# 2021 Fall Meeting Webinar Final Agenda

**The agenda is subject to change. The agenda reflects the current estimate of time required for scheduled Board meetings. The Commission may adjust this agenda in accordance with the actual duration of Board meetings. It is our intent to begin at the scheduled start time for each meeting, however, if meetings run late the next meeting may start later than originally planned.**

**Monday, October 18**

**9:00 a.m. – Noon** **American Lobster Management Board**
*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia
*Other Members:* NMFS
*Chair:* McKiernan
*Other Participants:* Perry, Reardon, Beal
*Staff:* Starks

1. Welcome/Call to Order *(D. McKiernan)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Review Annual Data Update of American Lobster Abundance Indices *(K. Reardon)*
5. Discuss Development of Draft Addendum XXVII on Gulf of Maine/Georges Bank Resiliency *(C. Starks*)
   - Consider Plan Development Team (PDT) Recommendations on Objectives
   - Provide Feedback to PDT on Proposed Options
6. Progress Update on Draft Addendum XXIX: Electronic Vessel Tracking Devices in the Federal American Lobster and Jonah Crab Fisheries *(C. Starks)*
7. Consider Next Steps for Development of a Management Strategy Evaluation of American Lobster Fisheries *(J. Kipp)* **Possible Action**
8. Other Business/Adjourn

**Noon – 12:45 p.m.** **Lunch Break**

**12:45 – 1:15 p.m.** **Atlantic Herring Management Board**
*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey
*Other Members:* NEFMC, NMFS
*Chair:* Patterson
*Other Participants:* Zobel, Brown
*Staff:* Franke

1. Welcome/Call to Order *(C. Patterson)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2021
3. Public Comment
4. Set Quota Period for the 2022 Area 1A Fishery *(E. Franke)* **Final Action**
5. Other Business/Adjourn

**1:30 – 4:00 p.m.** **Tautog Management Board**

*Member States:* Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia
*Other Members:* NMFS
*Chair:* Hyatt
*Other Participants:* Ares, Snellbaker
*Staff:* Rootes-Murdy

1. Welcome/Call to Order *(W. Hyatt)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Review 2021 Stock Assessment Update *(N. Ares)*
5. Consider Management Response to 2021 Stock Assessment Update *(W. Hyatt)* **Possible Action**
6. Review and Provide Feedback on Risk and Uncertainty Decision Tool for Tautog *(J. McNamee)*
7. Develop Guidance for Law Enforcement Committee Review of Commercial Tagging Program *(K. Rootes-Murdy)*
8. Other Business/Adjourn

**4:15 – 5:15 p.m.** **Atlantic Large Whale (ALW) Take Reduction Team Update** *(M. Trego)*

NOAA Fisheries will provide an update on ALW Take Reduction efforts. The update will include a review of the final rule to amend the ALW Take Reduction Plan to reduce risk of serious injury and mortality to North Atlantic right whales caused by incidental entanglement in Northeast Jonah crab and lobster trap/pot fisheries. Scoping on the next phase of rulemaking is ongoing, through October 21, 2021. Additionally, NOAA FIsheries will provide an overview of scoping efforts to inform the Take Reduction Team's development of recommendations to modify the Atlantic Large Whale Take Reduction Plan to reduce risk to North Atlantic right whales in coastwide gillnet and Atlantic mixed species trap/pot fisheries and Mid-Atlantic lobster fisheries.

**Tuesday, October 19**

**9:00 – 10:30 a.m.** **Shad and River Herring Management Board**

*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Other Members:* DC, NMFS, PRFC, USFWS
*Other Participants:* Sprankle, Warner, Neilan, O'Connell
*Chair:* Davis
*Staff:* Starks

1. Welcome/Call to Order *(J. Davis)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from May 2021
3. Public Comment

4. Consider American Shad Habitat Plans/Updates *(B. Neilan)* **Action**Consider Technical Committee Report on Methods for Evaluating Mixed-stock Catch *(B. Neilan)*
   **Possible Action**
5. Progress Report on Prioritizing Systems for Shad Recovery and Developing Inventory of Available Data to Support Development of Fish Passage Criteria *(B. Neilan)*
6. Update from USGS Eastern Ecological Science Center on Alosine Science in Support of Interstate Management *(T. O'Connell)*
7. Elect Vice-Chair **Action**
8. Other Business/Adjourn

**10:30 – 11:00 a.m.** **Break**

**11:00 a.m. – 12:30 p.m.** **Atlantic Coastal Cooperative Statistics Program Coordinating Council**
*Partners:* ASMFC, Connecticut, Delaware, District of Columbia, Florida, Georgia, MAFMC, Maine, Maryland, Massachusetts, NEFMC, New Hampshire, New Jersey, New York, NMFS, North Carolina, Pennsylvania, PRFC, Rhode Island, SAFMC, South Carolina, USFWS, Virginia
*Chair:* Carmichael
*Staff:* White

1. Welcome/Call to Order *(J. Carmichael)*
2. Council Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Consider Recommendations for FY2022 Submitted Funding Proposals *(J. Simpson)* **Action**
5. Other Business/Adjourn

**12:30 – 1:15 p.m.** **Lunch Break**

**1:15 – 5:15 p.m.** **Atlantic Menhaden Management Board**
(break included)
*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Other Members:* NMFS, PRFC, USFWS
*Chair:* Woodward
*Other Participants:* Newhard, Kersey, Cieri, Brust
*Staff:* Rootes-Murdy

1. Welcome/Call to Order *(S. Woodward)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Provide Guidance to the Technical Committee and Ecological Reference Points Work Group on Priorities for Completing Next Benchmark Stock Assessment *(M. Cieri)* **Possible Action**
5. Progress Update on Development of Draft Addendum I to Amendment 3 *(K. Rootes-Murdy)* **Possible Action**
6. Update on 2020-2021 Atlantic Menhaden Mortality Events *(J. Brust)*

7. Other Business/Adjourn

**Wednesday, October 20**

**8:00 – 10:00 a.m.** **Executive Committee**

*(A portion of this meeting may be a closed session for Commissioners and Committee members only)*

*Members:* Abbott, Anderson, Batsavage, Bell, Bowman, Burgess, Cimino, Clark, Davis, Gilmore, Keliher, Kuhn, McKiernan, McNamee, Miller, Patterson, Woodward

*Chair:* Keliher

*Staff:* Leach

1. Welcome/Call to Order *(P. Keliher)*
2. Committee Consent
   - Approval of Agenda
   - Approval of Meeting Summary from August 2021
3. Public Comment
4. Review and Consider Approval of FY2021 Audit *(S. Woodward)* **Action**
5. Discuss Policy on Responding to FOIA Requests *(R. Beal)*
6. Discuss Commission Involvement in Wind Energy Development *(J. Cimino)*
7. Discuss Seafood Processors Pandemic Response and Safety (SPRS) Block Grant Program
8. Discuss Appeals Process *(R. Beal)*
9. Future Annual Meetings Update *(L. Leach)*
10. Other Business/Adjourn

**10:00 – 10:30 a.m.** **Break**

**10:30 – 11:00 a.m.** **Coastal Sharks Management Board**

*Member States*: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida

*Other Members:* NMFS

*Chair:* Bell

*Other Participants:* Willey, Garner

*Staff:* Rootes-Murdy

1. Welcome/Call to Order *(M. Bell)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from February 2021
3. Public Comment
4. Set Specifications for 2022 Fishing Year *(K. Rootes-Murdy)* **Final Action**
5. Elect Vice-Chair **Action**
6. Other Business/Adjourn

**11:15 a.m. – 12:15 p.m.** **Business Session**

*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Chair:* Keliher
*Staff:* Beal

1. Welcome/Call to Order *(P. Keliher)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Consider Approval of 2022 Action Plan **Action**
5. Elect Chair and Vice-Chair **Action**
6. Recess

**12:15 – 1:00 p.m.** **Lunch Break**

**1:00 – 5:15 p.m.** **Atlantic Striped Bass Management Board**
(break included)

*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina
*Other Members:* DC, NMFS, PRFC, USFWS
*Chair:* Borden
*Other Participants:* Sullivan, Blanchard, Bassano
*Staff:* Franke

1. Welcome/Call to Order *(D. Borden)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Consider Draft Amendment 7 for Public Comment *(E. Franke)* **Action**
5. Consider Draft Addendum VII for Public Comment *(E. Franke)* **Action**
6. Other Business/Adjourn

**Thursday, October 21**

**8:30 – 10:00 a.m.** **Horseshoe Crab Management Board**

*Member States:* Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Other Members:* NMFS, PRFC, USFWS
*Chair:* Cimino
*Other Participants:* Brunson, Garner, Sweka
*Staff:* Starks

1. Welcome/Call to Order *(J. Cimino)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2020
3. Public Comment

4. Set 2022 Harvest Specifications **Final Action**
    - Review Horseshoe Crab and Red Knot Abundance Estimates and 2021 Adaptive Resource Management Model (ARM) Results *(J. Sweka)*
    - Set 2022 Harvest Specifications (*C. Starks)*
5. Progress Update on Revision to the ARM Framework *(J. Sweka)*
6. Consider Fishery Management Plan Review and State Compliance for the 2020 Fishing Year *(C. Starks)* **Action**
7. Elect Vice-Chair **Action**
8. Other Business/Adjourn

**10:15 – 11:15 a.m.** **Spiny Dogfish Management Board**

*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina
*Other Members:* NMFS
*Chair:* Batsavage
*Other Participants:* Newlin, Moran, Didden, McManus
*Staff:* Rootes-Murdy

1. Welcome/Call to Order *(C. Batsavage)*
2. Board Consent
    - Approval of Agenda
    - Approval of Proceedings from October 2020
3. Public Comment
4. Review Analysis on Trip Limit and Market Price *(J. Didden)*
5. Review and Revise (if needed) 2022-2023 Specifications *(K. Rootes-Murdy)* **Possible Action**
6. Consider Fishery Management Plan Review and State Compliance for the 2020 Fishing Year *(K. Rootes-Murdy)* **Action**
7. Update on Research Track Assessment *(C. McManus)*
8. Other Business/Adjourn

**11:30 a.m. – 12:15 p.m.** **American Eel Management Board**

*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Other Members:* DC, NMFS, PRFC, USFWS
*Chair:* Fegley
*Other Participants:* Tuckey, Beal
*Staff:* Rootes-Murdy

1. Welcome/Call to Order *(L. Fegley)*
2. Board Consent
    - Approval of Agenda
    - Approval of Proceedings from May 2021
3. Public Comment
4. Consider Extending Maine's Glass Eel Quota for 2022-2024 *(K. Rootes-Murdy)* **Final Action**
5. Consider Fishery Management Plan Review and State Compliance for the 2020 Fishing Year *(K. Rootes-Murdy)* **Action**
6. Progress Update on 2022 Benchmark Stock Assessment *(K. Anstead)*
7. Other Business/Adjourn

**12:15 – 12:45 p.m.** **Lunch Break**

**12:45 – 4:30 p.m.** **Interstate Fisheries Management Program Policy Board**
(*A portion of this meeting will be held with the Mid-Atlantic Fishery Management Council (MAFMC)*)
*Member States:* Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida
*Other Members:* DC, NMFS, PRFC, USFWS
*ASMFC Chair:* Keliher
*Other Participants:* Pentony
*Staff:* Kerns

1. Welcome/Call to Order *(P. Keliher)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Update on Draft Addendum/Framework on Harvest Control Rule for Bluefish, Summer Flounder, Scup, and Black Sea Bass (*This agenda item will be considered with the MAFMC*.)
5. Executive Committee Report *(P. Keliher)*
6. Review Management and Science Committee Tasks to Address Conservation Equivalency Concerns *(T. Kerns)*
7. Presentation by NOAA Fisheries on Efforts and Next Steps to Reduce Sea Turtle Bycatch in Several Trawl Fisheries in the Greater Atlantic Region, including Summer Flounder, Atlantic Croaker, and Longfin Squid *(M. Pentony)*
8. Update on East Coast Climate Change Scenario Planning Initiative *(T. Kerns)*
9. Review Noncompliance Findings (if necessary) **Action**
10. Other Business/Adjourn

**4:30 – 4:45 p.m.** **Business Session**

7. Reconvene
8. Consider Noncompliance Recommendations (if necessary) **Final Action**
9. Other Business/Adjourn

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **American Lobster Management Board**

**FROM:** **American Lobster Plan Development Team**

**DATE:** **October 5, 2021**

**SUBJECT:** **Update on Development of Draft Addendum XXVII and Request for Board Feedback**

**Background**

At the February 2021 meeting, the Board reinitiated work on Draft Addendum XXVII on Gulf of Maine/Georges Bank (GOM/GBK) Resiliency with the following motion:

> *"Move to re-initiate PDT and TC work on the Gulf of Maine resiliency addendum. The addendum should focus on a trigger mechanism such that, upon reaching of the trigger, measures would be automatically implemented to improve the biological resiliency of the GOM/GBK stock."*

Addendum XXVII was originally initiated in 2017 to proactively increase resilience of the GOM/GBK stock by standardizing measures across Lobster Conservation and Management Areas (LCMAs) within the stock, but stalled due to the prioritization of Atlantic right whale conservation issues and the stock assessment. In October 2020, the Board reviewed the results and recommendations from the 2020 Benchmark Stock Assessment for American lobster, and determined that while the GOM/GBK stock is near time-series high abundance and not experiencing overfishing, there is a need to proactively address stock resiliency given recent declines in young-of-year indicators.

The Plan Development Team (PDT) and Technical Committee (TC) have been meeting since February to develop analyses and management options for Draft Addendum XXVII. The Board's guidance to the PDT included (1) prioritizing options to increase the biological resiliency of the stock over standardization, and (2) considering a tiered trigger mechanism with multiple trigger levels that include relatively proactive trigger levels. The PDT was directed to not consider trigger levels that may already have been surpassed. The TC and PDT developed a trigger mechanism in which an annual trigger index would trigger management if it surpasses a certain magnitude of decline from its 2017 value (see TC memo dated September 10, 2021, enclosed).

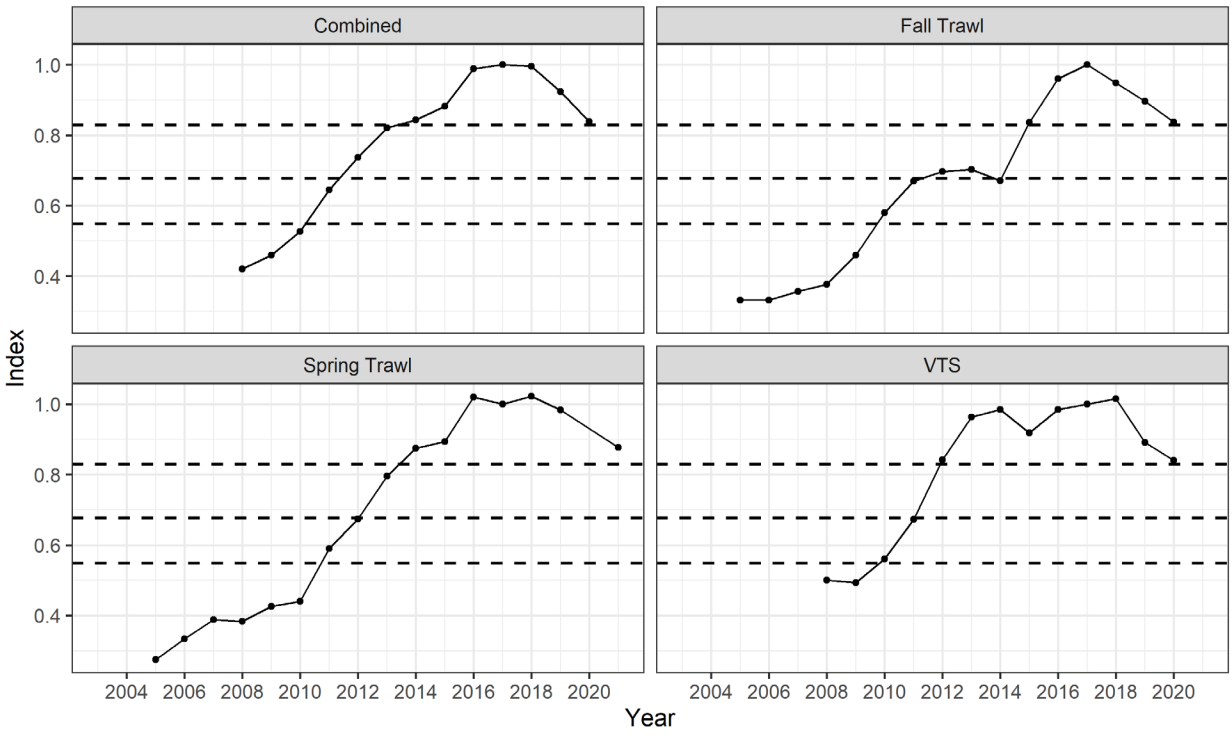
The trigger index will be calculated as the average of survey-specific running three year average recruit indices (71-80 mm carapace length) from (1) the combined ME/NH and MA DMF spring trawl surveys, (2) the combined ME/NH and MA DMF fall trawl surveys, and (3) the combined Gulf of Maine Ventless Trap Survey that are scaled to their 2015-2017 values. There is an expected one year lag between the recruit indices and recruitment to the stock assessment reference abundance used for stock status determination, so the recruit index years 2015-2017 are indicative of recruitment to the reference abundance during years used for the stock status determination in the 2020 stock assessment (2016-2018). Scaling each survey-specific index to their 2015-2017 averages puts each of these indices on comparable scales that represent percent change from these reference years and can, therefore, be combined into the trigger index. The trigger index would trigger management action when it falls below the selected trigger level(s).

**Update on Draft Addendum XXVII Development**

The PDT has struggled to develop appropriate options for Draft Addendum XXVII given the conflicting nature of some of the guidance received from the Board and advice from the TC. In its September 10, 2021 memo to the PDT, the TC defined biological resiliency "the ability of the stock to recover from a disturbance," and their recommendations on the appropriate range of trigger levels and management measures to increase biological resiliency were based on the understanding that the Board is interested in adding an additional biological buffer to the stock through the protection of spawning stock biomass (SSB) across LCMAs. The TC suggested that immediate action to increase minimum gauge size while stock conditions are favorable would be a more effective approach to address growth overfishing and increase the proportion of females that reach maturity prior to the gauge, compared to waiting for declines in abundance to trigger a management change.

Additionally, the TC provided the PDT with a calculation of the proposed trigger index with data through 2020 (Figure 1). All three indices used for the (combined) trigger index show a declining trend since 2018. The calculation of the trigger index for 2020 is 0.84, which equates to a 16% decline in the index from the reference period.

**Figure 1. Scaled survey-specific indices and combined trigger index compared to three proposed trigger levels (0.83 which equates to a 17% decline to the Fishery/Industry Target, 0.68 which equates to a 32% decline to the Moderate/High Abundance Regime Shift Level, and 0.55 which equates to a 45% decline to the Abundance Limit) identified from potential reference abundance declines (dashed lines).**




Given this information, members of the PDT have concerns that the Board's motion to consider a trigger approach to modifying the management measures is inconsistent with the stated objective of increasing the biological resiliency of the stock. To address this issue, the Board could consider modifying the goal of the addendum in light of the latest trends in the recruit indices for the GOM/GBK stock. As there have already been observed declines in recruit indices since the 2020 stock assessment, the PDT has suggested it may be clearer to frame the action as responding to these trends, rather than proactively

boosting stock resiliency in anticipation of future declines. As such, the PDT proposed the following objective statement for the Board to consider:

> ***Given persistent low settlement indices and recent decreases in recruit indices, the addendum should consider a trigger mechanism such that, upon reaching the trigger, measures would be automatically implemented to increase the overall protection of spawning stock biomass of the GOM/GBK stock.***

**Proposed Management Options and Requested Board Feedback**

The draft management options the PDT has developed based on the Board's guidance and the TC analysis are included below. The PDT is looking for additional feedback from the Board on the trigger levels and management measures that should be considered for public comment. With additional input from the Board, the PDT and TC expect to provide a Draft Addendum document for consideration for public comment at the ASMFC Winter meeting.

The PDT proposes the management options in the Draft Addendum be organized into three issues:

1. Standardizing some measures for implementation upon final approval of addendum
2. Establishing management triggers to automatically implement measures to increase spawning stock biomass
3. Spatial implementation of management measures in LCMA 3

<u>Issue 1: Standardizing some measures for implementation upon approval of addendum</u>

This issue considers options to modify some management measures when the Addendum is considered for final approval. If the Board selects an option to modify the management measures, the states would be required to implement the measures selected for the fishing year defined by the Board.

**Option 1: Status Quo**

- Maintain current management measures (standardization of measures would not be addressed at this time).

**Option 2: Standardized measures to be implemented upon final approval of addendum *(can be combined with other options; can select multiple sub-options)***

- **Sub-option 2A**: Upon approval of the addendum (not dependent on a trigger), implement standardized measures within each LCMA to the most conservative measure where there are inconsistencies between state and federal regulations within GOM/GBK stock LCMAs. This would result in Outer Cape Cod (OCC) maximum gauge being standardized to 6-3/4" for state and federal permit holders, and the V-notch definition being standardized to 1/8" with or w/out setal hairs.
- **Sub-option 2B**: Upon approval of the addendum, implement a standard V-notch requirement across all GOM/GBK stock LCMAs. This would result in mandatory V-notching for all eggers in LCMAs 1, 3, and OCC.
- **Sub-option 2C**: Upon final approval of the addendum, standardize regulations across GOM/GBK stock LCMAs to limit the issuance of trap tags to equal the harvester trap tag allocation. This would mean no surplus trap tags would be automatically issued until trap losses occur and are documented.

Issue 2: Establishing management triggers to automatically implement measures to protect spawning stock biomass

This issue considers establishing a trigger mechanism, such that pre-determined measures for each LCMA would be implemented when a trigger is reached. Each trigger is defined by a certain level of decline in the indices from an established reference period. The reference value for each index is calculated as the average of the recruit index values from 2015-2017. These percent declines in the recruit indices are expected to approximate comparable declines in reference abundance from the stock assessment model. The proposed mechanism is described in detail in the September 10, 2021 TC memo.

The PDT developed several draft options for packages of trigger levels and the management measures that would be implemented as a result of each trigger level being reached. Of the measures the Board was considering, the TC advised gauge size changes were the most likely to have a positive impact on the stock, therefore, the PDT focused on management options that consider gauge size changes.

The TC advised that immediate action to increase minimum gauge size while stock conditions are favorable would be a more effective approach to address growth overfishing and increase the proportion of females that reach maturity prior to the gauge, compared to waiting for greater declines in abundance to trigger a management change. After reviewing the 2020 trigger index, the TC noted that the 2020 value was approaching the 17% decline trigger level and will likely continue declining in 2021 to surpass a 17% decline. Therefore, the PDT felt the 17% decline trigger was likely to be equivalent to immediate action if and when this addendum is implemented.

Considering the TC advice, the PDT developed options that focused on increasing the minimum gauge size in LCMA 1 by a small increment as a more immediate action, which is expected to significantly benefit the protection of spawning stock biomass (Table 1). The PDT does recommend preventing back-to-back changes in regulations, which could have socioeconomic impacts to the industry while they are facing regulation changes from the Atlantic Large Whale Take Reduction Plan Rule. Please note that while the first two options in the set do rely on an index-based trigger mechanism, the third was proposed as an alternative approach that would not utilize a trigger but rather implement scheduled changes to the management gauge sizes over several years.

**Table 1. Draft Management Options**

| | **LCMA 1** | **LCMA 3** | **OCC** |
|---|---|---|---|
| **Option 1** | | | |
| Trigger 1 (17% decline) | Min: 3-5/16 (84 mm)<br>Max: status quo, 5” | Min: status quo, 3-17/32” (90 mm)<br>Max: status quo, 6 ¾” (171mm) | Min: status quo, 3 3/8” (86 mm)<br>Max: status quo, 6 ¾” (171mm) |
| Trigger 2 (32% decline) | Min: 3-3/8 (86 mm)<br>Max: status quo | Min: status quo<br>***Max: 6 or 6.5”*** | Min: status quo<br>***Max: 6 or 6.5”*** |
| **Option 2** | | | |
| Trigger 1 (17% decline; initiate gradual change in increments of 1/16”) | ***Min: 3-3/8” or 3-15/32” (88 mm)***<br>Max: status quo | Min: status quo<br>***Max: 6 or 6.5”*** | ***Min: status quo or 3-15/32” (88 mm)***<br>***Max: 6 or 6.5”*** |
| **Option 3 (no trigger and LCMA 1 only)** | | | |
| Immediate action: 2023 measures | Min: 3-5/16 (84 mm)<br>Max: status quo | Min: status quo<br>Max: status quo | Min: status quo<br>Max: status quo |
| 2025 measures | Min: 3-3/8 (86 mm)<br>Max: status quo | Min: status quo<br>Max: status quo | Min: status quo<br>Max: status quo |

** Note that the PDT did not finalize the trigger level or management measures for some of the options because there was disagreement among members, and thus the PDT is seeking guidance from the Board on these aspects, which are identified in bold italics in the table.*

Issue 3: Implementation of Management Measures in LCMA 3

The following management options are intended to determine where in LCMA 3 the management measures selected in this addendum will apply. See Section 2.8 Stock Boundaries for additional information.

**Option A: Maintain LCMA 3 as a Single Area (Status Quo)**

Under this option, the current boundaries of LCMA 3 would be maintained. Management measures in this document would apply to all LCMA 3 permit holders, including those that fish in the SNE stock.

**Option B: Split LCMA 3 along the 70oW Longitude Line with an Overlap Area**

Under this option, LCMA 3 would be split along the 70◦W longitude line to create an eastern section and a western section in LCMA 3 with an overlap area of 30' on either side of the 70◦W longitude line. The eastern boundary of the LCMA 3 overlap would be comprised of the area west of the 69◦ 30' W longitude line. The western boundary of the overlap would be comprised of the area east of 70◦ 30' W longitude line. Within this overlap area, permit holders who declare fishing activity in either the eastern or western portions of LCMA 3 would be allowed to fish for lobster or Jonah crab regardless of their LCMA 3 sub-area declaration. The western portion of LCMA 3 would be comprised of areas west of the 70◦ 30' W longitude line which are currently a part of the SNE stock. The eastern portion of LCMA 3 would be comprised of areas east of the 69◦ 30' W longitude line which are currently a part of the GOM/GBK stock.

**Board Guidance for Development of Options**

The PDT is seeking additional guidance from the Board related to the proposed management measures that should be considered for public comment in Draft Addendum XXVII. Specific questions are listed below:

- Is the Board interested in including sub-option 2B, option being included in the Draft Addendum for public comment? The PDT has some concerns that it would be challenging to estimate the impacts on SSB of this option given available data and the issue of enforceability of V-notching.
- On the issue of V-notching, is the Board interested in considering an option to standardize the V-notch definition to 1/8" across all areas in the stock? And furthermore, is the Board interested in standardizing the minimum depth of the V-notch and shape when it is cut?
- Does the Board prefer to address the options under Issue 1 separately from the trigger mechanism, or as part of the management measures that would be implemented upon reaching defined triggers?
- The TC has advised that increasing the minimum gauge size in LCMA 1 is likely to have the largest impact on protection of overall SSB. Would the Board be willing to consider options that would increase the minimum size in LCMA 1 to 3-3/8" (86 mm) or 3-15/32" (88 mm)? The current minimum size in LCMA 1 is 3 ¼" (83mm).
- The TC agreed that compared to increasing the minimum size in LCMA 1, decreasing the maximum gauge size in LCMA 3 and OCC to 6" or above has great uncertainty surrounding the impact, but is likely to have a relatively small positive impact on SSB with minimal, but permanent impacts to the Area 3 industry. Is the Board willing to consider any decreases to the maximum gauge size in these areas? If so, what would be the lowest maximum size that the Board would consider? 6 ½"? 6-1/4"? 6"?

# Atlantic States Marine Fisheries Commission

## Atlantic Herring Management Board

*October 18, 2021*
*12:45 – 1:15 p.m.*
*Webinar*

## 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 (*C. Patterson*) | 12:45 p.m. |
| 2. | Board Consent<br>• Approval of Agenda<br>• Approval of Proceedings from February 2021 | 12:45 p.m. |
| 3. | Public Comment | 12:50 p.m. |
| 4. | Set Quota Period for the 2022 Area 1A Fishery *(E. Franke)* **Final Action** | 1:00 p.m. |
| 5. | Other Business/Adjourn | 1:15 p.m. |

The meeting will be held via webinar, click here for details.

# MEETING OVERVIEW

**Atlantic Herring Management Board**
**October 18, 2021**
**12:45 p.m. – 1:15 p.m.**
**Webinar**

| | | |
|---|---|---|
| Chair: Cheri Patterson (NH)<br>Assumed Chairmanship: 02/20 | Technical Committee Chair:<br>Renee Zobel (NH) | Law Enforcement Committee<br>Representative: Delayne Brown (NH) |
| Vice Chair:<br>Megan Ware (ME) | Advisory Panel Chair:<br>Jeff Kaelin (NJ) | Previous Board Meeting:<br>February 2, 2021 |
| Voting Members: ME, NH, MA, RI, CT, NY, NJ, NMFS, USFWS (9 votes) | | |

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from February 2021

**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. Set Quota Period for the 2022 Area 1A Fishery (1:00-1:10 p.m.) Final Action**

**Background**

- In February 2021, the Board set specifications for the 2021-2023 fishing years. The 2022 sub-annual catch limit (sub-ACL) for Area 1A is 1,184 metric tons.
- Per Amendment 3, quota periods shall be determined annually for Area 1A.
- For the 2021 fishing year for Area 1A, the Board adopted a seasonal quota approach with 72.8% available June-September, and 27.2% available October-December.
- Discuss potential tools to set quota periods in the future. In May 2020, the Board postponed final action on Draft Addendum III, which was initiated to consider new approaches for managing the Area 1A fishery under low quotas **(Supplemental Materials)**.

**Presentations**

- Overview of Amendment 3 quota period system by E. Franke

**Board actions for consideration at this meeting**

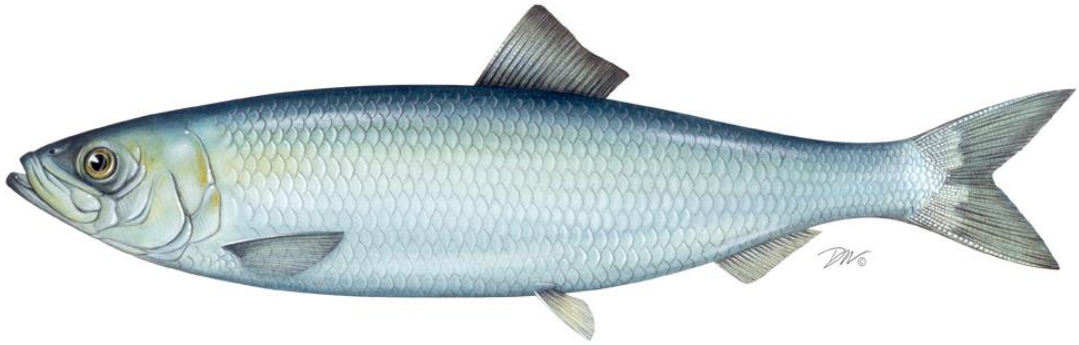
- Set quota periods for the 2022 Area 1A Fishery.

**5. Other Business/Adjourn (1:15 p.m.)**

# *Atlantic States Marine Fisheries Commission*

# DRAFT ADDENDUM III TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR ATLANTIC HERRING FOR BOARD REVIEW

## *Proposed Revisions to Days Out Program and Quota Management*





**February 2020**
**Final Action Postponed in May 2020**

**Sustainable and Cooperative Management of Atlantic Coastal Fisheries**

# Draft Addendum For Board Review – Final Action Postponed May 2020

In February 2020, the Atlantic States Marine Fisheries Commission's (Commission) Atlantic Herring Management Board initiated the development of an addendum to Amendment 3 of the Interstate Fishery Management Plan (FMP) to provide more tools for managing the Area 1A (inshore Gulf of Maine) fishery under low quotas. This Draft Addendum presents background on the Commission's management of Atlantic herring, the addendum process and timeline, and a statement of the problem.

**Commission's Process and Timeline**

| | |
|---|---|
| October 2019 | Atlantic Herring Board Tasks Staff to Develop Draft Addendum III |
| November 2019 – January 2020 | Staff Develops Draft Addendum III for Public Comment |
| **February 2020** | **Atlantic Herring Board Reviews Draft Addendum III and Considers Its Approval for Public Comment** |
| February– March 2020 | Board Solicits Public Comment and States Conduct Public Hearings |
| May 2020 | Board Reviews Public Comment, Selects Management Options and Considers Final Approval of Addendum III |
| TBD | Provisions of Addendum III are Implemented |

## 1. INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC) is responsible for managing Atlantic herring (*Clupea harengus*), under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). The U.S. Atlantic herring fishery is currently managed as a single stock through complementary fishery management plans (FMPs) by ASMFC and the New England Fishery Management Council (NEFMC). ASMFC has coordinated interstate management of Atlantic herring in state waters (0-3 miles) since 1993. Management authority in the exclusive economic zone (EEZ, 3-200 miles from shore) lies with the NEFMC and NOAA Fisheries.

The stockwide annual catch limit (ACL) is divided amongst four distinct management areas: 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 to New Jersey and federal partners.

At its 2019 Annual meeting, the Board approved the following motion:

*"Move to initiate an addendum to expand the quota period options in Amendment 3 by adding options which address challenges experienced in low quota scenarios (frequent starting and stopping of fishing days, small amounts of quota left at the end of the year). The addendum should include, but does not have to be limited to, an option which allocates 100% of the Area 1A quota to the months of June-December. The addendum should also consider expanding the Small Mesh Bottom Trawl Fleet Days Out provision to all Category C and D permits."*

This draft document proposes new quota management options and the expansion of permit provisions as part of the days out program to maximize landings value and provide greater flexibility in managing the herring fishery under low quota scenarios.

## 2. OVERVIEW

### 2.1 Statement of the Problem

Historically, the sub-ACL in Area 1A has been divided seasonally, as well as by trimesters, to meet the needs of the high volume herring fishery and the bait market. In recent years, the Board has implemented measures to distribute the quota throughout the entirety of Trimester 2 (June through September) using a combination of management tools including the days out program. For the 2019 fishing year, the sub-ACL was significantly reduced in light of lower recruitment and estimated population size as indicated in the 2018 benchmark stock assessment (NEFMC 2018). In response, the Board chose a bi-monthly quota allocation in combination with days out measures to better manage fishing effort under the extremely low quota.

However, the chosen combination of effort controls and quota allocation in 2019 resulted in short and infrequent windows of harvesting opportunity. Additionally, while the bi-monthly quota allocation extended the fishing season, the allocation left very little quota available towards the end of the fishing year making fishing trips less economical. Accessing herring later in the season in Area 1A can be challenging as there are numerous spawning closures that inhibit access during late summer and fall, and catch rates have dropped in recent years as fish seem to be migrating farther offshore and out of Area 1A.

The sub-ACL for 2020 will be lower than 2019 and the sub-ACL in future years is anticipated to remain lower than historical quota levels given recent poor recruitment. To avoid continual closures and manage landings more efficiently under low quota scenarios, new allocations and management tools are needed. The days out program is used to meet the needs of the herring fishery as well as bait market demand; however, under the anticipated low quotas in the near term, additional flexibility is needed to enable efficient use of the herring resource in Area 1A to minimize economic impacts on the herring fishery overall.



### 2.2 Background

#### 2.2.1 ***Area 1A Effort Controls***

The Area 1A Atlantic herring fishery has been primarily managed using effort controls such as days out measures since 1999 via Amendment 1. The days out measures establish fixed days out of the fishery to manage the rate of harvest; the term 'day out' was in reference to days when a vessel could not fish for or land herring. Since Amendment 1, the days out measures and allocation of quota have been adjusted through a number of addenda and amendments, with the current quota allocations outlined in Amendment 3 (2016; revised 2018) and current days out measures outlined in Addendum I to Amendment 3 (2017).

Effort controls are applied to vessels fishing in Area 1A by permit category. The majority of vessels that fish and land Atlantic herring from Area 1A are federally-permitted because the fishery occurs in both state and federal waters. Vessels fishing in Area 1A are primarily composed of three federal permit categories: 1) limited access permit for all management areas (Category A); 2) limited access incidental catch permit for 25 mt per trip (Category C); 3) an open access incidental catch permit for 3 mt per trip (Category D). Under Addendum I, different landing restrictions can be placed on those permit holders depending on the permit category. The following annual process occurs for setting harvest specifications:

- Each year, the Board decides how to allocate the Area 1A sub-ACL at the ASMFC Annual Meeting for the upcoming fishing year. Tables 1 and 2 outline the seasonal, trimester, and bimonthly quota allocation options. From 2009-2018, the Board split the Area 1A sub-ACL into trimesters. During this time the majority (72.8%) of the Area 1A sub-ACL has been allocated during the months of June through September (Trimester 2). These months largely overlap with the peak season for lobster landings, where herring is a widely used bait type.

**Table 1. Bimonthly quota percent allocations from Amendment 3. Percentages were calculated using vessel trip reports from 2000-2007**

| Bi-Monthly Quotas | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| January – December | | | No Landings Prior to June 1 (with June as a one-month period) | | | No Landings Prior to June 1 (with December as a one-month period) | | |
| Period | Months | % | Period | Months | % | Period | Months | % |
| 1 | Jan/Feb | 1.5% | 1 | June | 16.4% | 1 | June/July | 36.8% |
| 2 | Mar/Apr | 2.3% | 2 | July/Aug | 40.1% | 2 | Aug/Sep | 36.0% |
| 3 | May/June | 24.0% | 3 | Sep/Oct | 34.0% | 3 | Oct/Nov | 27.1% |
| 4 | July/Aug | 34.6% | 4 | Nov/Dec | 9.5% | 4 | Dec | 0.2% |
| 5 | Sep/Oct | 29.4% | | | | | | |
| 6 | Nov/Dec | 8.2% | | | | | | |

**Table 2. Trimester and seasonal quota percent allocations from Amendment 3. Percentages were calculated using vessel trip reports from 2000-2007**

| Trimesters | | | Seasonal Quotas | | | | | |
|---|---|---|---|---|---|---|---|---|
| January – December | | | January - December | | | No Landings Prior to June 1 | | |
| Trimester | Months | % | Season | Months | % | Season | Season | % |
| 1 | Jan - May | 13.7% | 1 | Jan - Sep | 76.5% | 1 | Jun - Sep | 72.8% |
| 2 | Jun - Sept | 62.8% | 2 | Oct - Dec | 23.5% | 2 | Oct - Dec | 27.2% |
| 3 | Oct - Dec | 23.5% | | | | | | |

- Once the quota allocation has been established, the states of Maine, New Hampshire, and Massachusetts set the days out measures prior to the start of the fishing year. The following restrictions can be applied by permit category[1]:
    - Category A permits can be subject to landing days, weekly landings limits, and requirements specific to classifying carrier vessels. All three of these provisions can be applied from June 1-September 30; from October 1-December 31, only landings days can be specified by the states.
    - For Category C and D permits, landing day restrictions can be applied only from June 1-September 30[2].

- Once 92% of the sub-ACL is projected to be harvested, the fishery moves to zero landing days. Once NOAA Fisheries determines that 95% of the stock-wide ACL is projected to

[1] The states are able to apply more restrictive measures by federal permit category as part of state permit requirements.

[2] Landing day restrictions can only be applied to Category C and D permits through the Small Mesh Bottom Trawl Fleet Days Out Program in Addendum I to Amendment 3 if the vessel meets the following criteria: 1) hold a Category C Limited Access or Category D Open Access Permit and 2) use small mesh bottom trawl gear to harvest herring. To opt into this program, eligible harvesters must submit a small mesh bottom trawl gear declaration to notify the states of their intent to fish in Area 1A by June 1.

be harvested, the fishery closes. In both scenarios, a 2,000 pound bycatch allowance will continue when the directed fishery is closed.

Throughout the fishing season, managers make changes in-season to increase or decrease the landing days based on the amount of seasonal quota available. Table 3 shows the landing days and weekly landing limits implemented during Trimester 2 of the Area 1A fishery in recent years. In 2017 and 2018, landing days and the weekly landing limit increased throughout the trimester to maximize harvest opportunities to meet bait demand with the fishery open from June 1-September 30 with no closure. These management changes were made in response to landings being much lower than the quota period allocation during the beginning of the fishing season (Figure 1). In 2019, the fishery did not begin until July 15, moved to zero landing days from August 18-September 1, and landing restrictions were maintained throughout the allocation periods to restrict fishing effort under the low quota. Under the lower quota level in 2019, landings tracked much closer with the quota period allocation throughout the entire fishing season (Figure 1), which was primarily a result of the significantly reduced quota (Figure 2).

**Table 3. Landing days and weekly landings limits for Atlantic herring in Trimester 2 (2017-2019)**

| Year | Trimester 2 (Jun - Sept) | Landing Days | Category A Permit Weekly Landing Limits (lbs) | Comments |
|---|---|---|---|---|
| 2017 | June 1 - July 1 | 3 | 400,000 | first season under Addendum I to Amendment 3; 4 in-season changes |
| 2017 | July 2 - 29 (*reactionary*) | 4 | 600,000 | |
| 2017 | July 30 - Sept 16 (*reactionary*) | 5 | 680,000 | |
| 2017 | Sept 17 - 30 (*reactionary*) | 7 | 1,000,000 | |
| 2018 | June 1 - July 21 | 4 | 480,000 | Sub-ACL adjusted mid-season |
| 2018 | July 22-Sept 30 (*reactionary*) | 5 | 640,000 | |
| 2019* | July 15- August 17 | 4 | 160,000 | Bimonthly Quota Periods used |
| 2019*^ | August 18 – 31 | 0 | 0 | |
| 2019* | Sept 1-15 | 4 | 160,000 | |

*Bi-monthly quota periods were implemented for 2019
^Fishery moved to zero landing days on August 18

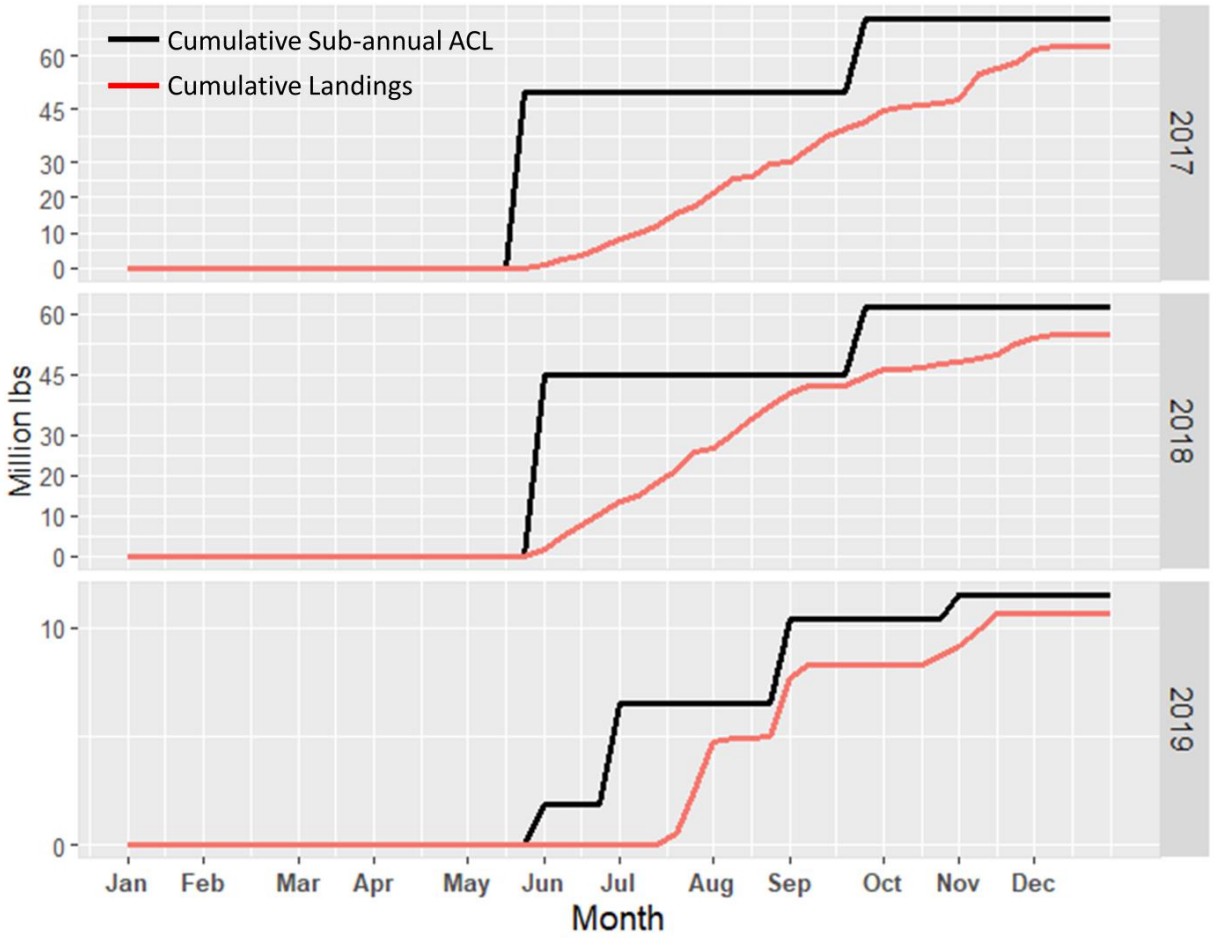



**Figure 1. Atlantic herring landings relative to quota by month (2017-2019)**

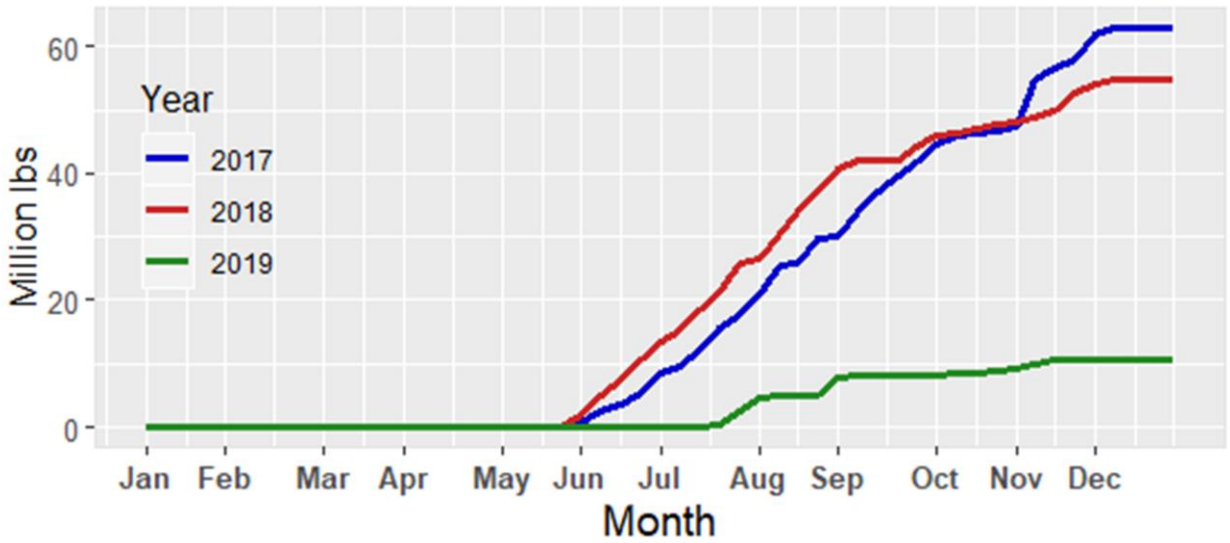



**Figure 2. Atlantic herring landings by month (2017-2019)**

### *2.2.2 Federal Permit Information*

Limited entry was implemented via Amendment 1 to the Federal Atlantic Herring FMP for the directed Atlantic herring fishery. As mentioned previously, three permit categories (A, C, and D) make up the majority of landings in Area 1A. There is an additional limited access permit (Category B) and one open access permit (Category E) (Table 4). The vessels that have not been issued a limited access herring permit, but have been issued a limited access mackerel permit, are eligible for a Category E permit. Not all vessels with herring permits are active in the herring fishery. Table 5 summarizes the number of vessels in each permit category with the percentage of vessels active within that category is presented in parentheses. For example, there were 50-60 vessels with Category A permits from 2014-2018, but only 50-60% of those were active (landed at least one pound of Atlantic herring). Although there have been far fewer active limited access versus open access vessels, the limited access vessels (Category A, B, and C permits) account for over 98% of annual Atlantic herring landings for 2014-2018 (Table 6).

**Table 4. Atlantic herring federal permit categories**

| | Category | Description |
|---|---|---|
| **Limited Access** | A | Limited access in all management areas. |
| | B | Limited access in Areas 2 and 3 only. |
| | C | Limited access in all management areas, with a 25 mt (55,000 lb) Atlantic herring catch limit per trip and one landing per calendar day. |
| **Open Access** | D | Open access in all management areas, with a 3 mt (6,600 lb) Atlantic herring catch limit per trip and one landing per calendar day. |
| | E | Open access in Areas 2 and 3 only, with a 9 mt (20,000 lb) Atlantic herring catch limit per trip and landing per calendar day. |

**Table 5. Fishing vessels with Atlantic herring federal permits**

| | | Permit Year (May-April) | | | | |
|---|---|---|---|---|---|---|
| Permit Category | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Limited Access | A | 40 (62.5%) | 42 (50%) | 39 (56.4%) | 39 (56.4%) | 38 (57.9%) |
| | BC | 4* | 4* | 4* | 4 (75%) | 3* |
| | C | 42 (23.8%) | 41 (26.8%) | 41 (24.4%) | 41 (34.1%) | 41 (26.8%) |
| Open Access | D | 1838 (3.6%) | 1762 (3.4%) | 1776 (2.9%) | 1759 (3.2%) | 1747 (2.7%) |
| | DE | 52 (9.6%) | 54 (5.6%) | 53 (5.7%) | 54 (7.4%) | 49* |
| | E | 1* | 1* | 1* | 1* | 1* |
| ***Total*** | | ***1977 (5.5%)*** | ***1904 (5.1%)*** | ***1914 (4.6%)*** | ***1898 (5.3%)*** | ***1879 (4.5%)*** |

*Source: GARFO Permit database and DMIS as of December 2019.* () = Percent of vessels in the category that are active.

*Confidential vessel activity data

**Table 6. Atlantic herring landings by federal permit category, permit year 2014-2018**

| Permit Group | Landings (mt) | % of total landings |
|---|---|---|
| A and BC | 54,918.9 | 98.69% |
| C | 681.5 | 1.22% |
| D, DE, and E | 49.0 | 0.09% |
| No Federal Herring Permit | 0.2 | 0.00% |

*Source: GARFO DMIS and Permits database as of 2019-12-09.*Includes RSA trips*

### ***2.2.3 Menhaden Fishery & Bait Demand***

Recent quota reductions for Atlantic herring have increased the importance of other sources of bait for the American lobster fishery in the Gulf of Maine (GOM). Concurrently, harvest of menhaden in the GOM has increased (Figure 3). This increase has helped supplement the shortage left by the reduced Atlantic herring quota during summer months. **Please note:** the reduction in herring landings from 2018 to 2019 is significantly more than the increase in menhaden landings. As a result, the increase in menhaden landings is unlikely to fully offset the loss in available herring quota.

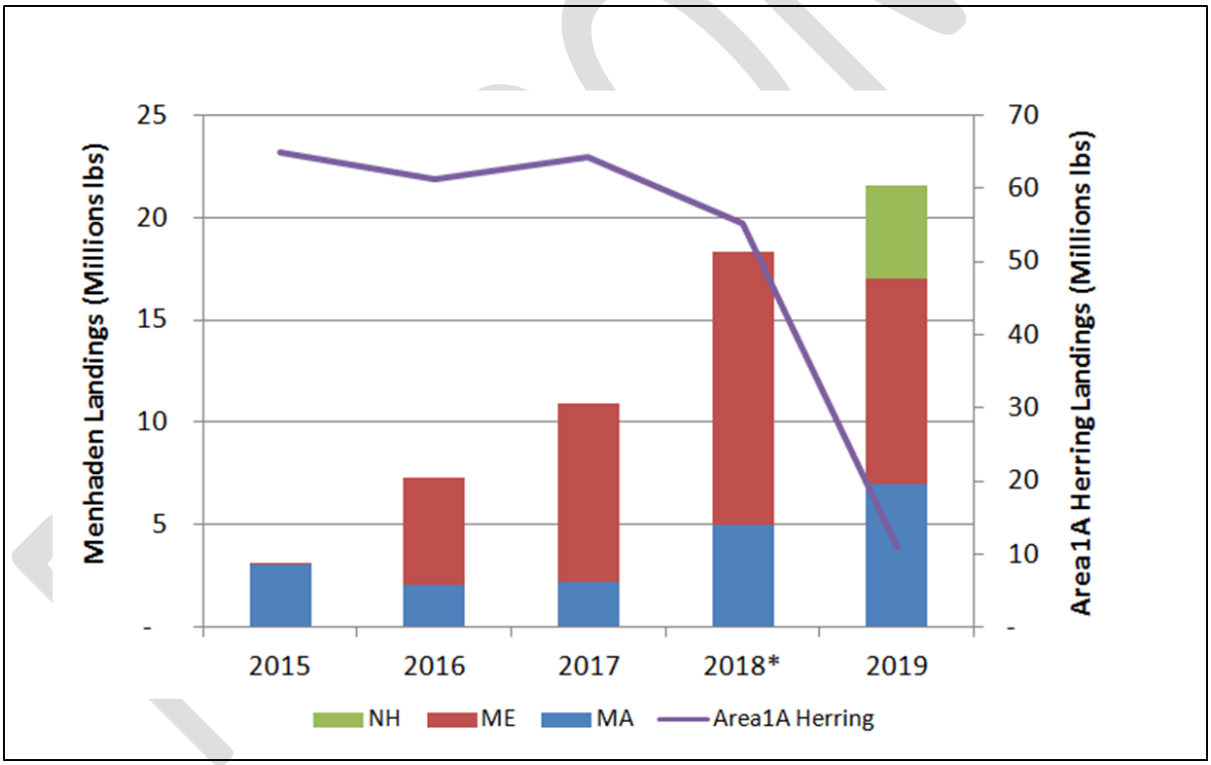



**Figure 3. Annual menhaden landings by state and Area 1A herring landings**

*Source: ACCSP Data Warehouse and NOAA VTR Data*

**NOTE:** 2019 data is preliminary and values are subject to change. Confidential data is omitted for some 2018 landings

The efficiency of harvesting, storing, and maintaining availability of lobster bait to GOM lobster harvesters has been discussed by managers in recent years. One such discussion for the 2019

fishing season included managing the timing of the Area 1A herring landings such that they did not directly overlap with large volumes of menhaden landings. Annual menhaden abundance in the GOM (the northern range of the species) is not guaranteed, and a prolonged season cannot be presumed. However, if high catches of menhaden continue, utilizing the flexibility of the Atlantic herring FMP could ensure high volumes of herring and menhaden are not being landed simultaneously.

Since 2017, menhaden landings in the GOM primarily occur in summer months (June, July, and August) (Figure 4), with the majority of landings occurring in July.

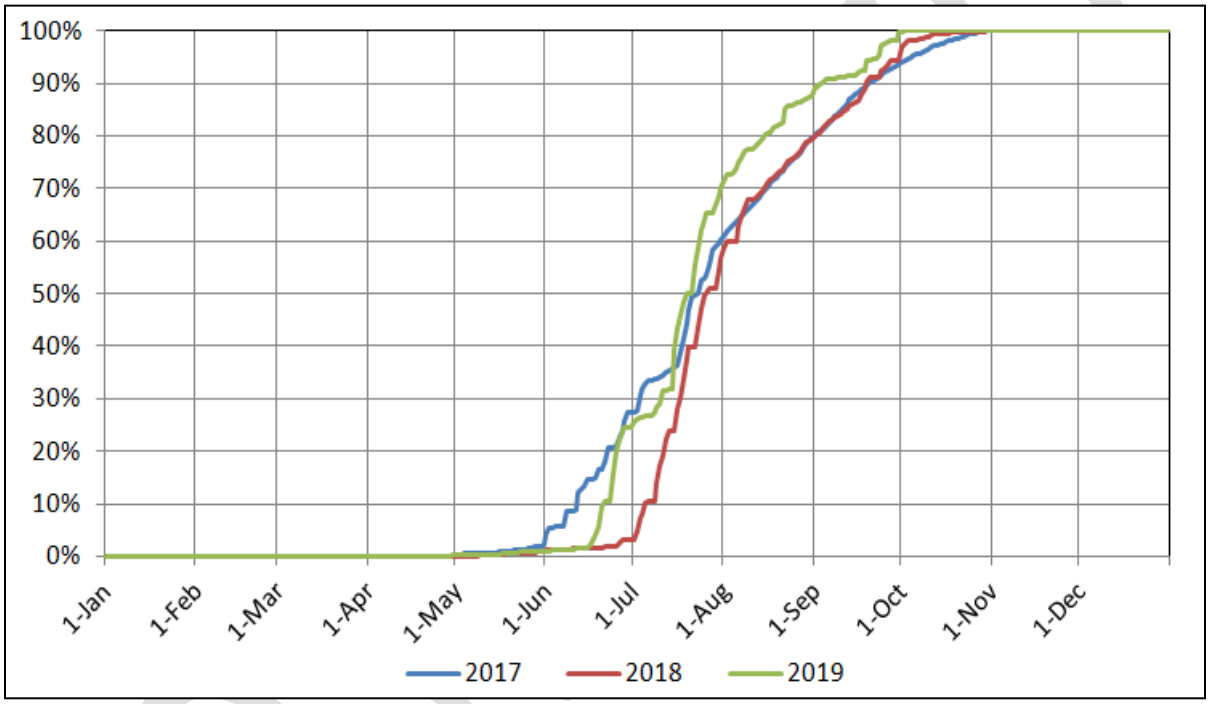



**Figure 4.Cumulative Landings of Menhaden over fishing season 2017-2019**
*Source: ACCSP Data Warehouse, SAFIS and NOAA VTR*

Aggregated landings during summer months, when herring are also available for harvest in Area 1A, show the third week of July as the most common week where landings greatly increase. If managers favor delaying the beginning of the Area 1A herring season, the in-season availability and catch rates of menhaden should be considered. If the GOM menhaden fishery continues to be productive and lucrative, maintaining an offset from the herring fishery could help mitigate a shortage in available lobster bait while providing increased fishing opportunity for vessels that target both species.

## 3. PROPOSED MANAGEMENT PROGRAM

This draft addendum considers modifying the current quota allocations as outlined in *Section 4.2.3.2*: *Quota Periods* of Amendment 3 and quota management measures outlined in *Sections 3.1 and 3.2* of Addendum I to add additional tools to the suite of options the Board can adopt.

**3.1 Quota Management Options**

For all proposed quota allocation options, similar to current management, the fishery will close when 92% of the quota has been projected to be harvested. Additionally, under low quota scenarios, the 1,000 mt transfer from the management uncertainty buffer to the Area 1A sub-ACL[3] may not be accessed in some years depending on how quickly the quota is caught and the percent of the sub-ACL remaining. **Please note:** Options 2 and 3 can both be selected for approval with this addendum. If the Board selects either both or only one of these two options, the option(s) will be added to the suite of quota allocation options the Board may annually choose from in setting fishery specifications.

**Option 1: Status Quo**

Under this option, the quota allocation options as outlined in Section 4.2.3.2 of Amendment 3 would remain unchanged. The Board may annually chose from the quota allocation options outlined in Amendment 3 when setting fishery specifications for the upcoming fishing season including the following:

- Bi-monthly periods
- Trimesters
- Season

In addition to having flexibility to choose between bi-monthly, trimester, or seasonal quotas, quota from the January 1 – May 31 period may be allocated to later in the fishing season in response to conditions in the fishery. The January 1 – May 31 period quota may be distributed to each remaining period proportional to the quota share of the remaining periods. If the bi-monthly periods with no landings before June 1 option is selected, the Board has the option to count June or December as their own periods. See Tables 1 and 2 for specific allocations. Allocations in Tables 1 and 2 were derived from Vessel Trip Reports from 2000-2007 and represent historical fishing effort that was driven by market demand for herring. These allocation percentages are fixed and can only be changed through a subsequent addendum or amendment.

**Option 2: Alternate Seasonal Quota Allocation: 0% allocated from January-May, 100% allocated from June 1-December 31**

Under this option, if the Board moves to allocate 0% of the quota prior to June 1, the Board may choose to allocate 100% of the Area 1A sub-ACL starting June 1 through December 31. This option is intended to give managers the ability to allocate all of Area 1A quota at once. If the desire is to harvest herring as quickly as possible to maximize efficiency and reduce costs associated with extending the fishing season, this alternative would provide the most flexibility to do that. **Please note**: Under this allocation in low quota years, certain gear types may not have access to the resource later on in the fishing season. For example mid-water trawl vessels

[3] If the Canada New Brunswick weir fishery catch through October 1 is less than 4,000 mt, then a 1,000 mt will be subtracted from the management uncertainty buffer and added to the ACL and Area 1A sub-ACL. This determination is made by NOAA annually in late October or November.

are prohibited from fishing prior to October 1, depending on the days out measures implemented, these vessels may not have access to the resource if the quota is caught before October 1.

***Seasons are established as follows:***
Season 1: January 1-May 31, 0%
Season 2: June 1-December 31, 100%

**Option 3: Alternate Trimester Split**
This option puts forward an alternate timeframe for trimester management that considers the need for access by various gear types throughout the year. Under this option, harvest of Atlantic herring can be concentrated during the peak availability of the resource during the fishing season, matching well with bait demand prior to the onset of spawning closures. Unused quota can be rolled into a subsequent trimester in the same year.

***Trimesters are established as follows:***
Trimester 1: January 1 – May 31; 0%
Trimester 2: June 1 – August 31; 80%
Trimester 3: September 1 – December 31; 20%

**3.2 Days Out of the Fishery Permit Provisions**

**Option 1: Status Quo**
Under this option, the permit provisions outlined in *Sections 3.1 and 3.2* of Addendum 1 would remain unchanged. Category A permits can be subject to both landing day restrictions and weekly landing limits during June 1-September 30. Category C and D permits can only be subject to landing day restrictions from June 1-September 30 through the Small Mesh Bottom Trawl Program. Board members from Maine, New Hampshire and Massachusetts will agree upon the days out provisions by permit category based on the number of participants in the fishery and the quota prior to the start of the fishing season.

**Option 2: Days Out of the Fishery for Vessels with a Category A or C Limited Access Herring Permit**
Under this option, vessels with a Category C permit can be subject to the same days out measures (landing days and weekly landing limits) that currently apply to Category A permits. A Category C permitted vessel would not be required to declare into the small mesh bottom trawl program for these landings restrictions to apply. This option is intended to implement the same days out measures for 99.9% of vessels responsible for herring landings in recent years (Table 6). If approved, Board members from Maine, New Hampshire and Massachusetts would specify the same landing restrictions for Category A and C permitted vessels during the days out specification process. **Please note**: Category C and D permitted vessels which also use small mesh bottom trawl gear could still be subject to landing day restrictions under the small mesh bottom trawl program.

If approved, *Section 4.2.4.2, Days Out,* in the Atlantic Herring FMP will be replaced with the following:

*Days Out of the Fishery for Vessels with a Category A or C Limited Access Herring Permit*
Vessels with a Category A or C Limited Access Permit are prohibited from landing or possessing herring caught from Area 1A during a day out of the fishery. Vessels with a Category A or C Limited Access Permit may land once per calendar day on any day that is open to landing (i.e., not a 'day out').

Landing of herring taken from management areas outside of Area 1A will be allowed during days out. During a day out, vessels with a Category A or C Limited Access Permit participating in other fisheries or fishing in an area closed to the directed herring fishery, may land an incidental catch of herring that does not exceed 2,000 pounds per trip. Category A or C vessels transiting a closed area with more than 2,000 pounds of legally caught herring on board must have all seine and trawl gear stowed.

Vessels with a Category D Open Access Herring Permit may land on a day designated as a day out of the fishery, unless restricted by the measures in the *'Small Mesh Bottom Trawl Fleet Days Out'* section. Vessels with a Category C Limited Access Herring Permit who meet the eligibility defined under *the 'Small Mesh Bottom Trawl Fleet Days Out'* section are exempt from the measures of this revised Section 4.2.4.2 and restricted to the measures of the '*Small Mesh Bottom Trawl Days Out'* section. In addition, fixed gear fishermen may remove and land herring from the gear (weirs and stop seines) on the days designated as a day out of the fishery.

**3.3 Weekly Landing Limit Per Vessel**

**Option 1: Status Quo**
Under this option, weekly landing limits (which currently apply to only Category A permits for June 1-September 30) outlined in *Section 3.5* of Addendum 1 would remain unchanged. Board members from Maine, New Hampshire and Massachusetts will agree upon the weekly landing limit for Category A permitted vessels based on the number of participants in the fishery and the quota prior to the start of the fishing season.

**Option 2: Status Quo with No Category A Permit Declaration**
Under this option, weekly landing limits (which currently apply to only Category A permits for June 1-September 30) outlined in *Section 3.5* of Addendum 1 would remain unchanged with the exception of the removal of the notification 45 days prior to the start of the fishing season. This option is intended to eliminate an administrative process that has not aided in developing estimates of fishing effort for the upcoming fishing season. Moving forward, estimates of potential participants in the Area 1A fishery will be based on participation and landings from the most recent fishing seasons. During the fishing season, states will continue to agree on changes to the weekly landing limit, as necessary. ASMFC will publish the initial weekly landing limit and adjustments thereafter**.**

**Option 3: Weekly Harvester Landing Limit for all Vessels throughout all quota periods**
Under this option, all vessel permit categories that land herring caught in Area 1A can be subject to a weekly harvester landing limit (pounds). The weekly landing limits may be specified through the entirety of all quota allocation periods (i.e. bimonthly, trimester, seasonal). Vessels landing in Maine, New Hampshire, and Massachusetts are subject to the same weekly landing limit, regardless of port state. Similar to option 2 under Section 3.2, this option is intended to implement the same days out measures for 99.9% of vessels responsible for herring landings in recent years (table 5) and not be restricted to certain times of the year. Additionally, under this option there would be no notification requirement, including the notification 45 days prior to the start of the fishing season for Category A permits, with the exception of requirements outlined under the *Small Mesh Bottom Trawl Fleet Days Out* provision.

## 4. COMPLIANCE SCHEDULE

If the existing Atlantic herring management plan is revised by approval of this draft addendum, the measures would be effective immediately.

## 5. LITERATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). Revised 2018. Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring. 105p.

Atlantic States Marine Fisheries Commission (ASMFC). 2017. Addendum 1 to Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring. 19p.

Northeast Fisheries Science Center. 2018. 65th Northeast Regional Stock Assessment Workshop (65th SAW) Assessment Summary Report. Northeast Fisheries Science Center Reference Document 18-08.

# Atlantic States Marine Fisheries Commission

## Tautog Management Board

*October 18, 2021*
*1:30 – 4:00 p.m.*
*Webinar*

## 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 (*W. Hyatt*) | 1:30 p.m. |
| 2. Board Consent<br>• Approval of Agenda<br>• Approval of Proceedings from August 2021 | 1:30 p.m. |
| 3. Public Comment | 1:35 p.m. |
| 4. Review 2021 Stock Assessment Update (*N. Ares*) | 1:45 p.m. |
| 5. Consider Management Response to 2021 Stock Assessment Update (*W. Hyatt*) **Possible Action** | 2:45 p.m. |
| 6. Review and Provide Feedback on Risk and Uncertainty Decision Tools for Tautog (*J. McNamee*) | 3:00 p.m. |
| 7. Develop Guidance for Law Enforcement Committee Review of Commercial Tagging Program (*K. Rootes-Murdy*) | 3:45 p.m. |
| 8. Other Business/Adjourn | 4:00 p.m. |

The meeting will be held via webinar, click here for details.

# MEETING OVERVIEW

**Tautog Management Board**
**October 18, 2021**
**1:30 - 4:00 p.m.**
**Webinar**

| | | |
|---|---|---|
| Chair: Bill Hyatt (CT)<br>Assumed Chairmanship: 11/19 | Technical Committee Chair:<br>Coly Ares (RI) | Law Enforcement Committee<br>Representative: Jason Snellbaker (NJ) |
| Vice-Chair:<br>Mike Luisi (MD) | Advisory Panel Chair:<br>VACANT | Previous Board Meeting:<br>August 3, 2021 |
| Voting Members: MA, RI, CT, NY, NJ, DE, MD, VA, NMFS, USFWS (10 votes) | | |

***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 should use the webinar raise your hand function and the Board Chair will let you know when to speak. 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 Board 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.

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from August 3, 2021

| **4. Review 2021 Stock Assessment Update (1:45-2:45 p.m.)** |
|---|
| **Background**<br>• The 2017 Stock Assessment Update was updated with data through 2020. The assessment updates the statistical catch-at-age model for each management region. Results and stock status for each region will be presented (**Briefing Materials**). |
| **Presentations**<br>• 20201 Stock Assessment Update by N. Ares |

**5. Consider Management Response to 2021 Stock Assessment Update (2:45-3:00 p.m.) Possible Action**

**Background**

- The 2021 Stock Assessment updates the stock status and reference points for all management regions.
- The Board should determine if management action in any region or request additional analysis from the Technical Committee (TC) is needed.

**Board Actions for consideration**

- Consider management action, if necessary

**6. Review and Provide Feedback on Risk and Uncertainty Decision Tools for Tautog (3:00-3:45 p.m.)**

**Background**

- In February, the ISFMP Policy Board indicated support for using Tautog as pilot case for the Risk and Uncertainty Policy. The pilot case is to be developed in conjunction with the 2021 Stock Assessment Update in order to use the most current information to help inform management decisions.
- The Tautog TC and the Committee on Economics and Social Sciences (CESS) provided technical inputs for the Tautog Risk and Uncertainty Decision Tools. The preliminary Tautog Risk and Uncertainty Report (**Supplemental Materials**), which summarizes the technical inputs, will be presented.
- The Board met via webinar in September to provide input on weightings for the decision tool's components. The preliminary weightings (**Supplemental Materials**) will be presented for additional Board review.

**Presentations**

- Review of the preliminary Tautog Risk and Uncertainty Decision Tools and Report by J. McNamee

**Board Actions for consideration**

- Provide feedback on the preliminary Tautog Risk and Uncertainty Decision Tools and Report including current weighting, scores, and risk and uncertainty by region.
- If a management action is being considered, task TC and CESS with producing the recommended probability of achieving the references points.
- Task TC and CESS with additional analyses to support the refinement of the decision tools, if needed.
- Provide feedback on the process for developing the decision tools thus far, including the weightings poll and webinar.

| **7. Develop Guidance for Law Enforcement Committee Review of Commercial Tagging Program (3:45-4:00 p.m.)** |
| --- |
| **Background**<br>• The Law Enforcement Committee (LEC) provided preliminary feedback on the implementation of the commercial harvest tagging program to the Board in August 2021.<br>• To better assess the impact of the tagging program on the illegal harvest and sale of tautog, Board Chair Bill Hyatt has drafted additional questions for LEC to address. |
| **Presentations**<br>• Overview of the draft question to LEC on commercial harvest tagging program by K. Rootes-Murdy (**Supplemental Materials**) |
| **Board Actions for consideration**<br>• Provide feedback on draft questions |

**6. Other Business/Adjourn**

**Atlantic States Marine Fisheries Commission**

# Preliminary Tautog Risk and Uncertainty Report

Produced for the 2021 Tautog Assessment Update

October 2021

The following report details the preliminary inputs for the Tautog Risk and Uncertainty Decision Tools. There are four decision tools, one for each tautog management region: Massachusetts – Rhode Island (MARI); Long Island Sound (LIS); New Jersey – New York Bight (NJ-NYB); and Delaware, Maryland, Virginia (DelMarVa). The report summarizes both technical inputs (scores) and weightings for the decision tools. The technical inputs characterize components of the tautog stock and fishery that may contribute to risk and uncertainty, while the weightings indicate the relative importance of each component to management considerations for tautog.

## Preliminary Risk and Uncertainty Decision Tools for Tautog Management Regions

| | **MARI** | | **LIS** | | **NJ-NYB** | | **DelMarVa** | |
|---|---|---|---|---|---|---|---|---|
| **Decision Tool Component** | Weight | Score | Weight | Score | Weight | Score | Weight | Score |
| ***Stock Status, scale: 0 to 1*** | | | | | | | | |
| P(SSB < SSB threshold) | 0.13 | 0.000 | 0.13 | 0.003 | 0.13 | 0.491 | 0.13 | 0.085 |
| P(SSB < SSB target) | 0.10 | 0.069 | 0.10 | 0.528 | 0.10 | 0.947 | 0.10 | 0.378 |
| P(*F* > *F* threshold) | 0.13 | 0.000 | 0.13 | 0.259 | 0.13 | 0.239 | 0.13 | 0.000 |
| P(*F* > *F* target) | 0.11 | 0.000 | 0.11 | 0.754 | 0.11 | 0.722 | 0.11 | 0.012 |
| ***Additional Uncertainty Considerations, scale: 0 to 5*** | | | | | | | | |
| Model uncertainty | 0.11 | 3.13 | 0.11 | 3.17 | 0.11 | 3.17 | 0.11 | 4.00 |
| Management uncertainty | 0.10 | 2.83 | 0.10 | 3.6 | 0.10 | 3.67 | 0.10 | 3.20 |
| Environmental uncertainty | 0.07 | 1.80 | 0.07 | 1.5 | 0.07 | 1.80 | 0.07 | 1.40 |
| ***Additional Risk Considerations, scale: 0 to 5*** | | | | | | | | |
| Ecosystem/trophic importance | 0.06 | 0.80 | 0.06 | 1.00 | 0.06 | 1.00 | 0.06 | 1.40 |
| ***Socioeconomic Considerations, scale -5 to 5*** | | | | | | | | |
| Short-term commercial socioeconomic effect | 0.09 | * | 0.09 | * | 0.09 | * | 0.09 | * |
| Long-term commercial socioeconomic effect | 0.09 | * | 0.09 | * | 0.09 | * | 0.09 | * |
| Short-term recreational socioeconomic effect | 0.10 | * | 0.10 | * | 0.10 | * | 0.10 | * |
| Long-term commercial socioeconomic effect | 0.10 | * | 0.10 | * | 0.10 | * | 0.10 | * |

*A portion of the socioeconomic scores will only be calculated if a management action will be initiated. See the Socioeconomic Considerations for further details and socioeconomic sub-scores.

## Region: Massachusetts – Rhode Island (MARI)

The following technical inputs were provided by the Tautog Technical Committee.

### Stock Status

All stock status inputs are based on the 2021 Tautog Assessment Update.

***Spawning Stock Biomass (SSB) Threshold***

Probability that SSB is less than the threshold (range: 0 – 1): 0.000

***SSB Target***

Probability that SSB is less than the target (range: 0 – 1): 0.069

***F Threshold***

Probability that fishing mortality (*F*) is more than the threshold (range: 0 – 1): 0.000

***F Target***

Probability that *F* is more than the target (range: 0 – 1): 0.000

### Additional Uncertainty Considerations

***Model Uncertainty***

Score (range: 0 – 5): 3.13

Justification: The MRIP PSEs for the MARI region are high as it is a small region with a low intercept rate. There are two age 1+ fishery independent indices with long time series; however, they are trawl surveys, which are not ideal for tautog. Retrospective patterns were large but in a conservative direction, underestimating SSB and overestimating *F*. There were more significant overestimations of *F* in the retrospective patterns than underestimates of SSB. SSB and *F* have been fairly steady the past several years and continue to track total removals and fishery independent indices well. There are some concerns with the age structure as length-at-age estimates differed between MA and RI in recent years; while this is not a major concern, it adds some uncertainty. There was some patterning in residuals. Sensitivity runs did not change the stock status.

***Management Uncertainty***

Score (range: 0 – 5): 2.83

Justification: The recreational fishery accounts for approximately 95% of removals in the MARI tautog fishery by weight. MRIP estimates for the region have moderate to high PSEs, indicating limited ability to accurately estimate catch. As a result, there is limited capacity to regulate removals and assess recreational compliance. There are known issues with illegal and unreported harvesting in the region, however, the commercial tagging program was implemented to help combat these issues. There is a moderate to high level of fishing activity and interest in tautog from fishermen in the region. Stock status (not overfished, overfishing not occurring) and the lack of significant biomass fluctuations over the last 20 years indicate successful management.

***Environmental Uncertainty***

Score (range: 0 – 5): 1.80

Justification: Recruitment is steady and there is no evidence that recruitment is strongly influenced by environmental factors. Natural mortality is believed to be adequately accounted for in the assessment. There are no major concerns with habitat loss. Although Hare et al.

(2016) identified tautog as having a very high vulnerability to climate change, there is no clear, imminent risk of climate change to tautog. While prey dynamics are not accounted for in the model, prey dependence is low and it is likely that tautog are generalists. Predator dependence is also low, with no known species that preferentially target tautog (Bigelow and Schroeder 1953).

**Additional Risk Considerations**

***Ecosystem/Trophic Importance***

Score (range: 0 – 5): 0.80

Justification: Tautog is not a keystone predator. However, it does provide control of crab populations that prey on other shellfish and turnover of mussel populations. There are no known species that preferentially prey on tautog and there are no known interactions with threatened or endangered species. Tautog is not known to provide any important ecosystem services or support key ecosystem functions.

**Socioeconomic Considerations**

See socioeconomic considerations section below.

## Region: Long Island Sound (LIS)

The following technical inputs were provided by the Tautog Technical Committee.

**Stock Status**

All stock status inputs are based on the 2021 Tautog Assessment Update.

***SSB Threshold***

Probability that SSB is less than the threshold: 0.003

***SSB Target***

Probability that SSB is less than the target: 0.528

***F Threshold***

Probability that fishing mortality (*F*) is more than the threshold: 0.259

***F Target***

Probability that *F* is more than the target: 0.754

**Additional Uncertainty Considerations**

***Model Uncertainty***

Score (range: 0 – 5): 3.17

Justification: The MRIP estimates have high PSEs, especially as a result of splitting New York between Long Island Sound and New York Bight. The interruptions to the recreational sampling surveys and fishery independent surveys in 2020 increase uncertainty. There is high uncertainty in catch and catch-at-age due to poor sample sizes. There is an age 1+ fishery independent index with a long time series; however, it is a trawl survey, which is not ideal for tautog. Overall, there are few biological observations. There are not enough catch and length observations for all modes, particularly: headboats (no length observations since 2016), spear fishing (no observations at all), and the commercial fleet (few observations). Length-age observations had to be borrowed from different years and different regions to fill out a minimal age-length key.

The retrospective patterns were large but in a conservative direction. The retrospective patterns fit within the 95% confidence intervals, however the percent difference in *F* is as high as 250% different from 2020. Percent different in SSB in the retrospective patterns is up to 30% different from 2020. Retrospective patterns in recruitment are distributed more evenly, some years overestimating some underestimating. Harvest is fairly variable.

***Management Uncertainty***

Score (range: 0 – 5): 3.60

Justification: The recreational fishery accounts for approximately 96% of tautog removals in the LIS region in weight. Tautog fishermen are poorly encountered by MRIP sampling and MRIP estimates for the region have moderate to high PSEs, indicating limited ability to accurately estimate catch. As a result, there is limited capacity to regulate removals and assess recreational compliance. In addition, there are difficulties with separating Long Island Sound catch from New York Bight catch for New York. There are significant concerns with illegal and unreported harvesting in the region, however, the commercial tagging program was implemented to help combat these issues. There is a high level of fishing activity and interest in tautog from fishermen in the LIS region.

***Environmental Uncertainty***

Score (range: 0 – 5): 1.50

Justification: Recruitment is steady and there is no evidence that recruitment is strongly influenced by environmental factors. Natural mortality is believed to be adequately accounted for in the assessment. Tautog requires structured habitat and moves from shallow to deep water for preferred water temperature and food (shellfish). There are no major concerns with habitat loss. Although Hare et al. (2016) identified tautog as having a very high vulnerability to climate change, there is no clear, imminent risk of climate change to tautog. While prey dynamics are not accounted for in the model, prey dependence is low and it is likely that tautog are generalists. Predator dependence is also low, with no known species that preferentially target tautog.

**Additional Risk Considerations**

***Ecosystem/Trophic Importance***

Score (range: 0 – 5): 1.00

Justification: Tautog is not a keystone predator. However, it does provide control of crab populations that prey on other shellfish and turnover of mussel populations. There are no known species that preferentially prey on tautog and there are no known interactions with threatened or endangered species. Tautog is not known to provide any important ecosystem services or support key ecosystem functions.

**Socioeconomic Considerations**

See socioeconomic considerations section below.

## Region: New Jersey – New York Bight

The following technical inputs were provided by the Tautog Technical Committee.

### Stock Status

All stock status inputs are based on the 2021 Tautog Assessment Update.

***SSB Threshold***

Probability that SSB is less than the threshold: 0.491

***SSB Target***

Probability that SSB is less than the target: 0.947

***F Threshold***

Probability that fishing mortality (*F*) is more than the threshold: 0.239

***F Target***

Probability that *F* is more than the target: 0.722

### Additional Uncertainty Considerations

***Model Uncertainty***

Score (range: 0 – 5): 3.17

Justification: Changes in scale for SSB were seen with the new MRIP data, as expected; however, the overall trend tracks with the prior update. The MRIP estimates have high PSEs, especially as a result of splitting New York between Long Island Sound and New York Bight. There is high uncertainty in catch and catch-at-age due to poor sample sizes. There is an age 1+ fishery independent index with a long time series; however, it is a trawl survey, which is not ideal for tautog. In addition, there were uncertainties related to 2020 data, including: a high proportion of imputed estimates for the MRIP landings, interruptions to two surveys providing FI indices (NY DEC WLI seine survey had a delayed schedule and NJ DEP ocean trawl survey ceased operations for 2020), and commercial landings that may have been impacted by market disruptions due to COVID-19. Sensitivity runs showed little to no impact on F, however two models did influence SSB and recruitment and could result in stock status changes with regards to the final overfished determination. Retrospective patterns were apparent for SSB and F, but in a generally conservative direction. *F* was consistently overestimated, while SSB showed a smaller percent difference and showed both over and underestimation. Retrospective patterns for recruitment were also present, and a concern as the model was consistently overestimating recruitment. There were moderate residual patterns for *F* and SSB (overestimating *F* and underestimating SSB), but the Mohn's Rho adjusted estimates for these parameters were within the 95% CI of the model estimates.

***Management Uncertainty***

Score (range: 0 – 5): 3.67

Justification: Recreational removals account for approximately 95% of removals within the NJ – NYB region. Tautog fishermen are poorly encountered by MRIP sampling and MRIP estimates for the region have moderate to high PSEs, indicating limited ability to accurately estimate catch. As a result, there is limited capacity to regulate removals and assess recreational compliance. In addition, there are difficulties with separating LIS catch from NYB catch for New

York. There are significant concerns with illegal and unreported harvesting in the region, however, the commercial tagging program was implemented to help combat these issues. There is a high level of fishing activity and interest in tautog from fishermen in the NJ – NYB region.

***Environmental Uncertainty***

Score (range: 0 – 5): 1.80

Justification: Recruitment is steady and there is no evidence that recruitment is strongly influenced by environmental factors. Natural mortality is believed to be adequately accounted for in the assessment. Tautog requires structured habitat and moves from shallow to deep water for preferred water temperature and food (shellfish). There are no major concerns with habitat loss. There is no clear, imminent risk of climate change to tautog. Although Hare et al. (2016) identified tautog as having a very high vulnerability to climate change, there is no clear, imminent risk of climate change to tautog. While prey dynamics are not accounted for in the model, prey dependence is low and it is likely that tautog are generalists. Predator dependence is also low, with no known species that preferentially target tautog.

**Additional Risk Considerations**

***Ecosystem/Trophic Importance***

Score (range: 0 – 5): 1.00

Justification: Tautog is not a keystone predator. However, it does provide control of crab populations that prey on other shellfish and turnover of mussel populations. There are no known species that preferentially prey on tautog and there are no known interactions with threatened or endangered species. Tautog is not known to provide any important ecosystem services or support key ecosystem functions.

**Socioeconomic Considerations**

See socioeconomic considerations section below.

## Region: Delaware – Maryland – Virginia

The following technical inputs were provided by the Tautog Technical Committee.

**Stock Status**

All stock status inputs are based on the 2021 Tautog Assessment Update.

***SSB Threshold***

Probability that SSB is less than the threshold: 0.085

***SSB Target***

Probability that SSB is less than the target: 0.378

***F Threshold***

Probability that fishing mortality (*F*) is more than the threshold: 0.000

***F Target***

Probability that *F* is more than the target: 0.012

**Additional Uncertainty Considerations**

***Model Uncertainty***

Score (range: 0 – 5): 4.00

Justification: Retrospective patterns are in a risky direction, i.e., *F* was consistently underestimated and SSB was overestimated. However, the percent difference for *F* has been decreasing in more recent years. SSB has been overestimated to a larger scale than the underestimations in F. Retrospective patterns in recruitment are varied and less of a concern. There is high uncertainty in MRIP recreational catch estimates for individual states, including a number of years with CVs > 50%, due to low intercept rates for tautog. The only index of abundance is MRIP CPUE and there is potential underestimation of CV in recreational CPUE. There are large blocks of years with consistently negative or positive residuals in index and catch model fits. In addition, there is no fishery independent index for the region. Because of the lack of indices, there were limited sensitivity runs that could be conducted. Some runs were completed testing starting values and CVs, none of which resulted in changes to stock status.

***Management Uncertainty***

Score (range: 0 – 5): 3.20

Justification: The DelMarVA tautog fishery is almost exclusively recreational, with 99% of removals by weight coming from the recreational fishery. MRIP estimates for the region have high PSEs, indicating limited ability to accurately estimate catch. As a result, there is limited capacity to regulate removals and assess recreational compliance. There are known issues with illegal and unreported harvesting in the region, however, the commercial fishery is an extremely small component of the overall removals and the commercial tagging program was implemented to help combat these issues. There is a low level of fishing activity and interest in tautog from fishermen in the DelMarVa region.

***Environmental Uncertainty***

Score (range: 0 – 5): 1.40

Justification: Recruitment is steady and there is no evidence that recruitment is strongly influenced by environmental factors. Natural mortality is believed to be adequately accounted for in the assessment. Tautog requires structured habitat and moves from shallow to deep water for preferred water temperature and food (shellfish). There are no major concerns with habitat loss. Although Hare et al. (2016) identified tautog as having a very high vulnerability to climate change, there is no clear, imminent risk of climate change to tautog. While prey dynamics are not accounted for in the model, prey dependence is low and it is likely that tautog are generalists. Predator dependence is also low, with no known species that preferentially target tautog.

**Additional Risk Considerations**

***Ecosystem/Trophic Importance***

Score (range: 0 – 5): 1.40

Justification: Tautog is not a keystone predator. However, it does provide control of crab populations that prey on other shellfish and turnover of mussel populations. There are no known species that preferentially prey on tautog and there are no known interactions with

threatened or endangered species. Tautog is not known to provide any important ecosystem services or support key ecosystem functions.

**Socioeconomic Considerations**

See socioeconomic considerations section below.

## Socioeconomic Considerations

The following technical inputs were provided by the Committee on Economics and Social Sciences (CESS). After comparing regional data, the CESS decided to provide a single coastwide score for each socioeconomic component. The data examined (tautog landings as a proportion of total landings, tautog ex-vessel value as a proportion of total ex-vessel value, proportion of removals from the recreational vs. commercial fishery) did not indicate major concerns with heterogeneity and providing a coastwide score would be consistent with the socioeconomic criteria.

### *Commercial Value*

Score (range: 0 – 5): 2

Justification: The average (2018-2020) ex-vessel value of tautog from Virginia to Massachusetts was $1,383,049 in 2020 dollars. This indicates a score of "low" based on the socioeconomic criteria.

### *Commercial Community Dependence*

Score (range: 0 – 5): 4

Justification: The average (2018-2020) commercial community dependence for the top ten communities was 35.1%, indicating a score of "high" based on the socioeconomic criteria. The top ten communities were determined based on the ports with the ten highest average tautog landings (2018-2020). Community dependence, calculated as the annual value of tautog landings as a proportion of the value of landings for all species for that port, was produced for each of the top ten communities.

### *Recreational Desirability*

Score (range: 0 – 5): 3

Justification: The average (2018-2020) recreational desirability was 2.4%, indicating a "moderate" score based on the socioeconomic criteria. Recreational desirability is calculated as the total coastwide (Virginia to Massachusetts) annual targeted trips for tautog (primary or secondary target) as a percentage of total trips for all species.

### *Recreational Community Dependence*

Score (range: 0 – 5): 2

Justification: The average (2018-2020) recreational community dependence for the top ten communities was 7.2%, indicating a score of "low" based on the socioeconomic criteria. The top ten communities were determined based on the counties with the ten highest average (2018-2020) tautog targeted trips. Community dependence, calculated as the annual number of

tautog targeted trips as a proportion of all trips for that county, was produced for each of the top ten communities.

***Commercial Short-term Management Change***
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

***Commercial Long-term Management Change***
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

***Recreational Short-term Management Change***
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

***Recreational Long-term Management Change***
Score (range: 0 – 1; + or – depending on direction of effect):
To be calculated if management actions are initiated.

## Preliminary Decision Tool Weightings

The following weightings were produced based on Tautog Management Board input. The Board provided input on priorities for risk considerations in tautog management via a webinar poll and survey. Each component of the Risk and Uncertainty Decision Tool was scored on a scale of 1 to 5, where 1 = this component is much less important than other components, 3 = this component is equally important as other components, and 5 = this component is much more important than other components. Responses were averaged and converted to the weighting scale.

| Component | Score | Weight |
|---|---|---|
| **SSB Threshold** | 4.14 | 0.13 |
| **SSB Target** | 3.14 | 0.10 |
| ***F* Threshold** | 4.14 | 0.13 |
| ***F* Target** | 3.43 | 0.11 |
| **Model Uncertainty** | 3.50 | 0.11 |
| **Management Uncertainty** | 3.21 | 0.10 |
| **Environmental Uncertainty** | 2.29 | 0.07 |
| **Ecosystem Importance** | 1.79 | 0.06 |
| **Commercial Short-term** | 2.93 | 0.09 |
| **Commercial Long-term** | 3.00 | 0.09 |
| **Recreational Short-term** | 3.14 | 0.10 |
| **Recreational Long-term** | 3.29 | 0.10 |

**Literature Cited**

Bigelow, H. B., & Schroeder, W. C. 1953. *Fishes of the Gulf of Maine* (No. 592). US Government Printing Office.

Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, et al. 2016. A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf. PLOS ONE 11(2): e0146756. https://doi.org/10.1371/journal.pone.0146756

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** Tautog Management Board

**FROM:** Bill Hyatt, Chair

**DATE:** October 8, 2021

**SUBJECT:** Law Enforcement Committee Review of Commercial Harvest Tagging Program and Impact on Illegal harvest

The Tautog Management Board (Board) is assessing the best path forward for evaluating compliance with the commercial harvest tagging program and its impact on the illegal fish market. In August, the Board received an initial report from the Law Enforcement Committee (LEC) on implementation of the tagging program. To further understand if the program is having the intended effect of reducing illegal harvest, the following questions have been drafted by Chair Bill Hyatt for Board consideration. Responses to these questions will better enable the Board to develop the best possible monitoring and enforcement recommendations.

Chair Hyatt is requesting that Board members review these questions and be ready to provide feedback at the Annual Meeting. If the Board agrees on a set of questions at the Annual Meeting, the LEC will meet and aim to provide responses to the Board by the 2022 Winter Meeting, if possible.

1) **Are there any areas of concern (ex. specific fisheries or markets) where compliance with tautog tagging requirements remains a significant issue? Please be as specific as possible.**

2) **Is there a practical way for Agencies to collect information on non-compliance with tagging requirements in the fishery or markets that could inform and improve the efficiently and effectiveness of law enforcement efforts? Examples might include specific types of advance information gathered by agency biologists or by partner organizations. Please be as specific as possible.**

3) **Any additional thoughts or recommendations for improving the efficiency and effectiveness of enforcement of the tagging program?**

4) **Now that the tagging program has been underway for a couple of years, what is your expectation on if the program will ultimately be successful at reducing illegal fishing and markets?**

# Atlantic States Marine Fisheries Commission

## Shad and River Herring Management Board

*October 19, 2021*
*9:00 – 10:30 a.m.*
*Webinar*

## 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 *(J. Davis)* | 9:00 a.m. |
| 2. | Board Consent<br>• Approval of Agenda<br>• Approval of Proceedings from May 2021 | 9:00 a.m. |
| 3. | Public Comment | 9:05 a.m. |
| 4. | Consider American Shad Habitat Plans/Updates *(B. Neilan)* **Action** | 9:15 a.m. |
| 5. | Consider Technical Committee Report on Methods for Evaluating Mixed-stock Catch *(B. Neilan)* **Possible Action** | 9:40 a.m. |
| 6. | Progress Report on Prioritizing Systems for Shad Recovery and Developing Inventory of Available Data to Support Development of Fish Passage Criteria *(B. Neilan)* | 10:05 a.m. |
| 7. | Update from USGS Eastern Ecological Science Center on Alosine Science in Support of Interstate Management *(T. O'Connell)* | 10:15 a.m |
| 8. | Elect Vice Chair *(J. Davis)* **Action** | 10:25 a.m. |
| 9. | Other Business/Adjourn | 10:30 a.m. |

This meeting will be held via webinar, click here for details.

# MEETING OVERVIEW

**Shad and River Herring Management Board**
**October 19, 2021**
**9:00 a.m. – 10:30 a.m.**
**Webinar**

| | | |
|---|---|---|
| Chair: Justin Davis (CT)<br>Assumed Chairmanship: 2/21 | Technical Committee Chair:<br>Brian Neilan (NJ) | Law Enforcement Committee Representative: Warner (PA) |
| Vice Chair:<br>VACANT | Advisory Panel Chair:<br>Pam Lyons Gromen | Previous Board Meeting:<br>May 5, 2021 |
| Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (19 votes) | | |

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from May 5, 2021

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

**4. Consider American Shad Habitat Plans/Updates (9:15-9:40 a.m.) Action**

**Background**

- Amendment 3 to the Shad and River Herring FMP requires all states and jurisdictions to submit a habitat plan for American shad. A majority of the habitat plans were approved by the Board in February 2014, and it was anticipated that they would be updated every five years.
- The states began the process of reviewing their American shad habitat plans and making updates in 2020, however, many states encountered delays due to COVID-19. The Board has approved the following habitat plan updates: ME, NH, MA, RI, CT, Delaware River, MD, NC, SC, Savannah River, GA and FL.
- The following plans were submitted for TC review and Board consideration at the October 2021 meeting: VA, DC, NY (**Briefing Materials**).
- The Technical Committee reviewed these habitat plan updates via email and recommends Board approval (**Supplemental Materials**). The remaining states will provide their updated plans to the TC for review before the next Board meeting.

**Presentations**

- Shad Habitat Plan Updates for Board Consideration by B. Neilan

**Board actions for consideration at this meeting**

- Consider approval of updated shad habitat plans for VA and DC, and new habitat plan for NY

**5. Consider Technical Committee Report on Methods for Evaluating Mixed-stock Catch (9:40-10:05 a.m.) Possible Action**

**Background**

- The American Shad 2020 Benchmark Stock Assessment and Peer Review Report was accepted for management use in August 2020. The assessment found that American shad remain depleted on a coastwide basis, likely due to multiple factors, such as fishing mortality, inadequate fish passage at dams, predation, pollution, habitat degradation, and climate change. At the February 2020 meeting, based on the TC recommendation the Board tasked the TC with "developing methods to evaluate bycatch removals in directed mixed-stock fisheries in state waters in order to understand and reduce impacts to stocks outside the area where directed catch occurs."
- The TC formed a work group to address this task. Relevant data were collected from the states to identify possible methods for evaluating the impacts of mixed-stock removals in directed mixed-stock fisheries in state waters in order to understand and reduce impacts to stocks outside the area where directed catch occurs (**Supplemental Materials**).

**Presentations**

- Technical Committee Report and Recommendations on Methods for Evaluating Mixed-stock Catch by B. Neilan

**Board actions for consideration at this meeting**

- Consider recommending the TC recommendations be incorporated into the Delaware River Basin Coop Sustainable Fishery Management Plan.

**6. Progress Report on Prioritizing Systems for Shad Recovery and Developing Inventory of Available Data to Support Development of Fish Passage Criteria (10:05-10:15 a.m.)**

**Background**

- In light of the 2020 American shad stock assessment results, which showed that barriers to fish migration are significantly limiting access to habitat for American shad, in May 2021 the TC recommended actions to address fish passage impacts on population recovery, including that dam removal and the use of fish passage performance criteria be prioritized by state and federal agencies with fish passage prescription authority. The Board sent letters to the U.S. Fish and Wildlife Service and NOAA Fisheries to support their efforts to review dam passage. Additionally, the Board tasked the TC with prioritizing systems for shad recovery and developing an inventory of available data that would support development of fish passage criteria.
- The TC has made progress on this task by identifying Federal Energy Regulatory Commission (FERC) hydropower projects that are a priority for shad recovery efforts. Additionally the TC is gathering information on the types of data available for developing fish passage criteria for these priority projects. The TC expects to deliver a final report on this task at the next Board meeting.

**Presentations**

- Progress Report on Prioritizing Systems for Shad Recovery and Developing Inventory of Available Data to Support Development of Fish Passage Criteria by B. Neilan

**7. Update from USGS Eastern Ecological Science Center on Alosine Science in Support of Interstate Management (10:15-10:25 a.m.)**

**Background**

- The U.S. Geological Survey (USGS) is the primary science agency within the Department of Interior and uniquely positioned to deliver ASMFC the actionable science required by the Atlantic Coastal Fisheries Cooperative Management Act of 1993.
- USGS's Eastern Ecological Science Center is conducting over 20 research projects in support of ASMFC-managed species. For shad and river herring, these include a genetic stock identification and tissue repository, innovative passage technologies, and disease research **(Supplemental Materials).**

**Presentations**

- Update on Alosine Science in Support of Interstate Management by T. O'Connell

**8. Elect Vice-Chair**

**9. Other Business/Adjourn**

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **Shad and River Herring Management Board**

**FROM:** **Shad and River Herring Technical Committee**

**DATE:** **October 8, 2021**

**SUBJECT:** **Technical Committee Recommendations on American Shad Habitat Plan Updates**

Amendment 3 to the Shad and River Herring FMP requires all states and jurisdictions to submit a habitat plan for American shad. A majority of the habitat plans were approved by the Shad and River Herring Management Board (Board) in February 2014, and it was anticipated that they would be updated every five years. The states began the process of reviewing their American shad habitat plans and making updates in 2020, however, many states encountered delays due to COVID-19. To date the Board has approved the following habitat plan updates: ME, NH, MA, RI, CT, Delaware River, MD, NC, SC, Savannah River, GA and FL.

For the October 2021 Board meeting, two additional habitat plan updates have been submitted for Board consideration from VA and DC, and the state of NY submitted a new habitat plan for the Hudson River. The updates that were made to each plan and the new plan for the Hudson River are summarized in the sections below. The TC reviewed these plans via webinar on September 27, 2021, and recommends Board approval of all three plans.

**Virginia Shad Habitat Plan Update**

The scope of this report and its updates are limited to the three primary tributaries of the Chesapeake Bay within Virginia (James, York, and Rappahannock rivers). This 2021 report includes additional information or progress on existing threats recorded within the 2014 report, but also includes documentation of additional threats considered to impact American Shad habitat including:

*In river construction and blockage to migration*

- In-river construction projects such as bridge and tunnel construction and maintenance, dredging, and others, have the potential for disruption of American Shad migration from both direct (e.g., acoustic interference) and indirect (e.g., habitat alteration) factors.
- This threat will be addressed through the enforcement of time of year restrictions on in-water development and case-by-case consideration of appropriate mitigation measures for individual projects

*Agricultural/Industrial Water Intakes and Discharge*

- The surface waters used by American Shad are subject to significant withdrawals, with the largest volumes removed occurring in the waters surrounding Richmond, Hampton Roads, and Washington D.C.
- Recommended actions in the plan to address this threat include developing a better understanding of the amount of water intakes for agriculture, particularly in tidal streams and rivers that support American Shad spawning and nursery grounds, as the effects (e.g., temperature and chemical differences) of discharge in non-consumptive water withdrawals on American Shad (particularly on early life history stages) is unknown.

**District of Columbia Shad Habitat Plan Update**

The updated plan included information on dredging projects within the District and invasive species monitoring since the last plan submission.

- Since the previous plan the dredging/channelization project associated with the runway extension at Reagan National Airport has been completed. There are no known channelization or dredging projects located within the District of Columbia at this time.
- The Department of Energy and Environment has an ongoing study examining stomach contents of the invasive blue and flathead catfish. To date, more than 1000 blue and flathead catfish digestive tracts have been examined with no American shad observed. The opportunistic nature of these catfish still poses a potential impact to American shad populations within the District of Columbia.

**Hudson River Shad Habitat Plan**

This is a new plan being submitted by the state of New York. The plan details the historically and currently available American shad spawning and nursery habitat within the tidally influenced portion of the Hudson River, current threats to these habitats, and ongoing projects geared toward better understanding and mitigating the impacts of these threats.

*Habitat Assessment*

- American shad currently have access to 91% of historical mainstem Hudson River habitat but conversion of habitat during the dredging and channelization of the upper portion of the estuary from preferred habitat to habitats not preferred by shad has been significant.

*Threats Assessment*

- The Plan identifies threats to American shad spawning and nursery habitat including:
  - Barriers to migration
    - Migration barriers represent a relatively minor threat to shad habitat availability as the Hudson stock has lost access to just 9% of historic habitat
  - Water Withdrawals

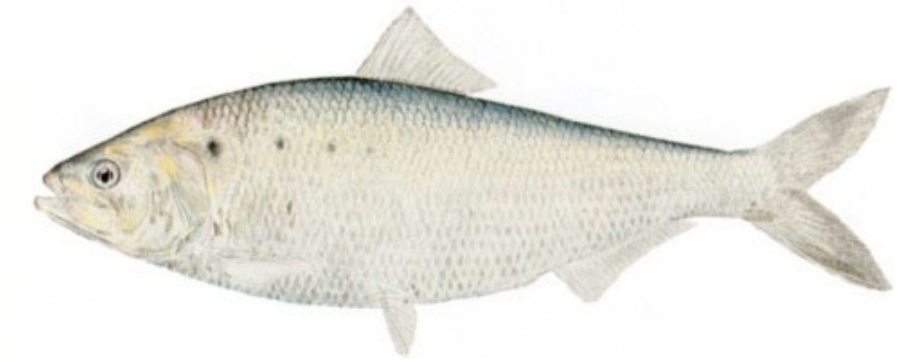
        - Modeling efforts have shown that impingement and entrainment mortality of American shad at various power generating facilities have resulted in year class reductions ranging from 16 to 52% during the period of 1974 to 1997
    - Anthropogenic Habitat Changes
        - Dredging/channelization of the mainstem Hudson River and adjacent land use changes over the past century have resulted in the change and degradation of preferred habitat used by American shad including the loss of 57% of the intertidal shallow water habitat (1,821 hectares) found north of the City of Hudson (km 190) during the middle of the 19th century.
    - Climate Change
        - The Hudson River stock will be vulnerable to climate change due, in part, to changes in water temperatures, water quality, and lost nursery habitat as storm intensity and frequency carry sediments that hinders the growth of submerged aquatic vegetation
    - Invasive Species
        - Over the past century invasive species have entered the Hudson River that threaten the American shad recruitment through predation from invasive fish species and loss of nursery habitat as a result of invasive plant species such as water chestnut

*Habitat Restoration Programs*

- Within the Hudson River system there are significant and ongoing efforts to understand and reduce the impacts of threats to American shad and shad spawning and nursery habitats identified in the Plan
- Restoration efforts include:
    - The removal of 9 dams within the Hudson River estuary since 2016
    - Managing water intakes to reduce entrainment and impingement mortality of shad eggs and larval American shad
    - Restoring vegetated shallow water and intertidal habitats including a side channel restoration project completed in July 2018 at Gay's Point (km 196), near Coxsackie, NY
    - Invasive species monitoring and management
    - Monitoring climate change impacts to the Hudson River and American Shad to identify and implement opportunities to adaptively manage and minimize adverse impact

# Commonwealth of Virginia American Shad Habitat Plan

# 2021 Update

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Submitted to ASMFC September 1, 2021

## Introduction

The Virginia American Shad Habitat Plan for the ASMFC is a joint effort between staff of the Virginia Institute of Marine Science, Virginia Department of Wildlife Resources, and the Virginia Marine Resources Commission. This 2021 report includes additional information or progress on existing threats recorded within the 2014 report, but also includes documentation of three additional threats considered to impact American Shad habitat: 1) In-river construction and blockage to migration; 2) Agricultural water intakes; and 3) Industrial water intakes and discharge. The scope of this report is limited to the three primary tributaries of the Chesapeake Bay within Virginia (James, York, and Rappahannock rivers. We thank Emily Hein (VIMS), Eric Brittle (VDWR), and Randy Owen and Tiffany Birge (VMRC) for information.

## Agencies within the Commonwealth of Virginia with Regulatory Ability Related to American Shad or American Shad Habitat Management

**Virginia Marine Resources Commission (VMRC).** The VMRC is divided into three divisions: 1) Fisheries Management, which is charged with regulation of fisheries resources in tidal and marine environments, including collection of fisheries statistics, development of management plans, and promotion and development of recreational fishing activities; 2) Habitat Management, which manages and regulates the submerged bottom lands, tidal wetlands, sand dunes, and beaches; and 3) Law Enforcement, which enforces state and federal fisheries laws and regulations.

**Virginia Department of Wildlife Resources (VDWR).** The Department of Game and Inland Fisheries became the Department of Wildlife Resources on July 1, 2020. The VDWR manages and regulates inland fisheries, wildlife, and recreational boating for the Commonwealth of Virginia, and is responsible for enforcement of laws pertaining to wildlife and inland fisheries management.

**Virginia Department of Environmental Quality (VDEQ**). The VDEQ is charged with monitoring and regulating the quality of air and water resources in Virginia. VDEQ is organized into many programs, including Air, Water, Land Protection and Revitalization, Renewable Energy, Coastal Zone Management, Enforcement, Environmental Impact Review, Environmental Information, and Pollution Prevention.

In addition to state agencies, the Army Corps also regulates all of these areas from the federal perspective (with input and/or official consultation with other federal agencies such as NOAA-Fisheries and Fish and Wildlife Service).

## Habitat Assessment

In Virginia, American Shad is found in the Chesapeake Bay and its major tributaries, including the Potomac, Rappahannock, York, and James rivers, as well as smaller tributaries and other coastal habitats (e.g., along the Delmarva peninsula) (Fig. 1). Additionally, American Shad are found in certain rivers in Virginia that drain to North Carolina (Desfosse et al., 1994). We include description of the habitat of these systems in Virginia, but there are no regular surveys of the status of these stocks in Virginia's portion of these systems beyond their presence in the systems. We focus discussion on the major western tributaries of the Chesapeake Bay as these are the primary stocks in Virginia waters. Although certain spawning/rearing reaches are known for American Shad for individual rivers (Bilkovic et al. 2002), the amount of habitat used by American Shad for these life history stages at a river-wide scale is unknown for Virginia tributaries of the Chesapeake Bay. Several tidal portions of the three major Virginia tributaries of the Chesapeake Bay have been designated as high priority areas for living resources, and migratory fishes in particular (Figs. 2, 3).

### James River

The James River forms at the junction of the Cowpasture and Jackson rivers (rkm 580), and its drainage is the largest watershed in Virginia, totaling 26,164 $km^2$ (Jenkins and Burkhead, 1994). Average annual spring discharge on the James River is 294.2 $m^3/s$ (Tuckey 2009). Prior to damming, which began in the colonial period, shad and river herring were reported to reach these headwaters and far into the major tributaries of the James River (Loesch and Atran, 1994). The two primary tributaries of the James River below the fall line at Richmond are the Appomattox River, which joins at the city of Hopewell (rkm 112), and the Chickahominy River, which joins at rkm 65. The extent of salt water is variable, but brackish conditions are observed as far up as the mouth of the Chickahominy River on a seasonal basis. Tidal water reaches the City of Richmond at approximately rkm 167 at the lower end of the fall zone. Boshers Dam is at the upper end of the fall zone at rkm 182.

### York River System

The York River system includes the Mattaponi and Pamunkey rivers, which merge at West Point, VA, to form the York River (53 rkm). This is the smallest of the three western tributary systems, with a watershed of 6,892 $km^2$ (Jenkins and Burkhead, 1994); the Pamunkey drainage is larger and has greater average spring discharge than that of the Mattaponi (3,768 $km^2$ and 47.5 $m^3/s$ vs. 2,274 $km^2$; 27.2 $m^3/s$, Bilkovic 2000). Tidal propagation extends to approximately 67 rkm in the Mattaponi and 97 rkm in the Pamunkey (i.e., approximately 120 km and 150 km, respectively, from the mouth of the York River; Lin and Kuo, 2001). The extent of the salt intrusion varies by season, but moderate salinity values (>2 ppt) are often observed in lower portions of these rivers.

### Rappahannock River

The Rappahannock River, which is approximately 314 km in length (172 km is tidal; 118 km is salt water), has its headwaters in the Piedmont and is fed by the Rapidan River. The Rappahannock watershed encompasses a total of 7,032 $km^2$ (Jenkins and Burkhead, 1994), and the average annual discharge at the fall line is 45 $m^3/s$ (O'Connell and Angermeier 1997). An

estimated 125 tributaries of the Rappahannock River are potentially used by alosines (O'Connell and Angermeier 1997).

**Other systems**

American Shad are known from the Chowan River drainage, which in Virginia comprises the Meherrin River, and the Nottoway and Blackwater rivers (the latter two form the Chowan River in North Carolina). Collectively, the watershed of these rivers forming Virginia's portion of the Chowan River drainage is 10,518 $km^2$ (Jenkins and Burkhead, 1994). The Nottoway and Blackwater rivers support American Shad, which were collected in the mainstems of the rivers in 2020 (Brittle, 2020a, b). There are no dams that impede American Shad migrations on either river (E. Brittle, VDWR, pers. comm. Sept. 2021).

The Meherrin River, which originates in Virginia, joins the Chowan River in eastern Hertford County, North Carolina. The Meherrin is largely blocked for migration by fishes by a dam at Emporia, VA (E. Brittle, VWDR, pers. comm. Sept. 2021), although American Shad have been collected within the Meherrin at the base of the Emporia Dam. A fish lift is present at the dam, and based on surveys conducted up river, there is at least historical (1990s) use of the lift by migrating American Shad. There is currently little directed sampling above the dam and the hydropower operator is not required by FERC to monitor the lift, so the current usage of upstream portion of the river by American Shad is unknown. The downstream portion of this river has not been surveyed for anadromous fishes since 2006 (E. Brittle, VDWR, pers. comm. Sept. 2021).

**Threats Assessment and Habitat Restoration Programs**

Rulifson (1994) identified the following river specific factors potentially involved in the decline of migratory alosines in Virginia, including American Shad:

<u>Rappahannock River:</u> dams, overfishing, turbidity, low oxygen

<u>York River System:</u>

York River: industrial water intakes, industrial discharge locations, overfishing, chemical pollution, thermal effluents, low oxygen, sewage outfalls

Mattaponi River: industrial discharge locations, overfishing, thermal effluents

Pamunkey River: industrial discharge locations, overfishing, thermal effluents

<u>James River System:</u>

James River: channelization, dredge and fill, dams, industrial water intakes, industrial discharge locations, overfishing, chemical pollution, thermal effluents, turbidity, sewage outfalls

Nansemond River: dams

Chickahominy River: dams, industrial discharge locations, overfishing.

Appomattox River: dams

Pagan River: turbidity, sewage outfalls

Further Rulifson (1994) identified the potential habitat management practices, or rather their effects, involved in the decline of migratory alosines in Virginia, including American Shad:

Rappahannock River: inadequate fishways, reduced spawning habitat

York River System:
York River: poor water quality
Mattaponi River: poor water quality
Pamunkey River: poor water quality

James River System:
James River: inadequate fishways, reduced freshwater input to estuaries, reduced spawning habitat, poor water quality, water withdrawal
Nansemond River: inadequate fishways, reduced freshwater input to estuaries, reduced spawning habitat, water withdrawal
Chickahominy River: reduced freshwater input to estuaries, reduced spawning habitat, fishing on spawning area, water withdrawal
Appomattox River: inadequate fishways, water releases from dams, reduced spawning habitat, water withdrawal
Pagan River: turbidity, poor water quality

From the above threats assessment, several primary classes of threats and their associated repercussions are identified here in relation to American Shad habitat needs and restoration in Virginia. These are discussed below.

**Threat: Barrier to Migration (Dams)**. As an anadromous fish, American Shad are negatively impacted by obstructions to migration from marine and estuarine habitats to the upstream freshwater spawning and rearing habitats. Here we provide a review of the primary obstructions found on the three Virginia tributaries of the Chesapeake Bay.

Rappahannock River: The main stem of the Rappahannock River was dammed until 2004-2005 when the submerged Crib Dam (built in 1854) and the Embrey Dam (built in 1910) at Fredericksburg (rkm 179) were removed. Removal of the dam reopened 170 km of potential habitat on the Rappahannock and Rapidan rivers for migratory fishes, such as American Shad and river herring (American Shad and Blueback Herring have been collected 45 km upstream of dam). Over 2,200 miles of Upstream Functional Network miles were reopened by the removal of Embrey Dam, which was the last remaining dam on the Rappahannock main stem. Upstream Functional Network miles are all miles accessible on the barrier stream plus all accessible tributary miles above the passage project (Martin, 2019). There are dams in place on tributaries of the Rappahannock (e.g., the Rapidan River) that may impede migration of American Shad (although it is unknown if American Shad used these reaches prior to dam installation). A fish passage was installed on the Orange Dam on the Rapidan River, a tributary of the Rappahannock (http://www.dwr.virginia.gov/fishing/fish-passage/) 16 km upstream of Rapidan Mill Dam, which remains as a migration barrier.

York River System: The Mattaponi, Pamunkey, and York rivers are all completely undammed. There are few dams in place on some tributaries of these rivers (e.g., the Ashland Mill Dam on the South Anna River, a tributary of the Pamunkey, which is known to block American Shad migration).

James River: Numerous dams on the James River and its tributaries have historically blocked migration of fishes. Between 1989 and 1993 three dams in the fall zone in Richmond were breached or notched, extending available habitat to the base of Boshers Dam. A fish passage was installed in Boshers Dam (built in 1823) in 1999, reopening 221 km of the upper James River and 322 km of its tributaries to American Shad and other anadromous fishes; the next dam of the mainstem is at Lynchburg, VA (Weaver et al., 2003). A total of 4,700 upstream functional network miles were reopened by the Boshers fishway (Martin, 2019). Approximately 204 km of the main stem of the Appomattox River is accessible to American Shad. Harvell Dam (rkm 17) in Petersburg, VA had a Denil fishway (1998) and then the dam was removed in 2014. Brasfield Dam (rkm 28) that forms Lake Chesdin near Matoaca, VA has a fish lift that completes passage through the Appomattox fall zone resulting in access to 2,957 upstream functional network miles. The first dam on the Chickahominy is Walkers Dam at rkm 35 that has a functioning double Denil fishway built in 2015 that reopens 48 mainstem river kilometers (508 upstream functional network miles). American Shad are known to use the Walkers fishway (2021 DWR trapping data) and have been found over 40 km upstream (Michael Odom, USFWS personal communication 2020). A number of additional dam removal and fishway construction projects have occurred in the past on several smaller creeks and streams in the James River drainage as well (http://www.dwr.virginia.gov/fishing/fish-passage/).

**Recommended Actions:** Installation of fish passage systems, breaching and removal of dams as appropriate (see Fig. 4 for recent activities in Virginia and the Chesapeake Bay watershed generally). Continued monitoring of fish passage systems currently in place for effectiveness for American Shad passage.

The remaining significant American Shad habitat that is yet to be reopened in Virginia includes the South Anna River, a tributary of the Pamunkey River, upstream of the Ashland Mill Dam (this would open 59.5 km of shad habitat on the mainstem plus any suitable tributary miles). American Shad were routinely collected during sampling for several years below Ashland Mill Dam at Rt. 1 and continue to be caught by anglers below the dam. Discussion of removal of this dam was proposed as mitigation for the King William Reservoir and there have been recent discussions of removal being done for mitigation credits, but the dam is still in place. Ashland Mill Dam is a Tier 1 (top 5% priority) barrier in the Chesapeake Bay Fish Passage Prioritization Tool (https://maps.freshwaternetwork.org/chesapeake/#) . In the James River, there remain seven dams spaced over 34 km beginning with Scott's Mill Dam in Lynchburg, VA (removal of these barriers or passageway installation would open a significant amount of habitat). Within the Rappahannock River system, removal or fish passage at the Rapidan Mill Dam (on the Rapidan River, a tributary of the Rappahannock; also a Tier 1 priority) would open 53.1 km of habitat because there is a Denil fishway on a water supply dam (Orange, VA) 16 km upstream of Rapidan Mill Dam. Passage options are currently being explored including removal for mitigation credits.

**Agency or Agencies with Regulatory Authority:** Licensing and relicensing of dams is regulated by FERC. Within Virginia, VDWR oversees the Fish Passage Program. VMRC, VDWR, and VDEQ all may be involved with the permitting process, regulations and monitoring of aspects of fish passage systems, dam removals, and other environmental factors associated with these activities depending on position of the dam. VDWR consults with fish passage engineers from the USFWS throughout fish passage projects.

**Goal:** "The importance of migratory fish species was recognized in the 1987 Chesapeake Bay Agreement and re-affirmed in Chesapeake 2000. A commitment was endorsed to **'**provide for fish passage at dams and remove stream blockages whenever necessary to restore natural passage for migratory and resident fish.' The Fish Passage Work Group of the Bay Program's Living Resource Subcommittee developed strategies (1988) and implemented plans (1989) to fulfill this commitment. In 2004, the original Fish Passage Goal of 1,357 miles (established in 1987) was exceeded. Chesapeake 2000 led to the establishment of a new Fish Passage Goal, set in 2004, committing signatory jurisdictions to the completion of 100 fish passage/dam removal projects," to re-open an additional 1,000 miles of high-quality habitat to migratory and resident fishes. This increased the overall goal to 2,807 total miles for which Virginia is responsible for roughly one-third of the miles to be reopened. [from VDWR (https://dwr.virginia.gov/fishing/fish-passage/#background; accessed June 28, 2021)].

**Progress:** Through 2013 partners reopened a total of 2,690.75 miles based on the original method of counting miles (mainstem miles only on barrier stream). Starting with 2014, the method for counting miles reopened was modified to begin counting all accessible miles above a barrier on the barrier stream and its tributaries. This method calculates what is known as "upstream functional network miles" in order to provide a more realistic picture of habitat restoration and accessibility (Martin, 2019). Using this GIS based method over 12,000 miles have been reopened by dam removal and over 19,000 miles have been reopened by fish passage installation for a grand total of 31,313.4 upstream functional network miles. Because American Shad tend to spawn in larger streams not all of the upstream functional network miles are necessarily available to shad spawning. The current Long-term Target in the Chesapeake Bay Fish Passage Logic and Action Plan is as follows: Continually increase access to habitat to support sustainable migratory fish populations in the Chesapeake Bay watershed's freshwater rivers and streams. By 2025, restore historical fish migration routes by opening an additional 132 miles every two years to fish passage. Restoration success will be indicated by the consistent presence of Alewife, Blueback Herring, **American Shad**, Hickory Shad, American Eel and Brook Trout, to be monitored in accordance with available agency resources and collaboratively developed methods.

**Cost:** N/A

**Timeline:** N/A. Other than continuing to contribute to the overall Bay passage goal target dates there is no Virginia specific timeline set for dam removal and fish passage installation in Virginia. While not set for individual species (i.e., specific to American Shad), the next phase in prioritizing will use the prioritization tools and other existing information to create a Virginia plan that could include breaking down habitat total goals and accomplishments per anadromous species, including American Shad.

**Threat: Pressures from Land Use Associated with Population Growth**

Many of the non-barrier threats identified by Rulifson (1994) can be collectively viewed as the results of changes in land use associated with population growth. The human population surrounding the three primary Virginia rivers is centered in Richmond (James River), with a significant population center in Fredericksburg (Rappahannock River); the remaining areas are rural (Fig. 5). According to the Chesapeake Bay Program, within Virginia land use pressure is highest along the James River at Richmond, with other significantly high vulnerability levels at

the James River near the confluence of the Chickahominy River, and the peninsula separating the James River from the York River (Fig. 6). Land use surrounding rivers within the Chesapeake Bay watershed in Virginia likely is associated with contamination (significant levels throughout, principally PCBs, but also metals within the York River system; Fig. 7), sediment load (High in the Rappahannock, Low in the York River system, Chickahominy and Appomattox rivers, and Medium in the Upper James River; Fig. 8), and phosphorus yields (High in the Rappahannock, Medium in the Upper James River, and Low in the other rivers; Fig. 9); nitrogen yields are low in all three river systems (Fig. 10). Low summertime dissolved oxygen levels remains a threat in all portions of three rivers, except the upper Mattaponi and upper Pamunkey rivers (York River System), and the upper James River (Fig. 11).

**Recommended Action**: No specific actions can be identified related to mitigation against land use in Virginia as it relates to American Shad habitat use. Indeed, it is difficult to identify specific actions to be taken in land use management that will affect American Shad population status (Waldman and Gephard, 2011). However, further study of freshwater habitat use by American Shad in Virginia is needed. Specifically, quantification and analysis of specific reaches of riverine habitats used by American Shad during residency (adults during the spawning run, larvae, and juveniles) is needed to better manage and address habitat concerns of the species. As a first step toward addressing decline of American Shad in Virginia, in part due to habitat alteration, a hatchery stocking program ran from 1994 to 2017 in the James River and 2003 to 2014 in the Rappahannock River.

**Agency or Agencies with Regulatory Authority:** Land use regulations associated with water quality primarily are under the authority of VDEQ, although both VMRC and VDWR may be involved in the permitting process and other aspects of regulation for certain activities that will affect water quality.

**Goal:** No specific goals are identified for protecting American Shad from pressures associated with habitat alteration and other land use changes. Enforcement of a moratorium on fisheries of American Shad (VMRC; VDWR) is aimed at curbing further declines.

**Progress:** The moratorium for American Shad has been in place in Virginia since 1994. Stocking of hatchery fishes (VDWR) ceased on the Rappahannock after the 2014 season and on the James after the 2017 season.

**Cost:** N/A

**Timeline:** N/A

**Threat: In-River Construction Blocking Migration**

In-river construction projects such as bridge and tunnel construction and maintenance, dredging, and others, have the potential for disruption of American Shad migration (as well as that of other anadromous fishes) from both direct (e.g., acoustic interference) and indirect (e.g., habitat alteration) factors.

**Recommended Action**: Enforcement of time-of-year restrictions (TOYR). Current TOYR for American Shad are between February 15 and June 30 of any year (https://dwr.virginia.gov/wp-

content/uploads/media/Time-of-Year-Restrictions.pdf). There may be case-by-case relaxation of this TOYR exceptions based on where the work is proposed. For example, upstream of Boshers Dam on the James River, VDWR recommend the TOYR to be March 15 to June 30 because American Shad do not reach this point in the river until mid-March. Case-by-case consideration of appropriate mitigation measures for individual projects (e.g., bubble curtains, coffer dams, etc.).

**Agency or Agencies with Regulatory Authority:** VMRC regulates any structures on, over, or under subaqueous bottom, the local wetlands board (or VMRC if a locality has not adopted the Wetlands Ordinance) regulates anything on, under, or over tidal wetlands (between mean low water and mean high water for non-vegetated areas and between mean low water and 1.5 x the tide range above mean high water for vegetated wetlands). VMRC distributes permit applications to other regulating agencies and other agencies (e.g., DWR, VIMS) that do not issue permits themselves to provide input to the permit process during the public interest review.

**Goal:** No specific goal is set for this threat, as the projects are sporadic and change year to year. However, with each application, measures of how the project will affect habitat are assessed and considered during the application process. Any request for TOY suspension for a specific project is vetted by inter-agency discussions.

**Progress:** Using the most recent five-year average (2016-2020), approximately 1,789 permit applications are estimated to be submitted per year for projects in Tidewater Virginia that have the potential to impact American Shad habitat. Within the same five-year time window, an estimated average of 346 permit applications per year for the non-tidal reaches of Virginia are received. An unknown number of these projects have the potential to adversely affect this species' habitat. Project scope ranges from small developments with minor impacts, if at all (e.g., dock construction and repair) to major infrastructure improvements (e.g., construction of a new tunnel across the mainstem of the James River).

**Cost:** N/A

**Timeline:** N/A

### Threat: Surface Water Withdrawal and Discharge

Surface water is removed for power generation (nuclear and fossil fuel), manufacturing, and agriculture, and may be categorized as either consumptive (irrigation) or non-consumptive (e.g., power generation). Surface water withdrawals in Virginia include significant removal of water from reservoirs, ponds and other impoundments, springs, rivers, and streams, and in 2019 accounted for 89% of total (=surface + ground) water withdrawals within the Commonwealth (1.1 billion gallons per day); this was 1% lower than the five-year average due to decrease in manufacturing (VDEQ 2020). The surface waters used by American Shad are subject to significant withdrawals, with the largest volumes removed occurring in the waters surrounding Richmond, Hampton Roads, and Washington D.C. (as well as Giles County, which lies outside of the range of American Shad).

In Virginia, the withdrawal of volumes greater than the average of 10,000 gallons per day during a month, or 1 million gallons per month for non-tidal waters (60,000 gpm for tidal waters) for irrigation are required to be reported through the Water Withdrawal Reporting Regulation

(VDEQ 2020). The VDWR recently updated its recommendations for design and operation of stream intakes (https://dwr.virginia.gov/wp-content/uploads/media/Surface-Water-Intake-Design-Operation-Standards.pdf), with the following requirements: intake is fitted with a screen with openings no larger than 1 mm, the intake velocity does not exceed 0.25 feet per second, and the intake does not withdraw more than 10% of the instantaneous flow. However, because of the permitting thresholds, the withdrawal of surface water for most agricultural purposes is exempt from permitting requirements, but have the potential to directly impact American Shad through impingement and entrainment.

**Recommended Action**: Develop a better understanding of the amount of water intakes for agriculture, particularly in tidal streams and rivers that support American Shad spawning and nursery grounds. Further, the effects (e.g., temperature and chemical differences) of discharge in non-consumptive water withdrawals on American Shad (particularly on early life history stages) is unknown.

**Agency or Agencies with Regulatory Authority:** VDEQ regulates water withdrawals and discharges. The VDEQ reports annually (October) to the VA Governor and General Assembly on the status of Water Resources in the Commonwealth. In-stream work is permitted by VMRC. VDEQ regulates water withdrawals, although water intakes for agricultural use (i.e., irrigation) are exempt (see 9VAC25-210-310; https://www.deq.virginia.gov/permits-regulations/permits/water/water-withdrawal).

Surface water withdrawal permits are applied for through the VDEQ, with input from VMRC and the U.S. Army Corps of Engineers (USACE) with VDEQ determining the potential impact on aquatic life, water quality, recreation, and downstream impacts.

**Goal:** Although by law the withdrawal of surface water for agricultural purposes is unregulated, (i.e., exempt from permit requirements), these withdrawals, given their position within the watersheds, are undoubtedly a potential source of loss of early life history stages through impingement and entrainment. Data on the prevalence of agricultural intakes within specific river systems would allow for estimation of potential losses of larval American Shad. This is a recognized concern by the VDEQ (2020). VDEQ has "tentatively been approved for federal funding from the USGS Water Use Data Research Program to support a project to improve estimates of agricultural water use." This and other VDEQ studies, including habitat and water quality and ecological modeling, are steps to fill these information gaps.

**Progress:** Nothing yet to report.

**Cost:** N/A

**Timeline:** N/A

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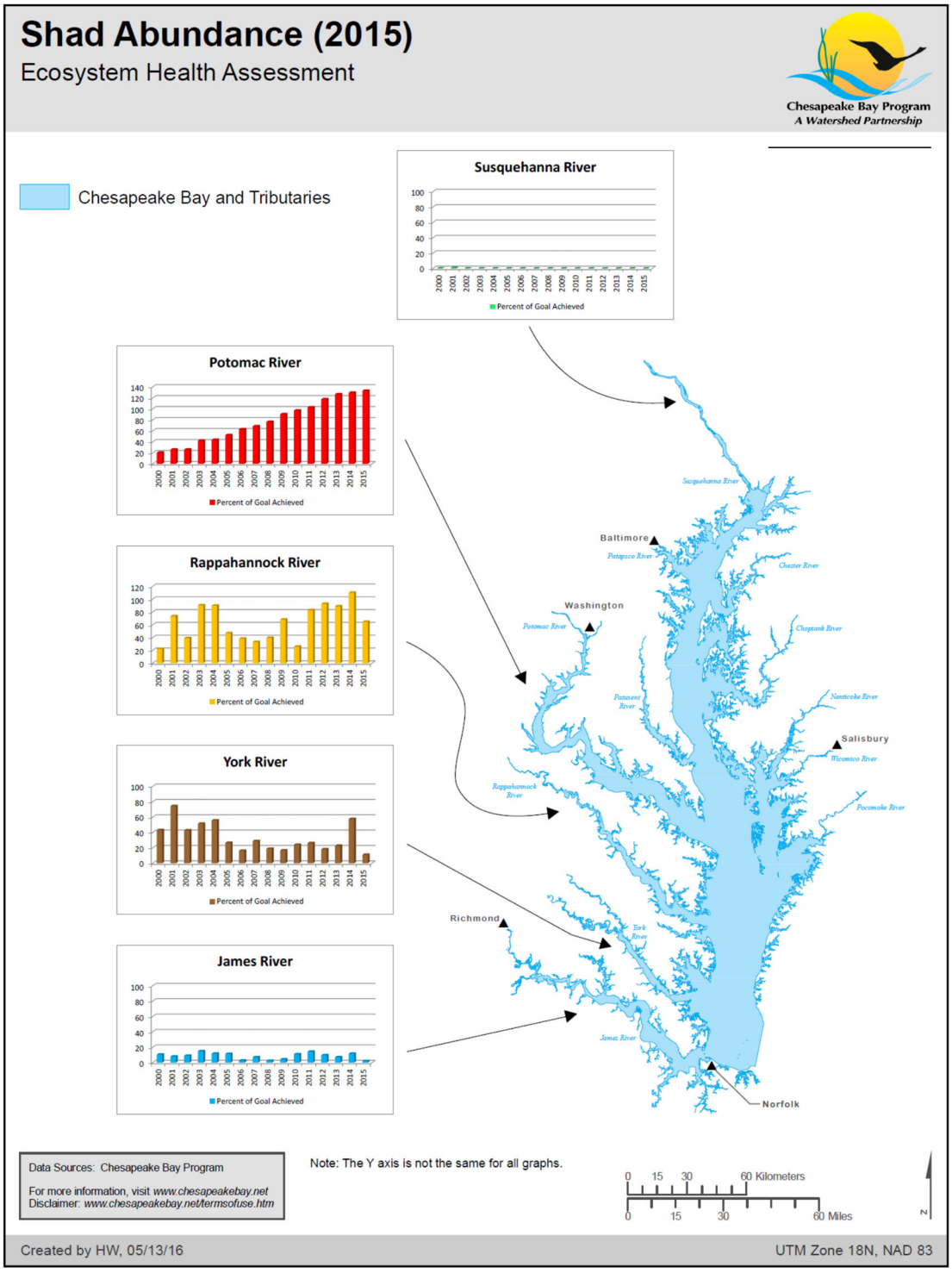


Figure 1. Shad distribution and abundance in the Chesapeake Bay. (Source: Chesapeake Bay Program)

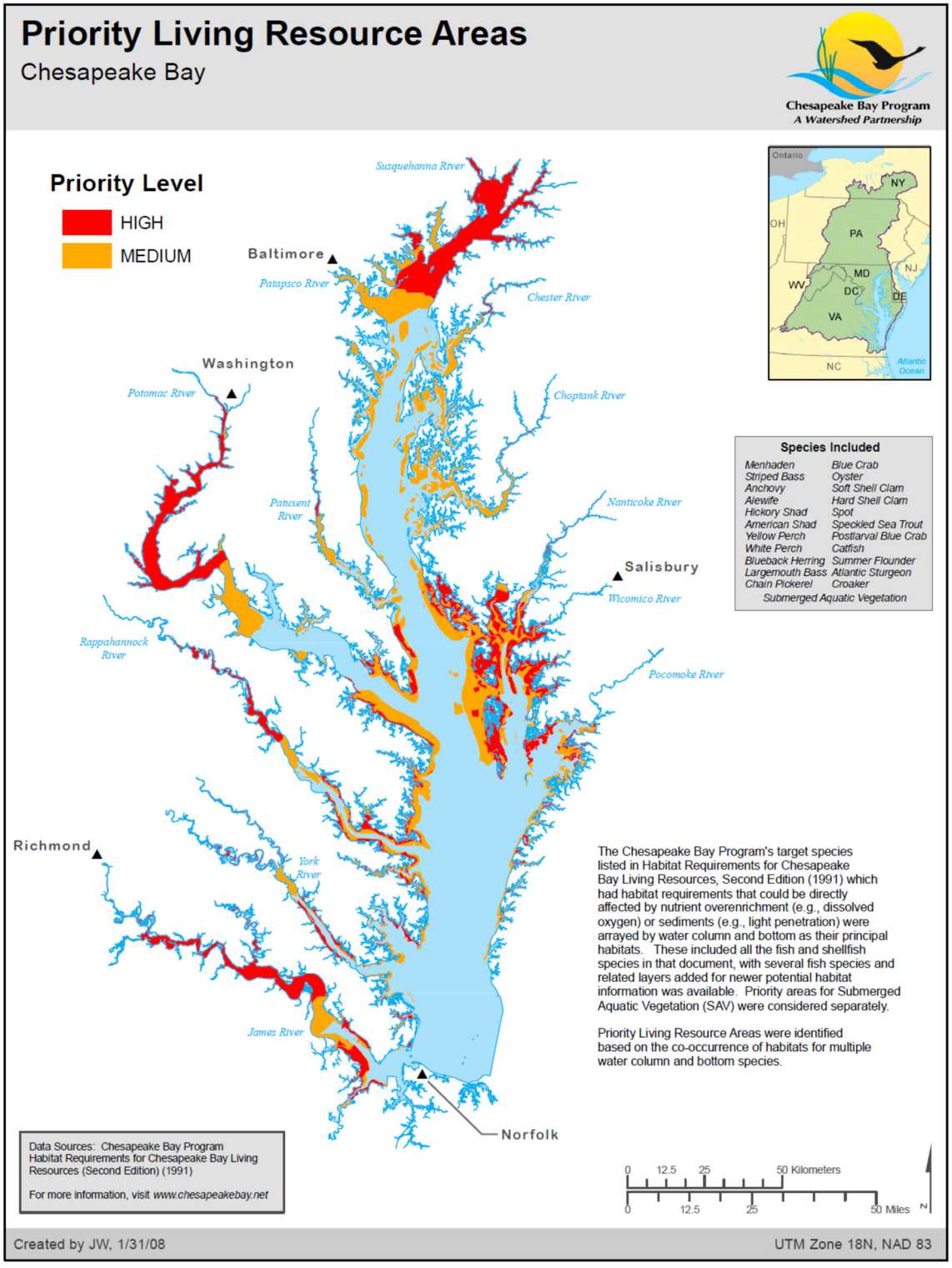


Figure 2. Priority living resource areas of the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

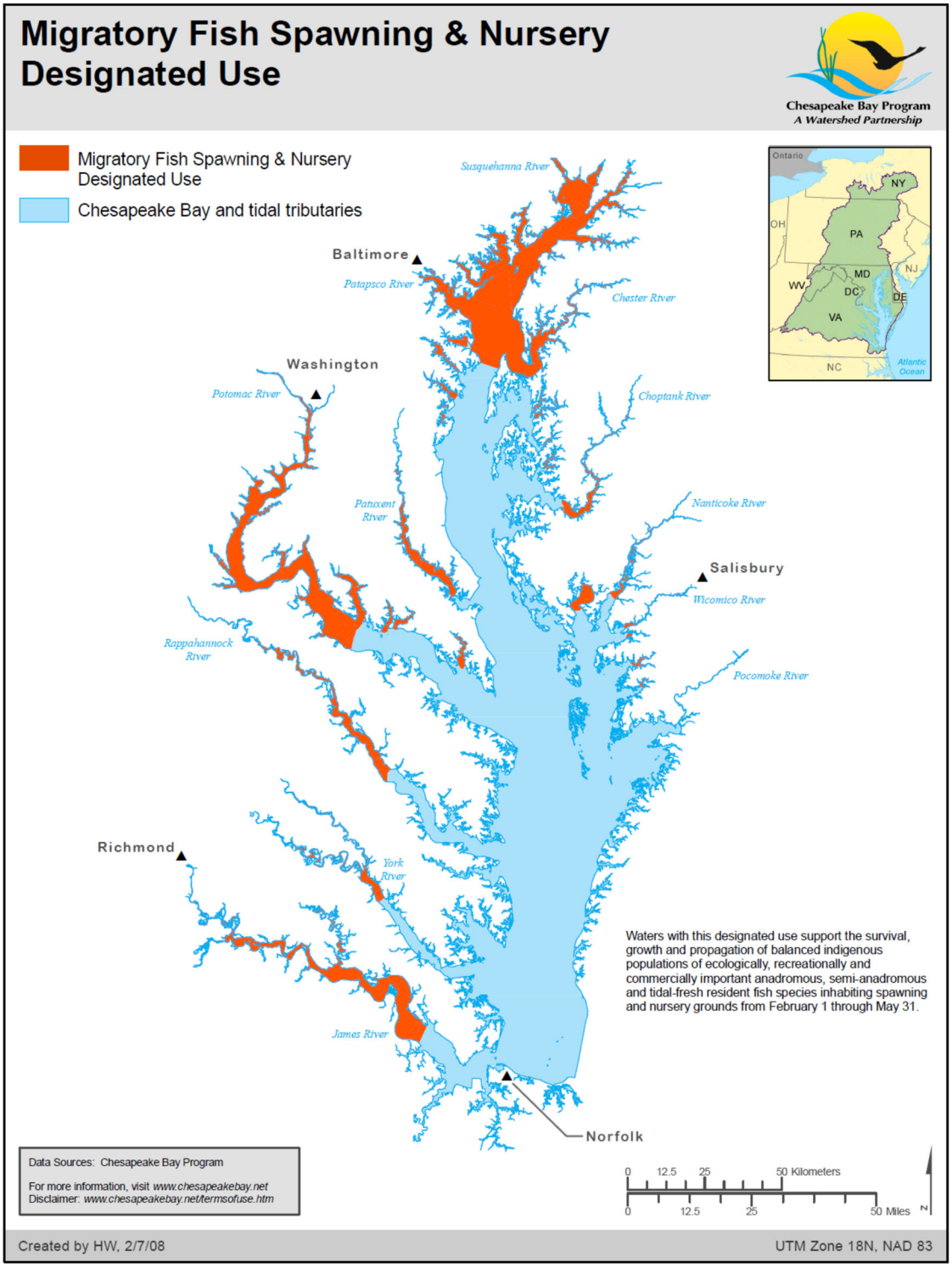


Figure 3. Migratory fish use of the Chesapeake Bay watershed (Source: Chesapeake Bay Program)

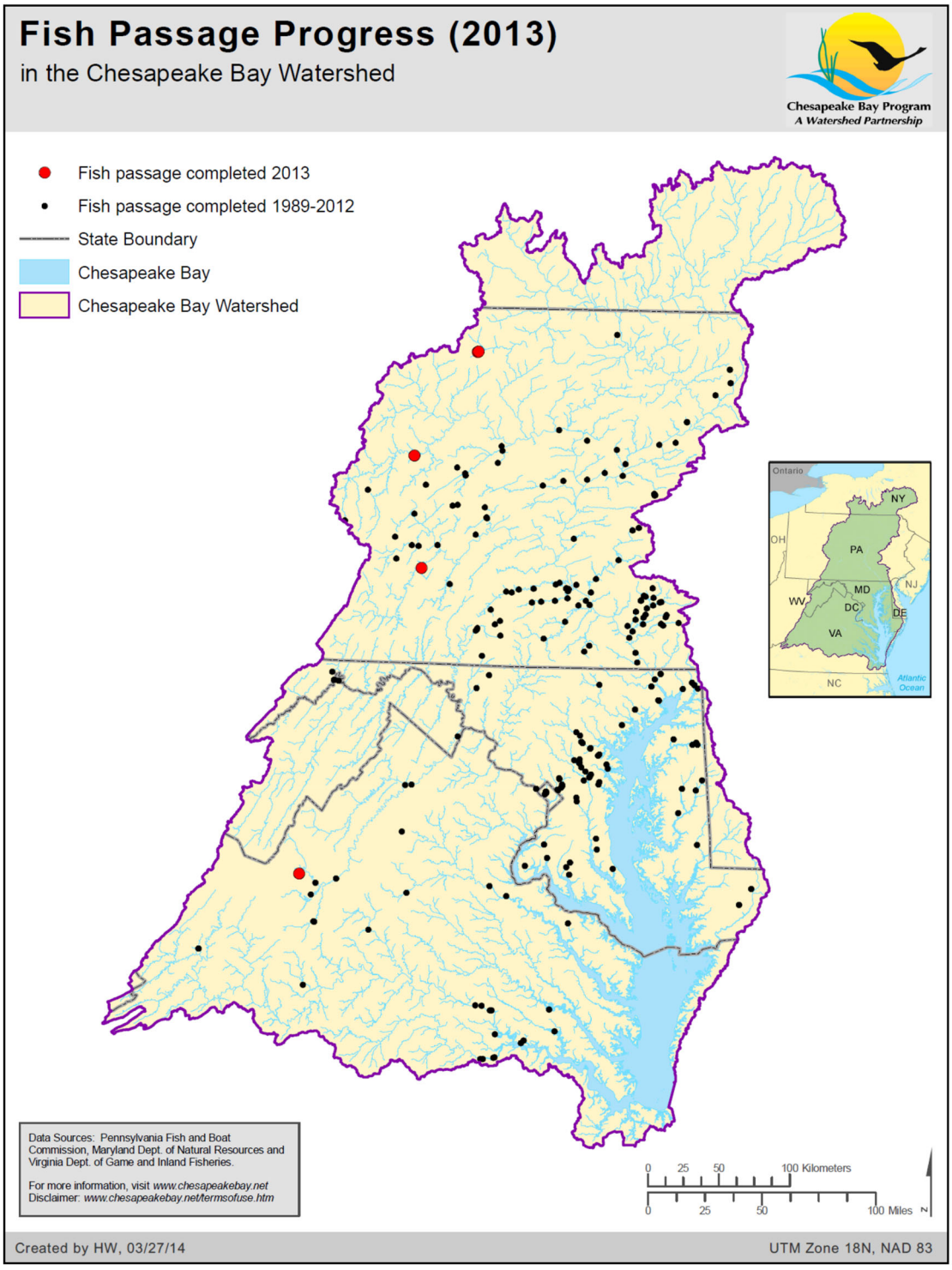


Figure 4. Fish passage projects in the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

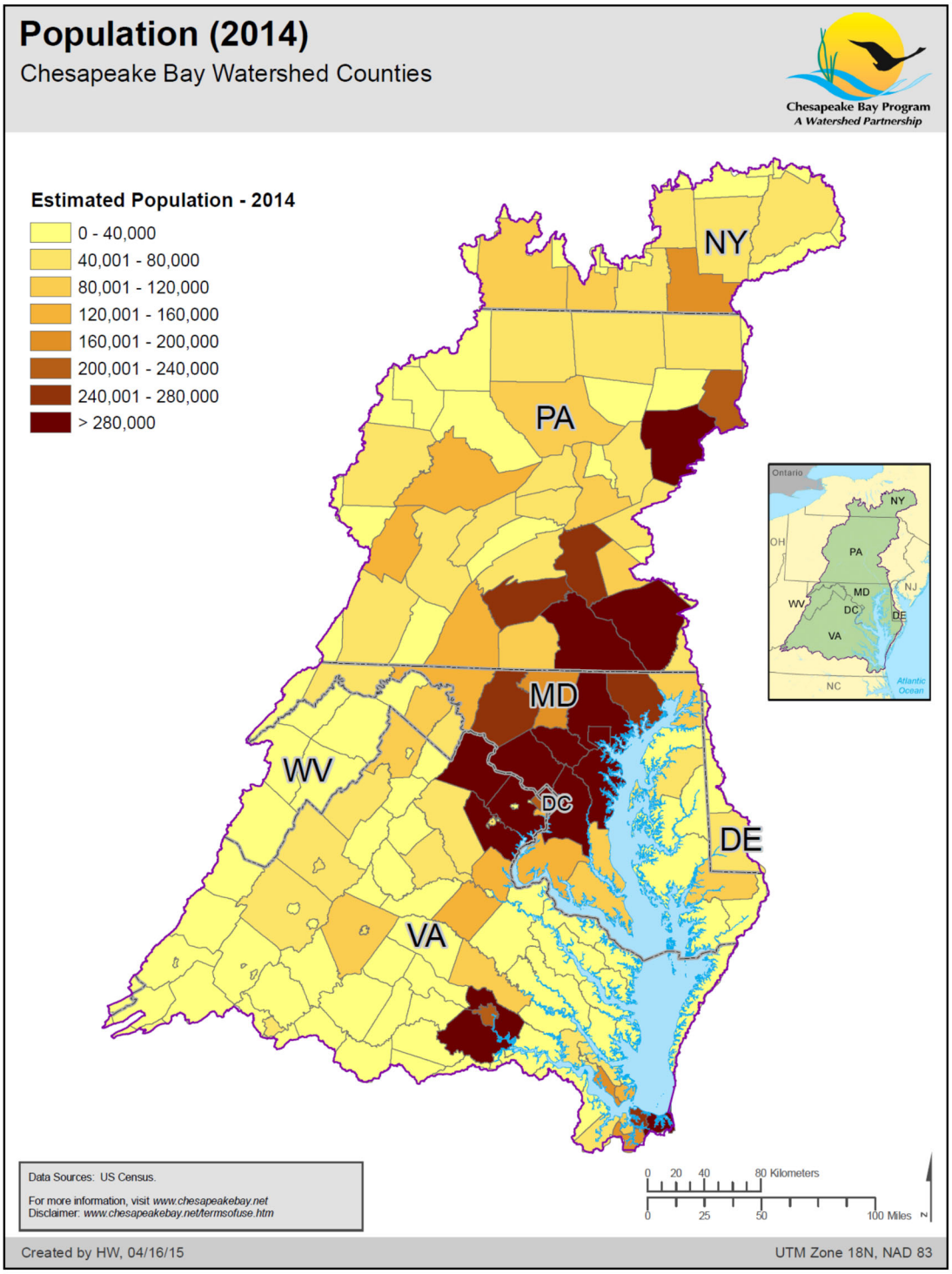


Figure 5. Population levels of the Chesapeake Bay region. (Source: Chesapeake Bay Program)

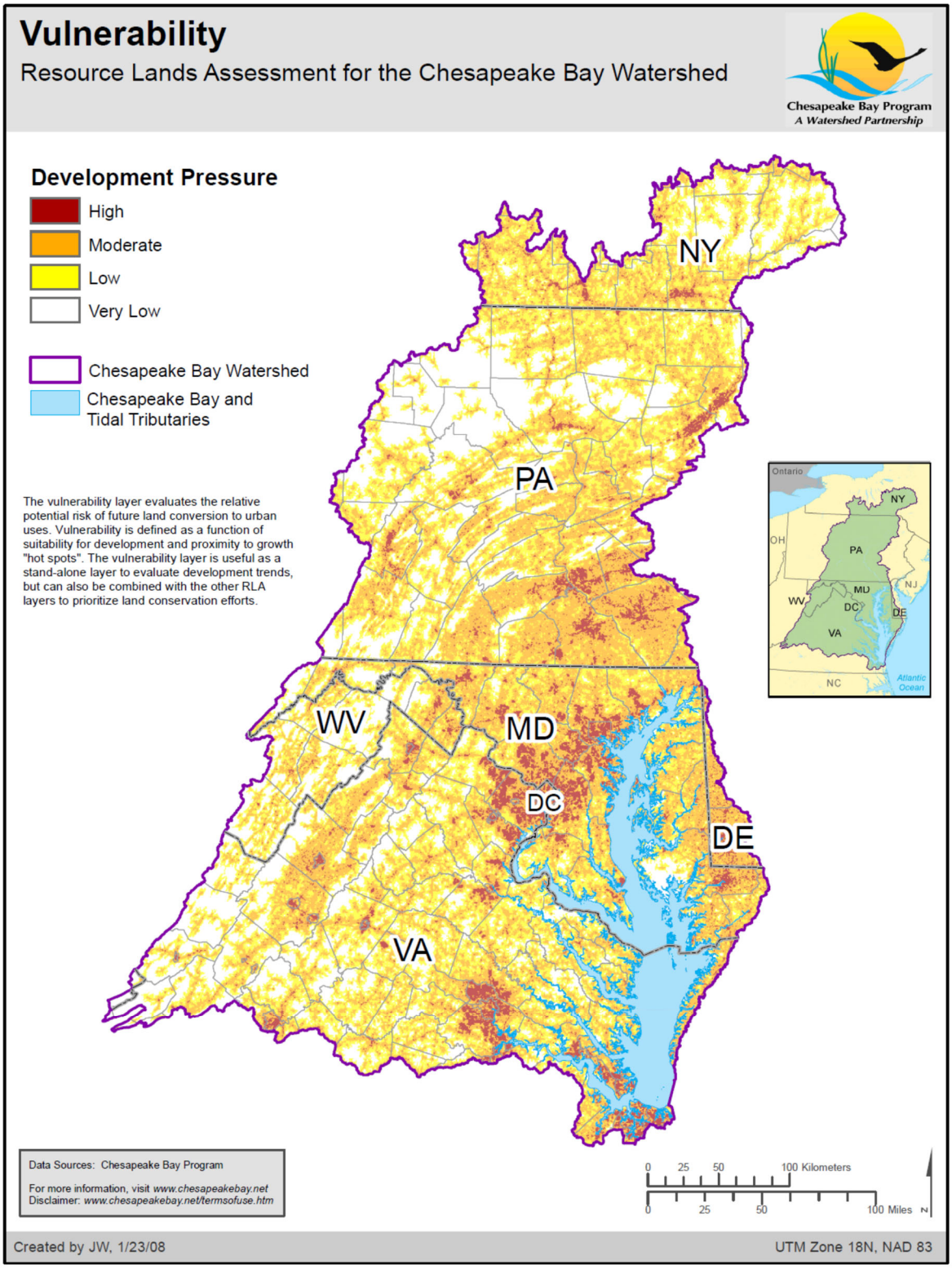


Figure 6. Potential for lands to become urban, representing significant land use changes and impacts. (Source: Chesapeake Bay Program)

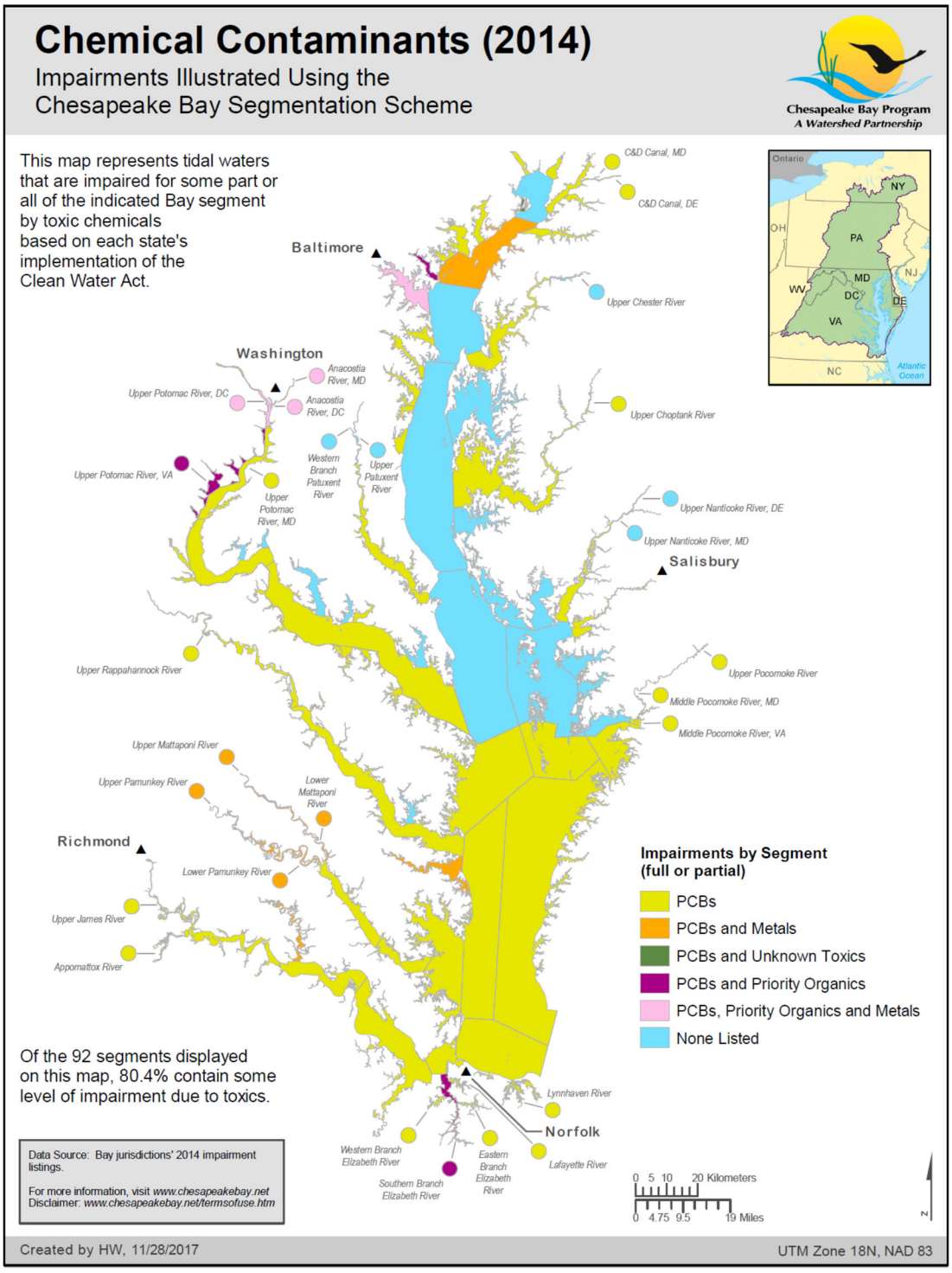


Figure 7. Chemical contaminants in the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

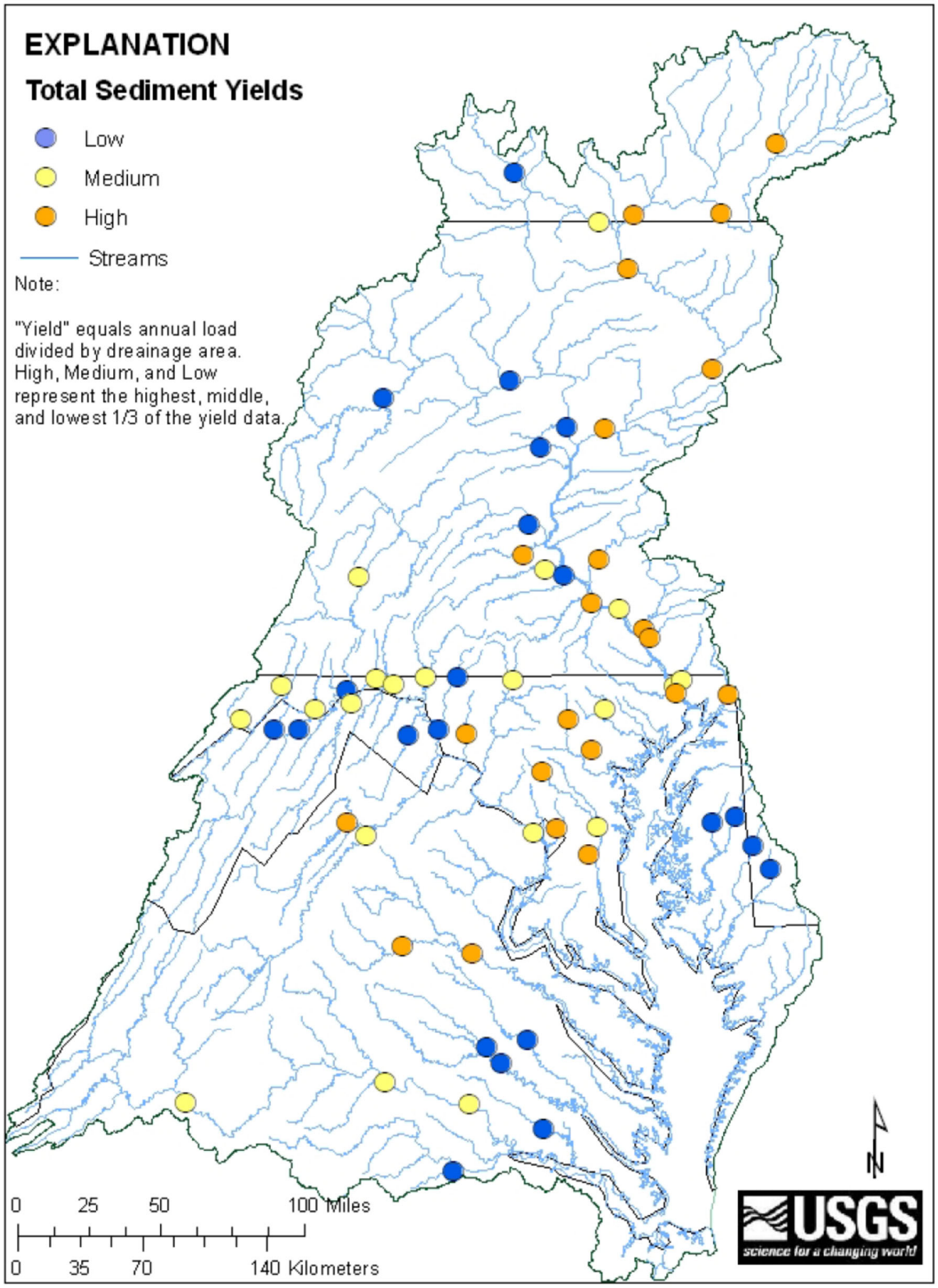


Figure 8. Sedimentation yields in the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

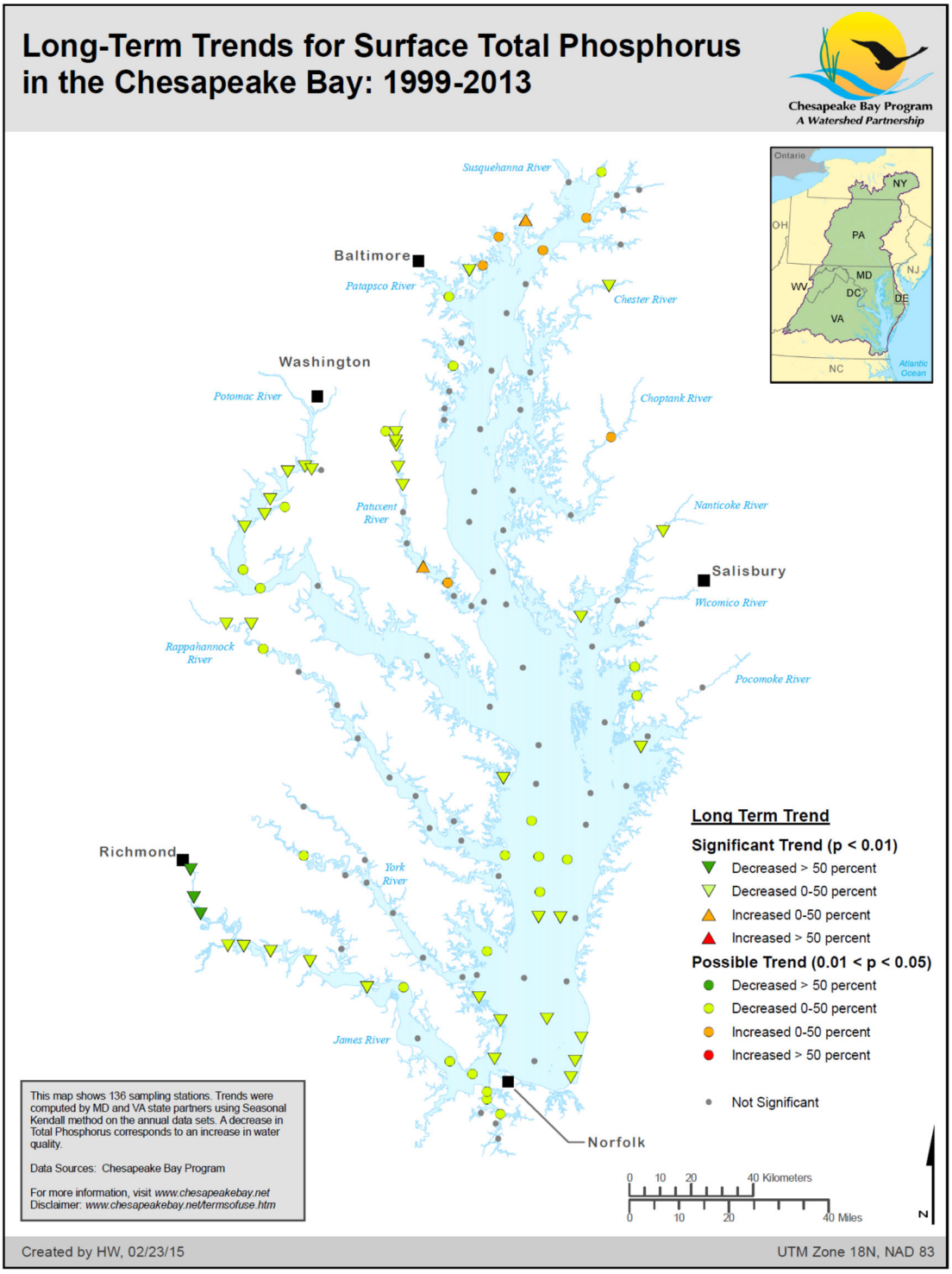


Figure 9. Total phosphorus yields in the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

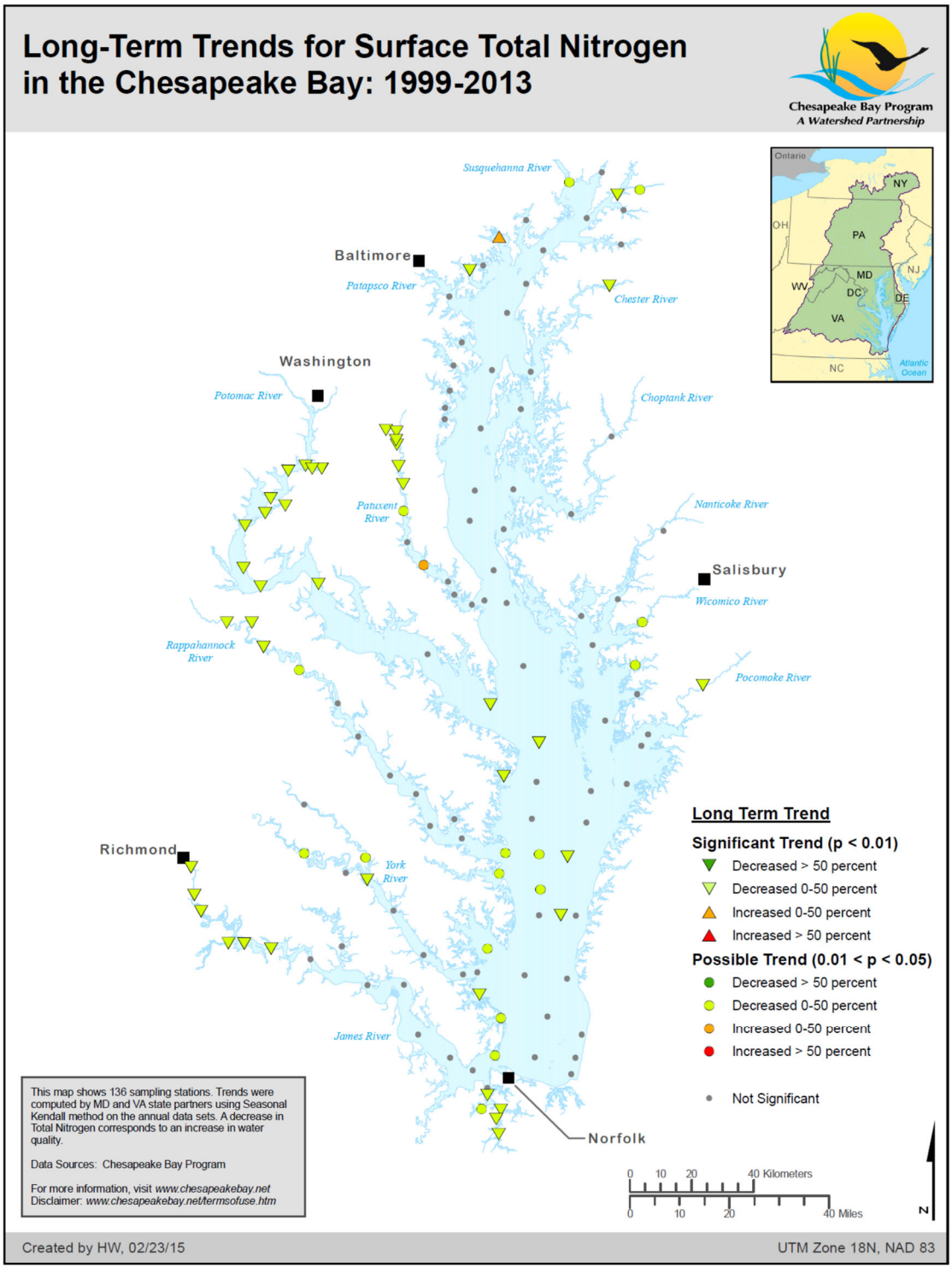


Figure 10. Total nitrogen yields in the Chesapeake Bay watershed (Source: Chesapeake Bay Program)

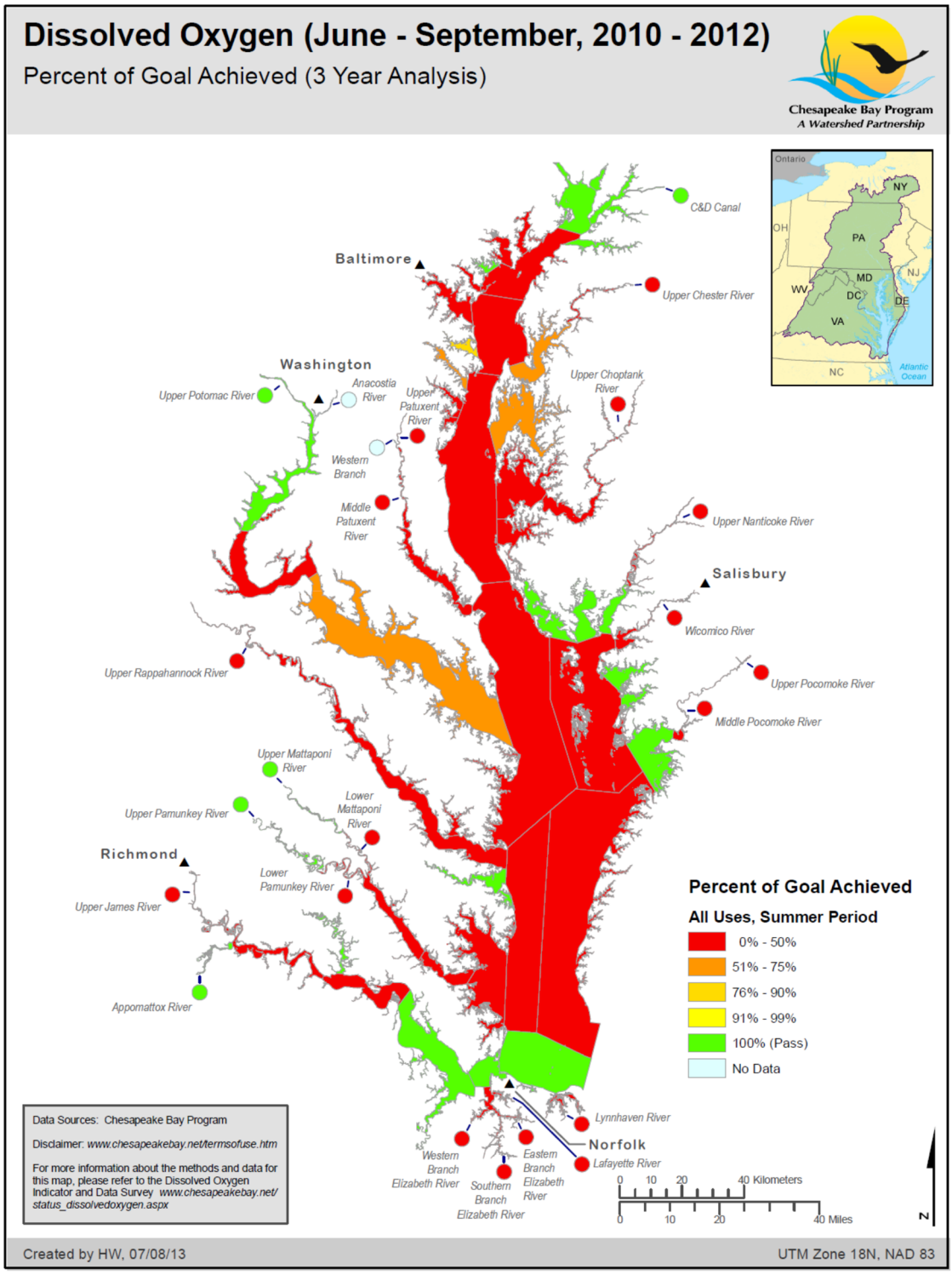


Figure 11. Dissolved oxygen in the Chesapeake Bay watershed. (Source: Chesapeake Bay Program)

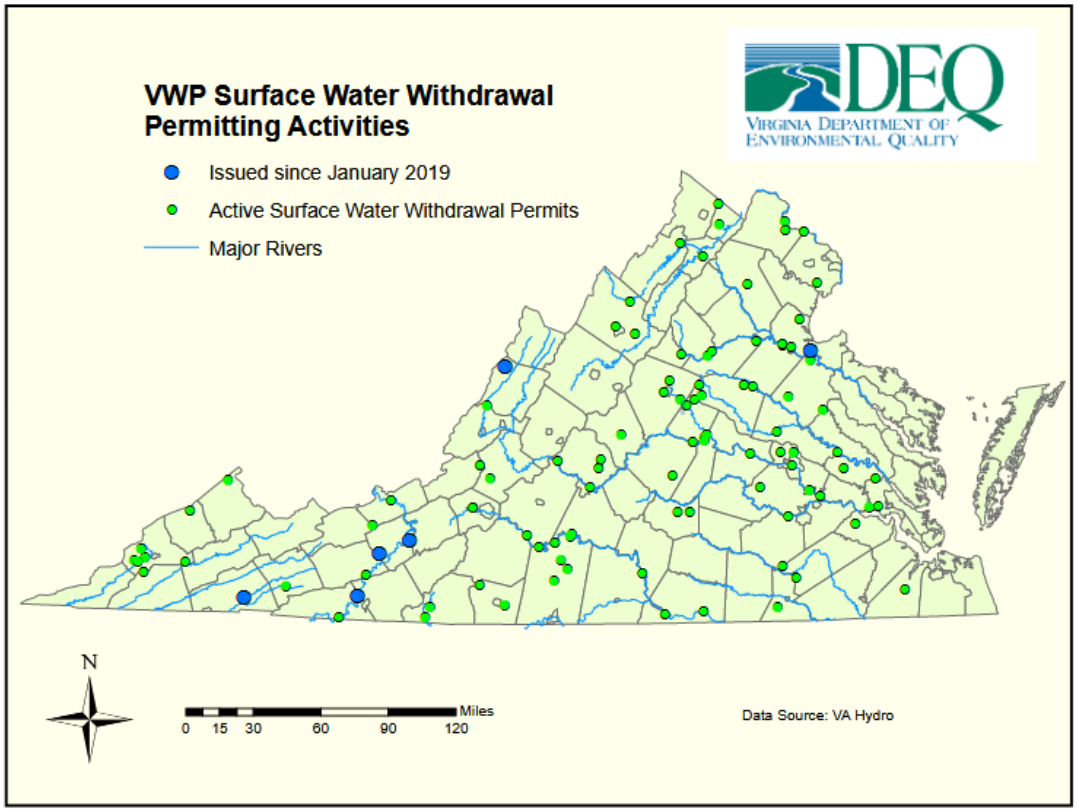


Figure 12. Surface water withdrawal permitting activities. Source: VDEQ (2020: fig. 4).

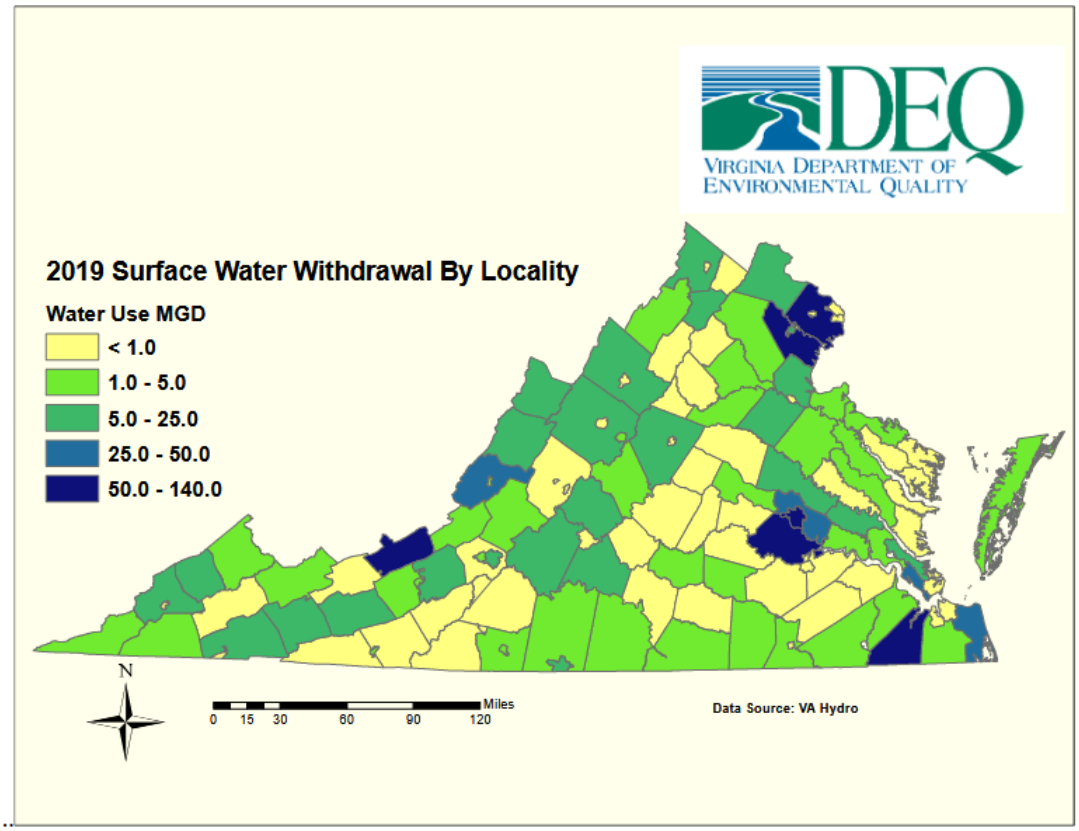


Figure 13. Surface water withdrawals. Source: VDEQ (2020: fig. 8).

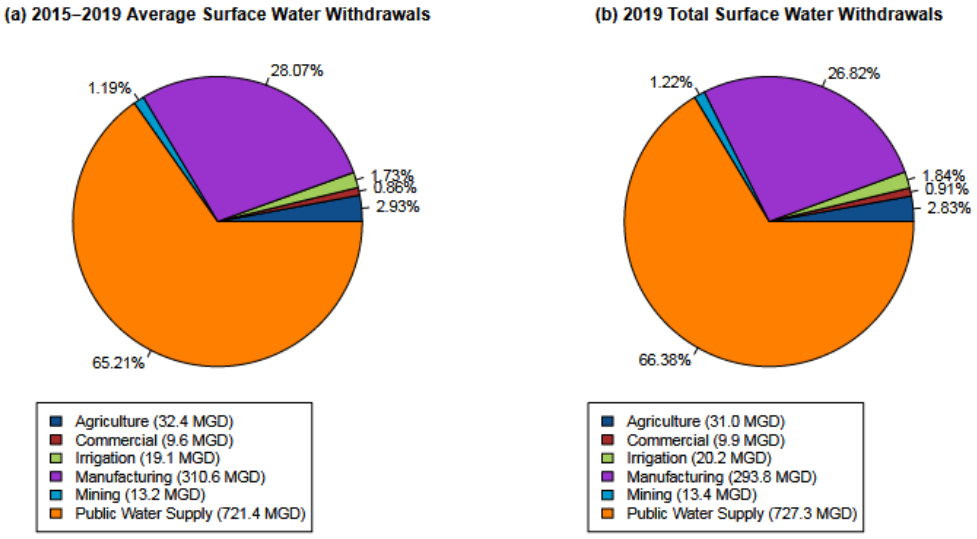


Figure 14. Surface water withdrawals by type. Source: VDEQ (2020: fig. 11).

**Shad and River Herring Technical Committee Report: Recommendations for Evaluating Bycatch Removals in Directed Mixed-stock Fisheries in State Waters**

October 2021

## 1 INTRODUCTION

The American Shad 2020 Benchmark Stock Assessment and Peer Review Report was accepted for management use in August 2020. The assessment found that American shad remain depleted on a coastwide basis, likely due to multiple factors, such as fishing mortality, inadequate fish passage at dams, predation, pollution, habitat degradation, and climate change. One of the priority research recommendations identified in the stock assessment and highlighted by the Technical Committee (TC) was to "conduct annual stock composition sampling through existing and new observer programs from all mixed-stock fisheries (bycatch and directed). Potential methods include tagging (conventional external tags or acoustic tags) of discarded catch and genetic sampling of retained and discarded catch. Mortality rates of juvenile fish in all systems remain unknown and improvement in advice from future stock assessments is not possible without this monitoring. Known fisheries include the Delaware Bay mixed-stock fishery and all fisheries operating in the Atlantic Ocean (U.S. and Canada) that encounter American shad (see Section 4.1.4 in the stock assessment report)."

To address this recommendation, the TC recommended that the Board task them to consider methods that could be used to understand and reduce impacts of mixed-stock catch on stocks outside the area where directed catch occurs. Therefore, at the February 2021 meeting the Board tasked the TC with "developing methods to evaluate bycatch removals in directed mixed-stock fisheries in state waters in order to understand and reduce impacts to stocks outside the area where directed catch occurs." The TC formed a task group to focus on this work. The task group produced the following report, and recommendations were developed by the full TC.

## 2 IDENTIFICATION OF MIXED-STOCK SHAD FISHERIES AND AVAILABLE DATA

After initial discussions, the task group requested that the full TC submit any data that could be used to identify where mixed stock shad fisheries may be taking place in state waters as well as data that might be useful in evaluating the impacts of these mixed stock fisheries on the individual stocks being harvested. The task group received a number of fishery dependent and independent data sets including data from tagging studies, by-catch genetic analysis, commercial landings, and long-term general abundance surveys (Table 1). The tagging studies and genetic analysis provided proved useful for identifying mixed stock shad fisheries within the Delaware Bay and Winyah Bay. Given the quantity of relevant data available from the Delaware Bay, this system was used as a test case for developing methods to evaluate the potential impacts of mixed stock harvest on individual stocks which could be applied to the other mixed stock fisheries that were identified.

The table below details the data sets submitted to the task group and used to identify or rule out potential mixed stock fisheries along the coast. From these submitted data, the task group

was ultimately able to identify mixed stock fisheries in the Delaware Bay and Winyah Bay systems. These data were used to explore the potential effects of mixed stock fisheries on out of basin stocks and identify management strategies that may be useful for limiting these potential effects.

**Table 1. Available Data Pertaining to Mixed-stock Shad Catch on the Atlantic Coast**

| ***Data Set*** | ***System*** | ***Time Series*** |
|---|---|---|
| New Jersey Adult Shad Tagging Survey | Delaware Bay | 1995-2019 |
| New Jersey Commercial Landings Reports | Delaware Bay | 1980-2019 |
| Delaware Commercial Landings Reports | Delaware Bay | 1980-2019 |
| Waldmen et al., Genetic Study, 2014 | Delaware Bay | 2009-2010 |
| Bartron & Prasko, Genetic Study, 2021 | Delaware Bay | 2017-2019 |
| Hudson River Adult Haul Seine Index | Hudson River | 1988-2017 |
| North Carolina, Acoustic Tagging Study | Albemarle Sound | 2017-2018 |
| South Carolina Adult Tagging Survey | Winyah Bay | 2003-2005, 2010-2020 |
| Maryland Adult Shad Tagging Survey | Susquehanna River | 1987-2019 |

## 2.1 Mixed-stock bycatch in state waters

### 2.1.1 Delaware Bay

The shad fishery within the Delaware Bay is generally considered the most significant source of mixed stock harvest within states' waters. Commercial fisheries in the bay and upper estuary are carried out by fisherman from the states of New Jersey and Delaware. The New Jersey fishery is a directed gill net fishery, typically harvesting between 10,000 to 20,000 pounds of shad per year. The shad harvested in Delaware are typically caught as bycatch in the directed striped bass gill net fishery. Landings from Delaware fluctuate significantly, averaging around 16,000 pounds per year over the past decade, with larger yearly shad catches being seen when the fishermen switch to smaller mesh sizes when targeting smaller striped bass.

A variety of studies have been completed using both tag recapture data and DNA analysis to determine stock origin of American shad within the Delaware Bay. New Jersey's Bureau of Marine Fisheries has been tagging shad in the lower bay continually since 1995 with recapture data showing about 40% of American shad recaptures occurring within the Delaware Basin. The remaining 60% being reported from the ocean and within river systems spanning from the St. Lawrence River in the north and as far south at the Santee River in South Carolina with the Hudson River making up the largest proportion (17.5% - 34.4%) of out of basin recaptures. DNA analysis by Waldmen et al., 2014, found varying proportions of stock representation from the commercial harvest depending on the analysis method used with Delaware Basin fish representing between 24% and 53% of the harvest and Hudson River fish making up the largest proportion of out of basin harvest. A more recent study by M. Bartron and L. Prasko with the USFWS Northeast Fishery Center using similar methods to Waldmen et al., 2014, found similar varying proportions of Delaware Basin versus out of basin stock compositions. The Hudson River stock represented the largest proportion of out of basin fish in this study as well. As a result of these high proportions of out of basin American shad that are caught in the

commercial fisheries in Delaware Bay, a Mixed Stock Fishery Benchmark has been implemented as part of the Sustainable Fishery Plan to minimize the impact of the Delaware Bay fishery on out of basin stocks.

### 2.1.2 Winyah Bay System, SC

The Winyah Bay System is made up of five main rivers and encompasses parts of North Carolina and South Carolina. Historically, American shad inhabited all of the Great Pee Dee River 280 kilometers (km) and had access to all main stem tributaries throughout the 22,258 $km^2$ watershed within South Carolina, including Little Pee Dee River (187 km), Lynches River (225 km), Black River (243 km), and Waccamaw River (225 km) in both South Carolina and North Carolina. The South Carolina commercial shad fishery is a directed gill net fishery, with the bulk of the catch occurring in the lower Pee Dee and Waccamaw Rivers. Landings fluctuate due to river discharge, but average around 24,000 – 35,000 pounds per year.

Since 2010, fishery-independent monitoring occurs annually in the lower Waccamaw River, prior sampling occurred on a rotational basis and included years 2003-2005. Sampling consists of using drift gill nets along a stretch of river in the Intra-coastal Waterway (ICW) where all captured shad are tagged with dart tags and released to estimate fishing mortality rates in this system. Tag return rates varied based on fishers' participation and with recent changes to regulations to demonstrate sustainability, have decreased significantly. Return rates during early years in the time series indicated a straying rate of ~25% (those returns from other rivers within the System). However, the majority of these occurred in the Great Pee River, a major high flow tributary river connected to the Waccamaw River and known spawning area for American shad. Therefore, tagging information alone cannot be used to distinguish stock composition.

Beginning in 2020 and continuing annually, fin clips were taken from captured shad in the lower portions of the Waccamaw and Great Pee Dee Rivers to better understand genetic mix stock composition of returning shad in the Winyah Bay System. In a similar effort as described above for Delaware Bay, results of genetic analysis for these samples should provide some missing information regarding number of stocks and composition of those stocks. If warranted, this information can then be used to update Sustainable Fishery Management Plans for the Winyah Bay System.

## 3 METHODS FOR EVALUATING BYCATCH REMOVALS IN DIRECTED MIXED-STOCK FISHERIES

The task group chose to take a tiered approach evaluating available data and potential methods for addressing this task, with the Delaware Bay mixed stock fishery serving as an example. Three tiers were developed based on (1) methods applicable with the quantity and quality of data currently available (first-tier), (2) methods applicable with data that could reasonably be collected without significant changes in near term data collection efforts (second-tier), and (3) advanced methods that would provide the most robust information but also would require significant changes in data collection efforts (third-tier). This tiered approach was used in order to allow the Board to consider several management approaches for addressing the effects of

mixed stock fisheries while also considering the availability of information and associated timelines for each tier.

### 3.1 First-Tier Methods

The first-tier represents the evaluation method that can currently be undertaken given the quantity and quality of fishery dependent and independent data available from existing data collection efforts.

***Relative F with static stock composition***

Age data and mortality estimates for American shad have been collected and calculated relatively inconsistently in regards to the stocks associated with the mixed stock fisheries. As a result, modeling efforts using these data as applied to evaluating impacts of mixed stock fisheries on out of basin stocks have not yielded useful results.

Data that have been consistently collected over appreciable time series include commercial landings reports and fishery independent relative abundance indices which can be used to develop a relative fishing mortality (*F*). When evaluated in conjunction with stock composition data (e.g., tag recapture data, genetic data), it is possible to generate stock specific relative *F*s for American shad harvested in mixed stock fisheries.

The task group determined all required data are currently available to evaluate the impact of the commercial American shad fishery in the lower Delaware Bay on Hudson River stock American shad using this relative *F* method. Hudson River stock shad represent the largest proportion of out basin shad harvested in this fishery. For this method, the proportion of Hudson River shad in the Delaware Bay mixed stock fishery, (24.5% derived from tag recapture data), can be applied to the yearly total mixed stock landings to derive an estimate of Hudson River stock removals (average of 4,443 lbs per year, 2003-2019). The yearly Hudson River stock removals can then be divided by the yearly index value generated from the New York Hudson River Adult Shad Haul Seine Survey to generate a yearly and time series average relative *F*.

Hudson River stock proportions have also been generated for the Delaware Bay using genetic analysis in several studies with varying proportions that could be used to generate alternative total Hudson River stock removals and subsequent relative *F* estimates. The caveat to using the proportions of Hudson River stock generated with the genetic analyses is that these represent proportions based on 1 to 4 year snapshots versus the tagging data which yields an average proportion over the entire time series being analyzed. The relative *F* method explored here for the Delaware Bay mixed stock fishery could readily be applied to other known mixed stock fisheries where the appropriate data (commercial landings, FI relative abundance index, and stock proportions) are available.

***Management Approaches***

Options to address the impacts of mixed stock harvest on out of basin stocks, as evaluated using stock specific relative *F*s, include establishing a relative *F* benchmark and associated management triggers based on a time series when rates of harvest were deemed acceptable.

Alternatively, catch caps can be developed to keep the harvest of out of basin stocks of American shad to an acceptable level and/or area restrictions can be implemented to reduce or eliminate fishing effort within areas where mixed stock fisheries are known to occur.

***Timing of Analysis***

Data are available to support this analysis in the Delaware Bay mixed stock fishery immediately. These data are not immediately available for a similar analysis in the Winyah Bay system.

### 3.2 **Second-Tier Methods**

The second-tier includes a method that offers improvements to the first-tier method with minor changes to existing data collection efforts.

***Relative F with time-varying stock composition***

The relative *F* method with static stock composition assumptions informed by existing snapshot sampling described in the first-tier could be improved with increased frequency of stock composition monitoring. Uncertainty in estimates would decrease with increased frequency of sampling (e.g., annual sampling) due to interannual variation in stock composition driven by factors like spatial and temporal variation of fishing and abundance changes of stocks encountered.

Three high priority research recommendations focused on collection of stock composition data (storage infrastructure, population baseline data, and mixed stock data) were included in the 2020 stock assessment and would address current limited and opportunistic sampling that would support the first-tier method. These recommendations led to the development of an alosine genetic sample repository at the Leetown Research Laboratory of the United States Geological Survey Eastern Ecological Science Center (USGS EESC). This effort aims to collect tissues from spawning rivers to create population baselines. Probabilistic genetic analysis would be used to assign individuals from the mixed stock fisheries to their respective populations. Hence, it will be possible to partition bycatch into its component stocks and identify populations that are potentially more affected. Researchers at the USGS EESC are working in collaboration with researchers at Cornell University to develop a panel of single nucleotide polymorphisms (SNPs) for higher resolution stock assignment. The principal advantage of these markers over microsatellites is their repeatability and accuracy. The repository addresses infrastructure needs, improved population baseline data, and mixed stock data from fisheries occurring in federal oceanic mixed stock fisheries, but additional support is necessary to sample mixed stock fisheries in state waters including the Delaware Bay mixed stock fishery.

***Management Approaches***

Management approaches would be the same as for the first-tier method, but would informed by estimates with greater certainty.

***Timing of Analysis***

This method could be applicable after as little as one year of stock composition data sampling and analysis in the Delaware Bay fishery. Updated estimates could then be provided each year

new stock composition data are collected. These data are not immediately available for a similar analysis in the Winyah Bay system.

## 3.3 **Third-Tier Methods**

***Catch Impact Analysis***

A catch impact analysis would use an adult equivalents model as described by Ianelli and Stram (2015). This analysis divides mixed stock fishery removals of potential spawners, both from the current fishing year and previous fishing years (i.e., removals of immature or repeat spawning fish from previous years), by the sum of bycatch removals and spawning escapement. This impact estimate ranges from zero to one, with zero indicating no impact from the fishery, one indicating complete removal of an annual spawning run by the fishery, and an increasing impact as the estimate increases from zero to one. A feature of these estimates that offers an improvement to the first- and second-tier methods is that they can be interpreted as absolute exploitation estimates as opposed to relative exploitation estimates. Absolute exploitation estimates can more readily be compared to biological reference points.

This method would quantify any mixed stock fishery impacts and, if generated in a time series, provide trends of these impacts through time. However, the method does not provide reference point estimates, requiring the need for ad hoc reference points developed through additional simulation analyses or other methods (e.g., per-recruit analyses) if used for management.

This method may be the better suited of the third-tier methods for stocks that are under moratorium or have very limited in-river removals, as removal data from established and directed fisheries improve utility of traditional stock assessment models like statistical catch-at-age models.

*Data Requirements*

*Total Mixed Stock Fishery Removals*

Total removals of shad by the mixed stock fishery are necessary, including both fish retained for harvest and fish discarded that die due to interaction with the fishery. Total discards, both discarded dead and released alive, and a discard mortality rate are needed to estimate total dead discards.

- Delaware Bay Mixed Stock Fishery: Total harvest data are reported for the Delaware Bay mixed stock fishery. Complete harvest data are available back to 2002 and incomplete data (NJ harvest only) are available back to 1985. Delaware harvest data prior to 2002 were reported without spatial information and would require assumptions to delineate into mixed stock harvest (lower bay) and harvest of the Delaware River stock only (upper bay). However, data limitations (see below) would preclude applying this method retrospectively to these earlier years. Anecdotal information indicates that discards of American shad in this fishery are negligible.

Biological sampling of mixed stock catch is necessary to determine the number of spawners that would have been repeat spawners had they not been removed by the fishery. This would require length, age, and repeat spawn mark sampling. If the mixed stock fishery encounters immature shad, maturity ogives would also be necessary.

- Delaware Bay Mixed Stock Fishery: Biological sampling data are not regularly collected from the Delaware Bay mixed stock fishery. It can be assumed the fishery is only encountering mature shad returning to spawn, precluding the need for maturity ogives. There were several research recommendations in the 2020 stock assessment to further evaluate error in spawn mark determinations which would help understand utility of these data for this type analysis.

Stock composition monitoring in the mixed stock fishery would also be required. Snapshot sampling (i.e., sampling less frequently than annual intervals) could be used. However, as with the relative *F* method, uncertainty in estimates would likely decrease with increased frequency of sampling due to interannual variation in stock composition driven by factors like spatial and temporal variation of fishing and abundance changes of stocks encountered.

- Delaware Bay Mixed Stock Fishery: There are stock composition estimates available for 2009-2010 (Waldman et al. 2014). There are additional, recent stock composition estimates from 2017-2020 (Bartron and Prasko 2021), but additional estimates (i.e., stock composition estimates across baseline groups for the lower Delaware Bay sampling region only) would be necessary to support a catch impact analysis. The USGS EESC alosine repository does provide a pathway for improved stock composition data, but, again, additional support is necessary to sample the Delaware Bay mixed stock fishery.

A study (or assumptions) is needed to determine migration patterns of the stocks impacted relative to the timing of the mixed stock fishery and spawning. If the mixed stock fishery occurs following the spawning run for a given stock, the fishery impacts the stock the following year and beyond (i.e., removal of potential repeat spawners). If the mixed stock fishery occurs prior to the spawning run, the fishery impacts the stock in the same year and beyond.

- Delaware Bay Mixed Stock Fishery: Based on the timing of this fishery and concurrent sampling by a fishery-independent survey that encounters unripe fish, it can be assumed that all fishing occurs pre-spawn.

*Spawning Escapement Counts*

The analysis requires escapement count data (absolute abundance of fish as they return to their spawning grounds). Escapement counts could be observed counts at a choke point (e.g., fishway count) or extrapolations of relative abundance measured by a fishery-independent survey.

- Delaware Bay Mixed Stock Fishery: There are fishway counts for three stocks that account for at least 1% of the Delaware Bay mixed stock fishery, according to 2010 stock composition estimates (Waldman et al. 2014), that were considered reflective of

interannual abundance changes during the 2020 stock assessment: the Essex Dam fishway count on the Merrimack River, the Holyoke Dam fishway count on the Connecticut River, and the Boshers Dam fishway count on the James River. Unfortunately, these are considered indicators of relative abundance, not absolute spawning escapement, because of their locations above some American shad spawning grounds and river flow impacts to fishway operation throughout the spawning season.

*Marine Survival*

Estimates of marine survival-at-age are needed to correctly account for removals of potential repeat spawners. Marine survival data are used to decrement removals of potential spawners in previous years that would have experienced mortality from other causes. Assumptions could be made in the analysis, but any information on marine survival and how it changes through time would reduce uncertainty of estimates.

- Delaware Bay Mixed Stock Fishery: These estimates remain a primary limitation in assessment of all American shad stocks. The 2020 stock assessment provides estimates of baseline natural mortality based on the life history of the species that could be used for this component of total mortality. Fishing mortality due ocean bycatch has not been quantified. Ocean bycatch has been declining in recent years and assumptions about this mortality may become less impactful if this declining trend continues, but current contribution to total mortality is unknown.

***Statistical Catch-at-Age Model***

Statistical catch-at-age models could be used to estimate fishing mortality and exploitation rates of fisheries that remove portions of the stock abundance, including mixed stock fisheries. Statistical catch-at-age models are forward-projecting, age-structured models that track total stock abundance and exploitation rates through time according to data collected on changes in abundance-at-age and fishery removals-at-age. Fishing mortality and exploitation rates could be compared to those of other fisheries (e.g., in-river, stock-specific fisheries) and reference points to determine bycatch fishery impacts. To estimate mixed stock catch impacts, these models would be applied to individual stocks. For example, a model would need to be applied to Hudson River stock data sets, including mixed stock fishery removals of Hudson-origin fish, to estimate mixed stock catch impacts to the Hudson River stock. Therefore, the stock of interest would need all data sets required for these models. These models were applied to two stocks in the 2020 stock assessment that were negligible components of the Delaware Bay mixed stock fishery, according to Waldman et al. (2014), but data limitations precluded application to other stocks. Reference points would likely need to be estimated with coupled per-recruit analyses. This method would be less applicable to stocks under moratorium, which are likely to remain in data limited situations and be at low abundances that are encountered with high variability by mixed stock fisheries.

*Data Needs*

These models would require similar data sets as the catch impact analysis, with a few exceptions discussed below.

*Relative Abundance*

Total escapement counts required for the catch impact analysis are not required for statistical catch-at-age model, as these are estimated with these models using relative abundance data.

- Delaware Bay Mixed Stock Fishery: Relative abundance data are available for many of the stocks occurring in the Delaware Bay mixed stock fishery (see tables 13-20 in the 2020 stock assessment).

*Total Fishery Removals*

This method also requires total removals along with age composition data from biological sampling for all fisheries, whereas the catch impact analysis is still applicable if data from some removal sources (e.g., ocean bycatch) are unavailable.

- Delaware Bay Mixed Stock Fishery: As noted for the catch impact analysis, stock-specific ocean bycatch removals remain a major data limitation in assessment of American shad stocks. Recreational fishery removals are also a data limitation in some stocks impacted by the Delaware Bay mixed stock fishery inducing the Delaware River stock and Connecticut River stock.

***Management Approaches***

These methods could provide mixed stock catch impacts relative to established reference points, which could be used to trigger management responses (e.g., effort controls, catch reductions). However, this would not be real-time information and would only inform reactive management responses in subsequent fishing seasons.

***Timing of Analyses***

The catch impact analysis would be most applicable after at least a time series of data equal to the age structure in the population impacted by the fishery. This would be approximately nine and six years for mixed stock fisheries that remove all age classes and just mature age classes, respectively. Statistical catch-at-age models would require longer time series of data than the catch impact analysis that are dependent on contrast in the population over the time series. This analysis focused on the Delaware Bay mixed stock fishery, but the data requirements, timing of analyses, and management approaches would apply to the Winyah Bay system as well.

## 4 TECHNICAL COMMITTEE RECOMMENDATIONS

### 4.1 Recommended Path Forward

The TC reviewed the methods considered by the task group for evaluating bycatch removals in directed mixed-stock fisheries in state waters in order to understand and reduce impacts to stocks outside the area where directed catch occurs. Each tier was assessed based on the current data available and the required change in data collection efforts that would be necessary to successfully conduct each given method of analysis. The pros and cons of each tier were weighed with special attention being paid to increases in data sampling and analysis required to complete more robust analysis methods. The TC chose to prioritize considered

methods based upon robustness of analysis used while also considering whether data requirements for each method could be practically achieved.

### 4.2 **Management Recommendations**

After considering all of the options available, the TC recommends the second-tier method be used for evaluating bycatch removals in directed mixed-stock fisheries. Based on these methods, the TC recommends management strategies also be developed to reduce impacts of out of basin harvest in these fisheries. This tier involves developing a Relative F index based on increased genetic sampling and/or tagging efforts which could potentially provide annual stock composition of mixed stock landings. This method is preferable to the current first-tier methods of applying a historical average to stock assignment based on past tagging and DNA studies as regular DNA analysis can account for yearly fluctuations in stock composition of the harvest. While the TC acknowledges that the third tier methods would provide the most robust analysis of mixed stock fishery impacts, the required increase in data collection and sampling efforts could not practically be completed by agencies involved in mixed stock fisheries without a significant increase in staff time and resources. The TC feels that the minor increase in sampling and analysis required under the recommended second-tier methods could easily be achieved and could provide a meaningful increase in assessment quality over the status quo (first-tier) methods.

Whether the Board agrees with the TC recommendation or prefers an alternative approach, the preferred method should be incorporated into the appropriate Sustainable Fishery Management Plans through the development of management strategies, benchmarks, and triggers for addressing the impacts of mixed-stock catch. The Delaware River Basin Fish and Wildlife Management Cooperative is currently in the process of updating the American Shad Sustainable Fishery Management Plan for 2022; if desired, this update could potentially include a new mixed-stock benchmark based on the methods evaluated by the TC and recommended by the Board.

## References

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Waldman, J. W., D. Hasselman, P. Bentzen, M. Dadswell, L. Maceda, and I. Wirgin. 2014. Genetic mixed stock analysis of American shad in two Atlantic coast fisheries: Delaware Bay, USA, and inner Bay of Fundy, Canada. North American Journal of Fisheries Management 34(6): 1190-1198.

Bartron, M. L. and L. M. Prasko. 2021. Resolving contribution of American shad mixed stock fishery in Lower Delaware River and Bay: 2017-2020 collection evaluation. Lamar, PA. 15 p.

TOM O'CONNELL, EASTERN ECOLOGICAL SCIENCE CENTER DIRECTOR
PRESENTATION TO THE ASMFC SHAD & RIVER HERRING MANAGEMENT BOARD
OCTOBER 19, 2021

**BACKGROUND**

USGS is the primary science agency within the Department of Interior and uniquely positioned to deliver ASMFC the actionable science required by the Atlantic Coastal Fisheries Cooperative Management Act of 1993.

The Eastern Ecological Science Center (EESC) is aligning USGS investments with ASMFC management needs to produce actionable science. To that end, EESC has amplified its fisheries science support to ASMFC, USFWS, and NOAA Fisheries. In each of the past three years, the USGS Ecosystem Mission Area has provided $100,000 to EESC to conduct science in support of ASMFC-managed species. EESC has leveraged this funding into more than $2 million and over 20 research projects. The projects are developed in support of actionable science that covers a range of ASMFC species management and science needs.

The 2020 American Shad Benchmark Stock Assessment indicated coastwide populations are depleted. Restricted access to spawning habitat is significantly hindering recovery and may equate to a loss of more than a third of spawning adults. The 2017 River Herring Stock Assessment Update indicates coastwide populations remain depleted at near historic lows on a coastwide basis. However, total mortality estimates over the final three years of the data time series (2013-2015) are generally high and exceed region-specific reference points for some rivers. The "depleted" determinations were used instead of "overfished" because the impact of fishing cannot be separated from the impacts of all other factors responsible for changes in abundance.

**EESC PROJECT HIGHLIGHTS FOR SHAD & RIVER HERRING**

1. ALOSINE GENETIC STOCK IDENTIFICATION AND TISSUE REPOSITORY

Distinguishing among alosine populations is a critical component of ASMFC's Shad and River Herring Fishery Management Plan, which requires states to develop sustainable fishery management plans to maintain commercial and recreational fisheries. Sustainable fishery management plans must demonstrate that a stock can support a commercial and/or recreational fishery that will not diminish future stock reproduction and recruitment.

Alosines spend much of their life history in estuarine and marine environments, where they may form mixed stock aggregations and are captured as bycatch in other fisheries. An enhanced understanding of stock composition provides critical information on the status and trends of specific populations and offers insight into how offshore fisheries bycatch may be impacting recovery efforts.

EESC biologists are using genomic markers to build baseline information for American Shad (*Alosa sapidissima*) and expand existing data for Blueback Herring (*Alosa aestivalis*) and Alewife (*Alosa pseudoharengus*). The use of single-nucleotide polymorphisms (SNPs) will provide enhanced resolution of stock structure, greater repeatability, and cost savings when compared to previous genetic analyses using microsatellite markers.

EESC is seeking collaborators to assist with sample collection of American shad, blueback herring, and alewife throughout their ranges. If you have the opportunity to collect tissue samples and would like to support the project, please contact Dr. Miluska Olivera Hyde at mhyde@contractor.usgs.gov.
Primary Investigator: Dr. David Kazyak, dkazyak@usgs.gov

2. PASSAGE PROJECTS

APPLIED RESEARCH ON FISH LIFT ENTRANCES FOR ALOSINES

EESC's Conte Anadromous Fish Research Laboratory in Turners Falls, Massachusetts has a unique fish passage research facility where biologists, hydraulic and civil engineers design and test fish passageways tailored to specific species and river systems. EESC scientists are improving fishway designs to increase the percentage of migrating alosines that are able to find passage, reduce the amount of time it takes for a fish to pass a fish ladder, and increase survival of upstream and downstream migration.
Primary Investigator: Dr. Kevin Mulligan, kmulligan@usgs.gov

DEVELOPMENT OF A NOVEL D-CYLINDER FISH LADDER FOR MULTIPLE SPECIES INCLUDING SHAD AND RIVER HERRING

Fish ladder designs have, for the most part, not been developed in many decades. Moreover, fish ladders that were installed on the Atlantic Coast tend to be ones that were designed for Pacific salmonids. On the Atlantic and Gulf Coasts, target species include alosines (shad and herring) as well as anguilliform swimmers (eel and lamprey) which have much different swimming capabilities and kinematics. The objective of this project is to develop a new fish ladder design that will pass a multitude of target species and incorporates contemporary knowledge of fish swimming performance and behavior, targeted for fish of the Atlantic Coast. The fishway experiments will be performed at the EESC Conte Research Laboratory located in Turners Falls, Massachusetts.
Primary Investigator: Kevin Mulligan, kmulligan@usgs.gov

PASSAGE OF ANADROMOUS SHAD AND RIVER HERRING AT BARRIERS

EESC is improving historic habitat access for alosines through better upstream and downstream fish passage. The project is focused on greater understanding of clupeid biology (primarily shad and river herring), including physiology, energetics, behavior, ecology, and life-history, and then relating these data to migratory movements and passage performance at barriers such as fishways, culverts, and tidegates. Statistical modeling methods are advanced that inform and serve as standards for passage evaluations, often forming the foundation for Federal Energy Regulatory Commission licensing requirements. These methods are now being applied to improve conservation of migratory fishes globally.
Primary Investigator: Dr. Ted Castro-Santos, tcastrosantos@usgs.gov

DEVELOPMENT OF AN EAST COAST FISH PASSAGE STRUCTURE DATABASE

EESC biologists are integrating revised fishway data and standardized metrics into a geographic information system (GIS) database as well as the American Eel GIS Habitat Assessment Database. An online mapping tool for querying fishway data and metrics is under development.
Primary Investigator: Dr. Alex Haro, aharo@usgs.gov

3. INVESTIGATING NOVEL HEPATITIS B VIRUS IN RIVER HERRING

EESC scientists have responded to a technical assistance request by the New Jersey Department of Fish & Wildlife regarding evidence of a novel virus associated with alewife (*Alosa pseudoharangus*). This assistance led to the identification and complete genome sequencing of a novel hepatitis B-like virus collected from the Maurice River in New Jersey. Molecular diagnostic tools were developed to screen for this virus and next generation sequencing methods have been utilized to evaluate viral diversity. At present the involvement of this virus in overt alewife disease is not well understood. Similarly, the prevalence of this virus in alewife populations is unknown. This technical assistance research simply adds a viral pathogen to the list of disease agents that may be associated with alewife population health. This work established precedent virus biosurveillance in migratory alewife stocks.

Primary Investigator: Dr. Luke Iwanowicz, liwanowicz@usgs.gov

# Atlantic States Marine Fisheries Commission

## Atlantic Menhaden Management Board

*October 19, 2021*
*1:15 – 5:15 p.m.*
*Webinar*

## 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 (*S. Woodward*) | 1:15 p.m. |
| 2. Board Consent<br>• Approval of Agenda<br>• Approval of Proceedings from August 2021 | 1:15 p.m. |
| 3. Public Comment | 1:20 p.m. |
| 4. Provide Guidance to the Technical Committee and Ecological Reference Points Work Group on Priorities for Completing Next Benchmark Stock Assessment (*M. Cieri*) **Possible Action** | 1:30 p.m. |
| 5. Break | 2:15 p.m. |
| 6. Progress Update on Development of Draft Addendum I to Amendment 3 (*K. Rootes-Murdy*) **Possible Action** | 2:30 p.m. |
| 7. Update on 2020-2021 Atlantic Menhaden Mortality Events (*J. Brust*) | 4:30 p.m. |
| 8. Other Business/Adjourn | 5:15 p.m. |

The meeting will be held via webinar, click here for details.

# MEETING OVERVIEW

**Atlantic Menhaden Management Board**
**Tuesday, October 19, 2021**
**1:15 – 5:15 p.m.**
**Webinar**

| | | |
|---|---|---|
| Chair: Spud Woodward (GA)<br>Assumed Chairmanship:<br>03/20 | Technical Committee<br>Chair:<br>Josh Newhard (USFWS) | Law Enforcement Committee<br>Representative: Robert Kersey<br>(MD) |
| Vice Chair:<br>Mel Bell (SC) | Advisory Panel Chair:<br>Meghan Lapp (RI) | Previous Board Meeting:<br>August 4, 2021 |
| Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (18 votes) | | |

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from August 4, 2021

**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. Provide Guidance to the Technical Committee and Ecological Reference Points Work Group on Priorities for Completing Next Benchmark Stock Assessment (1:30-2:15 p.m.) Possible Action**

**Background**

- In February, the Board tasked the Technical Committee (TC) and Ecological Reference Points Work Group (ERP WG) with identifying data and modelling needs to develop a spatially-explicit model that could help inform management in the Chesapeake Bay.
- The TC and ERP WG met in March and discussed data needs and potential timelines depending on the management objectives the Board wants the next benchmark stock assessment to address. (**Briefing Materials**)
- The Board had a preliminary discussion in August on priorities and considerations for the completing the next benchmark stock assessment.

**Presentations**

- Decision Tree for Guiding next Benchmark Stock Assessment by M. Cieri

**Board Actions for Consideration**

- Provide Guidance to the TC & ERG WG on the next benchmark stock assessment.

**5. Break**

| **6. Progress Report on Development of Draft Addendum I to Amendment 3 (2:30-4:30 p.m.) Possible Action** |
|---|
| **Background**<br>• In August, the Board initiated a draft addendum to consider changes to commercial allocations, the episodic event set aside (EESA) program, and the incidental catch and small-scale fisheries provision. The action responds to the Board work group (WG) report on potential strategies to evaluating in changing provisions of the current management program.<br>• The Menhaden Plan Development Team (PDT) met six times in September and October to develop a memo outlining draft statement of the problem, objectives, considerations, and management alternatives for each topic based on the Board WG Report **(Supplemental Materials)**. The memo is intended for the Board to review and provide guidance to the PDT in further developing the draft addendum. |
| **Presentations**<br>• Progress Report on Draft Addendum I by K. Rootes-Murdy |
| **Board Actions for Consideration**<br>• Provide Guidance to the PDT on further development of the draft addendum. |

| **7. Update on 2020-2021 Atlantic Menhaden Mortality Events (4:30-5:15 p.m.)** |
|---|
| **Background**<br>• In August the Board received public comment on a number of menhaden mortality events that have occurred in multiple states this year. The Board requested staff work with U.S. Fish and Wildlife Service to provide a summary of these events at the Annual Meeting. |
| **Presentations**<br>• 2020-2021 Atlantic Menhaden Mortality Events by J. Brust |

**8. Other Business/Adjourn**

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **Atlantic Menhaden Management Board**

**FROM:** **Atlantic Menhaden Plan Development Team**

**DATE:** **October 8, 2021**

**SUBJECT:** **Progress Report on Draft Addendum I to Amendment 3**

At the 2021 Summer Meeting, the Atlantic Menhaden Management Board initiated draft Addendum I to Amendment 3 to consider changes to commercial allocations, the episodic event set aside (EESA) program, and the incidental catch and small-scale fisheries provision. A Plan Development Team (PDT) was formed to develop management alternatives based on recommendations from the August 2021 Menhaden workgroup (WG) report. This memo summarizes the PDT work and seeks Board guidance to aid the PDT in continuing development of the Draft Addendum. Specifically, the PDT requests the Board clarify the objective under each topic and provide feedback on the goals of draft management alternatives to ensure that issues important to the Board are addressed.

The PDT developed the WG report's proposed strategies into management alternatives. Each section below includes 1) a statement of the problem based on issues identified in the WG report 2) a draft objective to address the statement of the problem and guide developing and selecting management alternatives (for the Board to confirm or adjust as needed); 3) draft management alternatives and goals the Board is seeking to achieve; and 4) Key questions the PDT needs the Board to address. The PDT is seeking Board feedback on these issues for each topic. Please note that a status quo option will be included in the addendum per ASFMC policy, but are not listed below for brevity.

The PDT notes the following topics are interconnected and that decisions made for one topic will impact alternatives under other topics. For example, increasing a jurisdiction's minimum allocation and/or redirecting latent quota could reduce a jurisdictions' dependence on harvest under the EESA, and vice versa. Conversely, increasing the EESA set aside may alter a jurisdiction's need for quota transfers or incidental fishery landings. Because of this interconnectedness, without Board guidance on the objectives under each topic, the PDT is challenged in developing a clear management document the public will be able to effectively provide feedback on and the Board to take final action on.

M21-115

**Issue 1. Commercial Allocations**

Statement of the Problem: The current allocations have resulted annually in the Total Allowable Catch (TAC) not being fully landed, while at the same time some jurisdictions do not have enough quota to maintain directed fisheries. Quota transfers alone are not enough to ameliorate this issue. Some jurisdictions have become reliant on the EESA and incidental catch provision to maintain their fishery while other jurisdictions regularly do not land their allocation.

Objective: Allocations should be adjusted to 1) align with recent availability (not long-term "average" availability) of the resource 2) ensure jurisdictions can maintain directed fisheries with minimal interruptions during the season; 3) reduce the need for quota transfers and; 4) fully utilize the annual TAC without overage.

Draft Management Alternatives

*A. Fixed Minimum Allocation*

Goal: Adjust the minimum quota allocation amount to address latent quota for jurisdictions that don't have directed fisheries or whose landings have consistently been well below the fixed minimum.

**Please note:** these alternatives are decision points to make in conjunction with the *Timeframe for Allocating Remaining Available TAC*

1) Reduce fixed minimum allocation (0.1% - 0.3%): This approach would reduce the fixed minimum of 0.5% to 0.1-0.3 % for all jurisdictions. These options seek to redistribute latent quota from the original fixed minimum, however, they could also lower the minimum allocation given to jurisdictions that are currently using it. If paired with a more recent allocation time frame, the additional fixed minimum would shift to jurisdictions that have seen an increase in landings over that time frame. **Board Input: Is a fixed minimum of 0.1-0.3% the appropriate range of options?**

2) Fixed minimum tier approach: This approach assigns tiers of fixed minimum allocation based on the percentage of historical bait landings a jurisdiction achieved during the reference period. An example of a three tiered approach, when compared to bait landings from 2009 to 2020, tier 1 could include jurisdictions landing 0.1% or less of the average coastwide landings, tier 2 could include jurisdictions landing more than 0.1% but less than 0.2% of average coastwide landings, and tier 3 could include jurisdictions landing 0.2% or more of average coastwide landings. In this example, percentages of the TAC for tiers one through three would be 0.01%, 0.2%, 0.5%, respectively. Tier 1 jurisdictions (n=3) would have never been short of quota during the time period and tier 2 jurisdictions (n=4) would also receive some quota based on the time frame selected, making allocation shortages for these jurisdictions rare. This approach would reduce latent quota, but not reduce the percent allocation to jurisdictions currently utilizing their fixed minimum quota. **Board Input: This approach requires a system to equitably**

**place jurisdictions in tiers and the PDT requests further guidance on what criteria could be used to accomplish this.**

Key Questions to the Board:

- Does an overall reduction in the fixed minimum quota align with the Board's goals for this topic? If yes, is there a range of options the Board would find most applicable?

- Does the tiered fixed minimum approach meet the Board's goals for this topic?

- Does the Board agree with the approach that fixed minimum quota tiers would be distributed based on bait landings or should the PDT explore total landings instead?

- Does the Board have any suggestions on what criteria could be used to assign jurisdictions into fixed minimum quota tiers, other than average landings?

- Currently 8% of the TAC is distributed using the Amendment 3 fixed minimum approach. Using either of these options to modify the fixed minimum would result in that percentage being lowered. How would the Board envision using this difference – adding it to a set aside program or reallocating it to the remaining available TAC to be distributed based on a timeframe?

*B. Timeframe for Allocating Remaining Available TAC*

Goal: For the remaining available TAC, allocate the TAC based on timeframes that reflect important periods in the fisheries. Table 1 offers a comparison of the different timeframe alternatives below.

1) Longer Time-Series Average (e.g., 2009 – 2020): This approach considers a broader landings history from all jurisdictions, including times of higher and lower landings, and incorporate more recent years in the timeframe. However, this option may dilute more recent changes in the fishery given the rate of change. **The PDT notes that this option is similar to the weighted allocation approach, and recommends its removal**.

2) More Recent Time-Series Average (e.g., 2018 – 2020): This approach reflects the most recent landings history and is more likely to align with current stock distribution. These strategies do not take into account past landings that likely represented previous stock distributions. If the stock distribution shifts again in the near future, allocation under these options would likely not match fishery performance and would need to be adjusted.

3) Weighted Allocation (e.g., 50% based on 2009 – 2011 and 50% based on 2018 – 2020): This approach considers both recent and historical time frames. Similar to the longer time-series average approach, this may dilute more recent changes in the fishery given the rate of change, but possibly to a lesser degree, due to averaging over fewer years. Weighting of the time periods could be even (50/50) or uneven (i.e. 75/25 in either direction). The weighted allocation

timeframes presented in Table 1 give similar results at a 50/50 distribution. **Board Input: If the Board pursues a weighted timeframe, the PDT recommends the Board select one of the three split time periods in Table 1 to minimize complexity in the document and reduce the number of very similar options. For simplicity, the PDT recommends limiting the weighting options in the draft addendum to 50/50, 75/25 and 25/75, as the Board can select any option within these ranges when taking final action.**

4) Moving Average: This would utilize a three year moving average, lagged by one year to allow finalizing the data, and time to inform jurisdictions of their quota (i.e. 2019-2021 average used to set 2023 allocation). This approach would lag most recent trends slightly, but would continue to adjust allocations percentages through time as the stock and fishery dynamics change. This option could reduce the certainty of jurisdictional allocations, but could also alleviate the need to revisit allocations as often.

Key Questions to the Board:

- Does the Board want to pursue the longer time-series average, which is less likely to match current fishery performance than other timeframe options or can it be removed from the list of options?

- Does the Board want to consider options that only utilize the most current timeframes and not historical landings?

- If the Board believes the weighted allocation aligns with their goals for reallocation, what time frame option does the Board select for further development of this option?

- What suggested weightings of the timeframe would the Board recommend (note: the PDT recommends limiting this option to reduce complexity)?

- Does the Board want to consider the moving average method that may better track fishery performance moving forward and reduce the need to revisit allocation in the future?

*C. Other Alternatives*

Pooled Quota. Note: this alternative is not listed above because it includes regional allocations. Certain jurisdictions have consistently underutilized their allocation either by having small bait fisheries, no directed fisheries, or no recent landings. To reduce the administrative burden on these jurisdictions and increase utilization of latent quota, they could be grouped and share a pooled quota. Pooled quota jurisdictions may not need to have in-season monitoring as pooled quota percentages would be based on landings history with an added buffer. The WG Report proposed this strategy, yet the Board has shown no interest in moving away from jurisdictional allocations. Table 3 is presented as an example below, if the Board chooses to pursue this concept, other variations could be developed. **Board Input: PDT requests the Board clarify**

**whether the PDT should further develop this management alternative for inclusion in the Draft Addendum**.

Key Questions to the Board:

- Does a pooled quota approach align with the Board's goals for reallocation given the contradiction between jurisdictional allocations and a pooled quota approach?

- If the Board would like to pursue a pooled quota approach, would the Board like this to be done in smaller groupings, potentially regionally, or would the Board prefer all of these jurisdictions share the same pool?

*The following Alternatives have been reviewed by the PDT and are recommended to not be included in the Draft Addendum due to challenges listed below.*

Second Best Year Strategy. Similar to the weighted allocation, this approach would utilize a jurisdictions second best landing year from 2009 – 2020 to determine a jurisdictions allocation. The idea behind this strategy is that it may be less of a historical outlier than a 'best year' and therefore better represents current fishing needs. The second best landing year could be used in combination with other strategies such as a fixed minimum or a tiered fixed minimum to produce an allocation scheme that reflects current operational need coastwide. Changes in TAC level and management changes, such as the inclusion of the fixed minimum, during the evaluation time period complicate fairly assessing a best or second best year between jurisdictions. A period of high abundance or availability for a particular jurisdiction may have coincided with more restrictive regulations compared to another jurisdiction, and vice versa. Due to the complications of comparing second best years across jurisdictions from different years, the **PDT recommends that this option not be considered for inclusion in the Draft Addendum**.

Open fishery, then reallocate. Under this approach there would be an open fishery for several years to document the bait fisheries' landing capacity when not constrained by a jurisdictional quota. These years would then be used for calculating base allocations going forward. Upon further evaluation of landings data, there does not appear to be enough extraneous quota under the current TAC for fishery expansion that may occur during the open fishery period, which would risk exceeding the TAC. Therefore, the **PDT recommends that this option not be considered for inclusion in the Draft Addendum**.

Table 1. Percentage of TAC allocated to each jurisdiction by time frame. All values use the 0.5% base minimum allocations established in Amendment 3. Status quo values from Amendment 3 are included for comparison.

| | Timeframes | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Jurisdiction | Status Quo | 2009-2020 | 2016-2020 | 2017-2020 | 2018-2020 | 09-11/18-20 | 09-12/17-20 | 10-12/18-20 |
| ME | 0.52% | 1.90% | 3.96% | 4.45% | 5.00% | 2.66% | 2.36% | 2.59% |
| NH | 0.50% | 0.66% | 0.90% | 0.99% | 1.14% | 0.80% | 0.73% | 0.79% |
| MA | 1.27% | 1.38% | 1.76% | 1.89% | 2.04% | 1.64% | 1.50% | 1.43% |
| RI | 0.52% | 0.61% | 0.64% | 0.65% | 0.57% | 0.54% | 0.58% | 0.54% |
| CT | 0.52% | 0.53% | 0.56% | 0.57% | 0.58% | 0.55% | 0.54% | 0.54% |
| NY | 0.69% | 0.79% | 0.90% | 0.91% | 0.92% | 0.80% | 0.79% | 0.78% |
| NJ | 10.87% | 11.54% | 11.29% | 11.35% | 11.25% | 11.08% | 11.88% | 12.43% |
| PA | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| DE | 0.51% | 0.52% | 0.52% | 0.53% | 0.53% | 0.52% | 0.52% | 0.52% |
| MD | 1.89% | 1.82% | 1.28% | 1.16% | 1.15% | 1.54% | 1.71% | 1.71% |
| PRFC | 1.07% | 1.15% | 1.05% | 1.05% | 1.06% | 1.07% | 1.13% | 1.14% |
| VA | 78.66% | 76.32% | 74.46% | 73.75% | 73.07% | 75.96% | 75.46% | 74.74% |
| NC | 0.96% | 0.73% | 0.63% | 0.64% | 0.63% | 0.80% | 0.76% | 0.74% |
| SC | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| GA | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| FL | 0.52% | 0.55% | 0.56% | 0.55% | 0.55% | 0.53% | 0.54% | 0.54% |

Table 2. Percentage of TAC allocated to each jurisdiction by year using the three year moving average strategy. The allocation in a given year is calculated using the three year moving average of the years beginning four years prior. (i.e. the 2021 allocations would have been based on the 2017-2019 average). All values use the 0.5% base minimum allocations established in Amendment 2.

| Jurisdiction | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| ME | 0.52% | 0.51% | 0.51% | 0.51% | 0.51% | 0.97% | 1.64% | 2.76% | 3.85% |
| NH | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.52% | 0.85% |
| MA | 1.27% | 0.91% | 0.77% | 0.95% | 1.09% | 1.13% | 1.24% | 1.46% | 1.69% |
| RI | 0.52% | 0.52% | 0.52% | 0.55% | 0.71% | 0.72% | 0.82% | 0.71% | 0.69% |
| CT | 0.52% | 0.51% | 0.51% | 0.51% | 0.51% | 0.51% | 0.53% | 0.59% | 0.59% |
| NY | 0.69% | 0.67% | 0.68% | 0.70% | 0.77% | 0.79% | 0.85% | 0.77% | 0.72% |
| NJ | 10.93% | 13.45% | 13.94% | 12.81% | 10.67% | 10.89% | 11.25% | 11.41% | 11.23% |
| PA | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| DE | 0.51% | 0.52% | 0.52% | 0.53% | 0.53% | 0.53% | 0.52% | 0.52% | 0.52% |
| MD | 1.90% | 2.18% | 2.33% | 2.52% | 2.16% | 2.02% | 1.71% | 1.38% | 1.18% |
| PRFC | 1.07% | 1.20% | 1.30% | 1.41% | 1.23% | 1.15% | 1.06% | 1.11% | 1.06% |
| VA | 78.60% | 76.18% | 75.57% | 76.30% | 78.57% | 78.04% | 77.15% | 76.08% | 74.92% |
| NC | 0.96% | 0.83% | 0.80% | 0.64% | 0.68% | 0.67% | 0.66% | 0.64% | 0.65% |
| SC | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| GA | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| FL | 0.52% | 0.52% | 0.54% | 0.55% | 0.57% | 0.57% | 0.57% | 0.56% | 0.55% |

Table 3. Percentage of TAC allocated to each jurisdiction by time frame options, with a 0.5% fixed minimum base, using a pooled quota approach for a group of states. This is an example, if the Board wants to pursue this concept, other states could be added to this pool or other groupings could be created.

| | Timeframe | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Jurisdiction | 2009-2011 | 2009-2020 | 2016-2020 | 2017-2020 | 2018-2020 | 09-11/18-20 | 09-12/17-20 | 10-12/18-20 |
| ME | 0.52% | 1.93% | 4.02% | 4.53% | 5.08% | 2.71% | 2.40% | 2.63% |
| NH | 0.50% | 0.66% | 0.90% | 1.00% | 1.15% | 0.81% | 0.73% | 0.80% |
| MA | 1.29% | 1.40% | 1.78% | 1.92% | 2.07% | 1.66% | 1.51% | 1.45% |
| RI | 0.52% | 0.61% | 0.64% | 0.65% | 0.57% | 0.54% | 0.58% | 0.54% |
| CT | 0.52% | 0.53% | 0.56% | 0.57% | 0.58% | 0.55% | 0.54% | 0.54% |
| NY | 0.69% | 0.79% | 0.90% | 0.92% | 0.93% | 0.81% | 0.79% | 0.79% |
| NJ | 11.15% | 11.76% | 11.49% | 11.55% | 11.45% | 11.30% | 12.11% | 12.66% |
| PA | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| DE | 0.51% | 0.52% | 0.53% | 0.53% | 0.53% | 0.52% | 0.52% | 0.52% |
| MD | 1.93% | 1.85% | 1.29% | 1.17% | 1.16% | 1.56% | 1.74% | 1.73% |
| PRFC | 1.09% | 1.16% | 1.06% | 1.06% | 1.07% | 1.08% | 1.15% | 1.15% |
| VA | 80.28% | 77.79% | 75.82% | 75.11% | 74.41% | 77.47% | 76.93% | 76.18% |
| NC | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| SC | | | | | | | | |
| GA | | | | | | | | |
| FL | | | | | | | | |

**Issue 2. Incidental Catch and Small-Scale Fisheries Commercial Allocations**

Statement of the Problem: The intent of this provision was to provide continued access for low-volume landings of menhaden once a jurisdictions' directed fisheries quota was met. In recent years, menhaden availability at the northern end of its range has resulted in directed fishery quotas being met earlier in the year; coastwide landings under this category have exceeded a number of jurisdictions directed fishery quotas and ranged from between 1-4% of the annual TAC. However, landings under this provision have never caused the overall TAC to be exceeded. The Amendment 3 language has led to various interpretations of which landings fall under this provision (i.e. once a sector allocation is met or full jurisdiction allocation). Without changes, landings under this provision may remain at high levels or increase. An increase in these landing could have the potential to jeopardize overall management objectives.

Objective: Sufficiently constrain landings to achieve overall management objectives such as: 1) meeting the needs of existing fisheries; 2) reducing discard mortality by limiting eligible gear types, 3) indicating when landings can occur and that those landings are not a part of the directed fishery; and 4) establishing trip and season limits.

Considerations: Adding further restrictions to the incidental catch provision could increase discard mortality, reliance of the northern jurisdictions on the EESA, and reliance on jurisdictional quota transfers. Increasing a jurisdictions minimum allocation could help in alleviating these impacts.

Key Questions to the Board:

- Given the current incidental catch landings trend does the Board want the provision to be an incidental catch only provision or to continue allowing directed small-scale fisheries under this provision?
- If directed small-scale fisheries are allowed under this provision, would the Board rather constrain landings and not count against the TAC or not constrain landings but count against the TAC?

Draft Management Alternatives

*A. Permitted Gear Types*

Goal: Address the volume of landings under the provision by removing specific gear types

1) No purse seines, all other small-scale and non-directed gears maintained: The provision would apply to both small-scale directed gears and non-directed gears, but exclude purse seine gears. This alternative is included due to the growth of directed landings from small-scale purse seine gears in recent years (Table 4). Landings from purse seine gears will count against a jurisdictions directed fishery quota.

2) Non-directed gears only: the provision shall apply to non-directed gears only. Under Amendment 3 this includes pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

*B. Timing of Incidental Catch Provision*

Goal: Address the timing of when a jurisdiction begins fishing under the provision as this impacts the duration that landings occur.

1) Sector/fishery/gear type allocation within a jurisdiction is met: Currently, jurisdictions such as New Jersey and Virginia further divide their jurisdictional allocation into sector and gear type specific allocations. The provision would confirm that once a sector/fishery/gear type specific allocation is reached for a jurisdictions, that jurisdictions sector/fishery/gear type fishery can begin landing catch under the provision.

2) Entire jurisdictional allocation met: Once the entire quota allocation for a given jurisdictions is reached, regardless of jurisdictional sector/fishery/gear type fishery allocations, the menhaden fishery moves to an incidental catch fishery.

3) Full closure when allocation met, no incidental catch provision: Once the entire quota allocation for a given jurisdiction is reached, regardless of sector/fishery/gear type fishery allocations, the menhaden fishery is closed, and no landings of menhaden are permitted by that jurisdiction.

*C. Trip Limit for Incidental Catch Provision*

Goal: Limit the annual volume of the incidental catch by reducing the trip limit.

The alternatives below modify the trip limits for incidental catch. **Board Input: The PDT seeks Board guidance on whether adjusting the trip limit is a priority, as it is unclear if these changes alone would result in significant reductions in landings under this provision.** In 2020, 59% of reported trips under the Incidental/Small-Scale landings provision were > 3000 lbs; 49% of trips were > 5000 lbs (Table 5).

1) 4,500 lb trip limit (up to 9,000 lbs for two authorized individuals)

2) 3,000 lb trip limit (up to 6,000 lbs for two authorized individuals)

**The PDT needs further Board guidance whether there is interest in pursuing different trip limit levels for non-directed gears vs small-scale gears.**

*D. Catch Accounting*

Goal: Create a system where annual landings are limited and there is accountability for overages.

Depending on Board guidance to key questions above, landings could be managed either 1) under a catch cap that does not count towards the overall TAC or 2) an annual set-aside of the TAC. Landings data would be reported by the states to the Commission as part of the annual compliance reports. In turn, an evaluation of the catch cap or set-aside would occur no earlier than the spring meeting after the fishing year.

1) Catch cap equal to 1% of the annual TAC and 10% trigger exceedance management trigger: Landings under the provision shall have a catch cap equal to 1% of the TAC. The cap is not a set aside and landings would still not count against the TAC. Landings are reported by jurisdictions to the Commission as a part of Annual Compliance Reports. If reported landings exceed the cap by more than 10% in a single year or exceeds the cap two years in a row (management trigger), regardless of the percent overage, the management trigger is reached and the Board must take action reduce incidental landings in the fishery.

2) 1% set-aside of the annual TAC. Annual overages would be deducted from the next year's set-aside: Landings under this provision shall count against a 1% set-aside of the overall TAC set annually at the beginning of the fishing season. If the set aside is exceeded in a given year, the overage is deducted from the subsequent year's set aside.

3) (Gear type category) Small-scale directed gear types have catch cap equal 1% of the annual TAC and 10% trigger exceedance management trigger. Non-directed gear types would continue to have no catch cap, trigger, or accountability measures.

4) (Gear type category) Small-scale directed gear types would have a 1% set-aside of the annual TAC. Annual overages would be deducted from the next year's set-aside. Non-directed gear types would continue to have no catch set-aside, or accountability measures.

**The PDT recommends this approach not be included in the draft addendum due to the complexity of the potential options above. The goal of the catch accounting approach can be achieved through a combination of the reallocation alternatives and incidental catch sub-topics (gear restrictions and trip limit) listed above.**

Table 4. Annual summary of total incidental landings as a fraction of coastwide TAC; and the fraction of total incidental landings coming from small-scale directed purse seine fishing.

| Year | Total incidental landings | Total incidental % of TAC | Incidental landings from purse seine | % of Incidental from purse seine |
|---|---|---|---|---|
| 2017 | 7,407,441 | 1.8% | 4,291,347 | 58% |
| 2018 | 3,290,066 | 0.7% | 2,419,194 | 74% |
| 2019 | 10,750,929 | 2.4% | 9,545,747 | 89% |
| 2020 | 13,957,206 | 3.1% | 12,332,677 | 88% |

Table 5. Total number of incidental landings trips per year, binned by total landing amount per trip

| | Landings per Trip | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 1-1000 | 1001 -2000 | 2001 -3000 | 3001 -4000 | 4001 -5000 | 5001 -6000 | 6000+ | Total Trips |
| 2013 | 1807 | 286 | 158 | 111 | 130 | 158 | 133 | 2783 |
| 2014 | 3671 | 516 | 318 | 190 | 206 | 265 | 109 | 5275 |
| 2015 | 3040 | 551 | 304 | 136 | 130 | 196 | 141 | 4498 |
| 2016 | 1673 | 184 | 91 | 61 | 53 | 125 | 35 | 2222 |
| 2017 | 1443 | 267 | 89 | 66 | 83 | 140 | 20 | 2108 |
| 2018 | 495 | 190 | 113 | 56 | 46 | 319 | 5 | 1224 |
| 2019 | 943 | 355 | 182 | 127 | 140 | 1320 | 46 | 3113 |
| 2020 | 846 | 363 | 266 | 153 | 184 | 1647 | 106 | 3565 |
| Total Trips | 13918 | 2712 | 1521 | 900 | 972 | 4170 | 595 | 24788 |
| % of Total Trips | 56% | 11% | 6% | 4% | 4% | 17% | 2% | 100% |

**Issue 3. Episodic Event Set Aside (EESA) Program**

Statement of the Problem: Over 90% of the EESA has been utilized in all years since 2016. With the increase in Atlantic menhaden abundance to the northeast, the program has become a secondary regional quota for several jurisdictions to continue fishery operations in jurisdictional waters. The dependency on EESA highlights the mismatch of Atlantic menhaden biomass to current commercial allocations.

Objective: Ensure sufficient access to "episodic" changes in regional availability in order to minimize in-season disruptions and reduce the need for quota transfers and incidental harvest.

Key Question for the Board: The PDT is requesting Board guidance on the intended use of this program and defining 'episodic'. As an example, there is evidence that periodic abundance of menhaden in the Gulf of Maine may last from 1 to 20 years then disappear for 1 to 20 years (Figure 1). Is the EESA program intended to cover only "one off" episodic events, or continue to serve as a secondary regional quota during extended periods of increased availability?

Draft Management Alternatives

1) Eliminate the EESA: The EESA would be removed from the management program and to address landing menhaden during an episodic event or increased availability, quota transfers would be needed to continue the directed fishery if a jurisdictional quota is met. If redistribution of minimum allocations and changes to the incidental catch provision can sufficiently account for the inter-annual variability in availability, then the EESA could be eliminated. This was not a recommendation from the WG but is included for completeness.

A. *Increase the Set-Aside*

Goal: in combination with reallocation or separately, ensure the states of ME-NY have increased bait quota for this program to reduce the need for in-season quota transfers or reliance on the Incidental/Small Scale provision in response to the increased presence of Atlantic menhaden biomass in the Northeast.

To achieve this goal, there are two key consideration for the Board:

1) How much to increase the EESA: The set aside is currently 1% of the TAC. A preliminary analysis suggests a set aside of approximately 3% would cover EESA plus quota transfers for MA-ME in recent years (2018-2020). A higher percentage above 3% would be needed to also cover landings in the incidental fishery from those jurisdictions (Table 4).

2) The source of the increased set aside: Three options discussed by the PDT include 1) increasing the set aside off the top of the TAC, 2) allowing (or requiring) relinquished quotas to be redirected to the EESA, or 3) utilizing latent quota from restructuring of the fixed minimum allocations (see earlier allocation section). Depending on decisions made on other topics, the first option may reduce the remaining available TAC for jurisdictional allocations (more in the EESA = less available for jurisdictional quotas), and

may alter the need for quota transfers or incidental catch landings. The second option would benefit the EESA without impact to jurisdictional quotas, but may result in annual variability in the size of the EESA if jurisdictions do not consistently relinquish quota to the program. The third option would benefit the EESA without impact to state quotas, but is reliant on the Board selecting an option that frees up latent quota under the fixed minimum allocation.

Questions for the Board:

- Is there a maximum set aside value that should be considered?
- Should the EESA be generated from:
    - 1) initial set aside of the overall TAC or;
    - 2) from annually relinquished jurisdictions quota or;
    - 3) utilizing latent quota from restructuring of the fixed minimum allocations?
- Is the Board interested in seeing an option that eliminates the EESA?

*B. Other Alternatives from the WG Report the PDT does not recommend further pursuing*

Adjust the date unused EESA is redistributed – In recent years there has been full or near full utilization of the set-aside quota. Additionally, there are jurisdictions that experience a fall migration of Atlantic menhaden that could potentially utilize EESA later in the season. In order to maintain effective participation options of these jurisdictions in Southern New England, should biomass shifts occur in future fishing years, the **PDT recommends that this option not be considered for inclusion in the Draft Addendum**.

Consider additional restrictions on EESA - Currently each jurisdictions that utilizes the EESA program have regulatory programs that include effort control measures. Based on PDT member experience and feedback from ASMFC staff, jurisdictions participating in the EESA are currently using a variety of tools, such as lower landing limits and daily reporting, to collectively manage the EESA and that additional restrictions may be redundant. **The PDT recommends that this option not be pursued further at this time and not be included in the Draft Addendum**.

Allow access at <100% jurisdictional allocation - Jurisdictions are currently required to fully utilize their jurisdictions' allocated quota. Allowing jurisdictions the opportunity to fish under the EESA before reaching 100% of their directed fishery quota could allow for their directed fishery to continue without interruption or closure**.** Accounting for landings and determining whether to apply landings to the EESA or directed quota in-season if the quota is not fully met will be very challenging**. The PDT recommends that the Board clarify the language in Amendment 3 whether jurisdictions can apply for the EESA prior to fully landing their allocation. The PDT does not recommend that an option be included in the draft addendum that allows jurisdictions to begin fishing under the EESA while having remaining directed quota because of the challenges of catch accounting.**

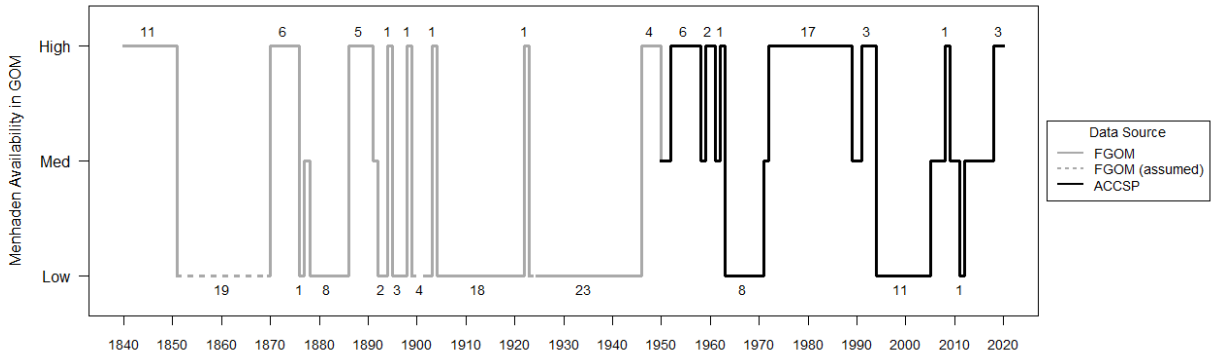


Figure 1. Reconstructed history of availability of Atlantic menhaden to the Gulf of Maine. The number of consecutive years in either a “High” or “Low” availability state are labeled. Data sources in include the book “Fishes of the Gulf of Maine” (FGOM), and the Atlantic Coastal Cooperative Statistics Program (ACCSP).

# DRAFT

# Policy on (Guidelines for) Information Requests

Atlantic States Marine Fisheries Commission

October12, 2021

While the Atlantic States Marine Fisheries Commission (ASMFC or Commission) is not generally subject to state or federal freedom of information laws, the Commission is dedicated to transparency and broad public access to information.

ASMFC member states have agreed to transparent and open decision-making, record-keeping, and public meeting processes. ASMFC policies and guidelines concerning public participation are set out in detail in the Compact, Rules and Regulations and the Interstate Fisheries Management Program (ISFMP) Charter. Of particular note, Section 6(c) of the ISFMP Charter sets out detailed provisions for public participation in ASMFC's fishery management process, including requirements for public disclosure of fishery management plan documents, and the preparation of administrative records concerning particular planning decisions.

Much of the publicly available information relating to the Commission's work can readily be accessed at the ASMFC's website, www.asmfc.org. The Commission's website is maintained to provide extensive information on fishery management proceedings, scientific and technical information, ASMFC procedures, and many other topics. For example, links to guiding documents may be found at Compact and Rules and Regulations, ISFMP Charter, Technical Guidance and Stock Assessment Process. Not all documents relevant to fishery management planning is posted on the website. For example public correspondence or data submissions/requests, made to ASMFC staff are not typically available on the website.

For access to such information, members of the public can email the Commission at info@asmfc.org. Within 14 days, ASMFC will acknowledge receipt of the request and provide a timeline for fully responding to the request.

As with any governmental entity, there are limitations regarding the types of information ASMFC is able to make public. For example, fisheries data may be confidential under state or federal law. If ASMFC receives a request related to confidential data, the request will be forwarded to the state or federal agency that originally collected the data. The state or federal agency will determine what data can be made available to the public based on their laws and policies.

In addition to confidential fisheries data, ASMFC may restrict access to certain other types of information in categories regularly withheld from public disclosure by governmental entities. Such information includes deliberative and pre-decisional technical or policy documents, attorney-client privileged documents, as well as personal and personnel information.

# ATLANTIC STATES MARINE FISHERIES COMMISSION

## 2022 Draft Action Plan

**Approved by the Administrative Oversight Committee for Review by the Business Session**

**(new tasks in bold)**

**October 20, 2021**

# Goal 1 – Rebuild, maintain and fairly allocate Atlantic coastal fisheries

Goal 1 focuses on the responsibility of the states to conserve and manage Atlantic coastal fishery resources for sustainable use. Commission members will advocate decisions to achieve the long-term benefits of conservation, while balancing the socio-economic interests of coastal communities. Inherent in this is the recognition that healthy and vibrant resources mean more jobs and more opportunity for those that live along the coast. The states are committed to proactive management, with a focus on integrating ecosystem services, socioeconomic impacts, habitat issues, bycatch and discard reduction measures, and protected species interactions into well-defined fishery management plans (FMPs). FMPs will also address fair (equitable) allocation of fishery resources among the states. Understanding global climate change and its impact on fishery productivity and distribution is an elevated priority. Improving cooperation and coordination with federal partners and stakeholders can streamline efficiency, transparency, and, ultimately, success. In the next five years, the Commission is committed to making significant progress on rebuilding overfished or depleted Atlantic fish stocks.

Fisheries management and stock assessment activities anticipated for 2020 and into 2021 are outlined below. Activities are divided into high priority species (those with significant management action, stock assessment activity, or are of critical importance to the states and their stakeholders) and medium-low priority species. For most species, there are several activities that occur on an annual or ongoing basis, including specification setting; FMP review and state compliance reports; and ensuring cooperation and consistent management programs among the states, regional councils, and NOAA Fisheries for shared resources. While ongoing activities are not listed below, they continue to be conducted. The focus of the Action Plan is to highlight new and high profile activities where the Commission will focus its resources and energies for the next two years.

## HIGH PRIORITY SPECIES FOR 2022

**American Eel**

- Review benchmark stock assessment and peer review, in which was developed in coordination with U.S. Geological Survey (USGS) and Fisheries and Oceans Canada, and respond if necessary.
- Monitor international action on the Convention of International Trade of Endangered Species through communications with US Fish and Wildlife Service (USFWS)
- Participate and co-chair an International Council for the Exploration of the Sea Work Group for American Eel with Fisheries and Oceans Canada

**American Lobster**

- Finalize and implement Addendum XXVII to establish a trigger mechanism for management measures to increase the biological resiliency of the Gulf of Maine/Georges Bank (GOM/GBK) stock
- Finalize and implement Addendum XXIX to enhance spatial and temporal characterization of effort in federal lobster and Jonah crab fisheries. Work with partners and ACCSP on developing tracking device approval and data collection and integration processes.

- Conduct a management strategy evaluation for the GOM/GBK lobster fishery, if approved by the Board in October
- Update annual indices of stock abundance and settlement and respond if necessary
- Continue to monitor and respond as necessary to NOAA rulemaking on Atlantic Large Whale Take Reduction Plan modifications
- Continue to work with the Law Enforcement Subcommittee, the states, and NOAA Fisheries to improve enforcement of management measures in both state and offshore waters
- Work with NOAA Fisheries to ensure consistency in state and federal regulations

**Atlantic Menhaden**

- Finalize and implement Addendum I on quota allocations, episodic event set aside program, and incidental catch and small-scale fisheries provisions
- Review stock assessment update and respond if necessary

**Atlantic Striped Bass**

- Finalize and implement Addendum VII on voluntary transfers of commercial quota
- Finalize and develop implementation plans for Amendment 7 to ensure stock rebuilding and address current fishery management issues
- Review stock assessment update and respond if necessary

**Black Sea Bass**

- Finalize and implement, in coordination with the Mid-Atlantic Fishery Management Council (MAFMC), addendum/amendment on commercial/recreational allocation, taking into account calibrated recreational estimates
- Finalize and implement, in collaboration with MAFMC, Addendum XXXIV on harvest control rule
- Develop, in collaboration with MAFMC, management action(s) to address remaining recreational reform issues
- Implement Addendum XXXIII on state commercial allocations
- Contribute data for 2022 research track assessment

**Bluefish**

- Implement, in coordination with MAFMC, Amendment 2 addressing issues including: commercial/recreational allocation, state-by-state commercial allocation, goals and objectives, quota transfers between sectors, management uncertainty, and a rebuilding program
- Finalize and implement, in collaboration with the MAFMC, Addendum XXXIV on harvest control rule
- Develop, in collaboration with MAFMC, management action(s) to address remaining recreational reform issues
- Contribute data for 2022 research track assessment

**Horseshoe Crab**

- Review Adaptive Resource Management (ARM) Framework revision and peer review and respond if necessary
- Secure long-term funding for the Horseshoe Crab Benthic Trawl Survey for use in the ARM Framework

**Jonah Crab**

- Finalize and implement Addendum XXIX to enhance spatial and temporal characterization of effort in federal lobster and Jonah crab fisheries. Work with partners and ACCSP on developing tracking device approval and data collection and integration processes.
- Continue development of benchmark stock assessment for peer review in 2023

**Scup**

- Finalize and implement, in coordination with MAFMC, amendment addressing commercial/recreational allocations, taking into account recalibrated recreational estimates
- Finalize and implement, in collaboration with MAFMC, Addendum XXXIV on harvest control rule
- Develop, in collaboration with MAFMC, management action(s) to address remaining recreational reform issues

**Summer Flounder**

- Finalize and implement, in coordination with MAFMC, amendment addressing commercial/recreational allocations taking into account recalibrated recreational
- Participate in MAFMC management strategy evaluation regarding the benefits of minimizing discards and converting discards into landings in the recreational sector
- Finalize and implement, in collaboration with the MAFMC, Addendum XXXIV on harvest control rule
- Develop, in collaboration with MAFMC, management action(s) to address remaining recreational reform issues

**Tautog**

- Use the Risk and Uncertainty Decision Tool to identify potential management responses to stock assessment update if necessary
- Continue to monitor the implementation of the commercial harvest tagging program to reduce illegal harvest

## MEDIUM-LOW PRIORITY SPECIES

**Atlantic Croaker**

- Conduct traffic light analysis and respond if necessary

**Atlantic Herring**

- Reconsider Draft Addendum III regarding allocation of Area 1A quota
- Review the 2022 management track assessment and respond if necessary

- Monitor and respond if necessary to New England Fishery Management Council (NEFMC) activities regarding Framework 7 development (spawning protections for Georges Bank and Nantucket Shoals), Framework 9 implementation, and potential changes to the Industry-Funded Monitoring Program
- Continue to improve coordination and collaboration with NEFMC
- Conduct meetings as necessary to establish state effort control (days-out) programs for Area 1A

**Atlantic Sturgeon**

- Monitor state and federal activities in response to an Endangered Species Act listing, including 5-year status review and recovery plan

**Black Drum**

- Conduct benchmark stock assessment and peer review

**Coastal Sharks**

- Review SEDAR hammerheads stock assessment and peer review, respond if necessary in collaboration with NOAA Fisheries Highly Migratory Species (HMS) Division
- Monitor activities of NOAA Fisheries HMS Division with regards to coastal shark management actions and consider development of complementary management actions as needed for consistency, including monitoring HMS Amendment 14 (annual catch limits and accountability measures)

**Cobia**

- Continue to monitor and respond as necessary to NOAA rulemaking

**Northern Shrimp**

- Based on 2021 management decisions, conduct appropriate stock evaluation and respond if necessary
- Continue to explore long-term management options given environmental changes in the GOM and depleted stock status
- In the absence of a dedicated survey, consider alternative monitoring approaches

**Red Drum**

- Review assessment simulation model and peer review and initiate benchmark stock assessment for completion for 2024

**Shad and River Herring**

- Continue development of river herring benchmark stock assessment for peer review in 2023
- Complete updates to shad and river herring sustainable fishery management plans
- Complete updates to the shad habitat plans
- Monitor management activities of NEFMC and MAFMC including, but not limited to, shad and river herring catch caps and bycatch avoidance programs

**Spanish Mackerel**

- Review SEDAR benchmark stock assessment and peer review and respond if necessary in collaboration with the South Atlantic Fishery Management Council (SAFMC)

**Spiny Dogfish**

- Conduct benchmark stock assessments and peer review in collaboration with Northeast Fisheries Science Center, MAFMC, and NEFMC, and respond if necessary

**Spot**

- Conduct the traffic light analysis and respond as necessary

**Spotted Seatrout**

No new tasks

**Weakfish**

No new tasks

**Winter Flounder**

- Review management track assessment and respond if necessary

## CROSS CUTTING ISSUES

- Evaluate impacts of Marine Recreational Information Program's (MRIP) implementation of data presentation standards to Commission FMPs and stock assessments
- Continue to update existing management programs to address the concerns of the recreational community with regard to Commission-managed and jointly-managed species
- Continue to participate in and provide administrative support for scenario planning activities to address changes in stocks and fisheries due to climate and fisheries governance
- Evaluate COVID-19 impacts on fishery-dependent and fishery-independent data collection; develop strategies to adapt assessment methods
- Continue to work with the states and NOAA Fisheries on changes to the Take Reduction Plan for North Atlantic Right Whale
- Continue to participate on MAFMC's Research Steering Committee's effort to examine reestablishing the Research Set Aside program
- Monitor developments related to changing ocean conditions, ocean acidification, stock distributions, ecosystem services, ocean planning and potential fisheries reallocations
- Evaluate conservation equivalency program and update as necessary
- Continue to explore allocation strategies for the Commission's quota-managed species to reflect current fishery conditions

## Goal 2 – Provide the scientific foundation for stock assessments to support informed management actions

Sustainable management of fisheries relies on accurate and timely scientific advice. The Commission strives to produce sound, actionable science through a technically rigorous, independently peer-reviewed stock assessment process. Assessments are developed using a broad suite of fishery-independent surveys and fishery-dependent monitoring, as well as research products developed by a coastwide network of fisheries scientists at state, federal, and academic institutions. The goal encompasses the development of new, innovative scientific research and methodology, and the enhancement of the states' stock assessment capabilities. It provides for the administration, coordination, and expansion of collaborative research and data collection programs. Achieving the goal will ensure sound science is available to serve as the foundation for the Commission's evaluation of stock status and adaptive management actions.

Several fisheries science activities occur on an annual or ongoing basis, including development of stock assessments and conducting peer reviews; stock assessment scheduling and evaluation of scientists' workloads; updating Commission research priorities and distributing to funding agencies; external research proposal reviews; development of ecological reference points models; supporting multispecies/diet data collection; fish ageing and tagging programs; gear technology research; and participation in Marine Recreational Information Program (MRIP) catch estimation calibrations and Atlantic Coastal Cooperative Statistics Program (ACCSP) committees. While ongoing activities are not listed below, they continue to be conducted.

### SCIENCE COMMITTEE ACTIVITIES

- **Support new Stock Assessment Scientist hire at a state agency to expand coastwide analytical capacity**
- Continue incorporating socioeconomic information in management documents and streamline processes for producing socioeconomic analyses through the Committee on Economics and Social Sciences
    - **Participate in the development of NEFSC's Ecosystem and Socioeconomic Profiles**
    - **Develop an American lobster socioeconomic data inventory to enhance current stock and fishery indicators**
- Develop proposals and pursue support for fisheries research priorities through the Management and Science Committee (MSC)
- Finalize testing of the Risk and Uncertainty Tool using tautog and incorporate lessons learned in approving the Tool for all species boards.

### DATA COLLECTION

- Coordinate the Southeast Area Monitoring and Assessment Program (SEAMAP) South Atlantic component
    - Collaborate with the Southeast Coastal Ocean Observing Regional Association (SECOORA) to host SEAMAP South Atlantic survey data
    - Seek increased funding support via budget discussions with Congressional staff

- Coordinate the Northeast Area Monitoring and Assessment Program (NEAMAP); implement action items stemming from the 2021 NEAMAP Summit
    - Develop common methodology protocols for NEAMAP surveys
    - Conduct Maturity Staging Workshop
    - Conduct Trawl Survey Calibration Workshop
    - Seek increased funding support via budget discussions with Congressional staff
- Collect new data to address data deficiencies
    - Collect fishery-dependent data using black sea bass research fleet
    - Assess fixed gear and right whale interactions in the Gulf of Maine
    - Increase bycatch monitoring of sturgeon, shad and river herring, and sciaenids in state waters, as resources allow
    - **In coordination with USGS and state agencies, establish an American shad and river herring genetics repository for stock identification purposes**
    - **Collaborate with NOAA Fisheries to request the collection of shad and river herring genetic samples from the Atlantic herring fishery**
    - Support SAFMC, the states, and ACCSP with the Citizen Science project to collect new recreational live release size data via volunteer logbooks
    - Leverage partnerships to increase diet data collection to support ecosystem-based assessments and management through new or existing programs (e.g., SEAMAP), as resources allow, **notably diets of larger offshore fish, birds, and marine mammals**
- Promote the collection of acoustic tagging information and work with the Atlantic Coastal Telemetry network to integrate tagging studies along the coast; secure telemetry tagging data for use in stock assessments

## FISHERIES RESEARCH

- Conduct **Atlantic Menhaden** and **Atlantic Sturgeon** Ageing Exchanges and Workshops
- Conduct a Fish Ageing Quality Assurance Workshop among Atlantic coast state and university laboratories to ensure consistency between new and historical age data
- Collaborate with university researchers to develop next iteration of lobster length-structured assessment model, with incorporation of time-varying thermal habitat effects and growth
- **Work with SUNY Stony Brook on the American lobster simulation analysis for possible use in management strategy evaluation**
- Seek opportunities to collaborate with academic institutions to advance population dynamic models for use in stock assessments
- Partner with USGS to identify shared research priorities and opportunities for enhanced scientific support to the Commission

## ECOSYSTEM-BASED MANAGEMENT & CHANGING OCEAN CONDITIONS

- Evaluate the effects of changing ocean conditions on stock productivity and distribution; develop criteria for adding/subtracting states from fishery management boards when stock distributions change
- **Provide input to NOAA Fisheries Atlantic Coast Science Coordination Initiative, and participate in East Coast Climate Change Scenario Planning Initiative**

- Collaborate with NOAA Fisheries Northeast and Southeast Fisheries Science Centers to include Commission interests in Ecosystem Status Reports
- Track development of emerging science and tools related to changing ocean conditions and impacts to fisheries (e.g., Climate Vulnerability Assessments)

### COMPETING OCEAN USES

- Participate in Responsible Offshore Science Alliance and provide forum for the states to discuss interactions between fisheries resources and offshore energy development
- Continue the Commission's role in aquaculture activities, including policy development and interstate shellfish seed tracking through the Aquaculture Committee

## Goal 3 - Produce dependable and timely marine fishery statistics for Atlantic coast fisheries

Effective management depends on quality fishery-dependent data and fishery-independent data to inform stock assessments and fisheries management decisions. While Goal 2 of this Action Plan focuses on providing sound, actionable science and fishery-independent data to support fisheries management, Goal 3 focuses on providing timely, accurate catch and effort data on Atlantic coast recreational, for-hire, and commercial fisheries.

Goal 3 will accomplish this through the Atlantic Coastal Cooperative Statistics Program (ACCSP), a cooperative state-federal program that designs, implements, and conducts marine fisheries statistics data collection programs and integrates those data into data management systems to meet the needs of fishery managers, scientists, and fishermen. ACCSP partners include the 15 Atlantic coast state fishery agencies, the three Atlantic Fishery Management Councils, the Potomac River Fisheries Commission, NOAA Fisheries, and the U.S. Fish and Wildlife Service (USFWS).

On a continuing basis, ACCSP does the following:

- Reviews and maintains coastwide standards for data collection and processing in cooperation with all program partners
- Provides funding to its Program Partners supporting data collection management and innovation through a competitive process and monitors funded projects
- Maintains commercial dealer reporting and commercial and for-hire fishermen catch reporting through the Standard Atlantic Fisheries Information System (SAFIS) electronic applications
- Coordinates state conduct of the Marine Recreational Information Program (MRIP) Access Point Angler Intercept Survey (APAIS) and the For-Hire Survey (FHS)
- Consolidates and integrates partner data and provides user-friendly, on-line, public and confidential access to those data via the Data Warehouse
- Maintains security protocols for ASMFC network and information systems to comply with Federal Information Security Management Act

## PROGRAM MANAGEMENT

- Implement method for distribution and revision of Atlantic coast data standards which will improve accessibility and be more responsive to partner needs
- Implement communication strategies in accordance with the ASMFC Communications Plan
- Update Atlantic Recreational Implementation Plan

## FISHERIES-DEPENDENT DATA COLLECTION

**SAFIS**

- **Support collection of trip location data and integration with electronic harvester reporting**
- **Support second phase of One Stop Reporting to include state trip reporting requirements**
- Extend major redesign of the SAFIS database and applications for dealer landings (SAFIS eDR) to add flexibility and streamline reporting. Within available resources, this will be accomplished by;
    - **Applying updated participant and permit database design to provide better resolution of individual and corporation fishing records as needed to support the SAFIS redesign**
    - **Restructuring data processing to use a single pathway for online, mobile, and uploaded data entry**
    - **Developing the SAFIS Management System Switchboard for eDR applications providing greater flexibility for partners to adjust data fields**
- Expand use of trip management system to incorporate universal trip ID into Partner systems

## DATA STANDARDS, DISTRIBUTION AND USE

**Data Warehouse**

- Continue to expand data warehouse content, with emphasis on biological data and recreational estimates
- **Publish biological and bycatch program inventories in online searchable and updatable format**
- **Create Data Warehouse queries for biological data linked to collection program details and metadata**
- Implement best practices on data validation, reconciliation, and documentation designed to improve data integrity

**Recreational Fisheries**

- **Submit for-hire program methodology to MRIP** to more fully incorporate for-hire logbooks into catch statistics
- **Expand standards for citizen science data**
    - Define appropriate uses of citizen science data to guide stakeholder expectations
    - Develop core fields for data collection and availability of data to promote data compatibility across source citizen science applications

## Goal 4 – Promote compliance with fishery management plans to ensure sustainable use of Atlantic coast fisheries

Fisheries managers, law enforcement personnel, and stakeholders have a shared responsibility to promote compliance with fisheries management measures. Activities under the goal seek to increase and improve compliance with FMPs. This requires the successful coordination of both management and enforcement activities among state and federal agencies. Commission members recognize that adequate and consistent enforcement of fisheries rules is required to keep pace with increasingly complex management activity and emerging technologies. Achieving the goal will improve the effectiveness of the Commission's FMPs.

The Commission's Law Enforcement Committee (LEC) carries out much of Goal 4. Most of these activities occur on an annual basis or as part of the FMP development process. Proposed changes in management are evaluated to determine enforceability and effectiveness. The LEC provides managers with feedback on the practicality of regulations to foster stakeholder buy-in and compliance.

### COMPLIANCE

- **Explore methods for improved enforcement of offshore lobster regulations**
- Incorporate and reference the revised "Guidelines for Resource Managers" in reviews and evaluations of proposed changes to management programs
- Annually review and comment on (as needed) NOAA Fisheries enforcement priorities to ensure they support the enforceability and effectiveness of Commission management programs
- Evaluate interagency measures to enhance traceability of fishery products across jurisdictional boundaries

### PARTNERSHIPS

- Engage and support NOAA Fisheries and USFWS Offices of Law Enforcement, U.S. Department of Justice, and U.S. Coast Guard to facilitate the enforceability of Commission FMPs
- Work to sustain financial support for Joint Enforcement Agreements (JEAs)

### STAKEHOLDER AWARENESS

- Use emerging communication platforms and tools to deliver real time information regarding regulations and the outcomes of law enforcement investigations
    - Explore the use of electronic tools to communicate real-time commercial and recreational regulations

## Goal 5 – Protect and enhance fish habitat and ecosystem health through partnerships and education

Goal 5 aims to conserve and improve coastal, marine, and riverine habitat to enhance the benefits of sustainable Atlantic coastal fisheries and resilient coastal communities in the face of changing ecosystems. Habitat loss and degradation have been identified as significant factors affecting the long-

term sustainability and productivity of our nation's fisheries. The Commission's Habitat Program develops objectives, sets priorities, and produces tools to guide fisheries habitat conservation efforts directed towards ecosystem-based management.

The challenge for the Commission and its state members is maintaining fish habitat in the absence of specific regulatory authority for habitat protection or enhancement. Therefore, the Commission will work cooperatively with state, federal, and stakeholder partnerships to achieve this goal. Much of the work to address habitat is conducted through the Commission's Habitat and Artificial Reef Committees. In order to identify critical habitat for Commission managed species, each year the committee reviews existing reference documents for Commission-managed species to identify gaps or updates needed to describe important habitat types and review and revise species habitat factsheets. The Habitat Committee also publishes an annual issue of the *Habitat Hotline Atlantic*, highlighting topical issues that affect all the states.

The Commission and its Habitat Program endorses the National Fish Habitat Partnership (NFHP), and will continue to work cooperatively with the program to improve aquatic habitat along the Atlantic coast. Since 2008, the Commission has invested considerable resources, as both a partner and administrative home, to the Atlantic Coastal Fish Habitat Partnership (ACFHP), a coastwide collaborative effort to accelerate the conservation and restoration of habitat for native Atlantic coastal, estuarine-dependent, and diadromous fishes. As part of this goal, the Commission will continue to provide support for ACFHP, under the direction of the National Fish Habitat Partnership Board.

## EDUCATE

- Educate Commissioners, stakeholders, and the general public about the importance of habitat to healthy fisheries and ecosystems
- Publish Habitat Management Series document on acoustics affecting fish habitat; **initiate next Habitat Management Series document**
- Identify mechanisms to evaluate ecosystem health for consideration by Technical Committees and Boards

## INTEGRATE

- Complete Fish Habitats of Concern descriptions to be considered for integration into Commission FMPs
- Increase communication on ecosystem-based management with Commission committees to find overlap with fish habitat related issues
- Explore opportunities to integrate habitat data into stock assessments where possible

## LEVERAGE PARTNERSHIPS

- Engage local, state, and regional governments in mutually beneficial habitat protection and enhancement programs through partnerships
- Foster partnerships with management agencies, researchers, and habitat stakeholders to leverage regulatory, political, and financial support

- Engage in state and federal agency efforts to ensure response strategies to changing ocean conditions are included in habitat conservation efforts
- Work with ACFHP to foster partnerships with like-minded organizations at local levels to further common habitat goals
- Promote development of effective fish passage approaches and projects through state and federal collaboration
- Provide administrative home and support to the Atlantic Coast Fish Habitat Partnership, including the following activities
- **When the NFHP releases its project evaluation guidance, compile monitoring data on previously funded on-the-ground projects**
- **Develop new Strategic Plan to guide ACFHP activities over the next five years**
- Work with partners to protect, restore, or maintain resilient Regional Priority Habitats to optimize ecosystem functions and services to benefit fish and wildlife
- Restore habitats by funding fish passage and non-fish passage projects (SAV, oyster reefs, salt marshes)

## Goal 6 – Strengthen stakeholder and public support for the Commission

Stakeholder and public acceptance of Commission decisions are critical to our ultimate success. For the Commission to be effective, these groups must have a clear understanding of our mission, vision, and decision-making process, as well as the opportunities that stakeholders have to participate in our process through advisory panels and public comment. The goal seeks to do so through expanded outreach and education efforts about Commission programs, decision-making processes, and its management successes and challenges. It aims to engage stakeholders in the process of fisheries management, and promote the activities and accomplishments of the Commission. Achieving the goal will increase stakeholder participation, understanding, and acceptance of Commission activities.

On a continuing basis, the Commission conducts outreach and stakeholder engagement though a number of products and activities. These include publications (e.g., bi-monthly Fisheries Focus, Annual Report to Congress), press releases, meeting summaries, stock assessment overviews, website and social media platforms, industry tradeshows and state festivals, and stakeholder engagement through the advisory panel process. Building strong relationships with local, regional and national media contacts, and networking/collaborating with our management partners from the Councils, states and federal agencies are also critical components of our outreach program, which occur on an ongoing basis.

### INCREASE PUBLIC UNDERSTANDING AND SUPPORT OF ASMFC

- Update *Guide to Fisheries Science and Stock Assessments*
- **Highlight successes in ending overfishing and describe challenges (outside of controlling fishing mortality) in rebuilding efforts for depleted species**
- Promote high profile species and stock assessment results through various outreach tools and platforms

- **Focal areas for 2022: Atlantic striped bass amendment development; harvest control rule/recreational reform initiative; climate change scenario planning, risk and uncertainty tool; and management strategy evaluation; and American lobster/Jonah crab trackers**
- **2022 stock assessments: American eel, Atlantic menhaden, Atlantic striped bass, bluefish, black sea bass, black drum, red drum, and spiny dogfish**

## MAXIMIZE USE OF CURRENT AND NEW TECHNOLOGIES

- Update/upgrade ASMFC website: modify to be https compliant; increase user friendliness; develop new content on climate change effects on managed species, **recreational reform initiative, recreational data (MRIP), and best fishing practices**
- **Explore moving ASMFC, NEAMAP, and SEAMAP websites to offsite host, and modify/update websites accordingly**
- Use webinars, videos and story maps to engage and inform public about current activities (management, science, habitat, and data collection and management)
- Use new technologies and communication platforms to more fully engage the broader public in the Commission's activities and actions
- Use story mapping and photo journaling to better communicate science and management activities
- Monitor the success of website and social media platforms in reaching broader constituency and effectively communicating ASMFC mission, programs and activities
- **Move to full digital distribution of Fisheries Focus and Habitat Hotline Atlantic**

## FACILITATE STAKEHOLDER PARTICIPATION

- Continue to evaluate effectiveness of current advisory panel process and consider possible changes to enhance engagement and provide management boards with useful stakeholder input
- **Revitalize Advisory Panels for American Lobster, Bluefish, Tautog, and Summer Flounder/Scup/Black Sea Bass to strengthen stakeholder input on pending management documents and stock assessments**
- **Coordinate with SAFMC on advisory panel process for Spanish mackerel**
- Explore additional tools to gather public comment on proposed management actions (e.g., online surveys)
- **Establish post-COVID-19 processes to facilitate stakeholder participation at in-person meetings and via webinar, including transparency and accountability**
- **Collaborate with NOAA Fisheries on development and conduct of the Recreational Fishing Summit (March 29-30, 2022)**

## MEDIA RELATIONS AND NETWORKING

- Increase interdepartmental coordination on outreach activities through the ASMFC Communications Plan
- Conduct a survey of ASMFC outreach products/tools to access effectiveness/success of products/tools and identify new platforms and opportunities for outreach moving forward

- **Develop and implement social media plan to ensure consistent social media messaging and presence across all departments and subject matters**
- Work with other Northeast Regional Coordinating Council (NRCC) communication members to coordinate outreach on shared stock assessments
- **Work with communication leads from the NRCC and SAFMC to promote activities of the Climate Change Scenario Planning Initiative**
- Strengthen national, regional, and local media relations to increase coverage of Commission actions
- Track media communications and coverage through ASMFC-related news clippings and media tracking sheet
- Work with Atlantic Coast Fisheries Communication Group, comprised of Public Information Officers from the Councils, states and federal agencies, to share successful tools, identify key media contacts and work cooperatively on joint projects

## Goal 7 – Advance Commission and member states' priorities through a proactive legislative policy agenda

State input is critical for a coherent national fisheries policy. The Commission recognizes the need to work with Congress, the Administration and partner organizations in policy formulation, and will be vigilant in advocating state interests to Congress. The Commission will pursue federal resources for states to implement and comply with the Atlantic Coastal Fisheries Cooperative Management Act (Atlantic Coastal Act) and to improve or maintain fisheries data collection. The importance of habitat restoration, research on the impacts of changing ocean conditions, and the need for effective marine enforcement will also be communicated to Congress and our management partners.

### DEVELOP AND STRENGTHEN RELATIONSHIPS WITH MEMBERS OF CONGRESS AND STAFF

- Encourage Commissioners to communicate with Members of Congress as needed and facilitate in person meetings when possible
- Provide opportunities for the Executive Director to communicate with congressional staff on a regular basis
- Provide state-specific 'ASMFC Meeting Previews' to congressional staff ahead of quarterly Meetings

### ENGAGE CONGRESS AND THE ADMINISTRATION ON FISHERY-RELATED LEGISLATION AND ISSUES

- Engage with the Administration and Congressional representatives following the November 2022 election on fisheries priorities and emerging issues
- Utilize the Legislative Committee to increase the Commission's effectiveness on Capitol Hill
    - Review pending legislation of interest to the Commission and make recommendations to the ISFMP Policy Board or Executive Committee
    - Explore reauthorization of the Atlantic Coastal Fisheries Cooperative Management Act

    - Explore a Commission line-item for annual federal appropriations
    - **Explore authorizing legislation for fisheries independent surveys supporting ASMFC-managed species (horseshoe crab, Atlantic menhaden, NEAMAP Mid-Atlantic and ME-NH trawl surveys)**
- Monitor federal legislation affecting the Commission, including policy and annual appropriations bills and develop Commission positions on pending federal legislation
    - Existing laws: Atlantic Coastal Act*,* Interjurisdictional Fisheries Act, Anadromous Fish Conservation Act, Magnuson-Stevens Act, Federal Aid in Fish Restoration Act, and Endangered Species Act
    - Pending legislation/emerging issues: forage fish management, user group and state-by-state allocations, disaster declarations, energy initiatives (offshore wind, hydropower, oil and gas exploration), shark fin trade, whale rulemaking, living shorelines, artificial reefs, and Recovering America's Wildlife Act

## PURSUE FEDERAL RESOURCES TO SUPPORT MANAGEMENT ACTIVITIES

- Communicate the Commission's federal funding needs to Congress and advocate for sufficient appropriations
    - Priority line items for NOAA: Regional Councils and Fishery Commissions, Interjurisdictional Fisheries Act, Fisheries Data Collections, Surveys and Assessments, SEAMAP, and Fisheries Information Networks
        - Priority projects, programs, and activities include: Atlantic Coastal/National Fish Habitat Partnership, Cooperative Enforcement Joint Enforcement Agreements, NEAMAP trawl surveys, GOM lobster research, Mid-Atlantic Horseshoe Crab Trawl Survey,
    - Priority line items U.S. Geological Survey (USGS): Ecosystem Mission Area
        - Priority projects, programs, and activities include: Eastern Ecological Science Center and Cooperative Research Units
    - Seek federal funding support for long-term monitoring surveys and species-specific initiatives
- Engage the Administration (Commerce and Interior Departments) on funding and policy issues, including Secretarial implementation of the Atlantic Coastal Act
- Communicate state and Commission funding needs to NOAA Fisheries, USFWS, and USGS

## PARTNERSHIPS

- Coordinate with the Gulf, Pacific, and Great Lakes Commissions on policy items of mutual interest including federal funding for fisheries programs. Executive Directors should continue to provide unified positions on funding and legislative priorities to lawmakers and federal agencies, where appropriate
- Continue participation on Marine Fisheries Advisory Committee, the Marine Fisheries Initiative and Association of Fish and Wildlife Agencies

## Goal 8 – Ensure the fiscal stability and efficient administration of the Commission

Goal 8 will ensure that the business affairs of the Commission are managed effectively and efficiently, including workload balancing through the development of annual action plans to support the Commission's management process. It also highlights the need for the Commission to efficiently manage its resources. The goal promotes the efficient use of legal advice to proactively review policies and react to litigation as necessary. It also promotes human resource policies that attract talented and committed individuals to conduct the work of the Commission. The goal highlights the need for the Commission as an organization to continually expand its skill set through training and educational opportunities. It calls for Commissioners and Commission staff to maintain and increase the institutional knowledge of the Commission through periods of transition. Achieving this goal will build core strengths, enabling the Commission to respond to increasingly difficult and complex fisheries management issues.

On a continuing basis, the Commission staff conservatively manages fiscal resources to achieve the proper balance between allocating funds to coastwide priorities and ensuring fiscal stability. Tasks performed to accomplish this balance include monitoring expenditures on a monthly basis; managing the reserve fund; fine-tuning meeting and travel policies; and preparing and participating in the annual audit and indirect cost proposal.

Human resources management is an ongoing process of recruitment and selection of employees; thoroughly orienting and introducing new employees to the culture of the Commission; maintaining good working conditions for all employees; managing employee relations; and training to enhance and increase their current skills. Ongoing tasks to accomplish this are annual review and revision of position descriptions; facilitating staff participation at national and regional conferences; and providing professional training opportunities. Additionally, human resource support is provided to cooperative programs such as APAIS and ACFHP. All human resources documents are reviewed at least annually to ensure compliance with federal regulations and consistency with current practices.

Further, Commission staff keeps abreast of changes in technology and evaluates the need for updating the Commission's hardware and software. Ensuring consistency of resources and training across the Commission as well as documenting processes and verifying database information are ongoing tasks conducted by the staff.

The Commission process can be overwhelming to new Commissioners. The staff is committed to providing a thorough introduction and orientation to new Commissioners. Tasks conducted throughout the year include documenting institutional knowledge and updating on a regular basis the Commissioner Manual. Staff also provides this service to new members of Commission committees.

## MANAGE OPERATIONS AND BUDGETS

- **Develop and submit the 4th 5-year "Fisheries Management, Science, Administrative and Logistical Support" cooperative agreement**
- **Manage the CARES II Act, and all ongoing Cooperative Agreements, insuring deliverables are completed and budgets are responsibly managed**
- **Evaluate equipment leases in light of hybrid work environment**
- **Implement a paperless process for accounting functions, to include accounts payable, invoicing and grant billing; research and select Accounts Payable Automation software**
- Utilize and update as necessary the Commission compensation plan, including job classifications and salaries based on location
- **Work with financial advisor to implement revised Commission investment policy**

## UTILIZE CURRENT INFORMATION TECHNOLOGY

- **Develop protocols for document retention; implement archive storage on the network**
- Manage Commission inventory through accounting software, tracking acquisitions and disposals
- Ensure adequate resources to support telecommuting and online meetings
- **Develop and implement a Commission intranet to connect our hybrid workforce via seamless and transparent communication; develop an human resources (HR) hub**
- Enhance contracts database to add features that assist Program Managers in awareness of payment details, balances and deliverables of Commission contracts
- Develop SOPPs for creating and conducting virtual **and hybrid virtual-in person** meetings
- Provide an annual update to staff, reviewing technology that has changed, been implemented or could be better-utilized
- Continue digitization of historical documents
- **Update and maintain telephone directory for forwarding incoming calls**
- **Provide technical support to staff by means of a support desk ticketing system**
- **Perform review of Commission technology to ensure it is updated, supported, in-sync with current technology, and is cohesive with software used by other agencies**

## MANAGE HUMAN RESOURCES

- Continue to refine the telecommute policy
- Promote Commission's mission and programs, and recruit new **and diverse** talent
- Provide training opportunities for ASMFC staff
- **Revise the recruitment process to include a job application form and security background check**
- **Implement a secure paperless process for HR onboarding new employees**
- Conduct annual meeting with financial advisor to review retirement program performance with staff and provide opportunities to meet individually with financial advisor to match financial goals with investment choices for retirement

## ENGAGE AND SUPPORT COMMISSIONERS

- Conduct a meetings facilitation training workshop for technical committee members
- Conduct a workshop on parliamentary procedures and meeting management
- Continue process to welcome and orient new Commissioners to allow for full engagement in the Commission process
- Facilitate the retention and transfer of institutional knowledge among Commissioners
- **Explore approaches for Commissioners to caucus during virtual meetings**

## ENSURE THE LEGAL COMPLIANCE OF COMMISSION ACTIONS

- Utilize legal advice on new management strategies and policies, and respond to litigation as necessary, whether it be regarding challenges to Commission FMPs, a human resource issue, or access to confidential data

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **Atlantic Striped Bass Management Board; Atlantic Striped Bass Plan Development Team**

**FROM:** **Atlantic Striped Bass Advisory Panel**

**DATE:** **October 12, 2021**

**SUBJECT:** **Advisory Panel Comments on the Scope of Draft Amendment 7 Options**

*AP Members in Attendance:* Dave Pecci (ME – for-hire/recreational), Bob Humphrey (ME – comm. rod and reel/for-hire), Peter Whelan (NH – recreational), Patrick Paquette (MA – rec/for-hire/comm), Andy Dangelo (RI – for-hire), Michael Plaia (RI – comm/rec/for-hire), Kyle Douton (CT – recreational), Al Ristori (NJ – for-hire), Chris Dollar (MD – fishing guide), Dennis Fleming (PRFC – fishing guide/seafood processer/dealer), Bill Hall (VA – recreational), Kelly Place (VA – commercial), Jon Worthington (NC – recreational)

*ASMFC Staff*: Emilie Franke, Katie Drew

The Atlantic Striped Bass Advisory Panel (AP) met via webinar on September 29, 2021 to provide feedback on the options developed for Draft Amendment 7, including the scope and clarity of the options presented. The following is a summary of the AP's comments and discussion for each issue.

After Draft Amendment 7 is approved for public comment, there will be a separate AP meeting to discuss the AP's preferred management options.

**General Comments**

- The AP noted overall concern about the complexity of the draft document and the large number of options presented, which would be difficult to present at public hearings and would make the public comment process challenging.

**Management Trigger Options**

- Some AP members noted concern about options that would eliminate one of the SSB triggers given the importance of these triggers in the management program.
- AP members noted general concern about options that would allow the Board to defer management action until the next stock assessment. The AP noted there is already public concern about the Board not responding quickly enough to management triggers, and these options would delay the timeline for management response even further.

- AP question for PDT: Why is there no option for the SSB target trigger to trip after two consecutive years?
    - If the PDT already considered this, the AP recommends the PDT be prepared to provide their rationale to the Board and the public; there may be questions since there is an SSB target trigger option for three consecutive years, but there is no option for two consecutive years.
    - Staff indicated the PDT would follow-up to provide rationale.
- AP question for PDT: Is there redundancy between the SSB target trigger options and the management action deferment options?
    - The AP noted there are multiple options in those categories that address both the SSB target and the F target, and may seem redundant.
    - Staff indicated the PDT would follow-up to provide clarity on these options.
- AP question for science staff: Is there updated information on retrospective bias in the striped bass stock assessment?
    - Dr. Katie Drew indicated the striped bass stock assessment models have a retrospective pattern where fishing mortality tends to be slightly overestimated and spawning stock biomass tends to be slightly underestimated. She will follow-up with more detail on how the retrospective pattern has changed over time.

**Measures to Protect the 2015 Year Class (Ocean Recreational Fishery Size Limit Options)**

- One AP member recommended the PDT streamline this section of the document to better integrate the tables and figures; additionally, adding a table showing the estimated size-at-age in inches would be helpful.
- One AP member noted the moratorium option should more clearly specify which moratorium timelines are being considered (e.g. 2 years? 5 years?).
- AP members also noted the following concerns about the size/slot options:
    - Some AP members noted concern from the for-hire industry about slot limit options and a large minimum size option and associated negative impacts on the industry.
    - Some AP members noted support for the 35-inch minimum size option considering the simplicity for compliance and enforcement as compared to a slot limit.
    - Some AP members noted concern about higher discards associated with slot limits.

**Recreational Release Mortality Options**

- Seasonal closure options:
    - There was some concern about state coordination and accountability associated with the regional closure option. AP members noted the regional closure option should clearly specify how the regions would be defined.
    - Some AP members noted that even a 2-week closure could have a significant, negative impact on fishing businesses, particularly in northern states.

    - There was some support for using MRIP effort data to inform closure options, but there was a question and concern about high PSEs and whether the directed trip percentages are accurate, especially for the ocean regions of Maryland, Virginia, and North Carolina.
- Gear restriction options:
    - Most AP members expressed significant concern about including the gear restriction options. The AP noted the following concerns:
        - The list of gear restriction options seems to target certain types of businesses and would negatively impact a specific component of the recreational sector.
        - Gear is used differently across states and the benefits of a gear restriction would vary widely and cannot be measured.
        - There are continued concerns about enforcement of gear restrictions.
        - The Addendum VI circle hook requirement was informed by relatively more research and more widespread public support; the gear restriction options presented in Draft Amendment 7 do not have the same support or scientific backing.
    - AP Question for PDT: How was this list of gear restrictions identified?
        - Staff indicated these options were based on public comment received on the Draft Amendment 7 Public Information Document and Addendum VI.
- Outreach options:
    - One AP member noted that any required outreach should be more clearly defined and should be focused on best practices for handling of large fish, especially trophy fish.

**Conservation Equivalency (CE) Options**

- Some AP members noted the importance of accountability and associated concern that CE accountability measures are not included in the draft options.
    - Staff indicated the rationale for not including accountability options could be noted the draft document. Accountability options were not developed due to the challenge of separating the performance of management measures from factors like changes in angler behavior and fish availability. This makes it difficult to evaluate the effectiveness of CE programs, so the PDT focused on options on the front end of the CE process, like options to restrict when CE can be used and requirements for CE proposals.
- One AP member noted general concern about using MRIP for CE proposals and whether a PSE threshold of 50 is still too high.

Emilie Franke | Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Emily:

Rather than belabor last night's discussion I thought I would jot down a few comments for you to share with the board regarding Draft Amendment 7 to the Interstate Fishery Management Plan for Atlantic Striped Bass.

As with any state, Maine has its own unique nuances and circumstances, and as Maine's representative to the Advisory Panel I make the following comments:

4.2 RECREATIONAL FISHERY MANAGEMENT MEASURES
4.2.1 Size and Bag Limits (Measures to Protect the 2015 Year Class)
Ocean Recreational Fishery: Measures to Protect the 2015 Year Class

We've waited a long time for an opportunity to catch and keep striped bass in Maine. Our previous slot limit of 20-26" was a very sensible approach as it would have less impact on (then) current SSB, younger cohorts can be harvested at a higher rate with less impact and it's a better fish for anglers to catch and keep because there is less waste and less bio-accumulation of toxins and heavy metals. Just as a very strong age class approached that slot, we changed to a 28-<35" slot to hopefully achieve an 18% reduction in mortality, which meant the bulk of our fishery would remain catch and release. I understand the reasons Maine chose to go this route rather than seek a CE: consistency, enforcement, ease of administering and implementing.

I, like most other Maine anglers have patiently waited and watched the 2015 cohort grow to a point where they would finally enter that 28" minimum. Now, as they're on the brink, we learn of a proposal to implement a 35" minimum. This, with very little exception, would maintain our fishery as primarily catch and release. The goal was to reduce mortality by 18% and the 28-35 slot was supposed to accomplish that. Did it not work? Do we even know at this point? And if it did, why impose further restrictions?

4.2.2 Measures to Address Recreational Release Mortality

Clearly, catch and release mortality is an important metric, and trying to reduce it an important objective. If that is our goal, then actions that would maintain or possibly increase it seem to be in conflict - see above.

Among the options for consideration is Option B, Effort Controls (Seasonal Closures). In addition to projecting the possible reduction in impact on the fish, we also need to consider the impact on the fishery. Maine has a four month fishery, at best, and for the for-hire fleet it's a three month window of opportunity. A 2 week closure during Wave 4 could mean nearly a 20% loss in income opportunity for Maine's for-hire fleet.

Furthermore, that alone, regardless of gear restrictions and slot limits, would probably

result in at least an 18% reduction in mortality. Include those variables and the reduction becomes additive, placing an unfair burden on Maine compared to other states.

Maine has been at the forefront of conservation measures to protect striped bass, imposing circle hook restrictions and spawning area closures long before they were required. We have gone along with the status quo, implementing larger slot limits when and where they may not have been totally warranted. Our recreational anglers and for-hire fleet have waited patiently, and each time the opportunity to keep more fish comes along, it seems to get snatched away before it can be realized.

I get that the resource is in jeopardy and needs further protection to maintain stability but we need to remember our overall objective is to maintain a sustainable *fishery*. As someone who works on the wildlife side, I am familiar with the importance of white-tailed deer. They drive the system. Deer hunting accounts for more in license sales than all other types of hunting combined, and revenue from those licenses supports most of the conservation programs for all wildlife species, game and non-game alike. We don't have quite the same economic situation with marine fisheries, but striped bass are the white-tailed deer of Maine's recreational saltwater fishery. By continuing to impose stricter regulations and bag limits we are disenfranchising our constituents. There needs to be a balance between protecting the resource and maintaining a sustainable fishery but the scales seem to be unfairly tipped in favor of the resource, at least in Maine's case.

While it does complicate management efforts, I hope the board will give serious consideration to the idiosyncracies and nuances of each individual state, and the potential impacts on their respective fisheries when formulating management plans. We all must share the burden and make sacrifices to protect the resource, but let's make sure that burden is shared equitably.

Respectfully submitted,

Capt. Bob Humphrey
NOAA Fisheries Highly Migratory Species Advisory Panel
ASMFC Striped Bass Advisory Panel
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**To: Atlantic State Marine Fishery Commission Striped Bass Board**

**From: Chris D. Dollar, Striped Bass Advisory Panel member, Maryland.**

**Re: Comments on Draft Amendment 7**

**Date: October 1, 2021**

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*OVERVIEW*

More than thirty years ago the sport fishing community celebrated the re-opening of the striped bass fishery after the five-year moratorium. At the time we heralded it as a shining example of our collective ability to bring a species back from the brink, similar to the successful effort to save bald eagles and ospreys. Today, however, stripers are once again overfished and overfishing is occurring throughout their range. The warning signs have been evident for several years, especially to those of us who spend a lot of time on the water.

Particularly worrisome are the following trends: 1. Decline of large breeder-sized stripers, which get hammered by all sectors of the fishery; 2. Successive years of poor Juvenile Abundance Indices in the Chesapeake and other spawning waters; 3. Habitat and water quality challenges are as pressing as ever, and impacts of climate change on our coastal communities are becoming more clear, and raises more questions of how it is affecting fisheries.

The draft Amendment 7 reviewed by the Striped Bass Advisory Panel is definitely a positive step in the right direction. However, some of the items as outlined could be clarified and re-written in a more concise and less complicated manner. (Nothing turns off the fishing public more than wonky jargon.) Doing so, respectfully, would also help begin to reestablish the public's trust in the fishery management process.

The recreational fishing community has been direct and clear-eyed about what we expect and deserve from our fishery management leaders and decision makers: Fairness, transparency, and decisive actions that are in the best interest of the fish. For me—and the scores of sport anglers, charter boat operators and guides, and tackle shop owners I talk with in the Chesapeake region—it simply boils down to this: Manage stripers primarily as a recreational fishery, prioritize abundance over harvest. Most anglers would gladly leave more rockfish in the water in exchange for a healthier and more robust fishery.

To truly rebuild the striper fishery, and ensure its long-term sustainability, it is going to take sacrifice from all stakeholders. Creating a new 21st century striper paradigm is imperative. Once

adopted, Amendment 7 will guide striper management for at least the next decade, an opportunity that likely will not happen again in many of our lifetimes. We need to make this one count.

Below are more specific comments and recommendations. Thank you again for your dedication to improve our public fisheries.
Respectfully,

Capt. Chris D. Dollar
"Stay Healthy…Go Fishing!"
Outdoor Communications & Fishing Outfitter
(410) 991-8468
cdollarchesapeake@gmail.com

**1. Management Triggers**

- Focus on/prioritize the set of triggers that recognize a decline in abundance that so that corrective action can take place in a more timely and effectual manner.
- Test management triggers adopted and/or under consideration to determine the value of the trigger in avoiding stock declines and recognizing the value of regulatory stability.
- Stay the course to ensure the stock is rebuilt, especially in face of political pressures.

**2. Protect the 2015 Class of Stripers (and large breeders in general.)**

- Management triggers under consideration should be vetted/tested to determine the value of each trigger may have in avoiding stock declines.
- Implement and recognize the value of regulatory stability.
- Commit to funding additional surveys to track recruitment throughout the striped bass' range, which could provide supplemental data to existing indices of juvenile abundance in the Chesapeake Bay and other spawning waters.
- Prioritize breeding sized stripers across all sectors, via seasonal closures, size limits, and other tools limiting the removal of breeding sized stripers from waters. (Here is where individual States should think "outside the box.")

**3. Recreational Accountability**

- Use rigorous stock assessments that occur over two-three year intervals to assess changes to recreational catch and its impact on the population.
- Improve the Marine Recreational Information Program.
- Explore other programs that offer additional/better recreational catch data collection using electronic reporting and other programs/initiatives.
- Empower anglers with tools to better record and account for their catch, which could help improve data collection and possibly help managers better understand the pressure and harvest of the angling community.
- Consider creating a well-built coastal survey in which anglers are asked specific questions but with theme, "What do you want our striper fishery to look like?"

**4. Conservation Equivalency**

- Explore benefits of implementing coast-wide and Chesapeake Bay/Potomac River regulations for regulatory consistency and stability.
- Continue the development of a multi-stock model to improve managements understanding of stock dynamics.
- Restrict the use of conservation equivalency when the population is in a poor condition.
- Delay the implementation of regional management until a multi-stock model has been approved for management use and the stock is showing signs of recovery.

**Other Issues**

**Coastal Commercial Quota Allocation**

- Develop/improve methods for setting quotas and commercial allocation based on the selectivity of each component of the commercial fishery.
- Take into account its impact on specific portions of the stock, e.g., harvest of SSB vs. juvenile stocks, and the relationship of harvest to spawning and migratory cycles.

**Forage Abundance**

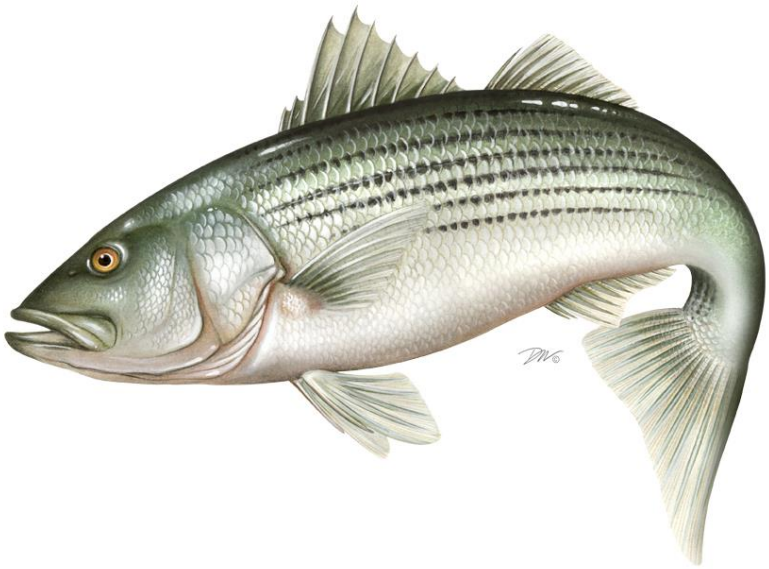
- Work with state resource agencies and federal commissions to accelerate the pace of implementing an ecosystem-based management structure, particularly Ecological Reference Points.
- Fully fund multi-year, coast-wide menhaden research and data collection.
- Hold Commercial Harvesters (particularly in the Reduction Fishery) fully accountable for their actions, especially when they go over their quota and cause “net spills” that waste hundreds of thousands of forage.

**Climate Change**

- Develop a stronger understanding of stock changes driven by climate change, e.g. how is it affecting spawning success rates, migratory patterns, predator-prey relationships?
- Develop a better understanding of habitat and environmental issues (water quality, water temps) that contribute to recruitment success and failure.
- Consider guidance to states on priorities or actions that may achieve specific outcomes for striped bass.

*Atlantic States Marine Fisheries Commission*

# DRAFT ADDENDUM VII TO AMENDMENT 6 TO THE ATLANTIC STRIPED BASS INTERSTATE FISHERY MANAGEMENT PLAN



**This draft document was developed for Management Board review and discussion. This document is not intended to solicit public comment as part of the Commission/State formal public input process. Comments on this draft document may be given at the appropriate time on the agenda during the scheduled meeting. If approved, a public comment period will be established to solicit input on the issues contained in the document.**

**October 2021**

**Sustainable and Cooperative Management of Atlantic Coastal Fisheries**

**Public Comment Process and Proposed Timeline**

In August 2021, the Atlantic Striped Bass Management Board (Board) initiated the development of an addendum to Amendment 6 to the Interstate Fishery Management Plan for Atlantic Striped Bass to consider allowing voluntary transfers of ocean commercial quota. This Draft Addendum presents background on the Atlantic States Marine Fisheries Commission's (Commission) management of striped bass; the addendum process and timeline; and a statement of the problem. This document also provides management options for public consideration and comment.

The public is encouraged to submit comments regarding this document at any time during the public comment period. The final date comments will be accepted is **XXXXX at 11:59 p.m. (EST).** Comments may be submitted at state public hearings or by mail, email, or fax. If you have any questions or would like to submit comment, please use the contact information below. Organizations planning to release an action alert in response to this Draft Addendum should contact Emilie Franke, Fishery Management Plan Coordinator, at efranke@asmfc.org or 703.842.0740.

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1050 N. Highland Street, Suite 200 A-N
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## 1.0 Introduction

Atlantic striped bass (*Morone saxatilis*) are managed through the Commission in state waters (0-3 miles) and through NOAA Fisheries in federal waters (3-200 miles). The management unit includes the coastal migratory stock between Maine and North Carolina. Atlantic striped bass are currently managed under Amendment 6 to the Interstate Fishery Management Plan (FMP) and Addenda I – VI.

The Atlantic Striped Bass Management Board (Board) initiated Draft Addendum VII in August 2021 through the following motion: *Move to initiate an addendum to amendment 6 to allow voluntary transfers of commercial striped bass quota as outlined in the memo of July 26th, 2021 to the Atlantic Striped Bass Management Board regarding these transfers*. To address the Board motion this Addendum considers allowing the voluntary transfer of the commercial coastal quota between states.

## 2.0 Overview

### 2.1 Statement of the Problem

In August 2020, the Board initiated development of Amendment 7 to the FMP. The purpose of the amendment is to update the management program in order to reflect current fishery needs and priorities given the status and understanding of the resource and fishery has changed considerably since implementation of Amendment 6 in 2003. The Board intends for the amendment to build upon the Addendum VI action to end overfishing and initiate rebuilding. In February 2021, the Board approved for public comment the Public Information Document (PID) for Draft Amendment 7. As the first step in the amendment process, the PID was a broad scoping document seeking public input on a number of important issues facing striped bass management, including coastal commercial quota allocation. The PID had proposed considering changes to the coastal commercial quota allocation because the striped bass commercial quota allocation has been based on harvest data from the 1970s which may, or may not be an appropriate baseline. Harvester reporting during that time was not required and there is evidence that harvesters would sell fish in other states resulting in further inaccuracies in state estimates. No other ASMFC-managed species is managed with harvest data as old as that used for striped bass allocation.

In May, after the PID public comment period, the Board approved the following issues for development in Draft Amendment 7: recreational release mortality, conservation equivalency, management triggers, and measures to protect the 2015 year class. The Board did not include the coastal commercial quota allocation issue for further consideration in the Draft Amendment. Many Board members acknowledge the concerns that were raised by states and the public but found it was not the right time to address allocation. The Board noted the Draft Amendment process is not the right time to address this because allocation discussions could make the process significantly longer and more complex. Some Board members suggested addressing quota allocation in a separate management document after Amendment 7 is complete. While waiting until after the Amendment process is complete would allow for the issue to be considered, the unknown timeline for when possible new allocations could be finalized was raised. In order to provide a management option that could provide some immediate relief to states that were seeking a change in commercial quota allocation, the Board initiated this addendum which proposes to allow for the voluntary transfer of commercial allocation of the coastal quota. Many quota-managed fisheries allow for the voluntary transfer of commercial allocations

between states (e.g., black sea bass, bluefish or horseshoe crab). This is a useful technique that can be utilized to address a variety of problems in the management of a commercial fishery (e.g., quota overages, safe harbor landings, shifting stock distributions).

## 2.2 Background

### 2.2.1 Status of the Stock

On a regular basis, female spawning stock biomass (SSB) and fishing mortality rate (F) are estimated and compared to target and threshold levels (i.e., biological reference points) in order to assess the status of the striped bass stock. The 1995 estimate of female SSB is currently used as the SSB threshold because many stock characteristics, such as an expanded age structure, were reached by this year, and this is also the year the stock was declared recovered. The female SSB target is equal to 125% female SSB threshold. The associated F threshold and target are calculated to achieve the respective SSB reference points in the long term.

In May 2019, the Board accepted the 2018 Benchmark Stock Assessment and Peer Review Report for management use. The accepted model is a forward projecting statistical catch-at-age model, which uses catch-at-age data and fishery-dependent data and fishery-independent survey indices to estimate annual population size, fishing mortality, and recruitment. The assessment indicated the resource is overfished and experiencing overfishing relative to the updated reference points. Female SSB in the terminal year (2017) was estimated at 151 million pounds, which is below the SSB threshold of 202 million pounds. F in 2017 was estimated at 0.31, which is above the F threshold of 0.24.

The assessment also indicated a period of strong recruitment (numbers of age-1 fish entering the population) from 1994-2004, following by a period of low recruitment from 2005-2011 which likely contributed to the decline in SSB in recent years. Recruitment was high in 2012, 2015, and 2016. In 2017, recruitment was estimated at 108.8 million age-1 fish which is below the time series average of 140.9 million fish.

### 2.2.2 History of the Fishery Management Plan

The first Interstate FMP for Atlantic Striped Bass was approved in 1981 in response to declining juvenile recruitment and landings occurring along the coast from Maine through North Carolina. The FMP and subsequent amendments and addenda focused on addressing the depleted spawning stock and recruitment failure. Despite these management efforts, the Atlantic striped bass stock continued to decline prompting many states (beginning with Maryland in 1985) to impose a complete harvest moratorium for several years. State fisheries reopened in 1990 under Amendment 4 which aimed to rebuild the resource rather than maximize yield. The stock was ultimately declared rebuilt in 1995 and as a result, Amendment 5 to the Atlantic Striped Bass FMP was adopted which relaxed both recreational and commercial regulations along the coast.

The Atlantic striped bass stock is currently managed under Amendment 6 and its subsequent addenda. The most recent, Addendum VI, set measures to end overfishing, and bring *F* to the target level in 2020. Specifically, the Addendum reduces all state commercial quotas by 18%, and implements a 1-fish bag limit and a 28” to less than 35” recreational slot limit for ocean fisheries and a 1-fish bag limit and

an 18" minimum size limit for Chesapeake Bay recreational fisheries. The measures are designed to achieve at least an 18% reduction in total removals at the coastwide level. The Addendum maintains flexibility for states to pursue alternative regulations through conservation equivalency (CE). Since catch and release practices contribute significantly to overall fishing mortality, the Addendum mandates the use of circle hooks when recreationally fishing with bait to reduce release mortality in recreational striped bass fisheries. Outreach and education will be a necessary element to garner support and compliance with this important conservation measure.

The U.S. Exclusive Economic Zone (EEZ; 3-200 miles from shore) has been closed to the harvest, possession, and targeting of striped bass since 1990, with the exception of a defined route to and from Block Island in Rhode Island to allow for the transit of vessels in possession of striped bass legally harvested in adjacent state waters. A recommendation was made in Amendment 6 to re-open federal waters to commercial and recreational fisheries. However, NOAA Fisheries concluded opening the EEZ to striped bass fishing was not warranted at that time. Following the completion of the 2018 benchmark stock assessment, NOAA Fisheries, in consultation with the Commission, is directed to review the federal moratorium on Atlantic striped bass, and to consider lifting the ban on striped bass fishing in the Federal Block Island Transit Zone (Consolidated Appropriations Act, 2018).

The Board previously considered commercial quota transfers in the FMP through Draft Amendment 5 for public comment and Draft Addendum IV to Amendment 6 for public comment. The Board did not approve the use of transfers in Amendment 5 in order to focus efforts on rebuilding the stock. The Technical Committee raised concerns that transfers had the potential to increase harvest at a time when harvest reductions were needed which contributed to the Board not approving transfers under Addendum IV to Amendment 6.

**2.2.3 Status of the Fishery**

In 2020, total Atlantic striped bass removals (commercial and recreational, including harvest, commercial discards and recreational release mortality) was estimated at 5.1 million fish, which is a 7% decrease relative to 2019 (Table 4). The recreational sector accounted for 87% of total removals by number.

*Commercial Fishery Status*

The commercial fishery is managed via a quota system resulting in relatively stable landings since 2004 (refer to Table 5 for a summary of striped bass regulations by state in 2020). There are two regional quotas: one for Chesapeake Bay and one for the ocean region (Maine through North Carolina, excluding Pennsylvania). The ocean region quota is based on average landings during the 1970s and the Chesapeake Bay quota changed annually under a harvest control rule until implementation of a static quota in 2015 through Addendum IV.

*Coastal Commercial Quota*

In 2020, the ocean commercial quota was 2,411,154 pounds and was not exceeded. Table 1 contains final 2020 quotas per Addendum VI and approved conservation equivalency programs and harvest that occurred in 2020.

*Chesapeake Bay Commercial Quota*

In 2020, the Chesapeake Bay-wide quota was 2,998,374 pounds and was allocated to Maryland, the Potomac River Fisheries Commission (PRFC), and Virginia based on historical harvest. In 2020, the Bay-wide quota was not exceeded. Table 1 contains jurisdiction-specific quotas and harvest that occurred in 2020 for Chesapeake Bay. In 2020, commercial harvest from Chesapeake Bay accounted for 64% of total commercial landings by weight, and averaged 61% annually under Addendum IV (2015-2019).

Commercial Fishery Landings

From 2004 to 2014, coastwide commercial harvest averaged 6.8 million pounds (942,922 fish) annually (Table 2). From 2015-2019, commercial landings decreased to an average of 4.7 million pounds (619,716 fish) due to implementation of Addendum IV and a reduction in the commercial quota. Commercial landings in 2020 were estimated at 3.6 million pounds (577,363 fish). Commercial discards are estimated to account for <2% of total removals per year since 2003 (Table 4). In 2019, commercial removals (landings plus commercial discards) accounted for 13.5% of total removals (commercial plus recreational) in numbers of fish, and 12.6% of total removals in 2020.

The commercial fishery harvested 3.73 million pounds (577,363 fish) in 2020, which is a 17% decrease by weight relative to 2019 (12% decrease by number; Table 2). This decrease aligns with the 18% reduction in commercial quotas implemented through Addendum VI in 2020, although some states implemented a different level of reduction in their commercial quotas through approved state conservation equivalency plans. The ocean quota utilization was about the same in 2020 (53%) as in 2019 (51%), while the Chesapeake Bay quota utilization decreased to 76% in 2020 from 91% in 2019. Despite the coastwide decrease in commercial harvest, ocean fishery conditions for some states may have improved from 2019 to 2020, which could be attributed to the increased availability of year classes moving through certain areas. The impacts of COVID-19 on the striped bass commercial fishery likely varied among states and varied depending on timing within the season. Some states heard from industry that restaurant closures and low prices had negative impacts on the commercial season, particularly during the early part of the pandemic.

Maryland (38%), Virginia (19%), and NY (13%) accounted for the three highest proportions of the commercial harvest (by weight) in 2020 (Table 3; Figure 1). Additional harvest came from PRFC (11%), Massachusetts (11%), Delaware (4%), and Rhode Island (3%). Commercial harvest from Chesapeake Bay accounted for 64% of the total commercial harvest by weight. The proportion of commercial harvest coming from Chesapeake Bay is much higher in numbers of fish (84% in 2020) than by weight because fish harvested in Chesapeake Bay have a lower average weight than fish harvested in ocean fisheries (Table 6). Coastwide commercial dead discards were estimated at 65,319[1] fish, which accounts for <2% of total removals in 2020 (Table 4).

The ocean region regularly underutilizes its quota allocations due to lack of availability in state waters (particularly off of North Carolina) and because commercial fishing is not allowed in some states (Maine, New Hampshire, Connecticut and New Jersey which collectively share about 10% of the ocean

[1] Commercial dead discard estimates are derived via a generalized additive model (GAM), and are therefore re-estimated for the entire time series when a new year of data is added.

commercial quota). Furthermore, the underage has increased in recent years since migratory striped bass have not been available to the ocean fishery in North Carolina resulting in zero harvest since 2012 (North Carolina holds 13% of the ocean quota) and raising questions about altered migratory pathways or preferred foraging areas as a result of climate change.

***Recreational Fishery Status***

For details on the most recent recreational fishery status see the Review for the Fishery Management Plan for Striped Bass: Fishing Year 2020.

**3.0 Proposed Management Program**

**3.1 State-to-State Commercial Quota Transfers of the Coastal Commercial Quota**

Option A: Status quo, no commercial quota transfers are permitted.

Option B: Commercial quota transfer provision of the coastal commercial quota.

Transfers between states may occur upon agreement of two states at any time during the fishing season up to 45 days after the last day of the calendar year. All transfers require a donor state (state giving quota) and a receiving state (state accepting additional quota). There is no limit on the amount of quota that can be transferred by this mechanism, and the terms and conditions of the transfer are to be identified solely by the parties involved in the transfer. The Administrative Commissioner of the agencies involved (giving and receiving state) must submit a signed letter to the Commission identifying the involved states, species, and pounds of quota to be transferred between the parties. A transfer becomes effective upon receipt of a letter from Commission staff to the donor and receiving states, and does not require the approval by the Board. All transfers are final upon receipt of the signed letters by the Commission. In the event that the donor or receiving state of a transaction subsequently wishes to change the amount or details of the transaction, both parties have to agree to the change, and submit to the Commission signed letters from the Administrative Commissioner of the agencies involved. These transfers do not permanently affect the state-specific shares of the quota (i.e., the state-specific quotas remain fixed).

Once quota has been transferred to a state, the state receiving quota becomes responsible for any overages of transferred quota. That is, the amount over the final quota (that state's quota plus any quota transferred to that state) for a state will be deducted from the corresponding state's quota the following fishing season.

**4.0 Compliance Schedule**

To be in compliance with Addendum VII to Amendment 6 to the Atlantic Striped Bass Interstate FMP, states must implement Addendum VII:

**Compliance Schedule to be determined by the Board.**

## 5.0 Tables and Figures

Table 1. Results of 2020 commercial quota accounting in pounds. Source: 2021 state compliance reports. 2020 quota was based on Addendum VI and approved conservation equivalency programs.

| State | Add VI (base) | 2020 Quota^ | 2020 Harvest | Overage |
|---|---|---|---|---|
| **Ocean** | | | | |
| Maine* | 154 | 154 | - | - |
| New Hampshire* | 3,537 | 3,537 | - | - |
| Massachusetts | 713,247 | 735,240 | 386,924 | 0 |
| Rhode Island | 148,889 | 148,889 | 115,891 | 0 |
| Connecticut* | 14,607 | 14,607 | - | - |
| New York | 652,552 | 640,718 | 473,461 | 0 |
| New Jersey** | 197,877 | 215,912 | - | - |
| Delaware | 118,970 | 142,474 | 137,986 | 0 |
| Maryland | 74,396 | 89,094 | 83,594 | 0 |
| Virginia | 113,685 | 125,034 | 77,239 | 0 |
| North Carolina | 295,495 | 295,495 | 0 | 0 |
| **Ocean Total** | **2,333,409** | **2,411,154** | **1,275,095** | **0** |
| **Chesapeake Bay** | | | | |
| Maryland | **2,588,603** | 1,442,120 | 1,273,757 | 0 |
| Virginia | | 983,393 | 611,745 | 0 |
| PRFC | | 572,861 | 400,319 | 0 |
| **Bay Total** | | **2,998,374** | **2,285,821** | **0** |

* Commercial harvest/sale prohibited, with no re-allocation of quota.

** Commercial harvest/sale prohibited, with re-allocation of quota to the recreational fishery.

^ 2020 quota changed through conservation equivalency for MA (735,240 lbs), NY (640,718 lbs), NJ (215,912 lbs), DE (142,474 lbs), MD (ocean: 89,094 lbs; bay: 1,445,394 lbs), PRFC (572,861 lbs), VA (ocean: 125,034 lbs; bay: 983,393 lbs).

Note: Maryland's Chesapeake Bay quota for 2020 was adjusted to account for the overage in 2019.

Table 2. Total harvest of Atlantic striped bass by sector, 1990-2020. Note: Harvest is from state compliance reports/MRIP (Query July 8, 2021). Estimates exclude inshore harvest from North Carolina.

| Year | Numbers of Fish | | | Pounds | | |
|---|---|---|---|---|---|---|
| | Commercial | Recreational | Total | Commercial | Recreational | Total |
| 1990 | 93,888 | 578,897 | 672,785 | 715,902 | 8,207,515 | 8,923,417 |
| 1991 | 158,491 | 798,260 | 956,751 | 966,096 | 10,640,601 | 11,606,697 |
| 1992 | 256,476 | 869,779 | 1,126,255 | 1,508,064 | 11,921,967 | 13,430,031 |
| 1993 | 314,526 | 789,037 | 1,103,563 | 1,800,176 | 10,163,767 | 11,963,943 |
| 1994 | 325,401 | 1,055,523 | 1,380,924 | 1,877,197 | 14,737,911 | 16,615,108 |
| 1995 | 537,412 | 2,287,578 | 2,824,990 | 3,775,586 | 27,072,321 | 30,847,907 |
| 1996 | 854,102 | 2,487,422 | 3,341,524 | 4,822,874 | 28,625,685 | 33,448,559 |
| 1997 | 1,076,591 | 2,774,981 | 3,851,572 | 6,078,566 | 30,616,093 | 36,694,659 |
| 1998 | 1,215,219 | 2,915,390 | 4,130,609 | 6,552,111 | 29,603,199 | 36,155,310 |
| 1999 | 1,223,572 | 3,123,496 | 4,347,068 | 6,474,290 | 33,564,988 | 40,039,278 |
| 2000 | 1,216,812 | 3,802,477 | 5,019,289 | 6,719,521 | 34,050,817 | 40,770,338 |
| 2001 | 931,412 | 4,052,474 | 4,983,886 | 6,266,769 | 39,263,154 | 45,529,923 |
| 2002 | 928,085 | 4,005,084 | 4,933,169 | 6,138,180 | 41,840,025 | 47,978,205 |
| 2003 | 854,326 | 4,781,402 | 5,635,728 | 6,750,491 | 54,091,836 | 60,842,327 |
| 2004 | 879,768 | 4,553,027 | 5,432,795 | 7,317,897 | 53,031,074 | 60,348,971 |
| 2005 | 970,403 | 4,480,802 | 5,451,205 | 7,121,492 | 57,421,174 | 64,542,666 |
| 2006 | 1,047,648 | 4,883,961 | 5,931,609 | 6,568,970 | 50,674,431 | 57,243,401 |
| 2007 | 1,015,114 | 3,944,679 | 4,959,793 | 7,047,179 | 42,823,614 | 49,870,793 |
| 2008 | 1,027,837 | 4,381,186 | 5,409,023 | 7,190,701 | 56,665,318 | 63,856,019 |
| 2009 | 1,049,838 | 4,700,222 | 5,750,060 | 7,217,380 | 54,411,389 | 61,628,769 |
| 2010 | 1,031,430 | 5,388,440 | 6,419,870 | 6,996,713 | 61,431,360 | 68,428,073 |
| 2011 | 944,777 | 5,006,358 | 5,951,135 | 6,789,792 | 59,592,092 | 66,381,884 |
| 2012 | 870,684 | 4,046,299 | 4,916,983 | 6,516,761 | 53,256,619 | 59,773,380 |
| 2013 | 784,379 | 5,157,760 | 5,942,139 | 5,819,678 | 65,057,289 | 70,876,967 |
| 2014 | 750,263 | 4,033,746 | 4,784,009 | 5,937,949 | 47,948,610 | 53,886,559 |
| 2015 | 621,952 | 3,085,725 | 3,707,677 | 4,829,997 | 39,898,799 | 44,728,796 |
| 2016 | 609,028 | 3,500,434 | 4,109,462 | 4,848,772 | 43,671,532 | 48,520,304 |
| 2017 | 592,670 | 2,937,911 | 3,530,581 | 4,816,395 | 37,952,581 | 42,768,976 |
| 2018 | 621,123 | 2,244,765 | 2,865,888 | 4,741,342 | 23,069,028 | 27,810,370 |
| 2019 | 653,807 | 2,150,936 | 2,804,743 | 4,284,831 | 23,556,287 | 27,841,118 |
| 2020 | 577,363 | 1,709,973 | 2,287,336 | 3,560,917 | 14,858,984 | 18,419,901 |

Table 3. Commercial harvest by region in pounds (x1000), 1995-2020. Source: state compliance reports. ^Estimates exclude inshore harvest.

| Year | Ocean | | | | | | | | Chesapeake Bay | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MA | RI | NY | DE | MD | VA | NC^ | Total | MD | PRFC | VA | Total | |
| 1995 | 751.5 | 113.5 | 500.8 | 38.5 | 79.3 | 46.2 | 344.6 | 1,874.3 | 1,185.0 | 198.5 | 517.8 | 1,901.3 | 3,775.6 |
| 1996 | 695.9 | 122.6 | 504.4 | 120.5 | 75.7 | 165.9 | 58.2 | 1,743.2 | 1,487.7 | 346.8 | 1,245.2 | 3,079.7 | 4,822.9 |
| 1997 | 784.9 | 96.5 | 460.8 | 166.0 | 94.0 | 179.1 | 463.1 | 2,244.4 | 2,119.2 | 731.9 | 983.0 | 3,834.2 | 6,078.6 |
| 1998 | 810.1 | 94.7 | 485.9 | 163.7 | 84.6 | 375.0 | 273.0 | 2,287.0 | 2,426.7 | 726.2 | 1,112.2 | 4,265.1 | 6,552.1 |
| 1999 | 766.2 | 119.7 | 491.8 | 176.3 | 62.6 | 614.8 | 391.5 | 2,622.9 | 2,274.8 | 653.3 | 923.4 | 3,851.4 | 6,474.3 |
| 2000 | 796.2 | 111.8 | 542.7 | 145.1 | 149.7 | 932.7 | 162.4 | 2,840.5 | 2,261.8 | 666.0 | 951.2 | 3,879.0 | 6,719.5 |
| 2001 | 815.4 | 129.7 | 633.1 | 198.6 | 113.9 | 782.4 | 381.1 | 3,054.1 | 1,660.9 | 658.7 | 893.1 | 3,212.6 | 6,266.8 |
| 2002 | 924.9 | 129.2 | 518.6 | 146.2 | 93.2 | 710.2 | 441.0 | 2,963.2 | 1,759.4 | 521.0 | 894.4 | 3,174.9 | 6,138.2 |
| 2003 | 1,055.5 | 190.2 | 753.3 | 191.2 | 103.9 | 166.4 | 201.2 | 2,661.7 | 1,721.8 | 676.6 | 1,690.4 | 4,088.7 | 6,750.5 |
| 2004 | 1,214.2 | 215.1 | 741.7 | 176.5 | 134.2 | 161.3 | 605.4 | 3,248.3 | 1,790.3 | 772.3 | 1,507.0 | 4,069.6 | 7,317.9 |
| 2005 | 1,102.2 | 215.6 | 689.8 | 174.0 | 46.9 | 185.2 | 604.5 | 3,018.2 | 2,008.7 | 533.6 | 1,561.0 | 4,103.3 | 7,121.5 |
| 2006 | 1,322.3 | 5.1 | 688.4 | 184.2 | 91.1 | 195.0 | 74.2 | 2,560.2 | 2,116.3 | 673.5 | 1,219.0 | 4,008.7 | 6,569.0 |
| 2007 | 1,039.3 | 240.6 | 731.5 | 188.7 | 96.3 | 162.3 | 379.5 | 2,838.1 | 2,240.6 | 599.3 | 1,369.2 | 4,209.1 | 7,047.2 |
| 2008 | 1,160.3 | 245.9 | 653.1 | 188.7 | 118.0 | 163.1 | 288.4 | 2,817.6 | 2,208.0 | 613.8 | 1,551.3 | 4,373.1 | 7,190.7 |
| 2009 | 1,134.3 | 234.8 | 789.9 | 192.3 | 127.3 | 140.4 | 190.0 | 2,809.0 | 2,267.3 | 727.8 | 1,413.3 | 4,408.4 | 7,217.4 |
| 2010 | 1,224.5 | 248.9 | 786.8 | 185.4 | 44.8 | 127.8 | 276.4 | 2,894.7 | 2,105.8 | 683.2 | 1,313.0 | 4,102.0 | 6,996.7 |
| 2011 | 1,163.9 | 228.2 | 855.3 | 188.6 | 21.4 | 158.8 | 246.4 | 2,862.5 | 1,955.1 | 694.2 | 1,278.1 | 3,927.3 | 6,789.8 |
| 2012 | 1,218.5 | 239.9 | 683.8 | 194.3 | 77.6 | 170.8 | 7.3 | 2,592.0 | 1,851.4 | 733.7 | 1,339.6 | 3,924.7 | 6,516.8 |
| 2013 | 1,004.5 | 231.3 | 823.8 | 191.4 | 93.5 | 182.4 | 0.0 | 2,526.9 | 1,662.2 | 623.8 | 1,006.8 | 3,292.8 | 5,819.7 |
| 2014 | 1,138.5 | 216.9 | 531.5 | 167.9 | 120.9 | 183.7 | 0.0 | 2,359.4 | 1,805.7 | 603.4 | 1,169.4 | 3,578.5 | 5,937.9 |
| 2015 | 866.0 | 188.3 | 516.3 | 144.1 | 34.6 | 138.1 | 0.0 | 1,887.5 | 1,436.9 | 538.0 | 967.6 | 2,942.5 | 4,830.0 |
| 2016 | 938.7 | 174.7 | 575.0 | 136.5 | 19.7 | 139.2 | 0.0 | 1,983.9 | 1,425.5 | 537.1 | 902.3 | 2,864.9 | 4,848.8 |
| 2017 | 823.4 | 175.3 | 701.2 | 141.8 | 80.5 | 133.9 | 0.0 | 2,056.1 | 1,439.8 | 492.7 | 827.8 | 2,760.3 | 4,816.4 |
| 2018 | 753.7 | 176.6 | 617.2 | 155.0 | 79.8 | 134.2 | 0.0 | 1,916.6 | 1,424.3 | 449.4 | 951.0 | 2,824.7 | 4,741.3 |
| 2019 | 584.7 | 144.2 | 358.9 | 132.6 | 82.8 | 138.0 | 0.0 | 1,441.2 | 1,475.2 | 417.3 | 951.1 | 2,843.6 | 4,284.8 |
| 2020[+] | 386.9 | 115.9 | 473.5 | 138.0 | 83.6 | 77.2 | 0.0 | 1,275.1 | 1,273.8 | 400.3 | 611.7 | 2,285.8 | 3,560.9 |

Table 4. Total removals (harvest plus discards/release mortality) of Atlantic striped bass by sector in numbers of fish, 1990-2020. Note: Harvest is from state compliance reports/MRIP (July 8, 2021), discards/release mortality is from ASMFC. Estimates exclude inshore harvest from North Carolina.

| Year | Commercial | | Recreational | | Total Removals |
|---|---|---|---|---|---|
| | Harvest | Discards* | Harvest | Release Mortality | |
| 1990 | 93,888 | 47,859 | 578,897 | 442,811 | 1,163,455 |
| 1991 | 158,491 | 92,480 | 798,260 | 715,478 | 1,764,709 |
| 1992 | 256,476 | 193,281 | 869,779 | 937,611 | 2,257,147 |
| 1993 | 314,526 | 115,859 | 789,037 | 812,404 | 2,031,826 |
| 1994 | 325,401 | 166,105 | 1,055,523 | 1,360,872 | 2,907,900 |
| 1995 | 537,412 | 188,507 | 2,287,578 | 2,010,689 | 5,024,186 |
| 1996 | 854,102 | 257,749 | 2,487,422 | 2,600,526 | 6,199,800 |
| 1997 | 1,076,591 | 325,998 | 2,774,981 | 2,969,781 | 7,147,351 |
| 1998 | 1,215,219 | 347,343 | 2,915,390 | 3,259,133 | 7,737,085 |
| 1999 | 1,223,572 | 337,036 | 3,123,496 | 3,140,905 | 7,825,008 |
| 2000 | 1,216,812 | 209,329 | 3,802,477 | 3,044,203 | 8,272,820 |
| 2001 | 931,412 | 182,606 | 4,052,474 | 2,449,599 | 7,616,091 |
| 2002 | 928,085 | 199,770 | 4,005,084 | 2,792,200 | 7,925,139 |
| 2003 | 854,326 | 131,319 | 4,781,402 | 2,848,445 | 8,615,492 |
| 2004 | 879,768 | 157,724 | 4,553,027 | 3,665,234 | 9,255,753 |
| 2005 | 970,403 | 146,126 | 4,480,802 | 3,441,928 | 9,039,259 |
| 2006 | 1,047,648 | 158,808 | 4,883,961 | 4,812,332 | 10,902,750 |
| 2007 | 1,015,114 | 160,728 | 3,944,679 | 2,944,253 | 8,064,774 |
| 2008 | 1,027,837 | 106,791 | 4,381,186 | 2,391,200 | 7,907,013 |
| 2009 | 1,049,838 | 130,200 | 4,700,222 | 1,942,061 | 7,822,321 |
| 2010 | 1,031,430 | 134,817 | 5,388,440 | 1,760,759 | 8,315,446 |
| 2011 | 944,777 | 85,503 | 5,006,358 | 1,482,029 | 7,518,667 |
| 2012 | 870,684 | 198,911 | 4,046,299 | 1,847,880 | 6,963,774 |
| 2013 | 784,379 | 114,009 | 5,157,760 | 2,393,425 | 8,449,573 |
| 2014 | 750,263 | 111,753 | 4,033,746 | 2,172,342 | 7,068,103 |
| 2015 | 621,952 | 84,463 | 3,085,725 | 2,307,133 | 6,099,273 |
| 2016 | 609,028 | 88,171 | 3,500,434 | 2,981,430 | 7,179,063 |
| 2017 | 592,670 | 98,343 | 2,937,911 | 3,421,110 | 7,050,035 |
| 2018 | 621,123 | 100,646 | 2,244,765 | 2,826,667 | 5,793,201 |
| 2019 | 653,807 | 84,013 | 2,150,936 | 2,589,045 | 5,477,801 |
| 2020 | 577,363 | 65,319 | 1,709,973 | 2,760,231 | 5,112,886 |

* Commercial dead discard estimates are derived via a generalized additive model (GAM), and are therefore re-estimated for the entire time series when a new year of data is added.

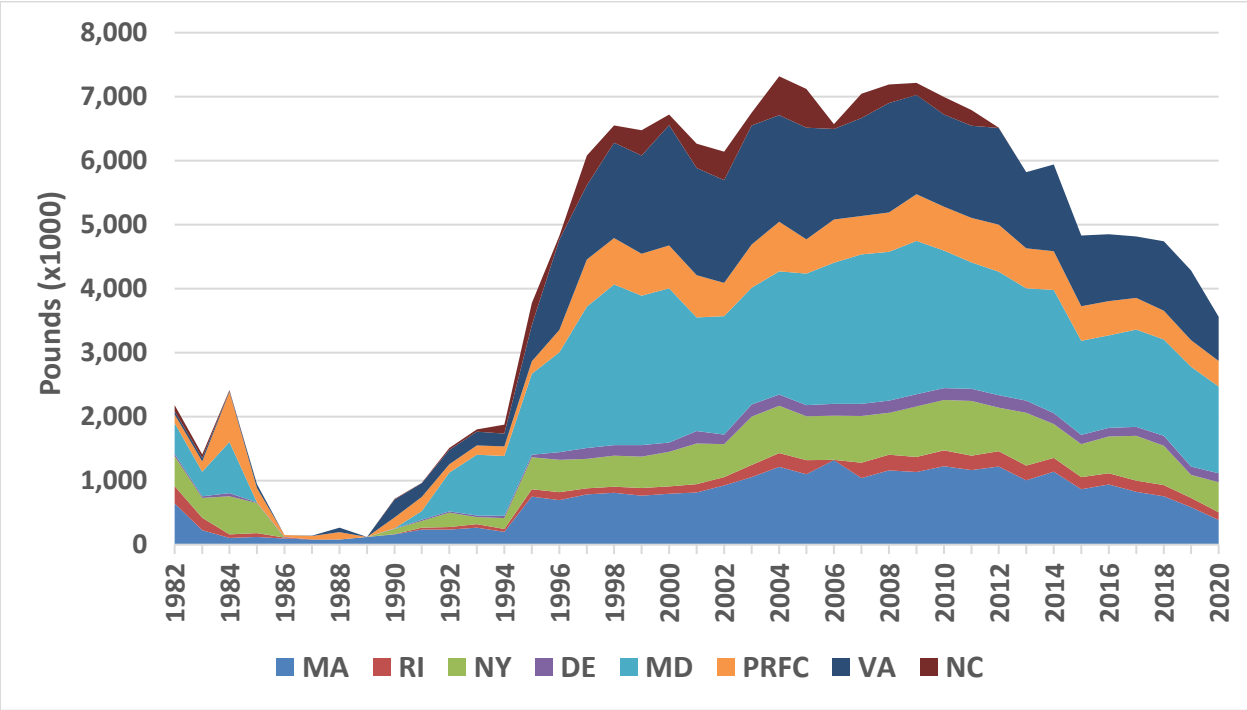
Table 5. Summary of Atlantic striped bass commercial regulations in 2020. Source: 2021 State Compliance Reports. Minimum sizes and slot size limits are in total length (TL). *Commercial quota reallocated to recreational bonus fish program.

| STATE | SIZE LIMITS (TL) and TRIP LIMITS | SEASONAL QUOTA | OPEN SEASON |
|---|---|---|---|
| **ME** | Commercial fishing prohibited | | |
| **NH** | Commercial fishing prohibited | | |
| **MA** | ≥35" minimum size; no gaffing undersized fish. 15 fish/day with commercial boat permit; 2 fish/day with rod and reel permit. | 735,240 lbs. Hook & Line only. | 6.24 until quota reached, Mondays and Wednesdays only. (In-season adjustment added Tuesdays effective Sept 1.) July 3rd, July 4th and Labor Day closed. Cape Cod Canal closed to commercial striped bass fishing. |
| **RI** | Floating fish trap: 26" minimum size unlimited possession limit until 70% of quota reached, then 500 lbs. per licensee per day | Total: 148,889 lbs., split 39:61 between the trap and general category. Gill netting prohibited. | 4.1 – 12.31 |
| | General category (mostly rod & reel): 34" min. 5 fish/vessel/day limit. | | 5.20-6.30, 7.1-12.31, or until quota reached. Closed Fridays, Saturdays, and Sundays during both seasons. |
| **CT** | Commercial fishing prohibited; bonus program in CT suspended indefinitely in 2020. | | |
| **NY** | 26"-38" size; (Hudson River closed to commercial harvest) | 640,718 lbs. Pound Nets, Gill Nets (6-8"stretched mesh), Hook & Line. | 6.1 – 12.15, or until quota reached. Limited entry permit only. |
| **NJ*** | Commercial fishing prohibited; bonus program: 1 fish at 24" to <28" slot size | 215,912 lbs. | 5.15 – 12.31 (permit required) |
| **PA** | Commercial fishing prohibited | | |

(Table 5 continued – Summary of commercial regulations in 2020).

| STATE | SIZE LIMITS (TL) and TRIP LIMITS | SEASONAL QUOTA | OPEN SEASON |
|---|---|---|---|
| DE | Gill Net: 20" min in DE Bay/River during spring season. 28" in all other waters/seasons. | Gillnet: 135,350 lbs. No fixed nets in DE River. | Gillnet: 2.15-5.31 (2.15-3.30 for Nanticoke River) & 11.15-12.31; drift nets only 2.15-28 & 5.1-31; no trip limit. |
| | Hook and Line: 28" min | Hook and line: 7,124 lbs. | Hook and Line: 4.1–12.31, 200 lbs./day trip limit |
| MD | Chesapeake Bay and Rivers: 18–36"<br>Common pool trip limits:<br>Hook and Line - 250 lbs./license/week<br>Gill Net - 300 lbs./license/week | 1,445,394 lbs. (part of Bay-wide quota) – Initial quota<br><br>1,442,120 lbs. – Adjusted quota due to 2019 overage | Bay Pound Net: 6.1-12.31<br>Bay Haul Seine: 6.1-12.31<br>Bay Hook & Line: 6.4-12.31<br>Bay Drift Gill Net: 1.1-2.28, 12.1-12.31 |
| | Ocean: 24" minimum | Ocean: 89,094 lbs. | 1.1-5.31, 10.1-12.31 |
| PRFC | 18" min all year; 36" max 2.15–3.25 | 572,861 lbs. (part of Bay-wide quota) | Hook & Line: 1.1-3.25, 6.1-12.31<br>Pound Net & Other: 2.15-3.25, 6.1-12.15<br>Gill Net: 1.1-3.25, 11.9-12.31<br>Misc. Gear: 2.15-3.25, 6.1-12.15 |
| VA | Bay and Rivers: 18" min; 28" max size limit 3.15–6.15 | 983,393 lbs. (part of Bay-wide quota) | 1.16-12.31 |
| | Ocean: 28" min | 125,034 lbs. | |
| NC | Ocean: 28" min | 295,495 lbs. (split between gear types). | Seine fishery was not opened<br>Gill net fishery was not opened<br>Trawl fishery was not opened |

Figure 1. Commercial Atlantic striped bass landings by state in pounds, 1990-2020. Source: State compliance reports. Commercial harvest and sale prohibited in ME, NH, CT, and NJ. NC is ocean only.



Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **Atlantic Striped Bass Management Board**

**FROM:** **Atlantic Striped Bass Plan Development Team**

**DATE:** **October 12, 2021**

**SUBJECT:** **Draft Addendum VII to Amendment 6**

At the direction of the Atlantic Striped Bass Management Board (Board), the Plan Development Team (PDT) drafted an addendum that considers options to allow for the voluntary transfer of the ocean region commercial quota between states that have ocean quota[1]. However, the PDT has significant concerns with adding ocean region commercial transfers to the fishery management program at this time. If the Board moves forward with public comment of Draft Addendum VII, it is recommended the below concerns are added to the Draft Addendum. The PDT notes these concerns were previously raised by the Technical Committee (TC) in 2014 when transfers were considered in Draft Addendum IV.

First, the PDT is concerned quota transfer could undermine the goals and objectives of the reductions taken under Addendum VI. The commercial ocean fishery has consistently underutilized quotas, due to a combination of fish availability and state-specific regulations (e.g. commercial prohibitions). Both Addenda IV and VI were designed to achieve a specific reduction in total removals through more restrictive recreational measures and reduced commercial quotas in order to achieve the fishing mortality target. During the Addendum VI process, the TC noted the reduction in commercial quota would achieve the necessary reduction in commercial removals only if the commercial fisheries perform as they have in the past, i.e., if they continue to underutilize their quotas to the same degree. This assumption would be violated if the transfer of commercial ocean region quota is permitted. If Addendum VI commercial quotas were fully utilized by allowing the transfer of latent quota, commercial harvest would be higher than estimated in the Addendum VI projections and states would not maintain the required commercial reduction, thus potentially undermining the goals and objectives of Addendum VI to end overfishing.

Second, a pound of commercial quota is not equal across all states. Through conservation equivalency (CE), states have been able to adjust their commercial size limits, which result in changes to their respective commercial quotas. For example, when implementing Addendum VI, Massachusetts increased its commercial minimum size limit, which increased its quota, and New York lowered its commercial slot limit minimum, which decreased its quota; both of these CE programs are based on a spawner-per-recruit analysis (SPR). Changes in state quota through CE have been occurring since before Addendum VI. Over time several adjustments have been made to commercial size limits resulting in changes to commercial quotas, making transferring quota between states with different size limits difficult. Since the PDT's focus has been on Draft Amendment 7, it has not had the time to consider all of the changes made to base quota allocations that have resulted from adjusting commercial size limits. Given more time, it might be able to address this concern.

[1] The Draft Addendum does not address potential transfers of the Chesapeake Bay quota among the Bay jurisdictions as the FMP does not establish the allocations of the Chesapeake Bay quota, rather Maryland, Virginia, and the Potomac River Fisheries Commission do so per the jurisdictions' mutual agreement. Additionally, the Draft Addendum does not consider allowing transfer of Chesapeake Bay quota to an ocean fishery (or vice versa) due to the distinct management programs between the areas (e.g., size limit differences).

# New Hampshire
# Fish and Game Department

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Scott R. Mason
Executive Director


September 22, 2021

David Borden
Chair, Atlantic Striped Bass Management Board
1050 N. Highland Street
Suite 200 A-N
Arlington, VA 22201

Dear Chair Borden,

During the Atlantic States Marine Fisheries Commission's summer meeting the Striped Bass Management Board met to review the draft Fisheries Management Plan (FMP) Review and state's compliance for fishing year 2020; review the JAI for the Albemarle Sound-Roanoke River striped bass stock; provide guidance to the Plan Development Team (PDT) on the development of Draft Amendment 7; and consider options for addressing commercial quota allocation in a future management document.

In addition to these agenda items, a motion (see below) was presented to initiate an addendum to Amendment 6 to consider allowing the voluntary transfer of commercial striped bass quota between states/jurisdictions that have commercial quota in response to a request from the State of Delaware. The State of Delaware proposed options to address their concerns with the status quo commercial quota allocation (Attachment 1).

Motion:
*Move to initiate an addendum to amendment 6 to allow voluntary transfers of commercial striped bass quota as outlined in the memo of July 26th, 2021 to the Atlantic Striped Bass Management Board regarding these transfers.*
Motion made by Mr. Clark and second by Mr. Geer. Motion passes (8 in favor, 7 opposed).

Based on the July 26th memo, Commission staff considered workload and indicated "If the Board decides to pursue the proposed option to allow voluntary quota transfers (Option B, sub-option 1)" there could potentially be time to develop a draft addendum to Amendment 6, but not all the options in the memo (e.g., reallocate commercial quotas among states and adjusted quotas).

However, the motion is silent whether both sub-options under Option B (see below) would be considered in the development of this addendum.

Option B: Allow commercial quota transfer.

*Sub-option 1: Allow states to voluntarily transfer surplus quota to other states that have commercial quota. Transfers are for one year only.*

*Sub-option 2: Allow states to voluntarily transfer surplus quota, but only to other states that filled their commercial quota during the previous year. Transfers are for one year only.*

Additional aspects in the memo are silent in the motion, such as, recognizing that several states currently implement conservation equivalency programs for their commercial fisheries in order to have management measures to meet the needs of their state's fishery indicating those programs will not be affected. Delaware had also defined the coastal area in the memo "as the entire management unit (i.e., all coastal and estuarine areas of all states and jurisdictions from Maine through North Carolina) excluding the Chesapeake Bay and Albemarle Sound/Roanoke River management areas.

Based on the motion being silent on several aspects outlined in the memo and Delaware's proposed voluntary striped bass commercial quota transfer options, the NH Commissioners have questions to be considered while ASMFC (staff, PDT, etc.) develops the draft addendum to Amendment 6:

- Are both Option B proposed sub-options being considered in this draft addendum?
- How will commercial quota transfers be integrated into state's commercial conservation equivalency programs?
    - For example, how may a state transferring commercial quota that has differing commercial length limits or adjusted target fishing mortality rates than the state receiving commercial quota be reconciled under any approved conservation equivalency programs.
- Will the addendum be inclusive of all coastal and estuarine areas or be excluding the Chesapeake Bay and Albemarle Sound/Roanoke River management areas as Delaware proposed?
- Would there be a limit on the amount of commercial quota a state may receive?
- Would states with no active commercial fishery or have the commercial fishery closed in rule be able to receive quota?
- Would states be able to receive commercial quota and convert this to quota in the recreational fishery?
- If states in the Chesapeake Bay and Albemarle Sound/Roanoke River management areas receive commercial quota would this commercial quota be able to be converted to the recreational fishery?
- Would states in Chesapeake Bay and Albemarle Sound/Roanoke River management areas be able to receive commercial quota from the coastal commercial quota?
- Would transfers be allowed when the stocks are overfished and overfishing is occurring?

- If unused commercial quota was harvested in 2022 what would be the impact to mortality?

Thank you for considering these questions and concerns as the draft addendum to Amendment 6 proceeds. The NH Commissioners request this letter be shared with all Striped Bass Management Board and Advisory Panel members.

Respectfully,

Cheri Patterson
Chief Marine Fisheries

G. Ritchie White
NH Governor Appointee

Dennis Abbott
NH Legislative Proxy

cc: Bob Beal, Toni Kerns, Emilie Franke, ASMFC
Senator David Watters

# Atlantic States Marine Fisheries Commission

## Horseshoe Crab Adaptive Resource Management Subcommittee & Delaware Bay Ecosystem Technical Committee Conference Call

## Call Summary

*Thursday, September 23, 2021*
*9:00 AM - 11:00 AM*

Call Attendees Representing Each Committee:

**Horseshoe Crab Adaptive Resource Management Subcommittee:** John Sweka (Chair), Jim Lyons (Vice Chair), Conor McGowan, Dave Smith, Henrietta Bellman, Jason Boucher, Linda Barry, Steve Doctor, Wendy Walsh, Margaret Conroy
**Delaware Bay Ecosystem Technical Committee:** Wendy Walsh (Chair), Henrietta Bellman (Vice Chair), Eric Hallerman, Yan Jiao, Jordy Zimmerman, Steve Doctor
**Horseshoe Crab Technical Committee Members*:** Jeff Brunson (Chair), Derek Perry, Jeffrey Dobbs, Jordy Zimmerman, Samantha MacQuesten, Steve Doctor, Chris Wright
**ASMFC Staff:** Caitlin Starks, Kristen Anstead
**HSC TC was not required to attend*

The Adaptive Resource Management (ARM) Subcommittee and the Delaware Bay Ecosystem Technical Committee (DBETC) met via conference call to review the most recent population estimates for horseshoe crabs and red knots, the results of the ARM for 2022, and supporting horseshoe crab and red knot data sets. Below are the agenda items and summary of the committee's discussion and decisions.

1. **Survey Results for 2020 Horseshoe Crab (Eric Hallerman)**

Eric presented the Virginia Tech Trawl Survey results for 2020. Yan Jiao provided analytical support for the report given to the ARM and DBETC. The survey began in early August, earlier than most years to accommodate the increased frequency of fall storms, and continued through early September. The average bottom temperature was the highest seen in the time series. The mean catch-per-tow of newly mature female and male horseshoe crabs show no trend but remain below peak values and mean catch-per-tow of mature horseshoe crabs show increasing trends since 2002. Additionally, mean prosomal widths of newly mature and mature horseshoe crabs in the coastal Delaware Bay area show decreasing trends.

In 2019, the ARM and DBETC agreed that for running the ARM model each year, primiparous crabs should be included in the adult abundance estimates (from the swept area delta distribution values) and that half a year of the annual mortality from the assessment (0.274) should be applied to account for the ~6 month time lag between the survey and the spawning

season when they interact with red knots. Therefore, the adult horseshoe crab abundance inputs for this year's ARM run is 9.5 million females and 29.7 million males.

The 2021 sampling season is currently underway, although they had to start in early August again to accommodate expected poor weather. Eric noted that, anecdotally, the abundance of horseshoe crabs appears to be high again in 2021. In fact, the survey experienced some gear saturation which is very rare. Whether horseshoe crab abundance is increasing or the crabs are staying inshore longer due to warming temperatures cannot be determined at this time. Funding for this survey for next year is unknown, although Eric usually does not hear about funding until the summer before the survey.

2. **Survey Results for 2020 Red Knots (Jim Lyons)**

Jim Lyons presented the red knot stopover population estimate. The population estimate for red knots is 42,271 birds for 2021. This estimation is an increase from 2020 but remains lower than the 2018-2019 estimates. May 21st saw an arrival of a lot of birds this year, which was unusual since it is later than most years. The persistence pattern was also unusual this year since it decreased mid-sampling season and then rose back up. The resight probability was high at the beginning of sampling but declined to low at the end of the season.

It was noted by the ARM subcommittee that there was a decline in the accompanying aerial counts for 2021. Jim said he could not really speak to that because that survey is run by Mandy Dey. Jim said he knew that COVID restrictions led to limited sampling in 2020, which was reported as a ground count. Henrietta Bellman chimed in that while she was also not responsible for those results, it has been discussed among the red knot representatives that the aerial flights in 2021 were done on May 23rd and 27th, while Jim's analysis indicated that peak arrival occurred on May 21st. So therefore, it might be a survey timing issue.

3. **Review Results of ARM Model Run (Conor McGowan)**

Conor reviewed the ARM model structure and annual process for the committees. He used the horseshoe crab and red knot abundance indices in the optimization matrix of the ARM model and determined that the harvest recommendation is harvest package 3, or 500,00 male-only harvest. He noted that both red knots and female horseshoe crabs are still below their population thresholds.

4. **Review of Supplementary Surveys for Horseshoe Crabs and Red Knots**

    a. **NJ Ocean Trawl Survey (Lindy Barry)**

Lindy reminded the groups that the NJ Ocean Trawl has not run since January, 2020, due to COVID restrictions. NJ is hoping to restart sampling in October of this year, but the pandemic and vessel issues have continued to delay the survey. John asked if the NJ Ocean Trawl samplers were still planning on staging horseshoe crabs. Lindy indicated that they began staging the crabs in 2019 and still plan on doing that to support future modeling efforts. John also

asked how missing years of data might affect the results of the catch multiple survey analysis (CMSA). Kristen said that the CMSA can handle missing years of data, as it does for the missing years of the Virginia Tech Trawl Survey. While it is not ideal to have missing years of data, that is one reason the model includes three surveys of relative abundance now. Additionally, the upcoming Revision to the ARM Framework did a sensitivity run that excluded the NJ Ocean Trawl altogether which indicated fairly consistent results to the run with its inclusion.

Last year, Lindy showed the indices of relative abundance for horseshoe crabs from the New Jersey Ocean Trawl Survey. Since 2010, there has been an increasing trend through the terminal year of 2019.

**b. DE Bay 30 ft. Trawl Survey and Spawning Survey (Jordy Zimmerman)**

Jordy reviewed the DE Bay 30ft and 16ft Trawl Survey methods and sampling routine for horseshoe crabs. He noted that sampling was missed in April 2020 for the 30ft trawl survey only, and in May 2020 for both surveys due to COVID restrictions on fieldwork. The calculated abundance indices from these surveys indicated a decline in adult and an increase in juvenile horseshoe crabs, but both were near their time series average.

The spawning survey is used by the ARM for providing a sex ratio of males to females on the spawning beaches. Jordy noted that sampling was reduced in 2020 due to COVID restrictions. The sex ratio in 2020 was 5.65 male horseshoe crabs to every 1 female, which indicated that there should be enough males to females for spawning. In 2021, high spawning densities were observed in the first half of May but two minor storms caused the sampling to be cancelled and reduced counts on most beaches.

**c. Shorebird survey (Mandy Dey)**

Given Mandy's absence on the call, Henrietta Bellman gave a summary of red knot sampling that she has been involved in, some of which was with Mandy and Larry Niles. Henrietta said there was a lower sampling effort this year due to COVID restrictions. The NJ estimates were similar to prior years according to Larry on a separate call she had with him and other red knot representatives. Henrietta said the DE estimates were lower than previous years and she spoke to Mandy about possible explanations which ranged from fewer birds to the effects of decreased sampling. Overall, DE recorded approximately 700 unique red knot flags which is about half of what they report when they have a larger team.

The field team reported that there was increased horseshoe crab spawning activity in early May when compared to last year and that may be due to the increased temperatures. The field team also noted increased peregrine falcon activity this season which causes disturbances to the red knot feeding behavior. She showed a figure of red knot capture weights through the sampling season, which showed an increasing trend although not all birds appeared to reach the 180 grams. The ARM had a good discussion about the importance of the 180 g threshold, a value the ARM uses to indicate sufficient weight gain during stopover, and its effect on survival. Conor said he cannot say if the threshold has held up with increased data collection, but he

noted that Anna Tucker's dissertation did find that most years the birds were hitting 180 g on average, which means about half are not getting to 180 g. Perhaps the severity of not hitting the 180 g is not as serious as previously thought and it is a research question worth pursuing. Wendy recalled that Conor's previous work (McGowan 2011) found that there was a small difference in survival for birds that did not reach 180 g, but on the scale of a 2-5% decrease which was less severe than what was proposed by Baker et al. (2004). While not reaching the 180 g weight might not be as severe as once thought, a small decrease in survivorship could matter over time.

5. **Board Recommendation**

The ARM Subcommittee and DBETC recommend harvest package 3, or 500,000 male-only harvest, for the Delaware Bay states for 2022.

6. **Other Business**

The Revision to the ARM Framework is complete and the ARM subcommittee and DBETC will be reviewing that work in the coming weeks to approve it for peer review. Upcoming meetings and webinar details are posted on the Commission website calendar: http://www.asmfc.org/calendar/10/2021.

Steve Doctor asked about the Virginia Tech Trawl Survey estimates for primiparous and multiparous, noting that one cannot track the stages with these values. He wondered if a stage based model was appropriate. In his experience with tanner crab and Maine shrimp, one can see the intermediate stage going to the adult stage but that does not seem to be the case for horseshoe crab. Many agreed this was a good question and something that has been considered through previous ARM model efforts and the benchmark assessment. Conor said that from the ARM modeling perspective, both juvenile crabs and birds are treated as unobservable variables but that there is a strong assumption that the surveys are not capturing all of them. Kristen also noted that the CMSA was tested with simulated data as part of the 2019 assessment, as was a surplus production model. The CMSA performed well whereas the surplus production model did not. John reiterated that primiparous represents one age-class and multiparous represents several age-classes so it sometimes appears a little mismatched at times.

DRAFT FOR BOARD REVIEW

# ATLANTIC STATES MARINE FISHERIES COMMISSION

## REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

**HORSESHOE CRAB**
**(*Limulus polyphemus*)**

**2020 Fishing Year**

Prepared by the Plan Review Team

**October 2021**

*Sustainable and Cooperative Management of Atlantic Coastal Fisheries*

DRAFT FOR BOARD REVIEW

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DRAFT FOR BOARD REVIEW

## I. Status of the Fishery Management Plan

| | |
|---|---|
| Date of FMP Approval: | December 1998 |
| Amendments | None |
| Addenda | Addendum I (April 2000)<br>Addendum II (May 2001)<br>Addendum III (May 2004)<br>Addendum IV (June 2006)<br>Addendum V (September 2008)<br>Addendum VI (August 2010)<br>Addendum VII (February 2012) |
| Management Unit: | Entire coastwide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ |
| States with Declared Interest: | Massachusetts – Florida, Potomac River Fisheries Commission |
| Active Boards/Committees: | Horseshoe Crab Management Board, Advisory Panel, Technical Committee, and Plan Review Team; Delaware Bay Ecosystem Technical Committee; Adaptive Resource Management Subcommittee |

***Goals and Objectives***

The Interstate Fishery Management Plan for Horseshoe Crabs (FMP) established the following goals and objectives.

*2.0. Goals and Objectives*

*The goal of this Plan is to conserve and protect the horseshoe crab resource to maintain sustainable levels of spawning stock biomass to ensure its continued role in the ecology of the coastal ecosystem, while providing for continued use over time. Specifically, the goal includes management of horseshoe crab populations for continued use by:*

1) *current and future generations of the fishing and non-fishing public (including the biomedical industry, scientific and educational research);*
2) *migrating shorebirds; and,*
3) *other dependent fish and wildlife, including federally listed (threatened) sea turtles.*

*To achieve this goal, the following objectives must be met:*

*(a) prevent overfishing and establish a sustainable population;*

*(b) achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit;*

*(c) establish the appropriate target mortality rates that prevent overfishing and maintain adequate spawning stocks to supply the needs of migratory shorebirds;*
*(d) coordinate and promote cooperative interstate research, monitoring, and law enforcement;*
*(e) identify and protect, to the extent practicable, critical habitats and environmental factors that limit long-term productivity of horseshoe crabs;*
*(f) adopt and promote standards of environmental quality necessary for the long-term maintenance and productivity of horseshoe crabs throughout their range; and,*
*(g) establish standards and procedures for implementing the Plan and criteria for determining compliance with Plan provisions.*

***Fishery Management Plan Summary***

The framework for managing horseshoe crabs along the Atlantic coast was approved in October 1998 with the adoption of the Interstate Fishery Management Plan (FMP) for Horseshoe Crabs. The goal of this plan is to conserve and protect the horseshoe crab resource to maintain sustainable levels of spawning stock biomass to ensure its continued role in the ecology of coastal ecosystems while providing for continued use over time.

In 2000, the Horseshoe Crab Management Board approved Addendum I to the FMP. Addendum I established a state-by-state cap on horseshoe crab bait landings at 25 percent below the reference period landings (RPL's), and *de minimis* criteria for those states with a limited horseshoe crab fishery. Those states with more restrictive harvest levels (Maryland and New Jersey) were encouraged to maintain those restrictions to provide further protection to the Delaware Bay horseshoe crab population, recognizing its importance to migratory shorebirds. Addendum I also recommended that the National Marine Fisheries Service (NMFS) prohibit the harvest of horseshoe crabs in federal waters (3-200 miles offshore) within a 30 nautical mile radius of the mouth of Delaware Bay, as well as prohibit the transfer of horseshoe crabs in federal waters. A horseshoe crab reserve was established on March 7, 2001, by NMFS in the area recommended by ASMFC. This area is now known as the Carl N. Shuster Jr. Horseshoe Crab Reserve (Figure 1).

In 2001, the Horseshoe Crab Management Board approved Addendum II to the FMP. The purpose of Addendum II was to allow the voluntary transfer of harvest quotas between states to alleviate concerns over potential bait shortages on a biologically responsible basis. Voluntary quota transfers require Technical Committee review and Management Board approval.

In 2004, the Board approved Addendum III to the FMP. The addendum sought to further the conservation of horseshoe crab and migratory shorebird populations in and around the Delaware Bay. It reduced harvest quotas and implemented seasonal bait harvest closures in New Jersey, Delaware, and Maryland, and revised monitoring components for all jurisdictions.

Addendum IV was approved in 2006. It further limited bait harvest in New Jersey and Delaware to 100,000 crabs (male only) and required a delayed harvest in Maryland and Virginia.

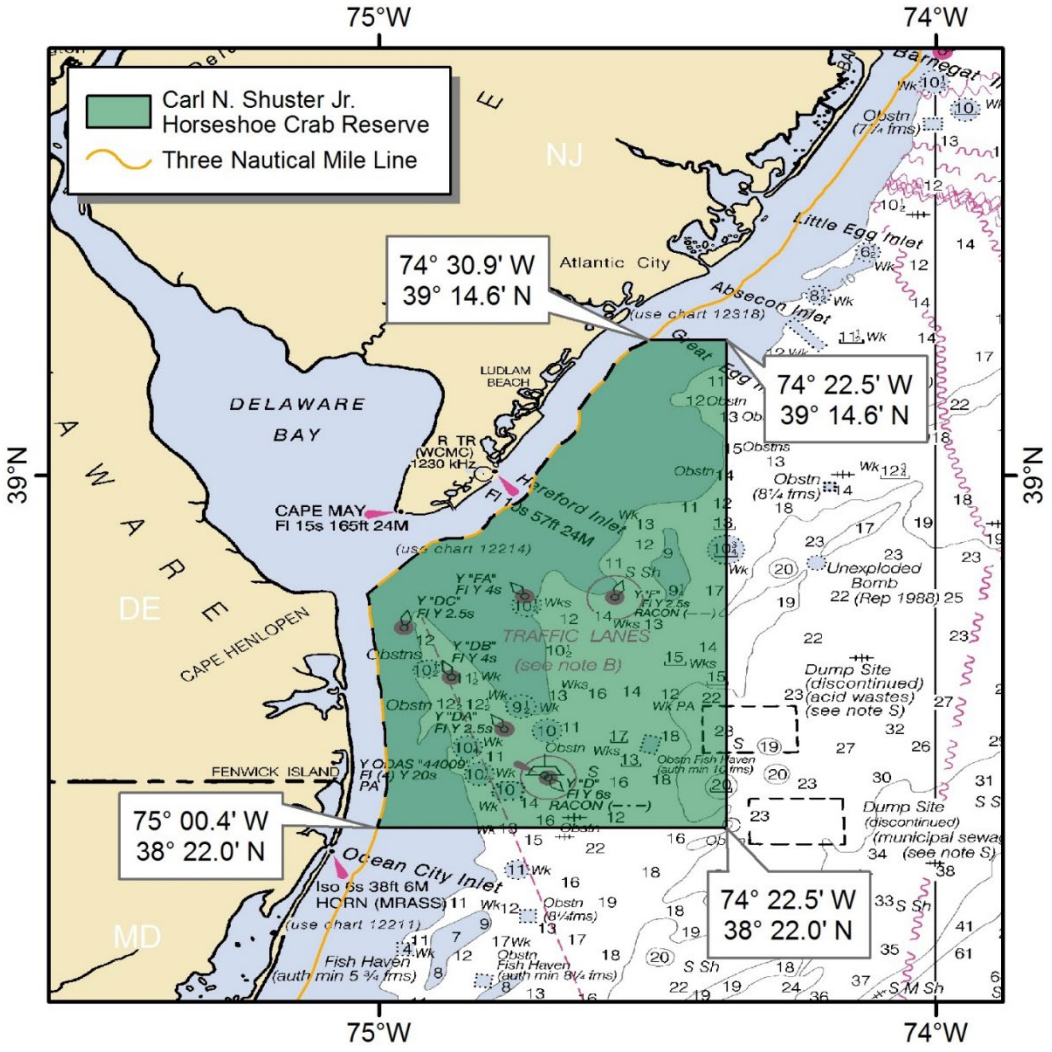



**Figure 1. Carl N. Shuster Jr Horseshoe Crab Reserve.**

Addendum V, adopted in 2008, extended the provisions of Addendum IV through October 31, 2010.

In early 2010, the Board initiated Draft Addendum VI to consider management options that would follow expiration of Addendum V. The Board voted in August 2010 to extend the Addendum V provisions, via Addendum VI, through April 30, 2013. The Board also chose to include language allowing them to replace Addendum VI with another Addendum during that time, in anticipation of implementing an Adaptive Resource Management (ARM) Framework.

The Board approved Addendum VII in February 2012. This addendum implemented an ARM framework for use during the 2013 fishing season and beyond. The framework considers the abundance levels of horseshoe crabs and shorebirds in determining the optimized bait harvest level for the Delaware Bay states of New Jersey, Delaware, Maryland, and Virginia (east of the

COLREGS). A process to review and possibly revise the ARM Framework was initiated in 2019 and is expected to be completed in 2022.

## II. Status of the Stock and Assessment Advice

A benchmark stock assessment was completed and approved for management use in 2019. The assessment report is available at:
http://www.asmfc.org/uploads/file/5cd5d6f1HSCAssessment_PeerReviewReport_May2019.pdf

This assessment was the first to successfully apply a stock assessment model to a component of the horseshoe crab stock. A Catch Multiple Survey Analysis (CMSA) model, a stage-based model that tracks progression of crab abundances from pre-recruits to full recruits to the fishery, was applied to female crabs in the Delaware (DE) Bay region (New Jersey-Virginia). This model estimated regional female crab abundance using relative abundance information from the Virginia Tech Benthic Trawl Survey, New Jersey Ocean Trawl Survey, and Delaware Adult Trawl Survey, and estimates of mortality including natural mortality, commercial bait harvest, commercial discard mortality, and mortality associated with biomedical use. While reference points were not approved to determine stock status, the CMSA population estimates were recommended as the best estimates for female horseshoe crab abundance in the DE Bay region.

The base CMSA model population estimates show an increase in the number of female crabs in the DE Bay region since 2012, when the ARM Framework was established via Addendum VII. This increasing trend is supported by positive trends in regional fishery-independent surveys during this time period. Population estimates from the base model are not publicly available due to the inclusion of confidential biomedical data. However, a sensitivity run assuming no biomedical mortality is publicly viewable, and these estimates are not significantly different from the base model results. Estimates of discard mortality from the Northeast Fisheries Observer Program (NEFOP) were also included in the base CMSA model and indicate that discard mortality could be significant, of similar or greater magnitude than mortality due to bait harvest. Population estimates from the CMSA are currently being considered for incorporation into the ARM Framework, which is applied annually to specify bait harvest quotas for the DE Bay region.

Autoregressive Integrated Moving Average (ARIMA) models, similar to those used in previous assessments, were applied to all regions. ARIMA models were fit to fishery-independent survey indices trends of abundance in each of the regional horseshoe crab populations: Northeast (Massachusetts-Rhode Island), New York (Connecticut-New York), DE Bay, and Southeast (North Carolina-Florida). No definitions for overfishing or overfished status have been adopted by the Management Board. However, the assessment characterized the status of each regional and the coastwide population based on the percentage of surveys within a region (or coastwide) having a >50% probability of the terminal year being below the ARIMA reference point. The ARIMA reference point was the 1998 index for each survey. “Poor” status was defined as >66%

of surveys meeting this criterion, "Good" status was defined as <33% of surveys, and "Neutral" status was defined as 34–65% of surveys. Based on these criteria, stock status was neutral for the Northeast region, poor for the New York region, neutral for the Delaware Bay region, and good for the Southeast region. Coastwide, abundance has fluctuated through time with many surveys decreasing after 1998 but increasing in recent years. The coastwide status includes surveys from all regions and indicates a neutral trend, likely due to a combination of positive and negative trends.

## III. Status of the Fishery

***Bait Fishery***

For most states, the bait fishery is open year round. However, because of seasonal horseshoe crab movements (to the beaches in the spring; deeper waters and offshore in the winter), the fishery operates at different times along the coast. New Jersey has prohibited commercial harvest of horseshoe crabs in state waters since 2006. State waters of Delaware are closed to horseshoe crab harvest and landing from January 1st through June 7th each year, and other state horseshoe crab fisheries are regulated with various season/area closures.

The total reported bait landings in 2020 were well below the ASMFC coastwide quota of 1,587,274 crabs (Table 1, Figure 2). Coastwide bait landings in 2020 totaled 292,980 crabs, excluding unreported landings from Massachusetts and confidential landings from Rhode Island. This represents a large decrease from 2019 landings of 832,755 crabs, however, due to the missing data from Massachusetts it is likely that actual 2020 landings are higher than what is reported here. Landings decreased in all states except Rhode Island, with the most significant decreases occurring in Virginia (84% decrease from 2019) and North Carolina (72% decrease from 2019). It is likely that the significant decreases in bait landings for 2020 are related to the COVID-19 pandemic restricting harvest effort.

Reported coastwide landings since 1998 show more male than female horseshoe crabs were harvested annually. Several states presently have sex-specific restrictions in place which limit or ban the harvest of females. The American eel pot fishery prefers egg-laden female horseshoe crabs as bait, while the whelk (conch) pot fishery is less dependent on females. States with greater than 5% of coastal landings are required to report sex for at least a portion of their bait harvest; for 2020 these states include Connecticut, New York, Delaware, Maryland, and Virginia. Within these states, 84% of reported bait landings were male, 15% were female, and 1% were unclassified in 2020.

The hand, trawl, and dredge fisheries typically account for the majority of reported commercial horseshoe crab bait landings. Other gears that account for the remainder of the harvest include rakes, hoes, and tongs, fixed nets, and gill nets.

**Table 1. Reported commercial horseshoe crab bait landings by jurisdiction. Note: Landings from 2017 and earlier were updated to numbers validated by all jurisdictions for use in the 2019 benchmark stock assessment.**

| Jurisdiction | ASMFC Quota 2020 | State Quota 2020 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|---|---|
| **MA** | 330,377 | 165,000 | *** | 172,664 | 159,002 | 134,707 | 110,399 | 117,611 |
| **RI** | 26,053 | 8,398 | C | C | 1,889 | 3,415 | 20,676 | 7,867 |
| **CT** | 48,689 | 48,689 | 15,942 | 17,588 | 21,870 | 19,944 | 21,945 | 19,632 |
| **NY** | 366,272 | 150,000 | 63,367 | 167,181 | 138,223 | 195,717 | 176,632 | 145,324 |
| **NJ*** | 162,136 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **DE*** | 162,136 | 157,122 | 124,803 | 164,225 | 126,065 | 201,132 | 109,836 | 151,262 |
| **MD*** | 255,980 | 255,980 | 61,165 | 145,907 | 66,647 | 237,146 | 157,013 | 27,494 |
| **PRFC** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **VA**** | 172,828 | 172,828 | 24,031 | 151,727 | 140,584 | 160,331 | 128,848 | 102,235 |
| **NC** | 24,036 | 24,036 | 3,672 | 13,463 | 10,998 | 25,161 | 25,197 | 24,839 |
| **SC** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **GA** | 29,312 | 29,312 | 0 | 0 | 0 | 0 | 0 | 0 |
| **FL** | 9,455 | 9,455 | 0 | 0 | C | 1,394 | 689 | 264 |
| **TOTAL** | 1,587,274 | 1,020,820 | 292,980 | 832,755 | 665,278 | 978,947 | 751,235 | 596,528 |

*Male-only harvest

**Virginia harvest east of the COLREGS line is limited to 81,331 male-only crabs under the ARM harvest package #3. Virginia data shown are preliminary. Virginia harvest east of the COLREGS in 2019 was 0 crabs.

***2020 bait landings from Massachusetts are unavailable.

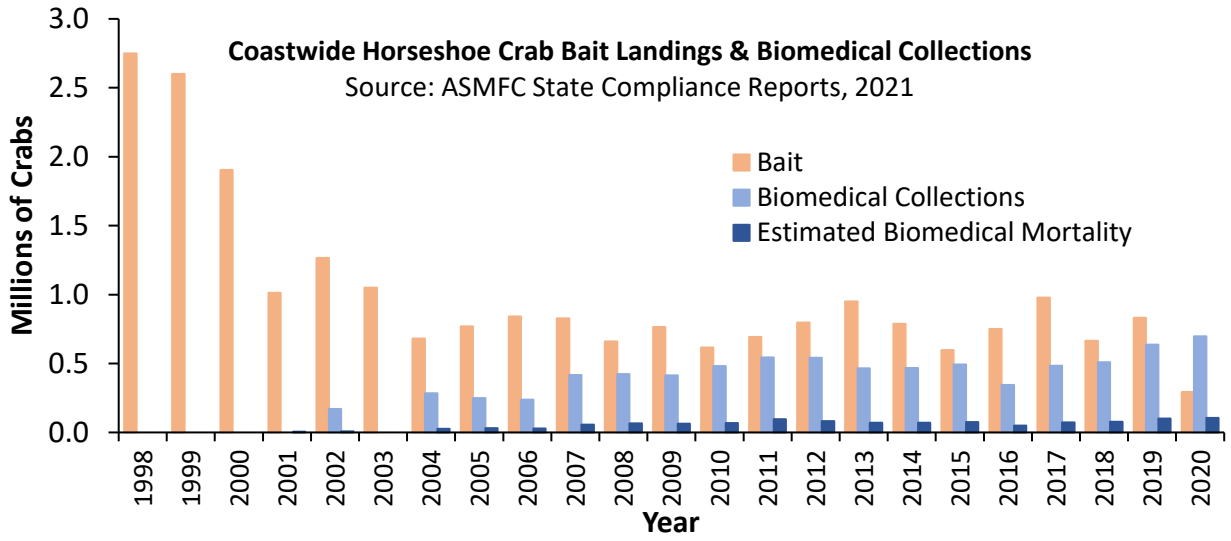
***Biomedical Use***

The horseshoe crab is an important resource for research and manufacture of materials used for human health. There are five companies along the Atlantic Coast that process horseshoe crab blood for use in manufacturing Limulus Amebocyte Lysate (LAL): Associates of Cape Cod, Massachusetts; Lonza (formerly Cambrex Bioscience), Limuli Laboratories, New Jersey; Wako Chemicals, Virginia; and Charles River Endosafe, South Carolina. Addendum III requires states where horseshoe crabs are collected for biomedical bleeding to collect and report total collection numbers, crabs rejected, crabs bled (by sex) and to characterize mortality.

The Plan Review Team (PRT) annually calculates total coastwide collections and estimates mortality associated with biomedical use. In 2020, 697,025 crabs were collected coastwide solely for biomedical bleeding[1] (Table 2).

[1] This does not include bait crabs that were borrowed for bleeding and then returned to the bait market; these are counted against state bait quotas. The dual use of horseshoe crabs harvested for bait is encouraged as a conservation tool. Facilities that bleed horseshoe crabs to manufacture LAL can utilize crabs from the bait market in what is often referred to as the "rent a crab" program. Permitted bait harvesters and/or dealers can "rent" crabs

**Figure 2. Number of horseshoe crabs harvested for bait and collected for biomedical purposes, 1998-2020.**




*Biomedical collections are annually reported to the Commission and include all horseshoe crabs brought to bleeding facilities except those that were harvested as bait, "rented" by biomedical facilities and counted against state bait quotas.
*Most of the biomedical crabs collected are returned to the water after bleeding; a 15% mortality rate is assumed for all bled crabs that are released. This number plus observed mortality reported annually by bleeding facilities via state compliance reports equals the 'Estimated Biomedical Mortality.'

This represents an 11.8% increase from 2019. Males accounted for 60% of total biomedical collections and females comprised 40%. Some crabs were rejected prior to bleeding due to mortality, injuries, slow movement, and size (mortality observed while crabs were going through the biomedical process is included under 'Observed Mortality' in Table 2). Approximately 1.3% of crabs collected solely for biomedical purposes were observed and reported as dead from the time of collection up to the point of bleeding.

During the 2019 benchmark stock assessment, literature estimates were analyzed to estimate post-bleeding mortality. Although many of these studies did not implement biomedical best practices, these values are the only available estimates of mortality experienced after bleeding. Post-bleeding mortality was estimated at 15%. Tagging data was used in the assessment to compare survivorship between crabs that were and were not bled. These results indicated some decrease in short-term survivorship, but greater long-term survivorship for bled crabs.

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caught for the bait industry to the bleeding facility; these crabs are returned to the bait vendor after bleeding. These crabs are caught under bait permits, are counted against the bait quota of the state of origin, and must comply with that state's regulations for bait harvest. The dual use of crabs in this program can reduce overall harvest, may decrease overall mortality, can provide the LAL manufacturers with an additional source of raw material, and may offer harvesters and dealers opportunity within this secondary market.

These results are likely attributable to the culling process used by biomedical facilities to select healthy crabs for bleeding.

Post-bleeding mortality, calculated as 15% of the number of bled biomedical-only crabs (not from the bait market), for 2020 was estimated as 97,432 crabs. Total mortality (observed mortality plus post-bleeding mortality) of biomedical crabs for 2020 was estimated as 106,339 crabs. This represents approximately 26% of the 2020 total directed use mortality (399,319 crabs), which includes both total biomedical mortality and removals for bait (excluding bait landings from MA).

The 1998 FMP established a biomedical mortality threshold of 57,500 crabs that, if exceeded, requires the Board to consider management action. This threshold was exceeded in 2020. Results of the 2019 Benchmark Stock Assessment indicate that levels of biomedical mortality prior to 2017 (the terminal year of data used in the assessment), which were relatively consistent between 2013-2018 (with the exception of 2016), did not have a significant effect on horseshoe crab population estimates or fishing mortality in the Delaware Bay region. However, the average biomedical mortality in the last three years has been about 40% higher than the 2013-2017 average.

**Table 2. Numbers of horseshoe crabs collected, bled, and estimated mortality for the biomedical industry. Numbers shown are for crabs collected solely for biomedical use. Mortality of bled crabs that later enter the bait industry is included in bait harvest.**

| Year | Crabs Collected | Crabs Bled | Post-Bleeding Mortality | Observed Mortality | Total Mortality |
|---|---|---|---|---|---|
| *2010* | 480,914 | 412,781 | 61,917 | 6,829 | 68,746 |
| *2011* | 545,164 | 486,850 | 73,028 | 24,139 | 97,166 |
| *2012* | 541,956 | 497,956 | 74,693 | 7,370 | 82,063 |
| *2013* | 464,657 | 440,402 | 66,060 | 5,447 | 71,507 |
| *2014* | 467,897 | 432,340 | 64,851 | 5,658 | 70,509 |
| *2015* | 494,123 | 464,506 | 69,676 | 5,362 | 75,038 |
| *2016** | 344,495 | 318,523 | 47,778 | 1,004 | 48,782 |
| *2017* | 483,245 | 444,115 | 66,617 | 6,056 | 72,674 |
| *2018* | 510,407 | 479,142 | 71,871 | 5,588 | 77,459 |
| *2019* | 637,029 | 589,361 | 88,404 | 12,789 | 101,193 |
| *2020* | 697,025 | 649,546 | 97,432 | 8,907 | 106,339 |

***Some biomedical collections were reduced in 2016 due to temporary changes in production.**

## IV. Status of Research and Monitoring

The Horseshoe Crab FMP set forth an ambitious research and monitoring strategy in 1999 and again in 2004 to inform future management decisions. Despite limited time and funding there are many accomplishments since 1999. These accomplishments were largely made possible by forming partnerships between state, federal and private organizations, and the support of hundreds of public volunteers.

***Addendum III Monitoring Program***

Addendum III requires affected states to carry out three monitoring components:

1. All states who do not qualify for *de minimis* status report monthly harvest numbers and subsample a portion of the catch for sex and harvest method. In addition, those states with annual landings above 5% of the coastwide harvest report all landings by sex and harvest method. Although states with annual landings less than 5% of annual coastwide harvest are not required to report landings by sex, the PRT recommends all states require sex-specific reporting for horseshoe crab harvest.
2. States with biomedical collections are required to monitor and report collection numbers and mortality associated with the transportation and bleeding of the crabs.
3. States must identify spawning and nursery habitat along their coasts. All states have completed this requirement, and a few continue active monitoring programs.

***Virginia Tech Research Projects***

The Virginia Tech Horseshoe Crab Trawl Survey (VT Survey) was not conducted in 2013-2015, due to a lack of funding, but was conducted in 2016-2020, and is in progress for 2021. The 2020 survey began in early August, earlier than most years to accommodate the increased frequency of fall storms, and continued through early September. The average bottom temperature was the highest seen in the time series.

In the coastal Delaware Bay area (DBA), stratified mean catches-per-tow for all demographic categories (immature, newly mature, and mature females and males) were relatively consistent from 2016 to 2018, but showed variations in the two most-recent years. Stratified mean catches of mature females and males have been variable over the time-series, but are significantly correlated. Both mature females and males were relatively less abundant in 2019 and more abundant in 2020 than in the previous five years. Yearly trends from the delta- and normal-distribution models followed similar patterns for all demographic groups. Mean catches of newly mature males generally are correlated with mean catches of newly mature females the following year from 2002-2018. In the two recent years, the trend of newly mature females and males are quite different. By adding results in 2019 and 2020, the correlations are no longer statistically significant, potentially due to low mean catches of newly mature females in 2019 and 2020. Mature males are typically more than twice as numerous as mature females throughout the survey time-series, however, the ratio of newly mature males to females is highly variable. This may reflect sampling effects, temporal variability in recruitment to the newly mature class relative to survey period, or differences in year-class abundance because females are believed to mature a year later than males. There has been a continued slight but detectable decreasing trend in the mean prosomal widths of mature and newly mature male and female crabs in the DBA survey over time, which continued through the 2020 survey.

In the lower Delaware Bay (LDB) survey mean catches of immature female and male crabs and newly mature female crabs in 2019 and 2020 were the lowest for the time-series. Mean catches of mature females were lower than in 2019 and further decreased in 2020, and both the male and females in all the three maturity groups were low in 2020. Sex ratios (M:F) of mature horseshoe crabs were higher within the lower Delaware Bay than on the coast, which may

reflect a tendency for male horseshoe crabs to remain near the spawning beaches. Decreasing trends in mean prosomal width were observed for mature females and males in the LDB survey, but an increasing trend was detected for newly mature males.

The Adaptive Resource Management (ARM) Working Group will use the indices from this survey to estimate horseshoe crab abundance for the ARM model, which specifies harvest limits for the upcoming year. The VT Survey for 2021 is currently in progress, although it began in early August to accommodate expected poor weather. Funding sources beyond 2021 continue to be explored.

***Spawning Surveys***

The redesigned Delaware Bay spawning survey was completed for the twenty-second consecutive year in 2020, although the number of beaches was greatly reduced due to field work restrictions associated with the COVID-19 pandemic. Five beaches in Delaware and one beach in New Jersey experienced limited sampling effort in 2020. The index of female spawning activity calculated from limited data suggests that spawning peaked during the third lunar period (June 3- June 7). The index of spawning activity was not reported due to biases associated with the spatial and temporal truncation of the survey in 2020.

***Tagging Studies***

The USFWS continues to maintain a toll-free telephone number and a website for reporting horseshoe crab tag returns and assists interested parties in obtaining tags. Tagging work continues to be conducted by biomedical companies, research organizations, and other parties involved in outreach and spawning surveys. Beginning with the 2013 tagging season, additional efforts were implemented to ensure that current tagging programs are providing data that benefits the management of the coastwide horseshoe crab population. All existing and new tagging efforts are required to submit an annual application to be considered for the USFWS tagging program and all participants must submit an annual report along with their tagging and resighting data to indicate how their tagging program addresses at least one of the following objectives: determine horseshoe crab sub-population structure, estimate horseshoe crab movement and migration rates, and/or estimate survival and mortality of horseshoe crabs. The PRT recommends all tagging programs approved by the states coordinate with the USFWS tagging program, in order to ensure a consistent coastwide program to support management.

Since 1999, over 373,000 crabs have been tagged and released through the USFWS tagging program along the Atlantic coast. Crabs have been tagged and released from every state on the Atlantic Coast from Florida to New Hampshire. In the early years of the program, tagging was centered around Delaware Bay; however, in recent years, tagging has expanded and increased in Long Island Sound and the Southeast. Tagging information from this database has been used in the 2019 Benchmark Stock Assessment to define stock structure, estimate total mortality, and characterize impacts of biomedical use on crab mortality.

***New York Region Monitoring***

Following the 2019 Benchmark Stock Assessment, which characterized the status of the horseshoe crab population in the New York region as "Poor", the Board directed the PRT to monitor fishery-independent surveys in this area to track progress of state management actions toward improving this regional population. During the assessment, five surveys were included in the ARIMA model to characterize this population. One of these, the Northeast Area Monitoring and Assessment Program (NEAMAP), includes sample areas outside of the New York region, making it too data-intensive to specify the regional index on an annual basis. The most recent information from the state-conducted surveys used in the assessment is summarized below, but can be viewed in greater detail in the Connecticut and New York state compliance reports. The Western Long Island (WLI) Little Neck Bay and Manhasset Bay seine surveys were combined in the assessment to form a single index, but are shown below separately. None of these beach seine surveys were completed in 2020 due to the COVID-19 pandemic. Figures 3-7 show the annual index for each survey over the time series until 2019.

Connecticut

- Long Island Sound Trawl (Fall) – 2020 index – **Due to the COVID-19 pandemic the LIS Trawl Survey did not take place. Sampling for LIS Trawl Survey was not authorized until Spring 2021.**

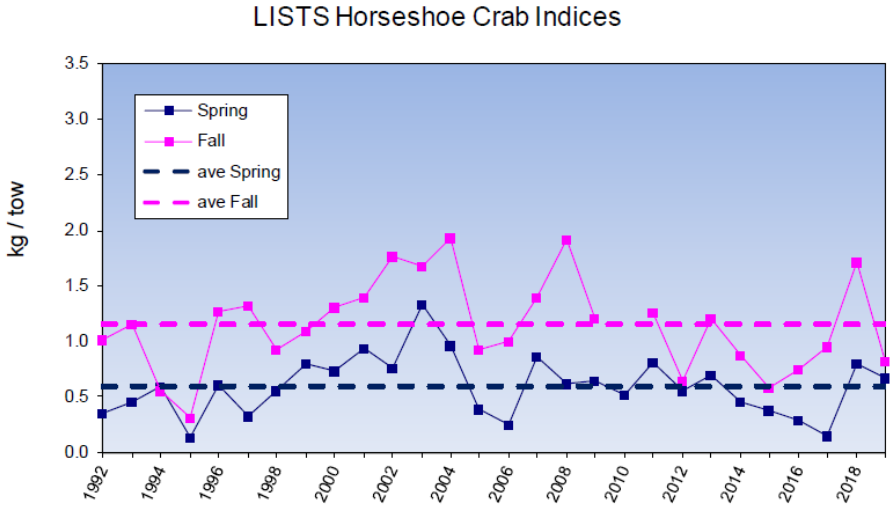



**Figure 3. LISTS Horseshoe Crab Indices, 1992-2019.**

New York

- Peconic Trawl – 2020 index = 0.05 (delta distribution average catch per unit effort [CPUE]), decrease from 2019, below 2010-20 average. **The 2020 mean is the lowest value in the time series, but the survey did not sample in May, which is one of the months with highest horseshoe crab catch.**

- WLI Jamaica Bay Seine (all horseshoe crabs) – **In 2020 sampling did not begin until July due to the COVID-19 pandemic. Therefore, there is no abundance index for 2020.** 2019 index = 0.23 (geometric mean), decrease from 2018, below 2010-19 average (0.32).
- WLI Little Neck Bay Seine (all) – **In 2020 sampling did not begin until July due to the COVID-19 pandemic. Therefore, there is no abundance index for 2020.** 2019 index = 0.88 (geometric mean), decrease from 2018, below 2010-19 average (1.16).
- WLI Manhasset Bay Seine (all) – **In 2020 sampling did not begin until July due to the COVID-19 pandemic. Therefore, there is no abundance index for 2020.** 2019 index = 0.68 (geometric mean), decrease from 2018, below 2010-19 average (0.65).

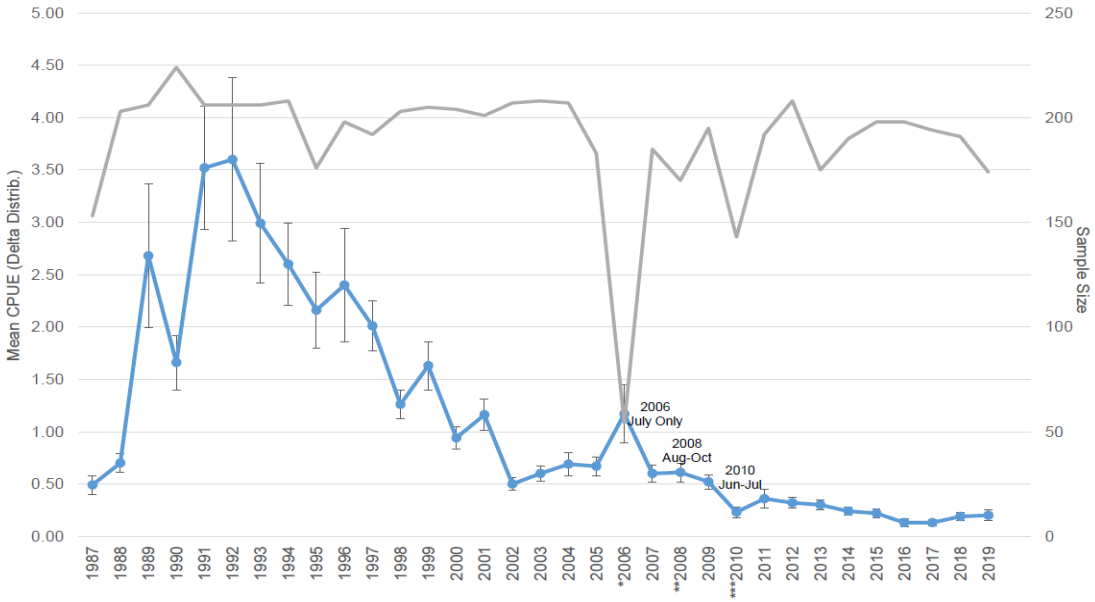



**Figure 4. Peconic Bay Trawl Survey: May through July, 1987-2019. (gray line=sample size, blue line=mean CPUE)**

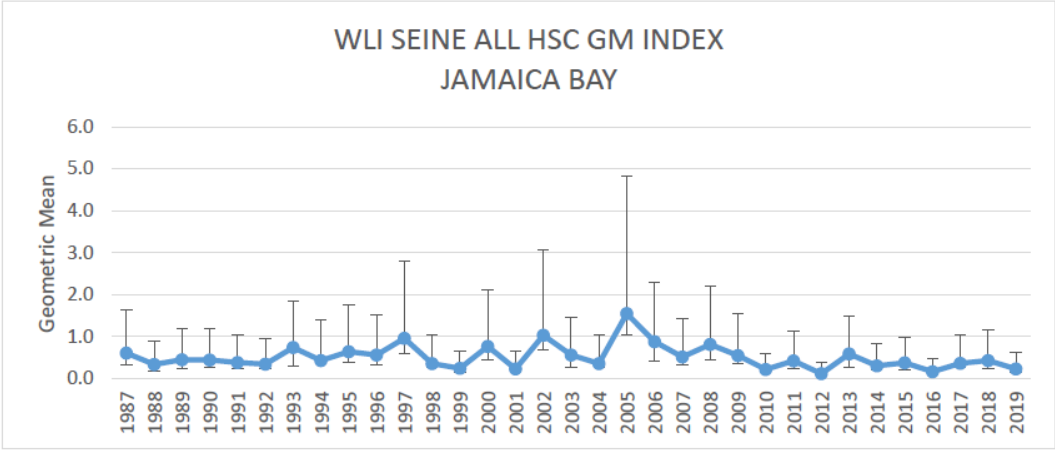



**Figure 5. NYSDEC WLI Beach Seine Survey All Horseshoe Crab GM Index, 1987-2019.**

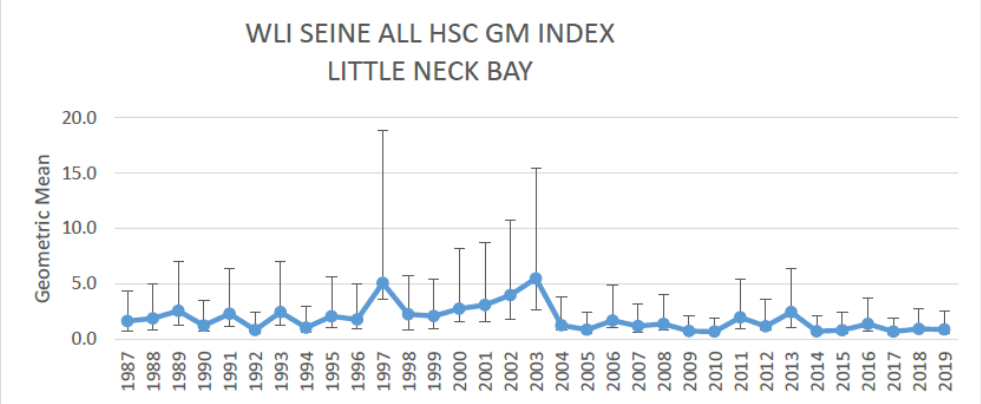



**Figure 6. Little Neck Bay Seine Survey All Horseshoe Crab GM Index, 1987-2019.**

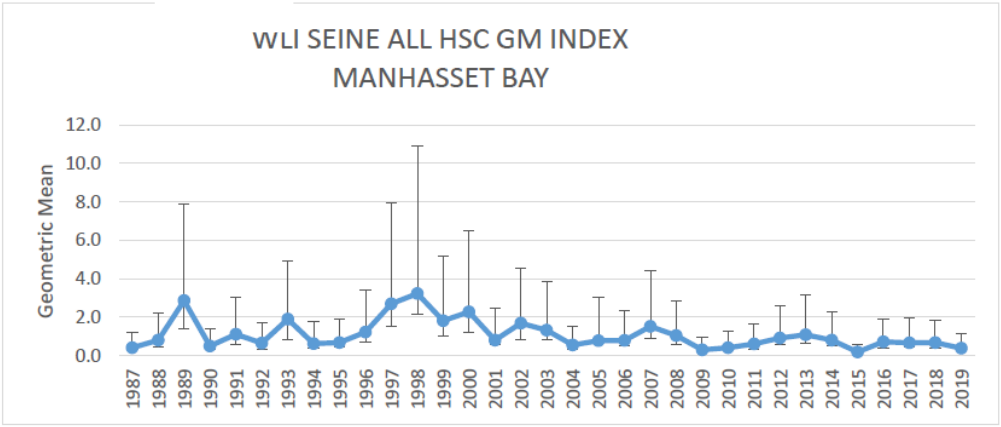



**Figure 7. Manhasset Bay Seine Survey All Horseshoe Crab GM Index, 1987-2019.**

## V. Status of Management Measures and Issues

***ASMFC***

Initial state harvest quotas were established through Addendum I. Addendum III outlined the monitoring requirements and recommendations for the states. Addendum IV set harvest closures and quotas, and other restrictions for New Jersey, Delaware, Maryland, and Virginia, which were continued in Addendums V and VI.

In February 2012 the Board approved Addendum VII to implement the ARM Framework; it was implemented in 2013. Addendum VII includes an allocation mechanism to divide the Delaware Bay optimized harvest output from the ARM Framework among the four Delaware Bay states (New Jersey, Delaware, Maryland, and Virginia east of the COLREGS). Season closures and restrictions present within Addendum VI remain in effect as part of Addendum VII.

State-specific charts outlining compliance and monitoring measures are included in Section VII. With the exception of Massachusetts, which has not submitted a compliance report for the 2020 fishing year, and required sampling that was not completed due to the COVID-19

pandemic, the PRT finds that all other jurisdictions appear to be in compliance with the FMP and subsequent Addenda in 2020. Minor changes to the state compliance reports requested by the PRT are below:

- Connecticut report should include monthly totals for bait harvest. Only annual totals provided.
- PRFC should clearly state if any scientific use permits were issued.

***Changes to State Regulations***

Rhode Island

- In 2020 the establishment of biomedical quota changed to include consultation with biomedical facilities: "Quota: Established annually after consultation with permitted biomedical facilities; not to exceed the total allowable harvest as determined by DMF based on the current stock status"
- New regulation was also added to require best management practices in transport of horseshoe crabs to and from biomedical facilities: "Horseshoe crabs must be transported to and from a biomedical facility in a temperature-controlled vehicle at or below seventy degrees Fahrenheit (70˚ F). Containers of crabs must be secured and at most two thirds (2/3) full."

New York

- Five-day lunar closures around the full moon in May and the new moon in June were implemented for 2021, and the initial trip limit was dropped to 150 crabs in period 2.

***Alternative Baits***

Trials testing effectiveness of alternative baits to horseshoe crab for the American eel and whelk fisheries have previously been conducted. Additionally, a survey of current bait usage in the eel and whelk fisheries was conducted in 2017. This survey is available at: http://www.asmfc.org/uploads/file/5a04b785HSC_BaitSurveyTCReport_Oct2017.pdf.

***Shorebird***

The USFWS received petitions in 2004 and 2005 to emergency list the red knot under the Endangered Species Act. In fall 2005, it determined that emergency listing was not warranted at the time. As part of a court settlement, the USFWS agreed to initiate proposed listings of over 200 species, including the red knot. In fall 2013, the USFWS released a proposal for listing the red knot as threatened. In January 2015 the USFWS designated the red knot as threatened under the Endangered Species Act.

The red knot has been listed as an endangered species in the state of New Jersey since 2012.

## VI. PRT Recommendations and Research Needs

***De Minimis***

States may apply for *de minimis* status if, for the last two years, their combined average horseshoe crab bait landings (by numbers) constitute less than one percent of coastwide horseshoe crab bait landings for the same two-year period. States may petition the Board at any time for *de minimis* status, if their fishery falls below the threshold level. Once *de minimis* status is granted, designated States must submit annual reports to the Board justifying the continuance of *de minimis* status.

States that qualify for *de minimis* status are not required to implement any horseshoe crab harvest restriction measures, but are required to implement components A, B, E and F of the monitoring program (Section 3.5 of the FMP; further modified by Addendum III). Since *de minimis* states are exempt from a harvest cap, there is potential for horseshoe crab landings to shift to *de minimis* states and become substantial, before adequate action can be taken. To control shifts in horseshoe crab landings, *de minimis* states are encouraged to implement one of the following management measures:

1. Close their respective horseshoe crab bait fishery when landings exceed the *de minimis* threshold;
2. Establish a state horseshoe crab landing permit, making it only available to individuals with a history of landing horseshoe crabs in that state; or
3. Establish a maximum daily harvest limit of up to 25 horseshoe crabs per person per day. States which implement this measure can be relieved of mandatory monthly reporting, but must report all horseshoe crabs harvests on an annual basis.

The following states have been removed from the Management Board in recent years: Pennsylvania (2007), Maine (2011), and New Hampshire (2014). South Carolina, Georgia, and Florida are requesting *de minimis* status for the 2021 fishing season based on the 2019-20 season landings and meet the FMP requirements for being granted this status (Table 1). The PRT recommends granting these jurisdictions *de minimis* status.

***Biomedical Threshold***

In 2020, total biomedical mortality exceeded the FMP's mortality threshold of 57,500 crabs, which requires the Board to consider management action. This threshold has been exceeded in 13 of the last 14 years. The PRT has noted previously that the results of the 2019 Benchmark Stock Assessment indicated recent levels of biomedical use did not result in mortalities that would significantly alter population status. However, biomedical mortality in 2019 and 2020 was higher than the average biomedical mortality between 2009 and 2018.

***Funding for Research and Monitoring Activities***

The PRT strongly recommends the funding and continuation of the VT benthic trawl survey. This effort provides a statistically reliable estimate of horseshoe crab relative abundance that is essential to continued ARM implementation and use of the CMSA stock assessment model.

***Discard Mortality Estimation***

Results of the 2019 Benchmark Stock Assessment indicate that discard mortality may be significant, of similar or greater magnitude than bait harvest. The Review Panel's report indicated that these estimates could be further refined to reduce their uncertainty and more precisely characterize this mortality source. The PRT recommends the Board take steps to increase access to and use of data from the NEFOP, allowing for improved monitoring and estimation of discard mortality.

***Improvement of the New York Regional Population***

Results of the 2019 Benchmark Stock Assessment indicate a "Poor" status for the New York regional population, due to negative trends in regional abundance indices. New York and Connecticut have indicated that they will take actions within their states to improve this population. The PRT recommends that the Board encourage such actions to continue so that this population's status may improve.

The PRT will continue to annually report regional indices of abundance so that progress of management actions may be tracked through the annual FMP Reviews. The PRT notes that sampling for the Fall CT Long Island Sound Trawl Survey, Jamaica Bay Seine Survey, Little Neck Bay Seine Survey, and the Manhasset Bay Seine Survey was significantly decreased or not completed due to the COVID-19 pandemic.

## VII. State Compliance and Monitoring Measures

| MASSACHUSETTS | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | **Report Not Provided** | **Report Not Provided** |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota<br>(Voluntary State Quota) | 330,377<br>(165,000) | 330,377<br>(165,000) |
| - Other Restrictions | Bait: 300 crab daily limit year round; limited entry;<br>Biomedical: 1,000 crab daily limit;<br>Conch pot and eel fishermen: no possession limit<br>All: May and June 5-day lunar closures; No mobile gear harvest Fri-Sat during summer flounder season; 7" PW minimum size; Pleasant Bay Closed Area | Bait: 300 crab daily limit year round;<br>Biomedical: 1,000 crab daily limit;<br>Conch pot and eel fishermen: no possession limit<br>All: May and June 5-day lunar closures; No mobile gear harvest Fri-Sat during summer flounder season; 7" PW minimum size; Pleasant Bay Closed Area |
| - Landings | **Report Not Provided** | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes, plus weekly dealer reporting through SAFIS | Yes, plus weekly dealer reporting through SAFIS |
| - Characterize commercial bait fishery | **Report Not Provided** | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Yes | Yes |
| - Required information for biomedical use of crabs | **Report Not Provided** | Yes |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | **Report Not Provided** | Yes |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | **Report Not Provided** | Yes |
| **Monitoring Component $B_3$**<br>Implement spawning survey | **Report Not Provided** | Yes |
| **Monitoring Component $B_4$**<br>Tagging program | Yes – w/NPS and USFWS; Pleasant Bay, Monomy NWR, Waquoit Bay | Yes – w/NPS and USFWS; Pleasant Bay, Monomy NWR, Waquoit Bay |

| RHODE ISLAND | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not request *de minimis* | Did not request *de minimis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota<br>(Voluntary State Quota) | 26,053<br>(8,398) | 26,053<br>(8,398) |
| - Other Restrictions | State Restrictions:<br>- Daily possession limit: 60 crabs per permit<br>- Bait Fishery Closure: May 1-May 31<br>- Biomedical Fishery Closure: 48 hours prior to and 48 hours following new and full moons during May.<br>- Biomedical quota and best management practices | State Restrictions:<br>- Daily possession limit: 60 crabs per permit<br>- Bait Fishery Closure: May 1-May 31<br>- Biomedical Fishery Closure: 48 hours prior to and 48 hours following new and full moons during May<br>- Biomedical quota and best management practices |
| - Landings | Confidential | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes, weekly call in and monthly on paper | Yes, weekly call in and monthly on paper |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Yes | Yes |
| - Required information for biomedical use of crabs | Yes, details within Massachusetts' biomedical reports | Captured in Massachusetts' biomedical reports |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$**<br>Implement spawning survey | Yes, since 2000 (methods unspecified) | Yes |
| **Monitoring Component $B_4$**<br>Tagging program | State Wildlife Grant for 2020-2021 tagging program in collaboration with University of Rhode Island. | State Wildlife Grant for 2020-2021 tagging program in collaboration with URI. Status unknown beyond 2021. |

| CONNECTICUT | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 48,689 | 48,689 |
| - Other Restrictions | Limited entry program, possession limits, and seasonal and area closures | Limited entry program, possession limits, and seasonal and area closures |
| - Landings | 15,942 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes, but only annual totals were reported. | Yes |
| - Characterize commercial bait fishery | No – exempt under Addendum III because landings are < 5% of coastwide total | No – exempt under Addendum III because landings are < 5% of coastwide total |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | **LIS Trawl Survey did not take place due to COVID-19.** | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | Yes, since 1999 (methods differ from DE Bay survey) | Yes |
| **Monitoring Component $B_4$** Tagging program | Yes, in collaboration with local universities (Sacred Heart University since 2015) | Yes |

| NEW YORK | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota<br>(Voluntary State Quota) | 366,272<br>(150,000) | 366,272<br>(150,000) |
| - Other Restrictions | Ability to close areas to harvest; seasonal quotas and daily harvest limits | Ability to close areas to harvest; seasonal quotas and daily harvest limits<br>- Five-day lunar closures around the full moon in May and the new moon in June.<br>-Initial trip limit dropped to 150 crabs in period 2. |
| - Landings | 63,367 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes | Yes |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | Yes. (Unable to sample in May 2020 due to COVID-19) | Yes |
| **Monitoring Component $B_3$**<br>Implement spawning survey | Yes. Due to COVID-19 only 8 long-term sites were monitored by DEC, CCE and Stony Brook University staff. | Yes |
| **Monitoring Component $B_4$**<br>Tagging program | Yes | Yes |

| NEW JERSEY | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not request *de miminis* | Does not request *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota<br>(Voluntary state quota) | 162,136 [male only]<br>(0) | 162,136 [male only]<br>(0) |
| - Other Restrictions | Bait harvest moratorium | Bait harvest moratorium |
| - Landings | 0 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Not Applicable | Not Applicable |
| - Characterize commercial bait fishery | Not Applicable | Not Applicable |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Yes | Yes |
| - Required information for biomedical use of crabs | Yes | Yes |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | No. Did not complete due to COVID-19. | Yes |
| **Monitoring Component $B_3$**<br>Implement spawning survey | Yes | Yes |
| **Monitoring Component $B_4$**<br>Tagging program | Outside, independent groups currently | No |
| **Monitoring Component $B_5$**<br>Egg abundance survey | Yes, but removed as a mandatory component | Yes |
| **Monitoring Component $B_6$**<br>Shorebird monitoring program | Yes | Yes |

| DELAWARE | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota<br>(State Quota) | 162,136 [male only]<br>157,122 [male only] | 162,136 [male only]<br>157,122 [male only] |
| - Other Restrictions | Closed season (January 1 – June 7); season closed early on June 16 | Closed season (January 1 – June 7) |
| - Landings | 124,803 males | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes (daily call-in reports & monthly logbooks) | Yes |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | Yes –updates once every 5 years or as needed | Yes – updates once every 5 years or as needed |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$**<br>Implement spawning survey | Yes. **Effort greatly reduced due to COVID-19.** | Yes |
| **Monitoring Component $B_4$**<br>Tagging program | No state program but has assisted in the past with various Delaware Bay horseshoe crab tagging initiatives | No |
| **Monitoring Component $B_5$**<br>Egg abundance survey | Removed as component | Removed as component |
| **Monitoring Component $B_6$**<br>Shorebird monitoring program | Yes | Yes |

Note: The egg abundance survey has been discontinued as a mandatory monitoring element. Delaware will include information on the survey if it continues, but is no longer required to perform the survey.

| MARYLAND | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 255,980 (male only) | 255,980 (male only) |
| - Other Restrictions | Delayed harvest and closed season/area combinations, catch limits | Delayed harvest and closed season/area combinations, catch limits |
| - Landings | 61,165 males | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes (weekly reports for permit holders; monthly for non-permit holders) | Yes (weekly reports for permit holders; monthly for non-permit holders) |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Yes | Yes |
| - Required information for biomedical use of crabs | Yes | Yes |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | Yes | Yes |
| **Monitoring Component $B_4$** Tagging program | Yes – through biomedical use | Yes – through biomedical use |

| POTOMAC RIVER FISHERIES COMMISSION | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | *De minimis* status granted in 2019. | *De minimis* requested and meets criteria. |
| - Ability to close fishery if *de minimis* threshold is reached | No horseshoe crab fishery | No horseshoe crab fishery |
| - Daily possession limit <25 for *de minimis* state | | |
| - HSC landing permit | | |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 0 | 0 |
| - Other Restrictions | None | None |
| - Landings | 0 | 0 |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes - weekly | Yes - weekly |
| - Characterize commercial bait fishery | Not Applicable | Not Applicable |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Not Applicable | Not Applicable |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Not Applicable | Not Applicable |
| **Monitoring Component $B_3$** Implement spawning survey | Not Applicable | Not Applicable |
| **Monitoring Component $B_4$** Tagging program | Not Applicable | Not Applicable |

| VIRGINIA | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de miminis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 172,828<br>(81,331 male-only east of COLREGS line) | 172,828<br>(81,331 male-only east of COLREGS line) |
| - Other Restrictions | Closed season (January 1 – June 7) for federal waters. Effective January 1, 2013 harvest of horseshoe crabs, from east of the COLREGS line, is limited to trawl gear and dredge gear only. | Closed season (January 1 – June 7) for federal waters. Effective January 1, 2013 harvest of horseshoe crabs, from east of the COLREGS line, is limited to trawl gear and dredge gear only. |
| - Landings | 24,031<br>(14,490 males) | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes | Yes |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | No permits issued in 2020 | Yes |
| - Required information for biomedical use of crabs | Yes | Yes |
| **Monitoring Component $A_3$**<br>Identify spawning and nursery habitat | Yes – completed | No |
| **Monitoring Component $B_1$**<br>Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$**<br>Continue existing benthic sampling programs | No | No |
| **Monitoring Component $B_3$**<br>Implement spawning survey | No | No |
| **Monitoring Component $B_4$**<br>Tagging program | No | No |

| NORTH CAROLINA | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | Did not qualify for *de miminis* | Does not qualify for *de minimis* |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 24,036 | 24,036 |
| - Other Restrictions | Trip limit of 50 crabs; Proclamation authority to adjust trip limits, seasons, etc. | Trip limit of 50 crabs; Proclamation authority to adjust trip limits, seasons, etc. |
| - Landings | 13,463 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes – trip level reporting each month | Yes – trip level reporting each month |
| - Characterize commercial bait fishery | Yes | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Little information available; Survey discontinued after 2002 and 2003 due to low levels of crabs recorded | Not specified |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | No | No |
| **Monitoring Component $B_4$** Tagging program | No | No |

| SOUTH CAROLINA | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | *De minimis* status granted in 2020. | *De minimis* requested for 2021 and meets criteria. |
| - Ability to close fishery if *de minimis* threshold is reached | No horseshoe crab bait fishery | No horseshoe crab bait fishery |
| - Daily possession limit <25 for *de minimis* state | | |
| - HSC landing permit | | |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 0 | 0 |
| - Other Restrictions | None | None |
| - Landings | 0 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes (Biomedical) | Yes (Biomedical) |
| - Characterize commercial bait fishery | Not Applicable | Not Applicable |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Yes | Yes |
| - Required information for biomedical use of crabs | Yes | Yes |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Completed | No |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Yes. **Sampling effort reduced due to COVID-19.** | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | Yes | Yes |
| **Monitoring Component $B_4$** Tagging program | Yes | Yes |

| GEORGIA | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | *De minimis* status granted in 2020. | *De minimis* requested for 2021 and meets criteria. |
| - Ability to close fishery if *de minimis* threshold is reached | Yes | Yes |
| - Daily possession limit <25 for *de minimis* state | 25/person; 75/vessel with 3 licensees | 25/person; 75/vessel with 3 licensees |
| - HSC landing permit | Must have commercial shrimp, crab, or whelk license; LOA permit required | Must have commercial shrimp, crab, or whelk license; LOA permit required |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 29,312 | 29,312 |
| (State Quota) | 29,312 | 29,312 |
| - Other Restrictions | None | None |
| - Landings | 0 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes | Yes |
| - Characterize commercial bait fishery | No bait landings | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Completed | Not Applicable |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | No | No |
| **Monitoring Component $B_4$** Tagging program | No | No |

| FLORIDA | | |
|---|---|---|
| | **2020 Compliance** | **2021 Management Proposal** |
| ***De minimis* status** | *De minimis* status granted in 2020. | *De minimis* requested for 2021 and meets criteria. |
| - Ability to close fishery if *de minimis* threshold is reached | Yes | Yes |
| - Daily possession limit <25 for *de minimis* state | 25/person w/ valid saltwater products license; 100/person with marine life endorsement | 25/person w/ valid saltwater products license; 100/person with marine life endorsement |
| - HSC landing permit | See above | See above |
| **Bait Harvest Restrictions and Landings** | | |
| - ASMFC Quota | 9,455 | 9,455 |
| - Other Restrictions | None | None |
| - Landings | 0 | -- |
| **Monitoring Component $A_1$** | | |
| - Mandatory monthly reporting | Yes | Yes |
| - Characterize commercial bait fishery | No | Yes |
| **Monitoring Component $A_2$** | | |
| - Biomedical reporting | Not Applicable | Not Applicable |
| - Required information for biomedical use of crabs | Not Applicable | Not Applicable |
| **Monitoring Component $A_3$** Identify spawning and nursery habitat | Yes | Yes |
| **Monitoring Component $B_1$** Coastwide benthic trawl survey | Yes, VT Trawl Survey was conducted in 2020 | Yes, VT Trawl Survey will be conducted in 2021; future years and spatial scope unknown at this time |
| **Monitoring Component $B_2$** Continue existing benthic sampling programs | Yes | Yes |
| **Monitoring Component $B_3$** Implement spawning survey | Yes | Yes |
| **Monitoring Component $B_4$** Tagging program | No | No |

# Atlantic States Marine Fisheries Commission

## Spiny Dogfish Management Board

*October 21, 2021*
*10:15 – 11:15 a.m.*
*Webinar*

## 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 (*C. Batsavage*) | 10:15 a.m. |
| 2. Board Consent<br>• Approval of Agenda<br>• Approval of Proceedings from October 2020 | 10:15 a.m. |
| 3. Public Comment | 10:20 a.m. |
| 4. Review Analysis on Trip Limit and Market Price (*J. Didden*) | 10:30 a.m. |
| 5. Review and Revise (If Needed) 2022/2023 Specifications (*K. Rootes-Murdy*) **Possible Action** | 10:45 a.m. |
| 6. Consider Fishery Management Plan Review and State Compliance for the 2020 Fishing Year (*K. Rootes-Murdy*) **Action** | 10:55 a.m. |
| 7. Update on Research Track Assessment (*C. McManus*) | 11:05 a.m. |
| 8. Other Business/Adjourn | 11:15 a.m. |

The meeting will be held via webinar, click here for details.

# MEETING OVERVIEW

**Spiny Dogfish Management Board**
**October 21, 2021**
**10:15 - 11:15 a.m.**
**Webinar**

| | | |
|---|---|---|
| Chair: Chris Batsavage (NC)<br>Assumed Chairmanship: 10/19 | Technical Committee Chair: Scott Newlin (DE) | Law Enforcement Committee Representative: Moran (NJ) |
| Vice-Chair:<br>Nichola Meserve | Advisory Panel Chair:<br>VACANT | Previous Board Meeting:<br>October 2020 |
| Voting Members: ME,NH, MA, RI, CT, NY, NJ, DE, MD, VA, NC, NMFS, USFWS (13 votes) | | |

**2. Board Consent**

- Approval of Agenda
- Approval of Proceedings from October 2020

***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 should use the webinar raise your hand function and the Board Chair will let you know when to speak. 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 Board 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. Review Analysis on Trip Limit and Market Price (10:30 - 10:45 a.m.)**

**Background**

- The Board has previously considered changes to the commercial federal trip limit due to concerns over was an additional constraint to the state and regional trip limits.
- In August, the Mid-Atlantic Fishery Management Council (Council) Advisory Panel met and requested that the federal trip limit be raised to allow for more vessels to participate and allow for higher landings. (**Briefing Materials**)
- In response, Council Staff conducted a price analysis (**Briefing Materials**) to evaluate the potential effect of federal trip limit changes on spiny dogfish ex-vessel prices.

**Presentations**

- Analysis on Trip Limit and Market Price by J. Didden

**5. Review and Revise (If Needed) 2022/2023 Specifications (10:45 - 10:55 a.m.) Possible Action**

**Background**

- In October 2020, the Board revised multi-year spiny dogfish specifications for the 2021/2022 and 2022/2023 fishing season to be consistent with measures recommended to NOAA Fisheries by the Council.
- Earlier this month the Council met and recommended increasing the federal trip limit to 7,500 pounds for the 2022/2023 fishing season.

**Presentations**

- Overview of 2022/2023 Specifications by K. Rootes-Murdy

**Board Actions for Consideration**

- Adjust the Northern Region (Maine to Connecticut) trip limit and recommend the states of New York to North Carolina implement trip limits in state waters consistent with the Council's recommended trip limit in federal waters for the 2022/2023 fishing season.

**6. Fishery Management Plan Review (10:55 - 11:05 a.m.) Action**

**Background**

- State compliance reports were due July 1, 2021
- The Plan Review Team reviewed each state report and compiled the annual FMP Review.
- New York and Delaware requested *de minimis* status

**Presentations**

- Overview of the Spiny Dogfish FMP Review by K. Rootes-Murdy (**Briefing Materials**)

**Board Actions for Consideration**

- Accept 2020 FMP Review and State Compliance Reports.
- Approve *de minimis* requests for New York and Delaware.

**7. Update on Research Track Assessment (11:05 - 11:15 a.m.)**

**Background**

- The Research Track Assessment Working Group was formed earlier this year and is continuing work on the assessment scheduled for peer review in summer 2022.

**Presentations**

- Update on Research Track Assessment by C. McManus

**8. Other Business/Adjourn**

# ATLANTIC STATES MARINE FISHERIES COMMISSION

## REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

## AMERICAN EEL
## *(Anguilla rostrata)*

### 2020 FISHING YEAR

Prepared by the American Eel Plan Review Team

**REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN AND STATE COMPLIANCE FOR AMERICAN EEL *(Anguilla rostrata)* FOR THE 2020 FISHERY**

**Management Summary**

| | |
|---|---|
| Date of FMP approval: | November 1999 |
| Addenda: | Addendum I (February 2006)<br>Addendum II (October 2008)<br>Addendum III (August 2013)<br>Addendum IV (October 2014)<br>Addendum V (August 2018) |
| Management unit: | Migratory stocks of American Eel from Maine through Florida |
| States with a declared interest: | Maine through Florida, including the District of Columbia and the Potomac River Fisheries Commission |
| Active committees: | American Eel Management Board, Plan Review Team, Technical Committee, Stock Assessment Subcommittee, and Advisory Panel |

## I. Status of the Fishery Management Plan

The ASMFC American Eel Management Board (Board) first convened in November 1995 and finalized the Fishery Management Plan (FMP) for American Eel in November 1999 (ASMFC 2000).

GOAL

The goal of the FMP is to conserve and protect the American eel resource to ensure its continued role in the ecosystems while providing the opportunity for its commercial, recreational, scientific, and educational use.

OBJECTIVES

1. Improve knowledge of eel utilization at all life stages through mandatory reporting of harvest and effort by commercial fishers and dealers, and enhanced recreational fisheries monitoring.
2. Increase understanding of factors affecting eel population dynamics and life history through increased research and monitoring.
3. Protect and enhance American eel abundance in all watersheds where eel now occur.
4. Where practical, restore American eel to those waters where they had historical abundance but may now be absent by providing access to inland waters for glass eel, elvers, and yellow eel and adequate escapement to the ocean for pre-spawning adult eel.
5. Investigate the abundance level of eel at the various life stages, necessary to provide

adequate forage for natural predators and support ecosystem health and food chain structure.

The FMP requires all states and jurisdictions to implement an annual young-of-year (YOY) abundance survey to monitor annual recruitment of each year's cohort. In addition, the FMP requires a minimum recreational size, a possession limit and a state license for recreational fishermen to sell eels. The FMP requires that states and jurisdictions maintain existing or more conservative American eel commercial fishery regulations for all life stages, including minimum size limits. Each state is responsible for implementing management measures within its jurisdiction to ensure the sustainability of its American eel population.

The FMP has been adapted through the following addenda:

Addendum I (February 2006)
In August 2005, the Board directed the American Eel Plan Development Team (PDT) to initiate an addendum to establish a mandatory catch and effort monitoring program for American eel. The Board approved Addendum I at the February 2006 Board meeting.

Addendum II (October 2008)
In January 2007, the Board initiated a draft addendum with the goal of increasing escapement of silver eels to spawning grounds. In October 2008, the Board approved Addendum II, which placed increased emphasis on improving the upstream and downstream passage of American eel. The Board chose to delay action on management measures in order to incorporate the results of the 2012 stock assessment.

Addendum III (August 2013)
In August 2012, the Board initiated Draft Addendum III with the goal of reducing mortality on all life stages of American eel. The Addendum was initiated in response to the findings of the 2012 Benchmark Stock Assessment, which declared American eel stock along the US East Coast depleted. The Board approved Addendum III in August 2013.

Addendum III requires states to reduce the yellow eel recreational possession limit to 25 eel/person/day, with the option to allow an exception of 50 eel/person/day for party/charter employees for bait purposes. The recreational and commercial size limit increased to a minimum of 9 inches. Eel pots are required to be ½ by ½ inch minimum mesh size or have at least a 4" by 4 inch escape panel of ½ by ½ inch mesh escape panel. The glass eel fishery is required to implement a maximum tolerance of 25 pigmented eels per pound of glass eel catch. The silver eel fishery is prohibited to take eels from September 1st to December 31st from any gear type other than baited traps/pots or spears. The Addendum also set minimum monitoring standards for states and required dealer and harvester reporting in the commercial fishery.

Addendum IV (October 2014)
In October 2014, the Board approved Addendum IV. This addendum was also initiated in response to the 2012 American Eel Benchmark Stock Assessment and the need to reduce

mortality on all life stages. The Addendum established a coastwide cap of 907,671 pounds of yellow eel, reduced Maine's glass eel quota to 9,688 pounds (2014 landings), and allowed for the continuation of New York's silver eel weir fishery in the Delaware River. For yellow eel fisheries, the coastwide cap was implemented for the 2015 fishing year and established two management triggers: (1) if the cap is exceeded by more than 10% in a given year, or (2) the cap is exceeded for two consecutive years regardless of the percent overage. If either one of the triggers are met, then states would implement state-specific allocation based on average landings from 2011-2013. The addendum also requires any state or jurisdiction with a commercial glass eel fishery to implement a fishery independent life cycle survey covering glass, yellow, and silver eels within at least one river system.

Addendum V (August 2018)

In August 2018, the Board approved Addendum V. The Addendum increases the yellow eel coastwide cap starting in 2019 to 916,473 pounds to reflect a correction in the historical harvest data. Further, the Addendum adjusts the method (management trigger) to reduce total landings to the coastwide cap when the cap has been exceeded, and removes the implementation of state-by-state allocations if the management trigger is met. Management action will now be initiated if the yellow eel coastwide cap is exceeded by 10% in two consecutive years. If the management trigger is exceeded, only those states accounting for more than 1% of the total yellow eel landings will be responsible for adjusting their measures. A workgroup was formed to define the process to equitably reduce landings among the affected states when the management trigger has been met (see appendix, approved October 2019). Additionally, the Addendum maintains Maine's glass eel quota of 9,688 pounds. The Board also slightly modified the glass eel aquaculture provisions, maintaining the 200 pound limit for glass eel harvest, but adjusting the criteria for evaluating the proposed harvest area's contribution to the overall population consistent with the recommendations of the Technical Committee.

## II. Status of the Stock

In 2009, the Board initiated a benchmark stock assessment. After reviewing over 100 surveys and studies, the American Eel Stock Assessment Subcommittee (SAS) selected 19 YOY surveys and 15 yellow eel surveys along the East Coast for use as indices of abundance in the assessment. Despite the large number of surveys and studies available for use, the American eel stock is still considered data-poor because very few surveys target eels and collect information on length, age, and sex of the animals caught. Additionally, eels have an extremely complex life history that is difficult to describe using traditional stock assessment models. Therefore, several data-poor methods were used to assess the American eel resource.

The first set of analyses (trend analyses) aimed to determine if there was a statistically significant trend in the fishery-independent survey data and whether or not there was evidence for significant trends on the regional and coastwide scales. The second approach involved a Depletion-Based Stock Reduction Analysis (DB-SRA) model, which uses trends in historical catch to estimate biomass trends and maximum sustainable yield. Both the trend analyses and DB-SRA

results indicated that the American eel stock declined in recent decades, and the prevalence of significant downward trends in multiple surveys across the coast is cause for concern. Therefore, the stock status for American eels is depleted, although overfishing and overfished status in relation to the reference points could not be determined with confidence. The benchmark stock assessment was peer reviewed in March 2012 and was approved for management use in May 2012 (ASMFC 2012).

In 2003, declarations from the International Eel Symposium (AFS 2003, Quebec City, Quebec, Canada) and the Great Lakes Fisheries Commission (GLFC) highlighted concerns regarding the health of eel stocks worldwide. In 2010, the Canada Department of Fisheries and Oceans (DFO) conducted a stock assessment on American eels in Canadian waters and found that region-specific status indices show that abundance is very low in comparison to levels in the 1980s for the Lake Ontario and upper St. Lawrence River stock, and is either unchanged or increasing in the Atlantic Provinces.

The 2017 American Eel Stock Assessment Update updates the 2012 American Eel Benchmark Stock Assessment with data from 2010-2016. The trend analysis results in this stock assessment update are consistent with the 2012 results, with few exceptions. Despite downward trends in the indices, commercial yellow American eel landings have been stable in recent decades along the Atlantic coast (U.S. and Canada), although landings still remain much lower than historical levels. The trend analysis and stable low landings support the Assessment Update's conclusion that the American eel population in the assessment range is similar to five years ago and remains depleted. Therefore, the resource is considered depleted and no stock status specific to overfishing determination can be made based on the trend analyses performed (ASMFC 2017).

Work has begun on the next benchmark stock assessment and is anticipated to be completed for peer review in 2022.

## III. Status of the Fishery

American eel currently support commercial fisheries throughout their range in North America, with significant fisheries occurring in the US Mid-Atlantic region and Canada. These fisheries are executed in riverine, estuarine, and ocean waters. In the US, commercial fisheries for glass eel/elvers exist in Maine and South Carolina and a silver eel weir fishery exists in New York's Delaware River, whereas yellow eel fisheries exist in all states and jurisdictions with the exception of Pennsylvania and the District of Columbia.

Although eel have been continuously harvested, consistent data on harvest has not always been available. Harvest data from the Atlantic coastal states (Maine to Florida) indicate that the harvest fluctuated widely between 1970 and 1980, but showed an increasing trend that peaked in 1979 at 3,951,936 pounds. From then landings declined to a low of 641,000 pounds in 2002, recovered steadily to exceed one million pounds on average from 2010-2014, and since has experienced a decline in four of the last five years to a time series low in 2019. Because fishing

effort data are unavailable for the entire time series, finding a correlation between population numbers and landings data is difficult.

### *Commercial*

***Please Note: Landings information for the following section are from state compliance reports and update the preliminary landings presented to the American Eel Management Board in May 2021.***

State reported commercial landings of yellow/silver eels in 2020 totaled approximately 259,862 pounds[1] (Table 1, Figure 1), which represents a 51.8% decrease in landings from 2019 (539,301 pounds) and was the lowest value in the last 20 years. The decline in harvest appears to be largely driven by market demand; in April 2021 AP members indicated that the all-time low landings is due to market demand and decline in yellow eels being exported to European markets. More information on 2021 AP report can be found here. Yellow eel landings decreased in ten states and jurisdictions, while increasing in one. In 2020, state reported landings from Maryland, PRFC, and Virginia together accounted for 78% of the coastwide commercial total landings. Landings of glass eels were reported from Maine totaled approximately 9,650 pounds; South Carolina's landings are confidential.

**Table 1. Preliminary 2020 Commercial Landings by State and Life Stage[1]**

| | **State Reported** | |
|---|---|---|
| | **Glass** | **Yellow** |
| **Maine** | 9,614 | 7,010 |
| **New Hampshire** | No Fishery | 0 |
| **Massachusetts** | No Fishery | 0 |
| **Rhode Island** | No Fishery | 1,425 |
| **Connecticut** | No Fishery | 1,134 |
| **New York** | No Fishery | 16,439 |
| **New Jersey** | No Fishery | 23,742 |
| **Pennsylvania** | No Fishery | No Fishery |
| **Delaware** | No Fishery | 1,942 |
| **Maryland** | No Fishery | 164,520 |
| **D.C.** | No Fishery | No Fishery |
| **PRFC** | No Fishery | 24,971 |
| **Virginia** | No Fishery | 14,799 |
| **North Carolina** | No Fishery | 3,291 |
| **South Carolina** | Confidential (<750 pounds) | 0 |
| **Georgia** | No Fishery | 0 |
| **Florida** | No Fishery | 499 |
| **Total** | **Glass: Approx 9,650 Elver: 0** | **259,862** |

*NA: Not Available*

[1] Preliminary landings data for 2020 comes from ACCSP and state compliance reports.

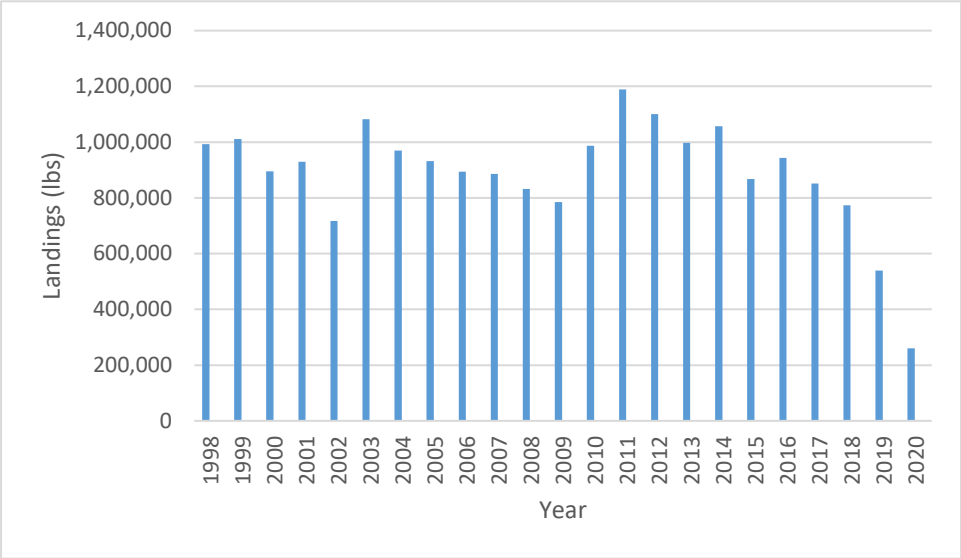



*Figure 1. American Eel Yellow-Life Stage Coastwide Landings 1998-2020*

**Table 2.** State commercial regulations for the 2020 fishing year.*

| State | Min Size Limit | License/Permit | Other |
|---|---|---|---|
| ME | Glass<br>No minimum size | Daily dealer reports/swipe card program; monthly harvester report of daily landings. Tribal permit system in place for some Native American groups. | In 2017, the Legislature authorized the DMR commissioner to adopt rules to implement the elver fishing license lottery, including provisions for the method and administration of the lottery. |
| | Yellow<br>9” | Harvester/dealer license and monthly reporting. Tribal permit system in place for some Native American groups. | Seasonal closures. Gear restrictions. Weekly closures. |
| NH | 9” | Commercial saltwater license and wholesaler license. No dealer reports. Monthly harvester reporting includes dealer information. | Gear restrictions in freshwater. |
| MA | 9" | Commercial permit with annual catch report requirement. Registration for dealers with purchase record requirement. Dealer/harvester reporting. | Traps, pots, spears, and angling only. Mesh restrictions. |

| State | Min Size Limit | License/Permit | Other |
|---|---|---|---|
| RI | 9" | Commercial fishing license. Dealer/harvester reporting. | Seasonal gear restrictions. |
| CT | 9" | Commercial license (not required for personal use). Dealer/harvester reporting. | Gear restrictions. |
| NY | 9" | Harvester/dealer license and monthly reporting. | Gear restrictions. Maximum limit of 14” in some rivers. |
| NJ | 9" | License required. No dealer reports. Monthly harvester reporting includes dealer information. | Gear restrictions. |
| PA | NO COMMERCIAL FISHERY | | |
| DE | 9" | Harvester reporting, no dealer reporting. License required. | Commercial fishing in tidal waters only. Gear restrictions. |
| MD | 9" | Dealer/harvester license and monthly reporting. | Prohibited in non-tidal waters. Gear restrictions. Commercial crabbers may fish 50 pots per day, must submit catch reports. |
| DC | NO COMMERCIAL FISHERY | | |
| PRFC | 9" | Harvester license and reporting. No dealer reporting. | Seasonal gear restrictions. Mesh size restrictions on eel pots. |
| VA | 9" | Harvester license required. Dealer/harvester monthly reporting. | Mesh size restrictions on eel pots. Seasonal closures. |
| NC | 9" | Standard Commercial Fishing License for all commercial fishing. Dealer/harvester monthly combined reports on trip ticket. | Mesh size restrictions on eel pots. Seasonal closures. |
| SC | Glass No minimum size | Fyke and dip net only permitted. Dealer/harvester monthly combined reports on trip ticket. License required. | Max 10 individuals. Gear and area restrictions. |
| | Yellow 9" | Pots and traps permitted only. Dealer/harvester monthly combined reports on trip ticket. License required. | Gear restrictions. |
| GA | 9" | Personal commercial fishing license and commercial fishing boat license. Dealer/harvester monthly combined reports on trip ticket. | Gear restrictions on traps and pots. Area restrictions. |

| State | Min Size Limit | License/Permit | Other |
|---|---|---|---|
| FL | 9" | Permits and licenses. Harvester reporting. No dealer reporting. | Gear restrictions. |

* For specifics on licenses, gear restrictions, and area restrictions, please contact the individual state.

***Recreational***

Available information indicates that few recreational anglers directly target American eel. For the most part, hook-and-line fishermen catch eel incidentally when fishing for other species. American eel are often purchased by recreational fishermen for use as bait for larger gamefish such as striped bass, and some recreational fishermen may catch their own to use as bait.

The National Marine Fisheries Service (NMFS) Marine Recreational Information Program (MRIP) shows a declining trend in the catch of eel during the latter part of the 1990s. As of 2009, recreational data are no longer provided for American eel, due to the unreliable design of MRIP that focuses on active fishing sites along coastal and estuarine areas.

**Table 3. State recreational regulations for the 2020 fishing year.***

| State | Size Limit | Possession Limit | Other |
|---|---|---|---|
| ME | 9" | 25 eels/person/day | Gear restrictions. License requirement and seasonal closures (inland waters only). Bait limit of 50 eels/day for party/charter boat captain and crew. |
| NH | 9" | 25 eels/person/day | Coastal harvest permit needed if taking eels other than by angling. Gear restrictions in freshwater. |
| MA | 9" | 25 eels/person/day | Nets, pots, traps, spears, and angling only; seasonal gear restrictions and mesh requirements. Bait limit of 50 eels/day for party/charter boat captain and crew. |
| RI | 9" | 25 eels/person/day | Bait limit of 50 eels/day for party/charter boat captain and crew. |
| CT | 9" | 25 eels/person/day | |
| NY | 9” | 25 eels/person/day | Maximum limit of 14” in some rivers. Bait limit of 50 eels/day for party/charter boat captain and crew. |
| NJ | 9" | 25 eels/person/day | Bait limit of 50 eels/day for party/charter boat captain and crew. Mesh size restriction on pots. |
| PA | 9" | 25 eels/person/day | Gear restrictions. |
| DE | 9" | 25 eels/person/day | Two pot limit/person. |
| MD | 9" | 25 eels/person/day | Gear restrictions. |

| | | | |
|---|---|---|---|
| DC | 9" | 10 eels/person/day | |
| PRFC | 9" | 25 eels/person/day | |
| VA | 9" | 25 eels/person/day | Recreational license. Two pot limit. Mandatory monthly catch report. Gear restrictions. Bait limit of 50 eels/day for party/charter boat captain and crew. |
| NC | 9" | 25 eels/person/day | Gear restrictions. Non-commercial special device license. Two eel pots allowed under Recreational Commercial Gear license. Bait limit of 50 eels/day for party/charter boat captain and crew. |
| SC | 9" | 25 eels/person/day | Gear restrictions. Permits and licenses. Two pot limit. |
| GA | 9" | 25 eels/person/day | |
| FL | 9" | 25 eels/person/day | Gear restrictions. Wholesale/retail purchase exemption applies to possession limit for bait. |

* For specifics on licenses, gear restrictions, and area restrictions, please contact the individual state.

## IV. Status of Research and Monitoring

The FMP requires states and jurisdictions with a declared interest in the species to conduct an annual YOY survey to monitor annual recruitment of each year's cohort. Please note that due to the COVID-19 Pandemic a number of state fishery independent surveys were not conducted to the same extent or at all in 2020.

In 2020, the states and jurisdictions of Maine (West Harbor Pond), Connecticut (Fishing Brook Eel Pass), New York (Carmans River), Virginia (Gloucester Point), and New Hampshire (Lamprey River) had above average YOY counts. The 2020 catch at Maine's West Harbor Pond site was the largest catch of YOY and the fourth largest catch of yellow eels. The 2020 catch at Connecticut's Fishing Brook Eel Pass was the ninth highest in the 20 year time series. Catch at New York's Carmans River was second highest in the 19 year time series. Catch at New Jersey's Patcong Creek was seventh highest in the 18 year time series. Delaware's Millsboro Pond was the 12$^{th}$ highest (total catch) in the 20 year time series. The second highest index for elvers at Gloucester Point, VA was observed in 2020 following the highest index last year. New Hampshire's lamprey river YOY survey in Newmarket had the fourth highest index in the time series.

All other states with YOY surveys (Rhode Island, New Jersey, Delaware, Maryland, North Carolina, South Carolina, and Florida) had at or below average survey counts. The results from Virginia's YOY surveys are forthcoming. D.C. and Georgia do not have YOY surveys, but instead have yellow eel surveys. The 2020 catch at Maryland's Turville Creek site was the second lowest in the survey's 21-year history. Due to a state mandated telework policy due to the COVID-19 pandemic, staff were unable to complete the survey in its entirety. As a result, uncertainty will remain with

accurately estimating annual abundance in 2020. North Carolina samples from the Beaufort Bridge Net survey for 2020 and 2021 have not been processed yet due to a backlog.

New Jersey additionally developed and implemented a fishery-independent eel pot survey to collect abundance data of yellow American eels within nursery grounds. This survey, which began in 2015, supplements the current glass eel survey by sampling more life stages and will allow biologists to collect additional biological samples (age-length-weight data).

As required by Addendum IV, Maine continued the fishery independent life cycle survey covering glass, yellow, and silver eels within at least one river system (West Harbor Pond) in 2020. This site was changed from Cobboseecontee Stream to West Harbor Pond YOY site to improve collection of eels at all life stages by Maine Department of Marine Resources staff starting in 2019.

Maine's glass eel aquaculture proposal for the 2019 season was approved and 130 pounds were harvested for aquaculture grow out. Maine submitted a similar proposal for the 2020 fishing season that was also approved. For both years, the approved proposals allow for an additional 200 pounds of glass eels to be harvested for aquaculture; this amount is in addition to the Maine's glass eel quota of 9,688 pounds. Due to the COVID-19 pandemic, a total of 0 pounds were harvested out of the 200 pound allocation in 2020. Maine did submit a proposal for 2021 and was approved by the Board in August 2020.

North Carolina's aquaculture plan for an American Eel Farm was approved for 2019-2020, allowing the harvest of up to 200 pounds of glass eel aquaculture. The American Eel Farm (AEF) harvested 0 pounds. A proposal was not submitted for 2021 to continue efforts at establishing glass eel aquaculture. There is no indication if North Carolina plans to submit a proposal in future years.

The FMP does not require any other research initiatives for participating states and jurisdictions. Nonetheless, the American Eel Technical Committee (TC) has identified several research topics to further understanding of the species' life history, behavior, and biology. **Please note** that the Stock Assessment Subcommittee will consider these research needed as part of the current benchmark stock assessment scheduled to be completed in 2022 and any updates will be in the full report next year. Research needs for American eel identified by the TC include:

***High Priority***

- Accurately document the commercial eel fishery to understand participation in the fishery and the amount of directed effort.
- Investigate, develop, and improve technologies for American eel passage upstream and downstream at various barriers for each life stage. In particular, investigate low-cost alternatives to traditional fishway designs for passage of eel.
- Formulate a coastwide sampling program for yellow and silver American eels using

standardized and statistically robust methodologies.

- Conduct regular periodic stock assessments and establish sustainable reference points for eel to develop a sustainable harvest rate and to determine whether the population is stable, decreasing, or increasing.
- Research coastwide prevalence of the swim bladder parasite *Anguillacolla crassus* and its effects on the American eel's growth and maturation, migration to the Sargasso Sea, and spawning potential.
- Evaluate the impact, both upstream and downstream, of barriers to eel movement with respect to population and distribution effects. Determine relative contribution of historic loss of habitat to potential eel population and reproductive capacity**.**

***Medium Priority***

- Investigate survival and mortality rates of different life stages (leptocephalus, glass eel, yellow eel, and silver eel) to assist in the assessment of annual recruitment. Continuing and initiating new tagging programs with individual states could aid such research.
- Tagging Programs: A number of issues could be addressed with a properly designed tagging program. These include:
    - Natural, fishing, and/or discard mortality; survival
    - Growth
    - Validation of aging method(s)
    - Reporting rates
    - Tag shedding or tag attrition rate
- Research contaminant effects on eel and the effects of bioaccumulation with respect to impacts on survival and growth (by age) and effect on maturation and reproductive success.
- Investigate fecundity, length, and weight relationships for females throughout their range; growth rates for males and females throughout their range; predator-prey relationships; behavior and movement of eel during their freshwater residency; oceanic behavior, movement, and spawning location of adult mature eel; and all information on the leptocephalus stage of eel.
- Assess characteristics and distribution of eel habitat and the value of habitat with respect to growth and sex determination.
- Identify triggering mechanism for metamorphosis to mature adult, the silver eel life stage, with specific emphasis on the size and age of the onset of maturity, by sex. A maturity schedule (proportion mature by size or age) would be extremely useful in combination with migration rates.

***Low Priority***

- Perform economics studies to determine the value of the fishery and the impact of regulatory management.
- Review the historic participation level of subsistence fishers in wildlife management planning and relevant issues brought forth with respect to those subsistence fishers involved with American eel.

- Examine the mechanisms for exit from the Sargasso Sea and transport across the continental shelf.
- Research mechanisms of recognition of the spawning area by silver eel, mate location in the Sargasso Sea, spawning behavior, and gonadal development in maturation.
- Examine age at entry of glass eel into estuaries and fresh waters.
- Examine migratory routes and guidance mechanisms for silver eel in the ocean.
- Investigate the degree of dependence on the American eel resource by subsistence harvesters (e.g., Native American Tribes, Asian and European ethnic groups).
- Examine the mode of nutrition for leptocephalus in the ocean.
- Provide analysis of food habits of glass eel while at sea.

## V. Status of Management Measures and Issues

The FMP required that all states and jurisdictions implement an annual YOY abundance survey by 2001 in order to monitor annual recruitment of each year's cohort. Addendum III requires a 9 inch minimum size restriction in the commercial and recreational yellow eel fisheries, as well as the use of ½ by ½ inch mesh in the commercial yellow eel pot fishery. The recreational bag limit is 25 fish/angler/day, and the silver eel fishery is restricted, as is the development of pigmented eel fisheries.

### Proposed Listing of American Eel

The US Fish and Wildlife Service (USFWS) reviewed the status of American eel in 2007 and found that, at that time, protection under the Endangered Species Act (ESA) was not warranted. American eel was later petitioned for listing as threatened under the ESA in April 2010 by the Center for Environmental Science, Accuracy, and Reliability (CESAR, formally the Council for Endangered Species Act Reliability). The USFWS published a positive 90 day finding on the petition in September 2011, acknowledging that the petition may be warranted and that a status review would be conducted. CESAR filed a lawsuit in August 2012 against the USFWS for failure to comply with the statutes of the ESA, which specifies a proposed rule based on the status review be published within one year of the receipt of the petition. A Settlement Agreement was approved by the court in April 2013, which required the USFWS to publish a 12-month finding by September 30, 2015. In the published finding, the USFWS determined that a listing under the ESA was not warranted.

## VI. Current State-by-State Implementation of FMP Compliance Requirements

The PRT reviewed the state compliance reports for the 2020 fishing year. The PRT continues to note the following regarding states implementing the required provisions of the American Eel Fishery Management Plan:

<u>Silver Eel Fishery Measures:</u>

- Florida does not have a regulation preventing harvest of eels from pound nets from September 1 through December 31, but the state is unaware of any active pound net fishery in the past 10-15 years.

Reporting Measures:

- The following jurisdictions do not have dealer reporting:
    - New Hampshire and New Jersey do not have dealer reporting (there are no permitted eel dealers for either state), but harvesters report some information on dealers.
    - Delaware (no permitted eel dealers)
    - the Potomac River Fisheries Commission (jurisdiction reports harvest, not landings)
    - Florida (considered a freshwater species and there is dealer reporting for freshwater species)

Section 4.4.2 of the FMP stipulates that states may apply for *de minimis* status for each life stage if (given the availability of data), for the preceding two years, their average commercial landings (by weight) of that life stage constitute less than 1% of the coastwide commercial landings for that life stage for the same two-year period. States meeting this criterion are exempted from having to adopt commercial and recreational fishery regulations for a particular life stage listed in Section 4 and any fishery-dependent monitoring elements for that life stage listed in Section 3.4.1.

Qualification for *de minimis* is determined from state-reported landings found in compliance reports. In 2020, New Hampshire, Massachusetts, Pennsylvania, District of Columbia, Georgia, and Florida requested *de minimis* status for their yellow eel fisheries. All states that applied for *de minimis* of the yellow eel fishery meet the *de minimis* criteria.

**VII. Recommendations/Findings of the Plan Review Team**

1. The PRT recommends the Board consider state compliance notes as detailed in Section VI.

2. The PRT recommends *de minimis* be granted to New Hampshire, Massachusetts, Pennsylvania, District of Columbia, Georgia, and Florida for their yellow eel fisheries.

3. The PRT noted the significant drop in yellow eel harvest in 2020 due to market demand; anecdotal information indicates harvest may remain at a low level due to continued decrease in market demand and challenges posed by the COVID-19 pandemic.

4. The PRT had previously requested that the Board reevaluate the requirement that states provide estimates of the percent of harvest going to food versus bait, as there is a high level of uncertainty and subjectivity inherent in the data. Additionally, the PRT notes that this information does currently impact regulations and is unclear of the benefit for management.

The PRT requests again that the Board consider tasking the Committee on Economic and Social Sciences (CESS) to conduct an analysis of the market demand for all life stages of eel, specific to food vs bait markets, as well as international market demand.

5. The PRT requests that states continue to work with the law enforcement agencies to include information on any confiscated poundage from illegal or undocumented fisheries, and that the Board continue to encourage interstate enforcement actions with regards to poaching, due to the broad geographic scale at which the issue occurs.

6. The PRT recommends that the Commission and USFWS work together to annually compare domestic landings data to export data for American eel across all life stages.

7. The PRT requests that New York separate its yellow and silver eel landings, if possible, when reporting harvest.

8. The PRT requests that states quantify escapements, changes in upstream and downstream passage (e.g. dam removals, new impediments to passage) annually and provide this information to the Technical Committee for evaluation.

## VIII. Works Cited


Atlantic States Marine Fisheries Commission (ASMFC). 1998. Interstate Fishery Management Plan for American Eel (*Anguilla rostrata*). Washington D.C. NOAA Oceanic and Atmospheric Administration Award No. NA97 FGO 0034 and NA07 FGO 024.

Atlantic States Marine Fisheries Commission (ASMFC). 2012. American Eel Benchmark Stock Assessment. Arlington, VA.

Atlantic States Marine Fisheries Commission (ASMFC). 2017. American Eel Stock Assessment Update. Arlington, VA.

Table 1: Metrics considered when setting recreational measures under each option in this Draft Addendum/Framework. Primary metrics determine which harvest control rule bin a stock is in; secondary metrics are only used if, through the evaluation of the primary metrics, the stock stays in the current bin. Metrics considered through accountability measures may differ from those shown below. See section 3.1 for more details on the options.

| Option | Metrics used to set measures | | | | | Measures are pre-determined | Expected number of sets pre-determined measures | Measures specified for 1 or 2 years |
|---|---|---|---|---|---|---|---|---|
| | Expected harvest* | Biomass compared to target level ($B/B_{MSY}$) | Fishing mortality compared to threshold level ($F/F_{MSY}$) | Recent recruitment | Biomass trend | | | |
| **No action** | Primary | | | | | No | N/A | 1 |
| **Percent change** | Primary | Primary | | | | No | N/A | 2 |
| **Fishery score** | Primary** | Primary** | Primary** | Primary** | | Yes | 4 | 2 |
| **Biological reference point** | Only when $F>F_{MSY}$ | Primary | Primary | Secondary | Secondary | Yes | 13 | 2 |
| **Biomass based matrix** | | Primary | | | Primary | Yes | 6 | 2 |

*Expected harvest refers to expected harvest under status quo measures compared to the upcoming year(s)' RHL and could be based on past MRIP estimates, including consideration of confidence intervals for those estimates, or a model-based estimate of harvest, including considerations related to uncertainty in that estimate.

**As described in the Draft Addendum, the fishery score metrics may not be weighted evenly. The Monitoring/Technical Committees will recommend the appropriate weight for each metric. These weights can be modified through the specifications process.

# Percent Change Option

Alternative considers future RHL, recent MRIP time-series average estimate, and the relationship of Biomass to Bmsy to determine what percent change should occur for management measures. Percent changes provide similar consideration for reductions and liberalizations.

## 1 → RHL compared to MRIP estimate

Determine if the RHL for the upcoming management period is above, below, or within the confidence interval of the most recent MRIP time-series estimate.

## 2 → Compare Biomass to Bmsy

Compare the Biomass estimate from the stock assessment to the biological reference point (Bmsy). Biomass categories are as follows:

- 150% above Bmsy
- between 100 and 150% Bmsy
- less than 100% of Bmsy

## 3 → Find percent change in measures

The RHL and Bmsy comparison determines the appropriate management response. Measures will either be liberalized, restricted, or status quo. There are three different percentages by which measures can be liberalized or reduced .

## 4 → Set Management Measures

Management measures are based on pre-defined % changes from the status quo.

# Fishery Score Option

This infographic explains how the Fishery Score will function to select the management measure bin for summer flounder, scup, black sea bass, and bluefish

## STEP 1

### Stock Assessment Results

An updated stock assessment is completed and approved for management use.

## STEP 2

### Calculate Fishery Score Metrics

Fishing mortality, biomass, recruitment, and fishery performance metrics are drawn from the stock assessment and recent MRIP estimates.

## STEP 3

### Use Formula to Calculate Fishery Score

Fishery Score metrics are entered in the Fishery Score formula to produce a value ranging from 1 to 5. On this scale, 1 is the lowest possible score and 5 is the highest possible score.

## STEP 4

### Determine Management Step Based on Fishery Score

Based on the calculated Fishery Score, the stock is placed into one of four bins. Each bin has an associated level of concern, stock status, and a pre-determined set of management measures.

## STEP 5

### Adapt New Measures if Needed

If the Fishery Score caused the stock to move from one bin to another, then the new pre-determined management measures will be applied. If the stock remains within the same bin, measures will remain the same.

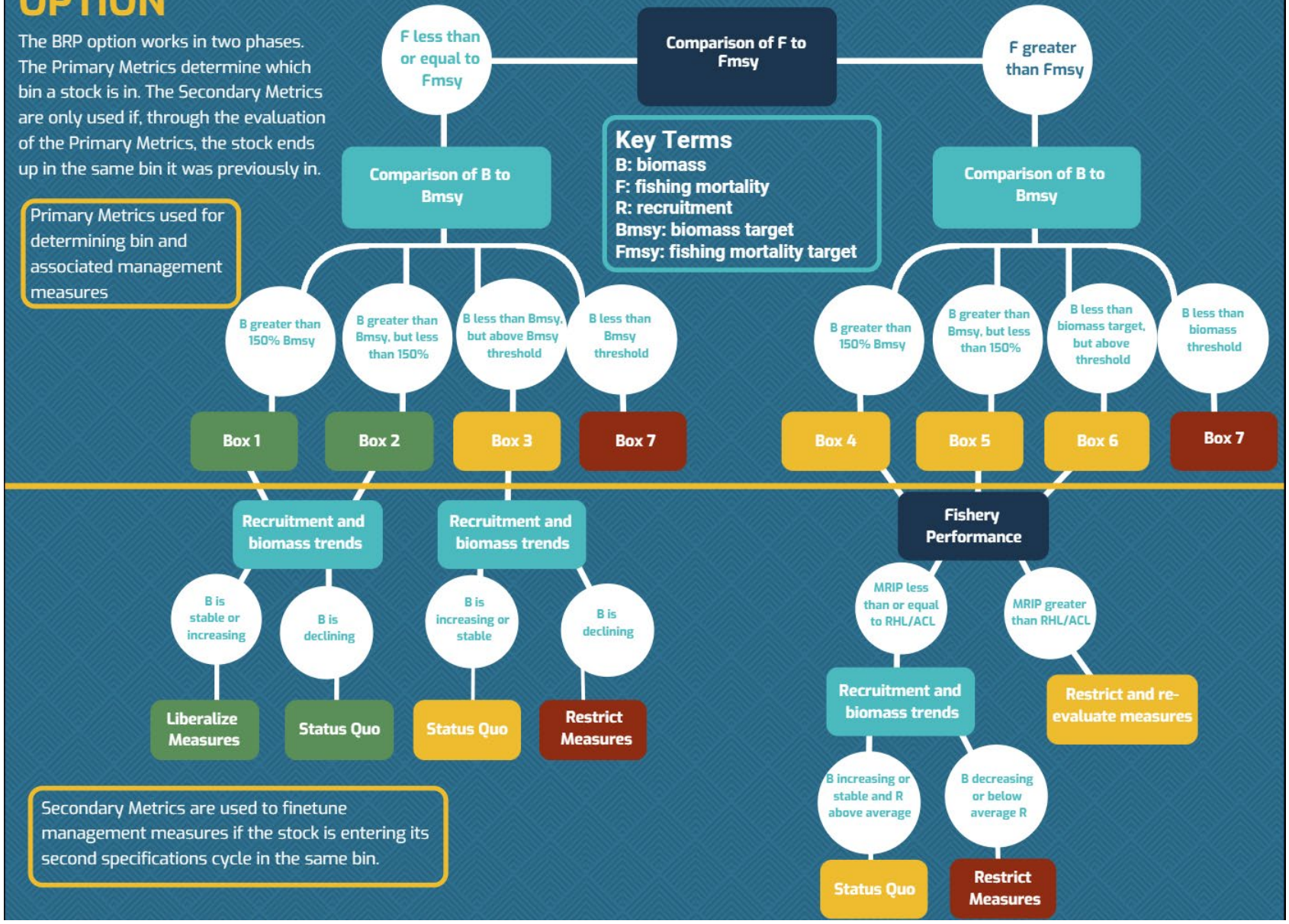
Fishery Score bins and the associated stock status, fishery performance outlook, and measures that are associated with each bin.

| Bin | Fishery Score | Stock Status and Fishery Performance Outlook | Measures |
|---|---|---|---|
| 1 | 4-5 | Good | Most Liberal |
| 2 | 3-3.99 | Moderate | Liberal |
| 3 | 2-2.99 | Poor | Restrictive |
| 4 | 1-1.99 | Very Poor | Most Restrictive |

# BIOLOGICAL REFERENCE POINT OPTION

The BRP option works in two phases. The Primary Metrics determine which bin a stock is in. The Secondary Metrics are only used if, through the evaluation of the Primary Metrics, the stock ends up in the same bin it was previously in.

Primary Metrics used for determining bin and associated management measures




**Key Terms**
**B: biomass**
**F: fishing mortality**
**R: recruitment**
**Bmsy: biomass target**
**Fmsy: fishing mortality target**

Secondary Metrics are used to finetune management measures if the stock is entering its second specifications cycle in the same bin.

# Biomass Based Matrix Approach

Defines bin conditions based on two factors: stock status (i.e., biomass relative to Bmsy or proxy) and the most recent trend in biomass (increasing, stable, or decreasing). These parameters create a three-by-four matrix to determine which step is appropriate.

## Stock Status is determined

Based on the relationship of biomass to the Bmsy the stock status is categorized as either abundant, healthy, below target, or overfished

## Biomass Trend Evaluated

A stock's biomass trend is considered increasing, stable, or decreasing.

## Determine Management Measures

Each bin has a set of pre-determined measures that depend on what step the stock is on. If the bin is the same as in the prior years, measures remain status quo.

## Bin Determined

Based on the stock status and biomass trend, the stock can be anywhere between Bin A (optimal conditions) and Bin F (worst conditions).

Recreational management measure matrix under the Biomass Based Matrix Approach

| | | Biomass Trend | | |
|---|---|---|---|---|
| | | Increasing | Stable | Decreasing |
| Stock Status | Abundant | Bin A | | |
| | Healthy | Bin A | Bin B | |
| | Below Target | Bin C | Bin D | |
| | Overfished | Bin E | Bin F | |

# Mid-Atlantic Fishery Management Council

# Sub-Group of the Scientific and Statistical Committee

## Peer Review Report of Recreational Fishery Models

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## Executive Summary

The Mid-Atlantic Fishery Management Council (Council) convened a peer review panel consisting of members of the Council's Science and Statistical Committee (SSC) to review two potential recreational management models[1]. A Recreational Fleet Dynamics Model (referred to in the report as RFDM) was developed by Dr. Jason McNamee (Rhode Island Dept. of Environmental Management, RIDEM) and collaborators Corinne Trusedale (RIDEM, Division of Marine Fisheries) and Savannah Lewis (Atlantic States Marine Fisheries Commission, ASMFC) for summer flounder and black sea bass. A Recreational Economic Demand Model (referred to in the report as REDM) was developed by Andrew (Lou) Carr-Harris (NMFS Northeast Fisheries Science Center) for summer flounder.

These two models are being considered for use by the Council's Fishery Management Action Team (FMAT) and the ASMFC's Plan Development Team (PDT) in the development and analyses of alternatives for the Council and ASMFC Recreational Reform Initiative[2]. The potential use of these models would be part of the development of a Harvest Control Rule currently being considered as one component of the Recreational Reform action. The goal of the peer review was to help identify the potential utility, benefits, uncertainties, and limitations of each model for use by the FMAT/PDT during the Harvest Control Rule development and to provide any guidance as to whether these models represent an improvement to the current

[1] Dr. Lee Anderson from the SSC participated in the peer review meeting.
[2] For more information about the Recreational Reform Initiative, please see: https://www.mafmc.org/actions/recreational-reform-initiative

process and methods used by the Council and ASMFC technical groups to set recreational measures.

The peer review meeting was held on September 20, 2021 from 10:00 a.m. - 4:00 p.m. via webinar and was open to the public to listen in and ask questions. The agenda, meeting materials, and presentations can be found on the peer review meeting page at: https://www.mafmc.org/council-events/2021/ssc-peer-review-panel-sept20.

*Summary of Key Peer Review Conclusions and Recommendations*

- Both models rely on MRIP data, though to a different degree, and are therefore subject to the limitations and uncertainties stemming from these MRIP data.
- The REDM is a simulation model which relies on the quality of the 2010 angler choice experiment data and population dynamics model. While the model has been properly specified and is sound, below we present some recommendations that may prove useful.
- The RFDM model selection process that the team has adopted is unclear and the model specifications need to be revised when considering space, time, population size and regulation variables. Also, it may be worthwhile to consider the correlation between harvest and discard when specifying and estimating the models.
- The review panel recommends that, upon implementing the revisions described below, both models be considered by the management/technical teams. For example, the performance of the RFDM could be benchmarked against that of the REDM for a couple of years. After the relevant improvements to the model coming from that process are implemented, the RFDM may be ready for use in fisheries for which bioeconomic models are unavailable due to a lack of angler preference survey data.

The peer review panel would like to thank Dr. McNamee, Dr. Carr-Harris, Ms. Trusedale, and Ms. Lewis for their commendable work and effort to develop these recreational models and for engaging in an open dialogue to address all of the questions asked by the panel. We would also like to thank Julia Beaty (Council staff) for her very valuable and informative presentation on the current process to set recreational management measures and an overview of the Recreational Reform Initiative.

## Response to the Terms of Reference

The peer review panel addressed each of the Terms of Reference (*italics*) provided by the Mid-Atlantic Fishery Management Council and consensus responses (standard font) are provided below. Individual panel member reports that address the same Terms of Reference are provided as Appendix 1-3.

1. *Are the theoretical and statistical model specifications consistent with professional standards?*

*a. Was the model's design and specification clearly described?*

Both RFDM and REDM models are well described in the background documents provided to this panel. While the description of the model is fairly clear in both cases, it would be useful to more clearly spell out the role that MRIP data play in each model. As far as the panel understands, the catch data comes from catch-per-unit effort obtained from the on-site survey of anglers (APAIS) wherein a survey agent often is able to examine the landings and the mail survey for effort (FES) wherein the household self-reports the number of trips that have been taken in each two-month wave. Additionally, discard information is obtained from anglers on site (APAIS) who self-report the species and number of discards. When discards are high, uncertainty is present that is not accounted for in the modeling framework.

The RFDM model uses MRIP data disaggregated to the year, state and wave levels. The RFDM models are a set of regression models to estimate harvest and discard by fitting to the MRIP data. The explanatory variables considered include year, wave, space, regulation variables such as bag and size limits and number of days the season is open, SSB, and interaction terms. The name of the RFDM may be revised to reflect what was done since the model does not attempt to capture behavior by individual anglers or by the fleets.

The REDM model is based on data from a 2010 angler choice experiment survey, MRIP data, and the stock assessment results from a statistical catch-at-age model. The 2010 choice experiment survey provides data to estimate anglers' preferences and predict behavior under different regulations, fish caught and fish release across 4 survey regions: ME-NY, NJ, DE/MD, VA/NC. The anglers' estimated preferences are then coupled with a biological submodule that uses population projections from the most recent stock assessment. The model is currently simulated to match the number of summer flounder directed trips in 2019. In turn, that simulation results in a number of so-called choice occasions (i.e. each simulated instance in which an angler must decide whether to go fishing or to do something else). When projecting next year's recreational harvest, previous year's number of simulated choice occasions, recreational selectivity and catch per unit of effort were used. The REDM relies on data reported through surveying anglers on site. The assumption is that the data are representative of the general population of anglers. However, the data are likely overrepresent the most avid anglers. Below are suggestions on how to address this bias (see ToR #3b on page 8).

*b. Are the underlying data sufficient to derive model estimates?*

Both models treated MRIP data as true observations, so the model results can only be interpreted as such. Any bias in the MRIP data will be carried through in both models. These considerations notwithstanding, the MRIP data are the most complete time-series on recreational effort and harvest coastwide. In addition, the REDM also uses information collected from a choice experiment survey administered as a follow-up to the Access Point Angler Intercept Survey (APAIS) conducted in 2010.

As mentioned earlier, the REDM selects anglers that were encountered in the on-site APAIS survey, and avid anglers are over-represented. Thus, a correction must be made to address the avidity bias that exists in the APAIS survey. Additionally, since the choice experiment survey was conducted in 2010, consideration might be given to conducting another choice experiment survey to reflect the current angler choices and preferences.

The population level projected recreational harvest relies on the number of calibrated choice occasions and recreational selectivity. The peer review panel suggests the role of the number of calibrated choice occasions may be evaluated in two ways: 1) calibrate the model using each of the individual past 5-7 years of data to see whether the resulting calibrated choice occasions are similar to the number currently used; 2) use the same number of the calibrated choice occasions from 2019 and the corresponding regulations for previous years to generate the number of trips in these years, and then compare them with the MRIP observed number of trips for a given year.

2. *How does the scale at which the model is operating (coast, regional, or state; wave or annual; fishing mode) affect the results?*

The RFDM model uses MRIP data disaggregated to the level of year, state and wave. As such, this model has the potential to provide wave-specific, year-specific, and state-specific harvest and discard estimates. However, it is worth highlighting that the MRIP survey was designed to have the lowest variance for species of interest when aggregated at the largest scale of region and year. When these data are disaggregated to state and wave, the variance increases resulting in wide confidence intervals. This may undermine the ability of the model to provide guidance for safe regulations that sustain the stock.

The REDM model is currently specified at the year and subregion levels (ME-NY, NJ, DE-MD, VA-NC) because the 2010 choice experiment survey was conducted at that subregion level. The model can readily be specified at the wave level by specifying wave-specific catch-at-length and number of fish caught per trip distributions. Disaggregation at the state level -to capture heterogeneity of anglers' preferences- would ideally entail an update of the angler preference survey. Alternatively, and given that the 2010 survey collected information on respondents' demographics, the utility function could be specified as a function of demographic characteristics (e.g., through the opt-out), which would then allow the simulation model to use state-level anglers' characteristics to predict impacts of management changes on effort, harvest, and welfare at the state level.

   a. *How does data availability, uncertainty, and variability affect model results, interpretation, and application?*

Both models rely on MRIP data, so if MRIP overestimates/underestimates the recreational catch and discards, both models will be impacted. In the REDM model, the calibration data come from MRIP in the same year. In prediction years, catch-at-length is derived from recreational

selectivity, calculated from the calibration year, and projected population numbers at length. On the other hand, the RFDM relies exclusively on MRIP data for the estimation of the policy impacts on harvest and discards. The MRIP catch data includes the CPUE of landed fish which may have been observed by the survey agents but also the CPUE of discarded fish that is self-reported. These self-reported data may exhibit digit bias and can also be misidentified. Digit bias occurs when anglers don't keep track of regulatory discards or catch many of these fish and tend to estimate the number of discards, usually by stating common numbers, say 5, 10, 15 but not actually directly having counted discards. When discards are a small proportion of landings this may not result in much concern. For species with a large proportion of discards such as bluefish, when slot limits or other size limits are imposed, this issue is a cause of concern in the RFDM, which relies on self-reported discards.

b. *What key assumptions affect the underlying statistical analysis and interpretation of the results? Were these assumptions and relevant uncertainties identified and characterized?*

Both models rely, though to a different degree, on MRIP data. The REDM also uses a choice experiment survey to estimate anglers' preferences. The less reliable the data used are, the larger the uncertainty will be around the predictions that the models generate. All the relevant caveats regarding MRIP data apply here. Additionally, in the case of the choice experiment survey, the possibility that the population of respondents may not be representative of the general angler population (e.g., due to response bias or avidity bias) should be considered. As discussed in this report, there are alternative ways to address this concern.

Regarding the models' assumptions:

The RFDM assumes that the harvest and discard components of catch for a given species are independent and specified as separate and independent equations, which may have an impact on the uncertainty bounds around the predictions of the reduced-form model. Accounting for correlation of the error term across equations, which is likely to exist since both equations are dealing essentially with the data from the same fishing trips, may increase efficiency, and thus reduce the uncertainty bounds around the predictions. Moreover, as stressed earlier, the assumption of this model that, whatever the management measures for black sea bass, there will be zero effect on the harvest and discards of summer flounder, seems untenable given that these species are typically caught together in the same trips.

Additionally, in the RFDM, the model selection process is based on AIC and *p*-values but is not well described and not consistently employed. Of concern is the fact that the RFDM uses different sets of policy variables (e.g., bag limit, size limit, length of the season) in the harvest and discard equations. These management measures impact the fishing trip and should therefore be included in both equations (is it reasonable, for example, to assume that closing the season for summer flounder would only impact harvest but leave discards unchanged?). Moreover, the

partial effects of the bag limit and size limits have counterintuitive signs in some of the specifications presented, particularly for black sea bass. The selection of interaction terms does not seem reasonable either. Additionally, the year effect is not correctly specified (treated as numerical but should be categorical). In sum, the team may want to consider revising their model selection approach and how some of the variables are treated.

The REDM explicitly uses anglers' preferences to determine how different sets of management measures, through their impact to keep or release, will impact anglers' effort and welfare. Thus, estimating anglers' preferences correctly is important for the performance of this model. The authors of the REDM have carefully specified an indirect utility model that accounts for angler heterogeneity, and the estimated coefficients have the expected signs and result in willingness-to-pay for kept and released fish that are consistent with similar estimates in the literature.

Regarding the models' predictions:

The team that developed the RFDM presented, in Figures 8, 9, 14 and 15 of the background documentation within-sample predictions for the entire coast (rather than at the state level). Absent out-of-sample predictions at the state level, the review panel is unable to assess the ability of the RFDM to predict the impact of management changes. Likewise, it was suggested that the team shows what level of harvest and discards the model would project if the fishery were closed (either through a zero-bag limit or a zero-day season). This is relevant, as a fishery closure could be a management option and the models should be able to predict zero harvest for a complete fishery closure.

The author behind the REDM presented predictions at the state level for 2019While the prediction of impacts on harvest and discards for the region were very close to the actual outcome, as expected predictions at the state level sometimes overestimated and others underestimated these impacts. It is suggested the author predicts additional years (i.e., out-of-sample predictions) to further assess model performance. Likewise, it may be worthwhile exploring how changing the calibration year (i.e., the baseline number of choice occasions) may impact the model's ability to predict policy impacts on harvest and releases.

3. *Is the model appropriate for estimating and predicting the impacts of bag, size, and season limits on recreational catch or harvest? Are the methods in the Recreational Economic Demand Model appropriate for estimating changes in recreational effort or fishing demand?*

    a. *Does the modeling approach represent an improvement over current methods used to estimate impacts of management measures?*

Yes, both methods, when revised, have improvements over the current methods used to estimate the impacts of management measures. They both provide methods to evaluate changes of single or multiple factors simultaneously either based on statistical relationships (RFDM) or based on a

simulated process model (REDM). The models' ability for dealing with more than one regulation change should be better than the current method.

The RFDM is built on appropriate statistical methods to evaluate harvest and discard changes in response to a combination of alternative policies. It uses a general additive model (GAM) and has penalties for overfitting. It provides a model-based approach to evaluating impacts of regulations on harvest and discards. Separate models were built for harvest and discard for summer flounder and black sea bass, as though harvest and discard are independent from each other. Upon revision and further refinements, this model would provide a statistical evaluation of proposed harvest control rules that are currently done in an ad hoc manner. Moreover, multiple regulation changes could be evaluated simultaneously.

The REDM uses appropriate methods for estimating changes in the recreational effort and welfare by simulating scenarios with alternative management regulations. This model is built on well-established, peer-reviewed methods for economic utility models. This model combines MRIP-based data with the results from an economic choice survey in a simulation framework to evaluate alternate regulatory scenarios for the harvest, release, and likelihood of taking a fishing trip for summer flounder and black sea bass and alternate harvest target species. It links the behavioral and biological components and is designed to estimate changes in recreational effort, fishing demand, and angler welfare.

*b. What are the strengths/limitations of the modeling approach for informing management measures, especially at the regional, state, wave, or mode level? Are there specific recreational fishing measures for which use of the model would not be recommended?*

The RFDM model is constructed to inform management measures at the regional, state, and wave level based on the past calibrated MRIP records. However, the current model selection and model construction have problems and need to be revised before being used to inform management measures. Its strengths are that it uses the recalibrated MRIP time series and the model can be used to evaluate its efficacy based on how well it reflects the outcomes of historic regulations.

One RFDM weakness, as currently configured, is that the model includes Wave as a model component that is smoothed. Because Wave is actually a categorical variable, this is an inappropriate specification, and it should be used as a categorical variable without smoothing. Depending on the number of points added by smoothing, the variance associated with this model component may be underestimated. The model is currently fit to all the available data, but a better practice is to fit the model to a portion of the data and to test for fit against the remaining data portion. Another potential weakness is that harvest and discard models are independent, whereas these quantities are not independent of one another. Moreover, because summer flounder and black sea bass are often caught together, there is a good motivation to also link species.

The REDM's strengths are that it uses choice simulations specific to regional, state and wave tailored to targeted species in these areas and times and based on regulations for bag and size limits. The model can project future behavioral responses to regulatory modifications based on past years' performance, under the reasonable assumption that behavior and preferences won't show radical change over short time periods. It is powerful because it is based on MRIP access-site interviews wherein catches were observed but also on a subsequent choice survey of these same anglers.

The REDM's weakness, as with any model relying on economic add-on surveys taken on site, is that it doesn't sample the full frame of marine recreational anglers in these regions. In relying on the on-site contacts of anglers to whom surveys were subsequently sent, it over-samples avid anglers from the entire population of marine anglers. Anglers who fish more frequently have a higher probability of being sampled. While MRIP provides the correct estimate of harvest and discard, it doesn't adequately represent the regulatory preferences of the full marine-angling community. This can be corrected by weighting avidity frequencies available through the Fishing Effort Survey. Alternatively, anglers' preferences (i.e. the opt-out) may be specified as a function of demographics (since the 2010 choice experiment survey collected this information from respondents). Moreover, there was considerable self-selection and non-response (~68%) to the choice survey, that should be addressed, if possible. While 2019 simulation estimates approximate MRIP catch at the regional level, harvest or discard estimates of summer flounder at the state level exhibited different degrees of discrepancy with the actual data: harvest for New Jersey, Connecticut, Massachusetts, and Maryland (which jointly contributed 55% of summer flounder recreational landings in 2019) are predicted with less than 5% error, but the discrepancy is larger for Delaware, New York, North Carolina, Rhode Island and Virginia. Lack of fit was also seen for black sea bass for some states, though the model predicts well the harvest in New York (whose contribution to the total black sea bass harvest in 2019 was 36%). The model also assumes 100% compliance to regulations and the peer review suggests the authors consider incorporating noncompliance behavior into the model once reliable estimates of noncompliance become available.

c. *What are the implications of using the model to predict future catch/harvest based on historical data? Are there limits on the magnitude of change in catch/harvest or stock status beyond which use of the model would not be recommended?*

The RFDM model can also provide estimates of uncertainty about its predictions. However, as input MRIP data are disaggregated to year-state-wave estimates, the smaller unit survey sample sizes upon which the predictions are based will increase uncertainty. It is expected that the model will provide the most precise estimates at higher levels of aggregation. The background documentation provided to the panel, however, does not include out-of-sample predictions to assess the predictive power of the model beyond the coastwide aggregation.

In recalibrating the MRIP dataset, most species effort data converge to the old MRFSS data that relied on telephone surveys for effort before telephone surveys became unreliable. This is not true for bluefish and this species could be problematic. The issue of convergence can provide a guide for use with appropriate species to apply this model.

The REDM is based on a long time series of harvest and discard estimates from the MRIP and as the model is revised its performance can be calibrated against this time series using the scenario of appropriate state year-specific regulations. The panel has suggested modifications that may improve fit, such as correcting for avidity bias. The panel also wonders how the number of calibrated choice occasions (i.e., currently obtained by calibrating the model to match the number of trips in 2019) will affect projected effort and harvest.

*d. Can the modeling approach support development of multi-year bag, size, and season limits? If so, what criteria should be applied or developed to assess the reliability of the multi-year projections?*

The RFDM could prove valuable in providing guidance for multi-year bag, size, and season regulations upon further model revision and development as suggested in this document. Further development that links the RFDM and the REDM could provide valuable guidance that encompasses not only predictions of harvest and discard under regulatory scenarios but could also include measures of angler participation. This would be an important advance to management.

The REDM has the potential of providing guidance on the selection of multi-year bag, size and season limits upon revision. When the model was calibrated against 2019 estimated harvests and discards, it showed appreciable differences for some of the states. Upon revision, the model fitting is likely to improve and prediction error to decrease to better inform managers of the uncertainty of predictions.

*4. Provide guidance for the following future model use considerations:*

*a. Could the model be modified to incorporate other species (e.g., scup, bluefish)?*

Yes, both models are set up to be modified and incorporate other species; however, there are likely species-specific data considerations depending upon the model. Given the existing data availability, both models could readily be applied to scup but may require additional data and/or analysis for bluefish. For example, the 2010 choice experiment survey did not include bluefish. This information underlies the angler preference estimation in the REDM and a new survey that includes bluefish would need to be conducted. In addition, the recalibrated MRIP data for bluefish show an increasing trend in discards that is now equal to the recreational harvest. Discard estimates are generated from self-reported information and are therefore more uncertain. Given the interaction between harvest and discards on a fishing trip, model parameterization and estimations should consider these trends and uncertainties in the underlying MRIP data.

b. *Could future model runs be conducted by other individuals (e.g., Council/ASMFC staff or Monitoring/Technical Committee members) without major modifications?*

Yes, both models are currently constructed to allow other technical staff/members to run the models without major modifications. Since most technical staff/members do not have an economic background, the REDM may require some additional training to fully understand bioeconomic models and stated preference techniques. The peer review panel also notes that full documentation as to how both models were revised and/or addressed peer review recommendations is needed prior to other technical staff/members running the models.

c. *How easily could the model be updated with additional years of data or additional variables?*

Both models can easily be updated with additional years of data and additional variables. The REDM may take longer to update and may necessitate additional or updated surveys to obtain information on changes in angler preferences, particularly as species distribution and availability changes.

# Mid-Atlantic Fishery Management Council
# Sub-Group of the Scientific and Statistical Committee

## Peer Review Report of Recreational Fishery Models

October 10, 2021

Individual Peer Review Report:
Dr. Jorge Holzer, University of Maryland

In addition to the comprehensive consensus report developed by the peer review panel, each member developed an individual report with detailed responses to each Term of Reference (*italics*) provided by the Mid-Atlantic Fishery Management Council and the responses (standard font) are provided below.

**Response to the Terms of Reference**

1) *Are the theoretical and statistical model specifications consistent with professional standards?*
    a. *Was the model's design and specification clearly described?*

"The recreational Fishery Fleet Dynamics Model" (referred to below as Reduced-Form Model)

The title of the paper describing this approach is misleading as the model does not attempt to capture behavior by individual anglers' or by the fleet of charter and party boats. Absent a module explicitly modeling fleet dynamics, it was suggested the name given to this model be revisited to better reflect what the approach is doing.

The model was well-described, but the model selection process (the specification of the equations finally selected as the preferred model) is unclear and seems somewhat ad hoc. In other words, it is unclear how the authors arrive at their preferred specifications in Tables 5-8. The reviewers highlighted the fact that selecting the models based on the Akaike information criterion (AIC) is not a good strategy in this context, given that the differences in AIC between the models considered are immaterial. Likewise, some of the claims regarding the partial effects, particularly those corresponding to the policy variables (i.e., bag and size limits) are not substantiated by the model results or by the explanations provided during discussion. In particular, the counterintuitive effects of the bag and size limits in the black sea bass harvest model (they have the opposite effect of the expected effect of these policies), are concerning. It is recommended that the authors look at alternative specifications that ensure the partial effects of the policy variables are of the expected sign.

"Recreational Fluke MSE Economic Modeling Overview" (referred to below as Structural Bioeconomic Model)

The model design and specification were clearly described. A detailed exposition of the two components of the model: i) the estimation of anglers' preferences module, and ii) the fishery simulation module, was provided by the author during the panel review presentation.

b. *Are the underlying data sufficient to derive model estimates?*

While more and better data is always welcomed, each model relies on the amount of data that allows it to derive empirical estimates. Importantly, the data requirements and capabilities of the two models are very different. The reduced-form model is essentially a curve fitting exercise which seeks to predict harvest and discards under different policy scenarios using only MRIP data. As such, that model is unable to predict changes in effort or angler welfare. The structural bioeconomic model, on the other hand, explicitly models the angler's behavioral response to alternative regulations. Thus, this model can predict not only changes in harvest and discards, but also changes in effort level and angler satisfaction (i.e., welfare). This is important as it would allow the Council to choose combinations of management measures that, conditional on achieving the conservation goals, optimize the economic efficiency of the fishery. The difference in capabilities between these two models, however, come at a cost, namely, data requirements and model complexity, which are higher for the structural model. Additional points raised during the peer review are discussed below:

The recreational Fishery Fleet Dynamics Model" (Reduced-Form Model)

The model currently assumes that, for each species, the harvest and discards equations are independent. It was noted that this is not necessarily the case as harvest and discards for a given species essentially correspond to the same trips and anglers. In these circumstances, the error terms of the two equations may be correlated. As such, joint estimation of the system comprising the two equations may result in more efficient estimates. In turn, efficiency will be important when deriving uncertainty bounds around the predictions that will be used by the Council to study the effects of management changes. Furthermore, since anglers typically catch summer flounder and black sea bass together and is the total number of kept and released fish of both species (summer flounder and black sea bass) that determines angler satisfaction, it is expected that changes in management affecting one of the species may have an impact on the harvest and discards of the other species through the effect on effort. Thus, if feasible, it may be worthwhile exploring the possibility of estimating the entire system of equations jointly.

Additionally, the peer review committee stressed the fact that the policy variables included as explanatory variables in the harvest and discard equations should be the same in both equations. The rationale is simply that those management measures regulate the fishing trip, and therefore, impact both harvest and discards. In other words, it makes little sense, for example, to expect a change in the number of days the season is open, to affect only the harvest of black sea bass and not the discards as well. Thus, the review panel suggested the authors explore alternative specifications with the same policy explanatory variables in both equations, the harvest and discard equations.

"Recreational Fluke MSE Economic Modeling Overview" (Structural Bioeconomic Model)

The panel highlighted the importance for the overall performance of the model of getting anglers' preferences right. These preferences are estimated using the data from the choice experiment survey. Thus, modelers should spend time exploring credible alternative specifications of the indirect utility. The author of this model has done a nice job, but he may want to consider exploring other specifications. On a related topic, avidity bias may play a role here as survey respondents are typically more avid than the average angler. However, since the survey collected avidity and other demographic information, it was suggested that one way to address the possibility of avidity bias is to model the opt-out option in terms of avidity and other demographic information of respondents. Then, in the simulations, the opt-out can be adjusted to the relevant population by using that population demographic characteristics.

2) *How does the scale at which the model is operating (coast, regional, or state; wave or annual; fishing mode) affect the results?*
    a. *How does data availability, uncertainty, and variability affect model results,interpretation, and application?*
    b. *What key assumptions affect the underlying statistical analysis and interpretation of the results? Were these assumptions and relevant uncertainties identified and characterized?*

Both models naturally rely on data, and thus unavailability of data would undermine or prevent their use. Moreover, the less reliable the data used are, the larger will be the uncertainty around the predictions that the models generate. An advantage of the bioeconomic model over the reduced-form model, however, is that it explicitly characterizes the trade-offs faced by anglers and their expected behavioral response. In these circumstances, model results are easier to interpret intuitively. This feature may be important in discriminating between plausible and implausible outcomes when analyzing predictions, especially when data is scarce.

As in the discussion of ToR1, the assumption of independence of the harvest and discards equations for a given species, may have an impact on the uncertainty bounds around the predictions of the reduced-form model. Accounting for correlation of the error term across equations may increase efficiency. Moreover, as stressed earlier, the assumption of this model that, whatever the management measures for black sea bass, will not affect harvest and discards of summer flounder seems untenable given that these species are typically caught together in the same trips.

As for the resolution of the models, the structural bioeconomic model can predict the impact of management changes at the regional and coast level, and the wave or annual level. During the presentation, results were shown at the regional and coast levels for year 2019. On the other hand, the reduced-form model has the potential to predict the impact of management changes at the state, regional and coast levels, and wave or annual levels. The models do not currently provide predictions disaggregated by fishing mode.

The author of the structural bioeconomic model showed state-level predictions for 2019. It was suggested by the panel that the author presents out-of-sample predictions (i.e., for years prior to 2019). The authors of the reduced-form model, on the other hand, showed in-sample predictions at the entire coast level in Figures 8, 9, 14 and 15. The authors were asked to provide out-of-sample predictions at the state level (drop some data, re-estimate the model, compare the prediction of the newly estimated model for the period of data dropped with the actual data, and calculate the square prediction error; when this process is repeated many times, the mean squared prediction error can be used for model selection)[1], which is the level at which bag and size levels are typically set. Absent these out-of-sample predictions at the state level, it is not possible to assess how well the models predict the impact of changes in policy on harvest and discards. In this same vein, it was requested that the authors of the reduced-form model show what level of harvest and discards the model would project if the Council closed the fishery (either through a zero-bag limit or a zero-day season). This is relevant, as a fishery closure should always be in the regulator's tools box and the models should be able to predict zero harvest for a complete fishery closure. As shown during the presentation, the structural bioeconomic model can predict zero harvest associated with a fishery closure, as expected.

3) *Is the model appropriate for estimating and predicting the impacts of bag, size, and season limits onrecreational catch or harvest? Are the methods in the Recreational Economic Demand Model appropriate for estimating changes in recreational effort or fishing demand?*
    a. *Does the modeling approach represent an improvement over current methods used to estimateimpacts of management measures?*

Yes, both models represent an improvement over the current methods as they bring structure and statistical methods to the analysis of alternative policies on harvest and discards. Regarding the economic demand model, it is a structural model that links the behavioral and biological components and is designed to estimate changes in recreational effort, fishing demand, and angler welfare.

    b. *What are the strengths/limitations of the modeling approach for informing management measures especially at the regional, state, wave, or mode level? Are there specific recreational fishing measures for which use of the model would not be recommended?*

The structural bioeconomic model is a more powerful model as it uses anglers' preferences to characterize the effort response to changes in regulation, and from that response predicts harvest, discards, and anglers' welfare. The reduced-form model is unable to characterize the trade-off anglers face and therefore is unable to predict changes in effort and anglers' welfare. However, as indicated earlier, this model requires less data and can be updated much more quickly than the

[1] *k*-fold cross validation has been suggested as a model selection algorithm robust to overfitting since at least Stone (1974). Stone, M. (1974). "Cross-Validatory Choice and Assessment of Statistical Predictions." In: Journal of the Royal Statistical Society. Series B (Methodological) 36(2), pp. 111–147.

structural model. Thus, if the authors of the reduced-form model can show specifications that provide good out-of-sample predictions at the state level (as requested by the peer review panel), then the model could be used for analyzing fisheries for which there is currently no survey data available to populate a structural model. Moreover, it was suggested that the structural model applied to black sea bass and summer flounder can be used as a benchmark for the reduced-form model. Under this strategy, that model could be improved to try to match the predictions of the bioeconomic model, and after that it could be used in fisheries for which there is not enough data to develop a structural bioeconomic model.

c. *What are the implications of using the model to predict future catch/harvest based on historical data? Are there limits on the magnitude of change in catch/harvest or stock status beyond which use of the model would not be recommended?*

As explained earlier, it is unclear how either model predicts out-of-sample. In the case of the reduced-for model, it is also unclear how it performs in predicting unusual years at the state level. When both teams provide the corresponding predictions, it will be possible to assess the models' predicting power. However, as highlighted above, the reduced-form model seems unlikely to predict a fishery closure satisfactorily, and the partial effects of the bag and size limits currently have counterintuitive signs. From the evidence provided to the review panel, the structural bioeconomic model seems better equipped to provide good predictions at the state level.

d. *Can the modeling approach support development of multi-year bag, size, and season limits?If so, what criteria should be applied or developed to assess the reliability of the multi-year projections?*

While both models could produce multi-year predictions to inform the setting of multi-year management measures, this strategy is not recommended at this stage. In the view of the review panel, the models should be first used to predict changes year by year first, and only after satisfactory performance should they be used to recommend multi-year management measures.

4) *Provide guidance for the following future model use considerations:*

a. *Could the model be modified to incorporate other species (e.g., scup, bluefish)?*

For the case of scup, the answer is yes for both models. However, the choice experiment survey that underlies the angler's preferences estimation in the structural model, which was conducted in 2010, does not include bluefish. Including bluefish into this model would require a new survey, which would require time to design and conduct. On the other hand, the reduced-form model can easily and readily incorporate new species, including bluefish (especially under the current assumption of independence of harvest and discards across species).

b. *Could future model runs be conducted by other individuals (e.g., Council/ASMFC staff or Monitoring/Technical Committee members) without major modifications?*

The answer is yes for both models, but the structural model is more complex and requires understanding of bioeconomic models and of stated preference techniques (i.e., random utility

models). As such, it would take longer to train a new person to run and update this model.

c. *How easily could the model be updated with additional years of data or additional variables?*

Both models can readily be updated with more data and variables, but it would take longer time to update the structural bioeconomic model than the reduced-form model.

# Mid-Atlantic Fishery Management Council
# Sub-Group of the Scientific and Statistical Committee

## Peer Review Report of Recreational Fishery Models

October 9, 2021

Individual Peer Review Report:
Dr. Yan Jiao, Virginia Tech University

In addition to the comprehensive consensus report developed by the peer review panel, each member developed an individual report with detailed responses to each Term of Reference (*italics*) provided by the Mid-Atlantic Fishery Management Council and the responses (standard font) are provided below.

**Response to the Terms of Reference**

1) *Are the theoretical and statistical model specifications consistent with professional standards?*
    a. *Was the model's design and specification clearly described?*

The design and specifications of both the Recreational Fleet Dynamics Model (RFDM) and the Recreational Economic Demand Model (REDM) are clearly described. Both models used MRIP data and both models treated MRIP data as true observations.

The RFDM models are based on the MRIP data disaggregated to the level of year, state and wave. The RFDM models are a set of regression models to estimate harvest and discard by fitting to the MRIP data and the variables considered in the models include YEAR, regulation variables SSB and some interaction terms.

The REDM model is based on data from a 2010 angler choice experiment survey, the MRIP data, and the stock assessment results from a statistical catch-at-age model. The 2010 angler choice experiment survey provides data to evaluate the angler behavior under different regulations, fish caught and fish release across 4 survey regions (ME-NY, NJ, DE/MD, VA/NC). The angler's choice estimated given regulations conditions is integrated in the population projection based on the most recent stock assessment specification with the recreational harvest simulated based on a process model of the angler's choice. When projecting next year's recreational harvest previous year's # of simulated choice occasions, recreational selectivity and catch per unit of effort were used.

    b. *Are the underlying data sufficient to derive model estimates?*

Both models treated MRIP data as true observations, so the model results can only be interpreted as such. Any bias in the MRIP will be carried on in both models.

The RFDM model may be revised to consider estimating trips under various regulation situations and population sizes. Such estimate may be used to provide input for the REDM model.

The angler choice survey was done in 2010. The council may consider another up-to-date survey to reflect the angler choice and may also look into the stakeholder types and preferences without responses.

The population projected recreational harvest replies on the # of simulated choice occasions and recreational selectivity. Both of them may be verified by comparing the past 5-7 year data to see whether using results from previous years are robust or not especially the # of simulated choice occasions which directly decide the # of trips in the projected year.

2) *How does the scale at which the model is operating (coast, regional, or state; wave or annual; fishing mode) affect the results?*

The RFDM models are based on the MRIP data disaggregated to the level of year, state and wave. I feel the scale that the RFDM is operating is appropriate based on its purposes. This model can provide wave-specific, year-specific and state-specific harvest and discard estimates and can meet the model for the need of both monitoring and recreational regulation considerations.

The REDM model is at the time step of 2 months and the state-specific results are reported but the angler preference survey is based on 4 coastal survey regions. It does not function to provide suggestion on the monitoring and do function to simulate the potential changes in harvest given regulation changes although I have concerns on how the # of trips is simulated.

   a. *How does data availability, uncertainty, and variability affect model results, interpretation, and application?*

Both models treat MRIP as true observations, so if MRIP overestimates the recreational catch and discard, both models will do so correspondingly. The REDM model only considered the surveys from the anglers responded. These concerns are understandable given the data availability but their influence on the recreational harvest and discard prediction may be explored through sensitivity analysis and extra add-on surveys such as a new angler preference survey. Both models can provide probabilistic estimates of the results of interests.

   b. *What key assumptions affect the underlying statistical analysis and interpretation of the results? Were these assumptions and relevant uncertainties identified and characterized?*

In the RFDM model, the variable selection process is based on AIC and p value but are not well described and the results don't seem to match what was used in variable selection. The Year effect is treated as linear which is of high concern both statistically and biologically. The effects

of bag limit and size limit do not seem to be reasonable in some cases also. The selection of interaction terms does not seem reasonable also. Overall, the team may consider revising how the variables are treated or considered, and selected in the models. After the year effect and interaction terms are better considered, the effect of the policy considerations may make sense. The model performance may be evaluated through both model fitting and model prediction. The scale of the data is in the state level, so some correlations between harvest and discard may be hidden but it may be worthwhile to investigate the performance of modeling harvest and discard together through multivariate regressions.

The RFDM model may compare the pattern of the effect of year and the fishable biomass. Usually, the year effect is to function the change of the population size. If the year-specific population size can replace the year effect then the model can be used to predict future year's recreational harvest given population size and regulation variables.

The REDM model is in the scale of year and regions. Sensitivity runs may be done to evaluate the influence of the combination of survey regions. The results provided to compare the model projected versus the MRIP observed is at the state level, and there are a couple of states with much higher differences. Exploration of the reasons that cause such large differences is important for the application of this model and management purposes. The REDM model also simulates the number of choice occasions so that the derived # of trips matches the MRIP estimated # of trips. The description of the process is clear but it is unclear how the use of the # of the simulated choice occasion will influence the year to be projected. Such uncertainty may be evaluated through more than one calibration since the population model can be from the stock assessment results.

Potential alternative approaches may be considered by the REDM: 1) simulate the work for multiple years with MRIP estimates in the past to evaluate the uncertainty of the # of choice occasions; 2) find an alternative external approach to predict the potential # of trips. This may be combined with the RFDM model idea by investigating the # of trips from each state given the alternative regulations, fishable population size, wave and co-occur economically valuable species, etc. The uncertainty of the # of calibrated choice occasions may be evaluated through 2 ways: 1) calibrate based on the bioeconomic model in the past 5-7 year data to see whether the resulted calibrated choice occasions are similar; 2) use the same # of the calibrated choice occasions from 2019 to generate the # of trips in the past years given their population and regulations through the integrated bioeconomic model, and compare them with the MRIP observed # of trips.

The REDM may also scale down the temporal scale of the angler choice experiment from year to season or waves to expand its potential application in fisheries monitoring (see Julia's presentation and related document). The RFDM model clearly demonstrated wave effect in both harvest and discard, and likely # of trips although no studies or presented in the provided document.

3) *Is the model appropriate for estimating and predicting the impacts of bag, size, and season limits on recreational catch or harvest? Are the methods in the Recreational Economic Demand Model appropriate for estimating changes in recreational effort or fishing demand?*

Both models have the potential for estimating and predicting the impact of the bag, size and season limits on recreational harvest or catch with further revision or verification (see TORs 1 and 2).

The REDM model is appropriate for estimating changes in the recreational effort of fishing demand after the uncertainty on how the use of the # of the simulated choice occasion will influence the recreational effort for the year to be projected, how the use of past one or two years' selectivity in population project and estimated recreational effort.

a. *Does the modeling approach represent an improvement over current methods used to estimate impacts of management measures?*

Yes, both methods have improvements over the current methods used to estimate the impacts of management measures. They both provide methods to evaluate changes of single or multiple factors simultaneously either based on statistical relationships (RFDM) or based on a simulated process model (REDM). The advantages for dealing with more than one regulation changes should be better than the current method.

b. *What are the strengths/limitations of the modeling approach for informing management measures, especially at the regional, state, wave, or mode level? Are there specific recreational fishing measures for which use of the model would not be recommended?*

The RFDM model has the function to inform management measures at the regional, state, wave level based on the past MRIP records. However, the current model selection and model construction have problems and need to be revised before being used for informing management measures.

The REDM model has the function to inform management measures at the regional and year and wave level based on an angler choice survey and a forward projecting stochastic catch-at-age model with parameters from the catch-at-age stock assessment. The angler choice model did not consider wave differences in angler preference and combined angler behaviors in 4 regions, so these scales reflected in their ability to be used in the fisheries management measures.

c. *What are the implications of using the model to predict future catch/harvest based on historical data? Are there limits on the magnitude of change in catch/harvest or stock status beyond which use of the model would not be recommended?*

The year effect needs to be further considered in the RFDM model and a linear relationship is not acceptable which likely influences the effect of the other regulation/policy variables. The year effect may be compared with the change of the effect of catchable biomass to see whether the size of the stock or catchable size of the stock can replace the year effect. If the stock size can replace the year effect then the use of the model to predict future catch/harvest based on historical data is possible. If the year effect can't be replaced, some assumptions well adjusted may be used when doing future predictions. The model performance may be compared based on both model fitting and prediction.

The REDM model is designed for estimating changes in the recreational effort of fishing demand. Extra uncertainty evaluation on the use of the # of the calibrated choice occasion may be explored and addressed when projecting the recreational effort for the year to be projected. Questions on how the use of past one or two years' selectivity in population project and estimated recreational effort may vary worth to be explored to better use this model.

The range of the population size for the historical data may be clarified. If the future year stock size is out of the range of the historical stock size, the models may be used with caution.

*d. Can the modeling approach support development of multi-year bag, size, and season limits? If so, what criteria should be applied or developed to assess the reliability of the multi-year projections?*

Both models have the potential. The models should provide fitting error and prediction error or uncertainty based on historical multi-year population size, recreational catch, regulations, etc.

*4) Provide guidance for the following future model use considerations:*

*a. Could the model be modified to incorporate other species (e.g., scup, bluefish)?*

Both models can be modified to incorporate other species. A new angler preference survey may be needed to incorporate new species and to provide up to date angler preference.

*b. Could future model runs be conducted by other individuals (e.g., Council/ASMFC staff or Monitoring/Technical Committee members) without major modifications?*

Both models can be conducted by other individuals without major modifications. The REDM is a simulation model once the estimation of angler choice preference is done, so should be handled reasonably.

*c. How easily could the model be updated with additional years of data or additional variables?*

Both models should be easily updated with additional years of data. The RFDM model should be easily updated with additional variables also; the REDM model may need some moderate level of modification if additional variables are included which requires revising both the angler choice preference analysis and the simulation of the projected recreational effort and harvest.

# Mid-Atlantic Fishery Management Council
# Sub-Group of the Scientific and Statistical Committee

## Peer Review Report of Recreational Fishery Models

October 11, 2021

Individual Peer Review Report:
Dr. Cynthia M. Jones, Old Dominion University

In addition to the comprehensive consensus report developed by the peer review panel, each member developed an individual report with detailed responses to each Term of Reference (*italics*) provided by the Mid-Atlantic Fishery Management Council and the responses (standard font) are provided below.

**Response to the Terms of Reference**

1) *Are the theoretical and statistical model specifications consistent with professional standards?*
    a. *Was the model's design and specification clearly described?*

Both models had good documentation and relied on peer-reviewed papers as the basis of their construction. Like any model construction, it is difficult to write a fully complete description and this is what lead to some of our questions.

The Recreational Fleet Dynamics Model (RFDM) spelled out the equations they used in clear fashion. This model is still under development and will benefit from further revision. In a general additive model framework (GAM), it is comprised of a set of independent polynomial regression equations for harvest and for discards of summer flounder and black sea bass. It provides simulated estimates of harvest and discard under proposed regulatory changes. The model equations include year, state, wave, recruitment, bag and size limits, spawning stock biomass (SSB) and interaction terms. The depiction of the model would be better served with an exposition of the assumptions that underlie the use of Marine Recreational Information Program (MRIP) data that form the foundation of the model. MRIP has two components, the Access Point Angler Intercept Survey (APAIS) conducted on site to estimate catch- and discards-per-angler trip and the Fishing Effort Survey (FES), a mail survey to estimate the number of angler trips. Combined, they produce estimates of total harvest and discards.

The Recreational Economic Demand Model (REDM) is more complete and is built on two peer-reviewed papers presented to the panel. It relies on an economic choice model undertaken in 2010 and statistical catch-age age models developed for stocks in 2019. Using the preferences that were evaluated from the 2010 survey, it simulates angler preferences in 2019. The model simulates angler choice, based on 2010 survey responses, to alternative bag and size limits under

regulatory changes for 2019 MRIP data. The Economic choice model of 2010 relied on data reported through surveying anglers on site as part of the APAIS. The assumption of the REDM is that this survey provided a random draw from the population of anglers and it did not. It over-represented the most avid anglers. (I will discuss this more below). Depending on the use of the model, this should be made clear in the model exposition and the implications should be stated for how it is best used.

Both models rely in part on MRIP estimates of harvest and discard data and take these data to be true representations of catch and harvest. Although these MRIP data are the best available science, they also have limitations that impact models and model formulation as I discuss below.

*b. Are the underlying data sufficient to derive model estimates?*

The MRIP data that are used for both models are the most complete time-series of data coastwide that are available not only for summer flounder and black seas bass, but for other predominantly recreational species. There are additional surveys such as the American Littoral Society's tagging study that captures data on harvests and discards of summer flounder and black sea bass that might also be used in conjunction with the MRIP data in future model development. The MRIP surveys were designed to have the lowest variance for species of interest when aggregated at the largest scale of region and year. The FES is conducted at the region, state and two-month wave levels. The APAIS is also conducted at region, state and wave levels but also can be evaluated at finer scale of localities and smaller time frames. When both of these data are disaggregated to state and wave, the variance increases. Depending on the species and wave, the variance can be quite large and depends on the sample size that the particular state had available – some states augment the MRIP survey with more sampling. When management uses confidence intervals as suggested in the August 2, 2021 memo on Harvest Control Rules, one has concern that disaggregation will result in wide confidence bands that would provide less guidance for safe regulations that sustain the stock.

The RFDM also uses statistical catch-at-age stock assessments for both species. Such assessments are well vetted but also rely on MRIP data as their basis. These data often have high variance, especially when evaluated at finer scale.

Because the REDM used the 2010 choice survey to select anglers who were encountered in the on-site survey, avid anglers are over-represented. While there is no problem using the CPUE data obtained from an on-site survey for expansion estimates of catch and discard, they do pose issues when used for economic expansions where the assumption is made that anglers are randomly selected from all angling households. When used for an economic survey, a correction must be made for the avidity bias that exists in the APAIS survey. If the goal is to determine what the general population of anglers values, the current REDM model specification lacks this correction. If the goal of the model is to evaluate what the most active anglers value, then this correction may not have to be made. Nonetheless this issue in these data needs to be explicitly addressed and stated. The panel discussed weighting avidity based on demographics as one approach to correcting avidity. The correct demographic weighting should be available in the NMFS Fishing Effort Survey (FES). Because the economic choice model was conducted in 2010, the model also assumes that angler preferences have no changed over the ensuing decade, even given changes in regulations and angler demographics.

2) *How does the scale at which the model is operating (coast, regional, or state; wave or annual; fishing mode) affect the results?*
    a. *How does data availability, uncertainty, and variability affect model results, interpretation, and application?*

The MRIP survey is structured as a stratified and nested design. The APAIS is stratified by state. Nested within state are wave and within wave there is a probabilistic draw on day-work shift and access points that make up the sampling frame. It is a design that is the most variable at the lowest level and variance decreases at the highest level of aggregation. The FES is also a weighted probability survey done by mail, drawn on wave within state, with greater sampling in coastal areas and supplemented from the states' list frame of marine angler license holders. These surveys are complex and I've oversimplified for expository sake.

The RFDM operates on disaggregated data by year, state, and wave based on combined APAIS and FES estimate of harvest and discard. When querying how regulatory changes will affect harvest and discard this is appropriate because regulations are made at the state level.

The REDM is based on year and four regions (ME-NY, NJ, DE/MD, VA/NC) but also can provide output at the state level. At the regional level, the model performed well. I noted in the final report that the model performs less well at the state level, where there can be wide discrepancies between model predictions and actual occurrences. For the 2019 simulation, harvest or discard estimates of summer flounder for New Jersey, Connecticut, Massachusetts, and Maryland are predicted well, but the discrepancy is larger for Delaware, New York, North Carolina, Rhode Island and Virginia. Lack of fit was also seen for black sea bass for some states. These discrepancies need to be resolved because regulatory action is taken at the state level.

    b. *What key assumptions affect the underlying statistical analysis and interpretation of the results? Were these assumptions and relevant uncertainties identified and characterized?*

The importance of stating the assumptions cannot be overemphasized as noted in the previous TOR. While there are assumptions in constructing the model processes that need to be more clearly addressed, the elephant in the room are all the assumptions that emanate from the use of MRIP calibrated data. These data demand a clear understanding of their implicit biases- avidity, self reporting, non-response- that will influence the outcome of the best designed model. These are the only data available across time and region that have been based on statistically valid sampling protocols. However, no large-scale sampling can be done without the full understanding of population and sampling frames.

The 2010 choice survey upon which the REDM is dependent must evaluate the anticipated effect of avidity bias on the model's ability to represent the entire population of anglers, or state clearly that its results favor avid anglers predominantly. This model also had a substantial proportion of non-response that is typically of economic surveys done through add-on mail surveys. Were the 2010 respondents representative of all anglers or were they different than the larger population?

One way to query this might be to evaluate the demographics of the respondents to the nonrespondents based on APAIS data from 2010. The REDM also assumes that the angler preferences have remained the same over a decade. Were the model used for other species, preferences may change.

Likewise, the RFDM relies on the validity of self-reported discards. Typically, these data show digit-bias when discards aren't valued or when there are many of them (replying to the survey agent that there were 5 or 10 discards rather than 6 and 9) and anglers may over- or under-report discards depending on the current regulations. This may be minor or not and is difficult to assess. It is most important in fisheries where there are many discards such as for bluefish.

3) *Is the model appropriate for estimating and predicting the impacts of bag, size, and season limits on recreational catch or harvest? Are the methods in the Recreational Economic Demand Model appropriate for estimating changes in recreational effort or fishing demand?*

    a. *Does the modeling approach represent an improvement over current methods used to estimate impacts of management measures?*

Both models have value for management, upon revision and if their limitations are accounted for in management decisions. I would anticipate that they will have real value when they are used together. This would be a major improvement over the ad hoc approaches that are used now. The models would predict the impact of multiple regulations on harvest and discards, and angler welfare.

Currently, the RFMD model uses smoothing to render categorical data (year and wave) for inclusion as continuous variables, which they are not. The smoothing adds data points to the dependent variables and this increases the degrees of freedom that the model uses. Although the model is penalized for overfitting, a modeling approach that uses these dependent variables appropriately as categorical variates may result in increased variance and decreased degrees of freedom. As such the estimates and predictions could be optimistic and greater certainty assumed.

Currently as configured the REDM is predicting the valuation and response to management regulations of the avid angling community, not the general population of anglers. This is a problem that can be remedied and will improve the value of the model. Because it is based on a choice model conducted in 2010, it would be valuable for the survey to be repeated, if feasible. Although choices may still be the same a decade later, this assumption should be tested. Moreover, when applied to different species, the 2010 survey may not reflected the choices of those anglers, especially if there are differences in fishing effort by season because of species availability.

    b. *What are the strengths/limitations of the modeling approach for informing management measures, especially at the regional, state, wave, or mode level? Are there specific recreational fishing measures for which use of the model would not be recommended?*

Both models have much to recommend them.

The RFDM model uses long time series of MRIP data and should provide greater certainty for large regional and yearly predictions but less certainty when used to predict state and wave predictions. States that add more sampling events to MRIP data will usually have less uncertainty depending on species spatial and temporal distributions. The statistical catch-at-age models use the aggregate data to provide predictions and so the uncertainty at state and wave level may be underestimated at the level where regulations will be promulgated. I noted that during the presentation that the model results presented at our meeting include only the private boat mode. Depending on the species, shore and for hire may also be important sources of data, especially for species such as bluefish.

The REDM performed well at the region level. It has the promise of simulating bag and size limit regulations of projected harvest, discard, and angler satisfaction. The model is subject to biases present in the data acquisition and so it will provide better insights where the sampling is adjusted for avidity or where avidity is less of an issue.

c. *What are the implications of using the model to predict future catch/harvest based on historical data? Are there limits on the magnitude of change in catch/harvest or stock status beyond which use of the model would not be recommended?*

The RFDM uses a long time series of revised MRIP estimates of landings and discards. Effort data for black sea bass and summer flounder used to develop the estimates converge well with previous MRFSS telephone survey estimates of effort. However, this is not true of all species for which this model may be applied in the future. For example, bluefish data do not converge through time in the calibrations and the impact of this on predictions is hard to ascertain.

The REDM relies on the stated preferences of anglers in 2010. I would anticipate that it simulates the regional preferences well when close to that period. However, if angler preferences have changed in the ensuing decade because of regulatory changes, species availability or abundance, the model may not predict well the impact of future regulatory measures. One indicator might be available in the MRIP demography data which might show whether the demographics of the marine angling community have changed. If climate change has altered fish distributions or angler behavior, then the choice preferences from 2010 may not as accurately reflect current angler choices. As offshore waters warm, we may also see a redistribution of effort to cooler waves which is currently not a focus of the model predictions.

d. *Can the modeling approach support development of multi-year bag, size, and season limits? If so, what criteria should be applied or developed to assess the reliability of the multi-year projections?*

Both models have the potential. The models should provide fitting error and prediction error or uncertainty based on historical multi-year population size, recreational catch, regulations, etc. to be more useful. The limitation and strengths discussed above will influence the accuracy of multi-year predictions.

4) *Provide guidance for the following future model use considerations:*
    a. *Could the model be modified to incorporate other species (e.g., scup, bluefish)?*

Although these models may be useful for scup, there are considerable concerns with their application to bluefish. The discards for bluefish have been steadily increasing and now equal the harvest. Moreover, the discard numbers and sizes are all self-reported data which can be much less certain. It is less clear if avidity bias is as much of a concern for summer flounder, but this has not yet been ascertained.

    b. *Could future model runs be conducted by other individuals (e.g., Council/ASMFC staff or Monitoring/Technical Committee members) without major modifications?*

Both models when revised and fully documented should be able to be run by council and ASFMC staff, many of whom are well qualified to do so.

    c. *How easily could the model be updated with additional years of data or additional variables?*

Both models, upon revision, should be easily updated. The concern for the REDM is that the choice survey may be outdated and should probably be done each decade or so. This will add additional expense to updating the model. Add-on surveys to APAIS require good survey sampling practice (initial mailing, reminder mailings, a check on non-respondents).

Atlantic States Marine Fisheries Commission

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# MEMORANDUM

**TO:** **ISFMP Policy Board**

**FROM:** **Executive Committee**

**DATE:** **October 9, 2021**

**SUBJECT:** **Tasks to address Concerns with Conservation Equivalency**

The Executive Committee raised questions and concerns regarding the use of conservation equivalency in Commission FMPs. The Committee tasked a subgroup to create a list of tasks for the Management and Science Committee to address general concerns that have been raised either through the Executive Committee or species management boards, e.g. Atlantic striped bass. The subgroup develop the following list of tasks for the MSC to address.

1. Develop a way to better characterize and address uncertainty of conservation equivalency (CE) proposals, for example: Develop a buffer to account for uncertainty
    a. Should stock status be accounted for when establishing buffers (stock status steps/tiers, control rule)
    b. Don't want a buffer to be overly burdensome on "fringe states" - should the buffer apply differently to the fringe states?
2. Develop a retrospective analysis to see how well CE performed including the coastwide measure for comparison
    a. This could help inform the above buffer
    b. Consider harvest vs total removals consistent with FMP
3. For species and measures that are harder to evaluate equivalency, should CE be allowed (some measures are non-quantifiable)? Should there be bounds on CE or is anything allowed unless specifically excluded by the FMP? Should FMPs allow the mix of CW measures and CE measures within the same management process? E.g. last round of SB measures
4. Data Standards:
    a. Are there minimum data standards for CE or a required level of review of the data sets used if not within the bounds of the minimum data standards?
    b. Should things that cannot be quantified be permitted under CE?
5. Should there be a time limit on CE programs (set number of years, assessment cycle, etc.)?
6. Should stock status impact CE? If so how? Example, if a stock is declared overfished/overfishing is occurring then should CE be re-evaluated?