Atlantic States Marine Fisheries Commission

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Spud Woodward (GA), Chair *Joe Cimino (NJ), Vice-Chair* *Robert E. Beal, Executive Director*

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEMORANDUM

January 12, 2022

TO: Commissioners; Proxies; American Lobster Management Board; Atlantic Menhaden ManagementBoard; Atlantic Striped Bass Management Board; Executive Committee; Horseshoe Crab Management Board; ISFMP Policy Board; Spiny Dogfish Management Board; Summer Flounder, Scup, and Black Sea Bass Management Board; Tautog Management Board

FROM: Robert E. Beal
Executive Director

RE: ASMFC 2022 Winter Meeting Webinar

The Atlantic States Marine Fisheries Commission's 2022 Winter Meeting Webinar will be held January 25-27, 2022. Meeting materials are now available on the Commission website at http://www.asmfc.org/home/2022-winter-meeting. Due to concerns about the continued spread of COVID-19 and the challenges of conducting a fully participatory hybrid meeting (in-person and virtual meeting combined), the meeting has shifted from a hybrid meeting to one that will be conducted entirely via webinar. Supplemental materials will be posted to the website on Wednesday, January 19.

Board meeting proceedings will be broadcast daily via webinar beginning Monday, January 25 at 10 a.m. and continuing daily until the conclusion of the meeting (expected to be 3:15 p.m.) on Thursday, January 27. The webinar will allow registrants to listen to board deliberations and view presentations and motions as they occur. Management boards will continue to provide opportunity for the public to bring matters of concern to the board's attention at the start of each board meeting. Board chairs will ask members of the public to raise their hands to let the chair know they would like to speak. Depending upon the number of commenters, the board chair will decide how to allocate the available time on the agenda (typically 10 minutes) to the number of people who want to speak. To register for the webinar go to https://attendee.gotowebinar.com/register/8463911188401300749(Webinar ID: 212-070-371).

Each day, the webinar will begin 30 minutes prior to the start of the first meeting so people can troubleshoot any connectivity or audio issues they may encounter. If you are having issues with the webinar(connecting to or audio related issues), please contact Chris Jacobs at 703.842.0790. If you are joining the webinar but will not be using VoIP, you can may also call in at 415.655.0600, access code 774-133-932. A PIN will be provided to you after joining the webinar; see webinar instructions for details how to receive the PIN.

We look forward to meeting with you at the Winter Meeting. If the staff or I can provide any further assistance please call us at 703.842.0740.

Enclosure: Public Comment Guidelines, Travel Reimbursement Guidelines, and Final Agenda

Atlantic States Marine Fisheries Commission

2022 Winter Meeting Webinar

January 25-27, 2022

Public Comment Guidelines

To provide a fair opportunity for public input, the ISFMP Policy Board approved the following guidelines foruse at management board meetings. **Please note these guidelines have been modified to adapt to meetings via webinar:**

For issues that are not on the agenda, management boards will continue to provide an opportunity to the public to bring matters of concern to the board's attention at the start of each board meeting. Board chairs will ask members of the public to raise their hands to let the chair know they would like to speak.

Depending upon the number of commenters, the board chair will decide how to allocate the available timeon the agenda (typically 10 minutes) to the number of people who want to speak.

For topics that are on the agenda, but have not gone out for public comment, board chairs will provide limited opportunity for comment, taking into account the time allotted on the agenda for the topic. Chairs will have flexibility in deciding how to allocate comment opportunities; this could include hearing one comment in favor and one in opposition until the chair is satisfied further comment will not provide additional insight to the board.

For agenda action items that have already gone out for public comment, it is the Policy Board's intent to end the occasional practice of allowing extensive and lengthy public comments. Currently, board chairs have the discretion to decide what public comment to allow in these circumstances.

In addition, the following timeline has been established for the **submission of written comment for issuesfor which the Commission has *NOT* established a specific public comment period** (i.e., in response to proposed management action).

1. Comments received 3 weeks prior to the start of the webinar (January 10) have been included in thebriefing materials.
2. Comments received by 5:00 PM on Tuesday, January 18 will be included in the supplemental materials.
3. Comments received by 10:00 AM on Friday, January 21 will be distributed electronically toCommissioners/Board members prior to the meeting.

Comments should be submitted via email at comments@asmfc.org. All comments must clearly indicate thecommenter's expectation from the ASMFC staff regarding distribution.

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 Boardmeetings. 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.

Tuesday, January 25

10:00 – 11:30 a.m. **American Lobster Management Board**
Member States: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia
Other Members: NMFS
Chair: McNamee
Other Participants: Perry, Reardon, Beal
Staff: Starks

1. Welcome/Call to Order *(J. McNamee)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October and December 2021
3. Public Comment
4. Consider Draft Addendum XXVII for Public Comment: *Increasing Protection of Spawning Stock in the Gulf of Maine/Georges Bank (C. Starks)* **Action**
5. Consider Terms of Reference for Jonah Crab Benchmark Stock Assessment *(J. Kipp)* **Action**
6. Consider Fishery Management Plan Reviews for American Lobster and Jonah Crab for 2020 Fishing Year *(C. Starks)* **Action**
7. Review and Populate Advisory Panel Membership *(T. Berger)* **Action**
8. Other Business/Adjourn

11:30 a.m. – 1:00 p.m. **Lunch Break**

1:00 – 2:30 p.m. **Tautog Management Board**
Member States: Massachusetts, Rhode Island, Connecticut, New York,New Jersey, Delaware, Maryland, Virginia
Other Members: NMFS
Chair: Luisi
Other Participants: Ares, Snellbaker
Staff: Rootes-Murdy

1. Welcome/Call to Order *(M. Luisi)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Review and Discuss Hypothetical Scenarios from Risk and Uncertainty Decision Tool *(J. McNamee)*
5. Review Feedback from Law Enforcement Committee on Commercial Tagging Program *(J. Snellbaker)*
6. Elect Vice-Chair **Action**
7. Other Business/Adjourn

2:45 – 4:15 p.m. **Summer Flounder, Scup, and Black Sea Bass Management Board**

Member States: New Hampshire, Massachusetts, Rhode Island, Connecticut, New York,
New Jersey, Delaware, Maryland, Virginia, North Carolina
Other Members: NMFS, PRFC, USFWS
Chair: Davis
Other Participants: Wojcik, Snellbaker
Staff: Colson Leaning

1. Welcome/Call to Order *(J. Davis)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from August 2021
3. Public Comment
4. Review Technical Committee Recommendations on Methodology for Adjusting 2022 Summer Flounder and Black Sea Bass Recreational Measures **Possible Action**
5. Elect Vice-Chair **Action**
6. Other Business/Adjourn

4:30 – 5:00 p.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: Meserve
Other Participants: Newlin, Moran
Staff: Rootes-Murdy

1. Welcome/Call to Order *(N. Meserve)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Consider Postponed Motions from October 2021 *(N. Meserve)* **Final Action**

Main Motion
Move to set at least a 7500-pound trip limit in the Northern Region (ME through CT) for FY2022 contingent upon NOAA Fisheries adopting at least a 7500-pound trip limit for federal waters. If at least a7500-pound trip limit is not approved in federal waters, then the 6,000-pound trip limit will remain in the Northern Region.

Motion to Substitute
Move to substitute to set the Northern Region (ME through CT) state waters trip limit for FY2022 equal to the trip limit in federal waters approved by NOAA Fisheries.

Motion to Postpone
Move to postpone action around the state waters trip limits for FY2022 until the ASMFC Winter Meeting.

5. Review and Populate Advisory Panel Membership *(T. Berger)* **Action**
6. Elect Vice-Chair **Action**
7. Other Business/Adjourn

Wednesday, January 26

8:00 – 9:30 a.m. **Executive Committee**

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

Members: Abbott, Bell, Burgess, Cimino, Clark, Davis, Fegley, Gilmore, Keliher, Kuhn, McKiernan, McNamee, Miller, Patterson, Plumlee, Rawls, Woodward

Chair: Woodward

Staff: Leach

1. Welcome/Call to Order *(S. Woodward)*
2. Committee Consent
   - Approval of Agenda
   - Approval of Meeting Summary from October 2021
3. Public Comment
4. Discuss the Commission's Role in Coordinating the Member States' Efforts in Offshore Wind Energy Development
5. Discuss Appeals Process *(R. Beal)*
6. Other Business/Adjourn

9:45 – 11:45 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, Couch, Sweka, Chen

Staff: Starks

1. Welcome/Call to Order *(J. Cimino)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Consider Adaptive Resource Management (ARM) Revision and Peer Review Report
   - Presentation of ARM Revision Report *(J. Sweka)*
   - Presentation of Peer Review Panel Report *(Y. Chen)*
   - Consider Management Response to ARM Revision and Peer Review Report *(J. Cimino)* **Possible Action**
5. Other Business/Adjourn

11:45 a.m. – 12:45 p.m. Lunch Break

12:45 – 1:15 p.m. **NOAA Presentation on Sea Turtle Bycatch in Trawl Fisheries** (*Carrie Upite,* Sea Turtle Recovery Coordinator, NOAA Fisheries' Greater Atlantic Region Fisheries Office)

NOAA Fisheries will provide an overview of its outreach process to develop bycatch reduction measures to reduce takes of sea turtles in Atlantic coast trawl fisheries

1:30 – 5:00 p.m. (break included) **Atlantic Striped Bass Management Board**
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: Gary
Other Participants: Sullivan, Blanchard, Bassano
Staff: Franke

1. Welcome/Call to Order *(M. Gary)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Consider Draft Amendment 7 for Public Comment *(E. Franke)* **Action**
5. Elect Vice-Chair **Action**
6. Other Business/Adjourn

Thursday, January 27

8:30 a.m. – Noon **Atlantic Menhaden 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: NMFS, PRFC, USFWS
Chair: Bell
Other Participants: Newhard, Kersey, Lapp, Brust
Staff: Rootes-Murdy

1. Welcome/Call to Order *(M. Bell)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Update on 2020-2021 Atlantic Menhaden Mortality Events *(J. Brust)*
5. Consider Draft Addendum I to Amendment 3 for Public Comment *(K. Rootes-Murdy)* **Action**
   - Advisory Panel Report *(M. Lapp)*
6. Review and Populate Advisory Panel Membership *(T. Berger)* **Action**
7. Elect Vice-Chair **Action**
8. Other Business/Adjourn

Noon – 1:00 p.m. **Lunch Break**

1:00 – 3:00 p.m. **Interstate Fisheries Management Program Policy 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: Woodward
Staff: Kerns

1. Welcome/Call to Order *(S. Woodward)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Executive Committee Report *(S. Woodward)*
5. Review and Discuss 2021 Commissioner Survey Results *(D. Tompkins)*
6. Consider Policy on Information Requests *(R. Beal)* **Action**
7. Update on East Coast Climate Change Scenario Planning *(T. Kerns)*
8. Committee Reports *(L. Havel)*
   - Habitat
   - Atlantic Coastal Fish Habitat Partnership
9. Review Noncompliance Findings (if necessary) **Action**
10. Other Business/Adjourn

3:00 – 3:15 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: Woodward
Staff: Beal

1. Welcome/Call to Order *(S. Woodward)*
2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment
4. Consider Approval of Amendment 22 to the Interstate Fishery Management Plan for Summer Flounder, Scup, and Black Sea Bass: Commercial/Recreational Allocation *(J. Davis)* **Final Action**
5. Consider Noncompliance Recommendations (if necessary) **Final Action**
6. Other Business/Adjourn

Atlantic States Marine Fisheries Commission

American Lobster Management Board

January 25, 2022
10:00 – 11:30 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. McNamee*)	10:00 a.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from October and December 2021	10:00 a.m.
3.	Public Comment	10:05 a.m.
4.	Consider Draft Addendum XXVII for Public Comment: Increasing Protection of Spawning Stock in the Gulf of Maine/Georges Bank *(C. Starks)* **Action**	10:15 a.m.
5.	Consider Terms of Reference for Jonah Crab Benchmark Stock Assessment *(J. Kipp)* **Action**	11:10 a.m.
6.	Consider Fishery Management Plan Reviews for American Lobster and Jonah Crab for 2020 Fishing Year *(C. Starks)* **Action**	11:15 a.m.
7.	Review and Populate Advisory Panel Membership *(T. Berger)* **Action**	11:25 a.m.
8.	Other Business/Adjourn	11:30 a.m.

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

MEETING OVERVIEW

American Lobster Management Board
January 25, 2022
10:00 – 11:30 a.m.
Webinar

Chair: Dr. Jason McNamee (RI) Assumed Chairmanship: 02/22	Technical Committee Chair: Kathleen Reardon (ME)	Law Enforcement Committee Representative: Rob Beal
Vice Chair: VACANT	Advisory Panel Chair: Grant Moore (MA)	Previous Board Meeting: December 6, 2021
Voting Members: ME, NH, MA, RI, CT, NY, NJ, DE, MD, VA, NMFS, NEFMC (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 18, 2021 and December 6, 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 Draft Addendum XXVII for Public Comment: Increasing Protection of Spawning Stock in the Gulf of Maine/Georges Bank (10:15-11:10 a.m.) Action

Background

- Draft Addendum XXVII was initially initiated in 2017 to proactively increase protection of the GOM/GBK stock but stalled due to the prioritization of Atlantic right whale issues. After accepting the 2020 Benchmark Stock Assessment for American lobster, the Board reinitiated work on the draft addendum in February 2021, with a focus on developing a trigger mechanism that would automatically implement management measures to improve protection of the GOM/GBK spawning stock if the trigger is reached.
- The Plan Development Team (PDT) and the Technical Committee met multiple times in 2021 to develop Draft Addendum XXVII (**Briefing Materials**). The PDT selected management options based on TC analysis and recommendations, which can be found here and here.
- Draft Addendum XXVII considers modifications to the management program with the goal of increasing protection of the GOM/GBK spawning stock. Two issues are included in the addendum. Issue 1 addresses the standardization of a subset of management measures within LCMAs and across the GOM/GBK stock. Issue 2 considers applying either a trigger mechanism or a predetermined schedule for implementing biological

management measures that are expected to provide increased protection to the spawning stock biomass and increase the resiliency of the stock.

Presentations

- Overview of Draft Addendum XXVII for Public Comment by C. Starks

Board Actions for Consideration at the Meeting

- Consider approval of Draft Addendum XXVII for public comment

5. Consider Terms of Reference for Jonah Crab Benchmark Stock Assessment (11:10-11:15 a.m.) Action

Background

- To date, there is no range-wide stock assessment of Jonah crab, stock status is unknown, and there has been limited science-based advice available to support management of the fishery.
- In August 2021 the Board initiated a benchmark stock assessment for Jonah crab. This was recommended by the Technical Committee given the data available, a steady increase in landings as the fishery has developed, and persistent uncertainty about sustainability and market limitations.
- The TC met in January 2022 to recommend Terms of Reference for the Jonah Crab Benchmark Stock Assessment, as well as a timeline for completion of the assessment (**Briefing Materials**).

Presentations

- Terms of Reference and Timeline for the 2023 Jonah Crab Benchmark Stock Assessment by J. Kipp

Board Actions for Consideration at the Meeting

- Approve Terms of Reference and timeline for Jonah Crab Benchmark Stock Assessment

6. Consider Fishery Management Plan Reviews and State Compliance (11:15-11:25 a.m.) Action

Background

- State compliance reports for American lobster and Jonah crab were due August 1, 2021.
- The Plan Review Teams reviewed state compliance reports and compiled the annual FMP Reviews for lobster and Jonah crab for the 2020 Fishing Year (**Briefing Materials; Supplemental Materials**).
- Delaware, Maryland, and Virginia have requested and meet the requirements for *de minimis* in the lobster and Jonah crab fisheries.

Presentations

- FMP Reviews for American Lobster and Jonah Crab for the 2020 Fishing Year by C. Starks

- Approve Fishery Management Plan Reviews and state compliance reports for American Lobster and Jonah Crab for the 2020 Fishing Year
- Approve *de minimis* requests.

7. Review and Populate Advisory Panel Membership (11:25-11:30 a.m.) Action

Background

• Eben Wilson and Jeff Putnam, both commercial trap fishermen from Maine, have been nominated to the American Lobster Advisory Panel **(Briefing Materials)**.
Presentations • Advisory Panel Nominations by T. Berger
Board Actions for Consideration at the Meeting • Approve Advisory Panel nominations

8. Other Business/Adjourn

American Lobster and Jonah Crab TC Task List

Activity level: High

Committee Overlap Score: Medium

Committee Task List
Lobster TC • Annual state compliance reports are due August 1 • Fall 2022: Annual data update of lobster abundance indices *Jonah Crab TC* • Winter/Spring 2022: Begin preparations for Jonah crab assessment data workshop • Summer 2022: Continue development of assessment • Annual state compliance reports are due August 1 • Fall 2022: Development of methods for Jonah crab stock assessment

TC Members
American Lobster: Kathleen Reardon (ME, TC Chair), Joshua Carloni (NH), Jeff Kipp (ASMFC), Kim McKown (NY), Conor McManus (RI), Chad Power (NJ), Tracy Pugh (MA), Burton Shank (NOAA), Craig Weedon (MD), Somers Smott (VA), Renee St. Amand (CT)
Jonah Crab: Derek Perry (MA, TC Chair), Joshua Carloni (NH), Chad Power (NJ), Jeff Kipp (ASMFC), Conor McManus (RI), Allison Murphy (NOAA), Kathleen Reardon (ME), Chris Scott (NY), Burton Shank (NOAA), Somers Smott (VA), Corinne Truesdale (RI), Craig Weedon (MD)

Jonah Crab Stock Assessment Subcommittee (SAS) Members
Jonah Crab: Derek Perry (MA, TC Chair), Joshua Carloni (NH), Jeff Kipp (ASMFC), Kathleen Reardon (ME), Burton Shank (NOAA), Corinne Truesdale (RI), Jeremy Collie (URI)

Addendum XXVII PDT Members
American Lobster: Kathleen Reardon (ME), Joshua Carloni (NH), Robert Glenn (MA), Corinne Truesdale (RI), Allison Murphy (NOAA)

Addendum XXIX PDT Members
American Lobster: William DeVoe (ME), Renee Zobel (NH), Nicholas Buchan (MA), Richard Balouskus (RI), Kim McKown (NY), Barry Clifford (NOAA), Allison Murphy (NOAA)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

AMERICAN LOBSTER MANAGEMENT BOARD

Webinar
October 18, 2021

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ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Sen. David Miramant, ME (LA)
Cherie Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Dan McKiernan, MA (AA)
Raymond Kane, MA (GA)
Rep. Sarah Peake, MA (LA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Colleen Bouffard, CT, proxy for J. Davis (AA)
Bill Hyatt, CT (GA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
Joe Cimino, NJ (AA)
Peter Clarke, NJ, proxy for T. Fote (GA)
Adam Nowalsky, NJ, proxy for Sen. Houghtaling (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
Pat Geer, VA, proxy for S. Bowman (LA)
Allison Murphy, NMFS

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

Ex-Officio Members

Kathleen Reardon, Technical Committee Chair
Derek Perry, Jonah Crab TC Chair

Staff

Robert Beal
Toni Kerns
Maya Drzewicki
Tina Berger
Kristen Anstead
Pat Campfield
Lisa Carty
Emilie Franke
Lisa Havel
Chris Jacobs
Jeff Kipp
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Mike Rinaldi
Julie Defilippi Simpson
Caitlin Starks
Deke Tompkins

Guests

Karen Abrams, NOAA
Max Appelman, NMFS
Peter Benoit, Ofc. Sen. King, ME
Frederick Bever
Kurt Blanchard, RI DEM
Sarah Bland, RI DEM
Karen Bradbury, Ofc. Sen. Whitehouse
Delayne Brown, NH FGD
Jeff Brust, NJ DEP
Thomas Burrell, PA F&B
Josh Carloni, NH FGD
Beth Casoni, MLA
Heather Corbett, NJ DEP
Justin Davis, CT (AA)
Lennie Day
William DeVoe, ME DMR
Lynn Fegley, MD DNR
Marianne Ferguson, NOAA

Guests (continued)

Joe Fessenden, Am. Comm. Fishing
James Fletcher
Tom Fote, NJ (GA)
Lewis Gillingham, VMRC
Angela Giuliano, MD DNR
Amalia Harrington, Univ Maine
Marin Hawk, MSC
Heidi Henninger, Offshore Lobster
Jay Hermsen, NOAA
Asm. Eric Houghtaling, NJ (LA)
Bob Humphrey, Powmal, ME
Rob LaFrance, Quinnipiac Univ
Chip Lynch, NOAA
Patrice McCarron, MLA
Genine McClair, MD DNR
Kim McKown, NYS DEC
Conor McManus, RI DEM
Meredith Mendelson, ME DMR
Nichola Meserve, MA DMF
Steve Meyers, Williamsburg, VA
Jerry Morgan, Madison, CT
Lorraine Morris, ME DMR
Wendy Morrison, NOAA
Brandon Muffley, MAFMC
Lindsey Nelson, NOAA
Jeff Nichols, ME DMR
Gerry O'Neill, Cape Seafoods
Derek Orner, NOAA
Nick Popoff, USFWS
Will Poston, SGA
Douglas Potts, NOAA
Tracy Pugh, MA DMF
Jill Ramsey, VMRC
Elizabeth Rasheed, SELCNC
Burton Shank, NOAA
Melissa Smith, ME DMR
Somers Smott, VMRC
Rene St. Amand CT DEP
Jesica Waller, ME DMR
Craig Weedon, MD DNR
Kelly Whitmore, MA DMF
Chris Wright, NOAA
Horace Wynn
Renee Zobel, NH FGD

The American Lobster Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Monday, October 18, 2021, and was called to order at 9:00 a.m. by Chair Daniel McKiernan.

CALL TO ORDER

CHAIR DANIEL McKIERNAN: Good morning, everyone, this is the October 18, 2021 American Lobster Management Board meeting. My name is Daniel McKiernan, and I am the Director of the Division of Marine Fisheries and the Administrative Representative to the delegation.

APPROVAL OF AGENDA

CHAIR McKIERNAN: First on the agenda, we need an approval of the agenda. Is there any objection or any edits that are desired for today's agenda?

MS. TONI KERNS: I don't see any hands, Dan.

CHAIR McKIERNAN: Hearing none, the agenda is approved by consent.

APPROVAL OF PROCEEDINGS

CHAIR McKIERNAN: Next the proceedings from August 2, 2021. Are there any suggested edits to the proceedings from that last meeting, please raise your hand?

MS. KERNS: I don't see any hands, Dan.

CHAIR McKIERNAN: Hearing none, it is approved by unanimous consent.

PUBLIC COMMENT

CHAIR McKIERNAN: Next is public comment. Toni, has anyone signed up to speak on any of the issues that are not on today's agenda?

MS. KERNS: I didn't have anyone sign up, but I'm going to ask for any hands, if anybody does need to make comment. I don't see any hands raised.

REVIEW OF THE ANNUAL DATA UPDATE OF AMERICAN LOBSTER ABUNDANCE INDICES

CHAIR McKIERNAN: Okay, on to Agenda Item 4. This is a Review of the Annual Data Update of American Lobster Abundance Indices**.** During the 2020 stock assessment the Stock Assessment Subcommittee recommended representation to the Board of these updated parameters. Caitlin, I'm assuming this is the first, and what will be kind of an annual event for the Board to receive an update on some of these indices.

MS. CAITLIN STARKS: Correct, Dan.

CHAIR McKIERNAN: That's cool. I guess we can go right to your presentation.

MS. STARKS: Kathleen is going to be presenting, and thanks, Maya for brining that up, and Kathleen, I think you should be all set to go.

CHAIR McKIERNAN: Thank you, Kathleen, go ahead.

MS. KATHLEEN REARDON: Okay thanks Caitlin and thanks Dan. As Dan just reviewed, as part of the 2020 Lobster Stock Assessment, the Stock Assessment Subcommittee and the Peer Review Panel recommended a data update process to monitor changes in stock abundance and trends between assessments, to be presented to the management board on an annual basis.

This process updates the survey indicators since the assessment, and the datasets recommended can indicate trends in exploitable lobster abundance expected in the near future. The datasets include the young of year settlement index, trawl survey indices for sizes 71 to 80 millimeters carapace length, and encounter rate, and the ventless trap survey to a greater than 53 millimeters carapace length.

To evaluate the trends, each indicator is compared to the relative percentile determined by the assessment time series of 1981 through the current, or the available years for each indicator. The process compares the calculated five-year means

for the assessment status and the updated status. For the assessment five-year means, the data was from years 2014 to 2018, and the update period was 2016 to 2020, with the additional two years.

For each indicator a negative status was determined if the indicator fell below the 25th percentile, neutral if between the 25th and the 75th percentile, and positive if greater than the 75th percentile. The tables and figures may be small in these slides and hard to read, depending on the size of your screen, but all are in the data update memo as well.

But for these slides you can focus on the color coding, where positive is white, neutral is gray, and black is negative. Any new data from 2019 or 2020 in the figures will be displayed in red at the end of the time series. The COVID-19 pandemic did impact data collection for all agencies. The pandemic prevented multiple trawl surveys from sampling in 2020, and that missing data does impact the five-year means used for the updated indicator status.

I will go through each stock and indicator, and how the updated status compared to the assessment status. To orient you, this standard time series to the left is 1981 to 2020, with each column representing a different statistical area, in this case state or survey for some of the other indicators.

The percentile ranges are on the bottom. In the table the assessment indicator means for 2014 and 2018 are outlined in red, while the updated indicator means are outlined in orange. The status of negative, neutral and positive are again as I said earlier, designated by black, gray, or white, and in the figure each panel is a different statistical area or survey with new data from 2019 to 2020 in the red.

To start, the young of year indices in the Gulf of Maine showed evidence of improvement, but were not positive. The assessment status had two negative indices and three neutral, while the updated status had all five indicators as neutral. For the Gulf of Maine trawl survey indices for recruits of 71 to 80 millimeters, the indices showed positive conditions with no status change from the assessment. But, as I noted earlier, five of the six surveys were not completed in 2020. The cross through the table means no survey. The Maine/New Hampshire fall survey was the only 2020 survey that was completed, and also posted the first neutral value since 2015. These figures show the annual recruit index value for each trawl survey with the spring surveys to the left and the fall surveys to the right.

As I said before, none of the surveys were completed in spring 2020 and the only fall survey completed in 2020 does show a decline. In general, the fall indicators since the assessment do show declines. For the Gulf of Maine trawl survey encounter rates, we have some of the same caveats for the 2020 missing data.

In general, the rates remain high and similar to the assessment, but there was some deterioration. In the assessment five of the six were positive, but in the updated status three were positive and three were neutral. In the assessment the ventless trap survey was not a stock indicator in previous assessments before 2020, because it only started in 2006.

But, because we are showing changes since the assessment, the TC determined that it is appropriate here to use the survey to evaluate trends since the assessment. In that assessment the VTS index was model based and stock wide. This modeled approach was not evaluated for estimated indices by statistical area.

But the TC decided that it would be useful to provide greater spatial resolution of the survey results to examine the abundance trends within the stock boundary. The results shared here are designed based ventless trap survey indices, and reported by statistical area. For the Gulf of Maine ventless trap survey, the columns are each statistical area by sex.

The assessment found that four of the indices were positive and four were neutral. In the updated status two were positive and six were neutral. These indices do show decline since the assessment. For figures of the same data, the females are to the left and the males are to the right, 511, the most northern statistical area is on the top with the most southern Gulf of Maine statistical area 514 on the bottom.

Statistical Area 514 fell into the negative range for the first time since 2014, 511 and 512 also exhibited a declining trend, dropping into the neutral range. For Georges Bank there were no indicators available for 2020. For recruit abundance the assessment status found both spring and fall surveys were neutral, but in the updated status spring was neutral and fall was negative.

The encounter rates were similar to the assessment, where both the assessment and updated status were positive. These are the figures for just the recruit indicators for Georges Bank, while Georges Bank recruit indicators show high inter-annual variability. The Georges Bank recruits show possible deterioration in the fall of 2019, similar to the Gulf of Maine inshore survey.

Switching to Southern New England. The young of year indices are reported by state and were negative across the stock. For the assessment, two of the states were negative while one was neutral. But for the update all indices were negative. Massachusetts has not seen a young of year for six years. For trawl surveys, only Rhode Island was able to complete their trawl survey in 2020, so six of the eight surveys were not completed in 2020. The updated status was similar to the assessment across the indicators with three neutral and five negatives. These are the figures of the annual trawl survey recruit numbers with the spring on the left and fall on the right with the federal offshore survey on the top, then moving south from Massachusetts to Rhode Island to Connecticut on the bottom.

Both of the offshore indictors on the top panel were negative in 2019, while all of the inshore areas also remained low. For encounter rates, the indicator statuses were similar to the assessment, with two neutral indicators and six negatives. For southern New England ventless trap survey, the indices are reported by sex and statistical area.

The TC notes that the survey has only taken place during depleted stock conditions in an adverse environmental regime. Inter-annual variability can be misleading without the context of a longer time series, including a period of more positive stock conditions. With that in mind, the assessment status had one indicator in negative status and three in neutral, while the updated indicators show that all four are in neutral status.

For the ventless trap, while the updated five-year mean was neutral, both 2019 and 2020 values in 539 were negative for males and females. I know that was a lot of information. It is all in the data update memo. But in summary, the lack of 2020 trawl survey data is problematic in looking at trends since the assessment.

With these limited data we can only make uncertain conclusions, but there is some evidence of decline. In the Gulf of Maine, the indicators are showing declining trends in recruitment in both the fall trawl surveys and ventless trap. For Georges Bank the indicators are highly variable and dependent on only the fall and spring federal survey that did not go in 2020. For Southern New England, the stock continues to have negative indicator status inshore and neutral conditions offshore. With that I am happy to take any questions.

CHAIR McKIERNAN: Any questions from the Board for Kathleen? Great job, Kathleen.

MS. KERNS: I don't see any hands yet, Dan. No hands.

CHAIR McKIERNAN: Okay, well I'm sure as we proceed forward between this meeting and the next on Addendum XXVII, especially on matters that pertain to the Gulf of Maine, some of these data

will be brought forward to help guide us. Thank you, Kathleen, for a great presentation.

Thanks to the Technical Committee for compiling all of this really interesting data. With any hope we'll have fewer data gaps in the future, as we kind of crawl out of this pandemic.

DEVELOPMENT OF DRAFT ADDENDUM XXVII, GULF OF MAINE/GEORGES BANK RESILIENCY

CHAIR McKIERNAN: Next on the agenda is the Development of Draft Addendum XXVII, Gulf of Maine/Georges Bank Resiliency**,** and Caitlin has a presentation on this.

I will remind the Board that over three years ago this Addendum was initiated, to deal with some of the expected declines in, I guess some of the same parameters that Kathleen just showed us, the decline of young of the year values, expected decline in the ventless trap survey indices, as well as the expected decline in landings as well. I think the Board appropriately wanted to see if we could sort of pre-bait some management measures that could address the decline and make the fishery more sustainable and less susceptible to the long-term decline that we saw in the Southern New England area. Like I said, this was brought forward over three years ago, and Caitlin is going to speak to the evolution of this Addendum.

The messaging that the Board has come forward with to the PDT, and then some of the PDTs struggles to fully comprehend what the Board is looking for, to put together some management recommendations that we could eventually take out to public hearing. Caitlin, why don't you present on the background, and what some of the detailed options are that have come forward from the Plan Development Team.

MS. STARKS: I can do that. I'll start off with some brief background, as Dan indicated, on this action, and give you an update to the proposed action timeline. Then I'll go over the recommendations from the Technical Committee and the PDT on the Addendum options. Then at the end highlight a few questions for the Board where the PDT is looking for some additional guidance.

For some brief context, Draft Addendum XXVII was initiated in August, 2017, and that was in response to concerns about declining trends in Maine's larval settlement survey over recent years that could possibly foreshadow future declines in recruitment in landings. At that time, the Addendum objective was to increase the resiliency of the Gulf of Maine and Georges Bank stock by considering standardized management measures across LCMAs in the stock.

Then, following initiation of the Addendum it was put on hold for a few years, to prioritize right whale risk reduction efforts. In February, 2021, after reviewing the 2020 benchmark stock assessment, the Board reinitiated work on this Addendum with a new motion, which changed the focus of the Addendum to consider a trigger mechanism.

Such that upon reaching the trigger measures would be automatically implemented to improve the biological resiliency of the Gulf of Maine and Georges Bank stock. Since that February meeting, the PDT and TC have met a number of times to develop the document, and the Board has met several times.

CONSIDER PLAN DEVELOPMENT TEAM (PDT) RECOMMENDATIONS ON OBJECTIVES

MS. STARKS: In May and August of 2021, the Board gave some guidance to the PDT, which included that the action should prioritize increasing resiliency of the stock over standardizing measures, that it should consider a tiered approach with multiple trigger levels, and that it should include some relatively conservative trigger levels, such that a change to measures would occur before abundance were to fall significantly from the current levels.

The PDT and TC took that into account, and they've provided some additional analysis and

recommendations on the draft management options for the Addendum. I want to highlight here that the PDT, as Dan mentioned, has had some trouble developing options for this Addendum for a few reasons.

One is that both the PDT and TC have felt that there is some inconsistency between the Board's original motion, which focused on stock resiliency and proactive management, and the additional guidance provided by the Board that supported management action occurring after declines in abundance are observed. Additionally, there is not consensus among all of the PDT members on some of the trigger levels and management measures being discussed, given the uncertainty about the goals of the Addendum.

For example, there is not union in this agreement on maximum gauge size changes being considered, and I'll go more into detail on that later. That said, the PDT is looking today for some more guidance from the Board at the end of the presentation, to be able to finalize this management document for consideration for public comment at the next meeting.

Given that information, this is an updated proposed timeline for the remaining steps of the action development. Today the Board is reviewing the TC and PDT recommendations for the Addendum, and then following today's meeting the plan is for the PDT to finalize the draft addendum for public comment, based on the Board's guidance.

The Board would then be able to consider the draft addendum for public comment in January of 2022 at the winter meeting, and if approved public hearings would take place in February, and the Board could consider the public comments and final approval of the Addendum in May, 2022.

Now I'll go into the TC analysis and recommendations on the action. First, I want to note that during the TCs discussions they defined resiliency as the ability of the stock to recover from a disturbance, and made the recommendations based on the understanding that the Board was interested in increasing stock resiliency by adding an additional biological buffer through the protection of spawning stock biomass across LCMAs.

With that in mind, the TC provided analysis and recommendations on the index for the trigger mechanism, the trigger levels, and the projected impact of management measures. For the trigger mechanism, the TC recommended using a trigger index that would be calculated as the average of three survey specific running three-year average recruit indices, meaning lobsters from 71 to 80 millimeters in carapace length.

The three surveys are the combined Maine and New Hampshire and Massachusetts spring trawl survey index, the combined Maine, New Hampshire and Massachusetts fall trawl survey index, and the combined Gulf of Maine ventless trap survey index. All these would be scaled to their 2015 to 2017 values.

The reason for using these recruit indices is that there is an expected one-year lag between the recruit indices and the recruitment to the stock assessment reference abundance, which was used for a stock status determination. The reference period for the recruit index is 2015 to 2017, and that is indicative of recruitment to the 2016 to 2018 reference abundance.

Again, that was used for the stock status determination in the 2020 stock assessment. Scaling each index to its 2015 to 2017 average puts them all on comparable scales that represent a percent change from the reference years, and allows them to be combined into the single trigger index. The way the mechanism would work as proposed, is that management would be triggered if the three-year moving average of the three survey indices were to fall by a certain percent from the reference value. The TC also recommended that the trigger level considered in the Addendum should be related to the assessment model outputs,

the abundance regime shift, and abundance reference points that were adopted by the Board.

As a reminder, those reference points include the fishery industry target, which is the 25th percentile of the high abundance regime and the abundance limit, which is the point below which the stock status is considered depleted. The trigger levels recommended are one that approximates the fishery industry target, one that approximates the abundance when the regime shift occurred from the moderate to high abundance regime, and one that approximates the 75th percentile of abundance during the moderate regime.

The TC did not recommend using trigger level approximating the abundance limit, because again, below that point the stock status would be considered depleted. The TC felt that this was not an appropriate trigger level as a proactive trigger for increasing stock resiliency. This is a visual of where those reference points from the stock assessment fall on the Gulf of Maine/Georges Bank model abundance curve.

The top horizontal dotted line is the fishery industry target, and below that there is a dashed blue line that represents the point where the moderate abundance regime shift occurred from the moderate to high abundance regime. Then the 75th percentile of the moderate abundance regime is shown by the yellow dot/dash line, and below that the dashed red line is the abundance limit.

The black dot on the top right represents that average abundance from 2016 to 2018, which was used for the stock status determination. These are the percent declines from the reference value, that black dot on the last graph to each of the possible trigger levels. From the 2016 to 2018 average abundance to the fishery industry target is a 17 percent decline in abundance.

To the point where the moderate to high regime shift occurs would be a 32 percent decline, and to the 75th percentile of moderate abundance regime would be a 45 percent decline. For the actual triggers in the Addendum, the idea is that they would be based on the annual recruit indices as I described, but these percent declines in the recruit indices are meant to approximate the same change in stock abundance.

Here is what those trigger levels look like as declines in abundance from the black dot, again the top most guideline is the cumulative decline to the fishery industry target, and then the dashed line is the cumulative decline to the abundance levels, where the regime shifted from moderate to high, and the dot/dash line is a cumulative decline to the 75th percentile of the moderate abundance regime.

Some additional comments that the TC made on these triggers are that first making changes to the management measures, such as increasing the minimum gauge size, while the stock abundance is at a higher level, has more potential to enhance the stock resiliency by increasing spawning stock biomass. In the same vein, making those types of changes while abundance is at higher levels will generally have a smaller impact to industry, as opposed to taking the same action after the industry is already feeling the impacts of declining abundance on the catch. Additionally, at the PDTs request, the TC was able to calculate the trigger index values with available data through 2020 using the recommended method. This graph shows the combined index in the upper left corner, with the three individual indices in the other plots. Again, these are all scaled to the reference values 2015 to 2017, and therefore they are comparable as proportional changes.

The horizontal dash lines in each graph represent the percent declines associated with those three trigger levels I discussed, 17 percent decline, 32 percent decline, and 45 percent decline from top to bottom. For 2020, which is the last year of data for which there is data available from the survey recruit indices, the trigger index value is calculated to be

0.84, which equates to a 16 percent decline in the index from the reference period.

As you can see, all three indices that are used for the combined trigger index show a declining trend in 2018. As a note, only the fall trawl and VTS survey indices were available for 2020, due to the spring trawl not being conducted because of the COVID-19 pandemic. The 2020 value is based on those two surveys, rather than the three.

The spring 2021 trawl survey was conducted, but that will not be used to calculate a combined index until the 2021 fall and VTS indices are available, which should be early next year. With regard to the possible management measures, the TC generally agreed that compared to the other types of biological measures in place now, changes to gauge size are the most likely to have positive impacts to the stock.

They focused their analysis on the impacts of different minimum and maximum gauge sizes for the LCMAs and the Gulf of Maine and Georges Bank stock, and they estimated impacts on landings, spawning stock biomass, and exploitation. The main take away from that analysis is that increasing the minimum gauge size is expected to have the most impact on stock resiliency by allowing more individuals in the population to reproduce, even if it were a relatively small change to that minimum gauge size.

The TC noted that increasing the minimum gauge size would likely have a short-term impact of decreasing the number of lobsters landed, but in the long run it is expected to increase the overall weight of landings. The analysis did not look at vent size separately, but agreed that vent sizes should be consistent with the changes in minimum gauge size.

For maximum gauge size in general, the TC has less certainty about the impact to the stock. They noted that when considering minor changes to maximum gauge size it is less likely to have a big impact, compared to changes to minimum gauge size due to the population structure, inshore versus offshore.

Inshore is where the large majority of landings are from, but the size structure of the population inshore is already truncated, and there are not many large individuals being caught, whereas offshore there are larger lobsters in the population, but the landings from offshore represent a much smaller proportion of the total landings from the stock. The benefit of maximum gauge size decreases would be that it places forever protections on a few large lobsters, which are likely to have higher reproductive capacity than smaller lobsters. Before I get to specific recommendations on measures for each LCMA, I wanted to put up the current management measures for reference. For now, the main things to note are the minimum and maximum gauge sizes that are currently in place in each area, and we will talk about the differences in the v-notch rules a little bit later.

This is another table for reference in case we need it. We will be talking about the sizes as both inches and millimeters, so this could be helpful. I might even recommend taking a picture or a screenshot while this is on the screen, so that you can reference it later during the discussion, and I can leave this up for a second or two for folks to do that if they would like, and I can also come back to it at the end.

This is a chart that shows the range of sizes currently in place within the Gulf of Maine and Georges Bank stock, shown by the yellow cells as well as the estimated size at 50 percent maturity for the Gulf of Maine/Georges Bank stock, which is 87 millimeters carapace length, and that is shown by the orange horizontal line in the middle.

As a reminder, there is some variations within the different areas of the overall stock unit for the size at maturity. But as you can see currently, Area 1 in Outer Cape Cod's minimum gauge sizes fall below the stock wide size at maturity. The TC has generally agreed that it's better for stock resiliency

to move the minimum size to be at or above the size at 50 percent maturity of the area.

These are the TCs recommendations for Area 1. The TC recommends increasing the minimum gauge size in Area 1, given it is currently below the size at 50 percent maturity, and additionally this could address growth overfishing by reducing the extent to which lobsters are harvested before reaching their growth potential, which would result in more yield per recruit for the fishery.

For maximum gauge in Area 1 the TC does not recommend a change. The current maximum gauge size is five inches, which is the lowest in all areas of the stock, and decreasing it further would not be expected to increase the spawning stock biomass. For LCMA 3, the Technical Committee does not recommend decreasing the minimum gauge size, and they agreed that increasing the minimum gauge size in Area 3 is not a high priority.

This is because the LCMA 3-gauge size is already close to the size at 50 percent maturity, which is 91 millimeters for the Georges Bank area. As I noted previously, the impacts of decreasing the maximum gauge in LCMA 3 are more uncertain. Their complex population and reproductive dynamics for larger lobsters offshore, which makes it hard to predict how a change would affect the spawning stock biomass, and whether that would translate into positive impacts to recruitment.

In general, decreasing the maximum gauge size has larger effects for LCMA 3 relative to decreasing minimum size in LCMA 3, or compared to changing the maximum sizes for the other LCMAs. But the benefit is expected to be much less than increasing the minimum size in Area 1. For Outer Cape Cod the TC also does not recommend decreasing the minimum gauge size. Again, this is not expected to have a positive effect on spawning stock biomass, and in general increasing the minimum gauge size should have some benefits to the stock.

However, for Outer Cape Cod there are more uncertainties due to the fact that this is considered a transitional area, with lobsters moving in from other locations. That creates challenges for pinning down the size at maturity for the area and the population size structure. Similar to Area 3, the impacts of decreasing maximum gauge size are uncertain.

The Outer Cape Cod fishery accounts for a relatively small portion of the stock wide landings, so the impact is unlikely to be large. Then the TC also recommends for Outer Cape Cod to standardize the measures for state and federal permit holders as is proposed in the draft options for this Addendum.

They noted benefits of this, including for law enforcement and commerce, as well as providing a consistent conservation strategy across the management area. The TC made a few additional statements related to these recommendations that they wanted to make clear for the Board. First, they noted that although the Board guidance was to prioritize improving the biological resiliency of the stock over the standardization of measures.

They did feel that standardizing measures across areas would be beneficial, because it would simplify the stock assessment and the evaluation of management strategies, especially given the management areas do not align with the stock boundaries. Additionally, the TC stated that although the recommendations focused on gauge size changes, that was mainly as a result of guidance from the Board and PDT to focus on the biological measures that are currently used for lobster, and not to look at alternative measures like quotas or trap reductions.

The TC does believe that other measures like trap reductions and quotas could have the potential to benefit the stock by reducing fishing mortality, but there are challenges with estimating the impacts, because the relationship between trap limits, traps fished, all frequency in catch is very difficult to predict.

It would be challenging to determine what the impacts would be, and additionally it would be challenging to get at an inappropriate quota level, due to the current levels of uncertainty around the abundance estimates from the stock assessment. If the Board is interested in these types of measures in the future, much more analysis would be needed.

Lastly, the Technical Committee wanted to emphasize that it may not be realistic to expect that the recommended changes to management measures will guarantee the stock abundance will stay at record high levels. The TC expects the recommendations to partially address growth overfishing to mitigate some of the effects of productivity decline, and enhance the stock's ability to recover from future declines by increasing the proportion of females that can reproduce before they're harvested.

But this does not necessarily mean that the stock could recover to the same record high levels that have been observed recently. The TC does not want to imply that these measures alone would ensure long term sustainability of the fishery. Now with the TCs recommendation in mind, I can move on to the PDT recommendations for the draft addendum. As I mentioned in the introductory slide, there has been some concerns amongst PDT members that some of the guidance received from the Board and the advice from the TC are inconsistent with each other, and in particular I mentioned the TC defines resiliency as the ability of the stock to recover from a disturbance, and suggested that immediate action to increase minimum gauge size while stock conditions are favorable would be more effective, compared to waiting for declines in abundance to trigger a management change.

However, the Board guidance was in favor of using a trigger mechanism, in which management measures would not be implemented until after an observed decline. Additionally, as you saw in the trigger index graph, all three of those indices that the TC recommended using to approximate changes in abundance for the trigger mechanism are showing a declining trend since 2018.

Both of these things have made it difficult for the PDT to agree on appropriate management options for this Addendum. The way to acknowledge these issues and try to move forward with more clarity about the purpose of the action. The PDT has put forward something for the Board to consider, which would be modifying the goal of the Addendum to frame the action as responding to these trends, rather than proactively reducing stock resiliency in anticipation of future declines.

The PDT drafted a proposed objective for the Board to consider, which is 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 Gulf of Maine and Georges Bank stock.

The PDT felt that this would address the most recent trends in the survey indices, as well as add clarity that the proposed measures are intended to increase spawning stock biomass. Working off of that goal statement, the PDT restructured the draft options in the Addendum since the last meeting.

They separated the Addendum into three issues. The first issue considers options to standardize some of the biological management measures, such as the inconsistencies within LCMAs at final approval of the Addendum. The second issue considers the trigger mechanism and management measures that would be implemented upon reaching those triggers, and the third issue would establish the spatial implementation of those measures within Area 3.

For Issue 1, the proposed options are Option 1, status quo, which means there would be no changes to the measures upon final approval of the Addendum, and Option 2 is that some standardized measures would be implemented upon final

approval of the Addendum. The sub-options for Option 2 would allow the Board to select which measures those would be.

One thing to note is the sub-options are not mutually exclusive, and the Board could select multiple sub-options under Option 2. Sub-option 2A is that upon final approval of the Addendum, measures within each LCMA would be standardized to the most conservative measure where there are inconsistencies in measures for state and federal permit holders.

This would result in Outer Cape Cod's maximum gauge size being standardized to six and three-quarters of an inch for both state and federal permit holders, and the v-notch definition being standardized to one-eighth of an inch with or without setal hairs. Sub-option 2B is to implement a standard v-notch requirement across all LCMAs in the Gulf of Maine/Georges Bank stock at final approval of the Addendum, which would result in mandatory v-notching for all eggers in LCMA 1, LCMA 3, and Outer Cape Cod.

Sub-option 2C is to standardize regulations across LCMAs and the Gulf of Maine and Georges Bank stock for issuing trap tags for trap losses, such that catastrophic trap tags are not being issued before documented losses occur. For Issue 2, again this considers establishing a trigger mechanism, where upon reaching a defined trigger based on the proposed index, measures would be implemented to increase the spawning stock biomass.

The PDT proposed three different options. Option 1 would be to establish one trigger at a 17 percent decline in the trigger index from the record level, and at that point the measures implemented would be a change to the minimum size in LCMA 1 to 3-5/16 of an inch. A second trigger would be established at a 32 percent decline in the trigger index from the reference level, and at that point the minimum size in LCMA 3 would be increased to 3-3/8 of an inch, and the maximum size in LCMA 3 and Outer Cape Cod would change as well.

As you can see, the PDT did not decide on the maximum size, but rather left it as a choice for the Board for either 6 inches or 6 and 1/2 inches. For Option 2 there is only one trigger level, which is the 17 percent decline in the trigger index, and at this point a gradual change in the gauge sizes would be initiated, where the size would change by 1/16 of an inch until reaching the endpoint shown in the table.

Again, the PDT is looking for Board guidance on the proposed final minimum size in LCMA 1 at either 3-3/8 or 3-15/32 of an inch, and the minimum size in LCMA 3 and Outer Cape Cod would remain status quo. The maximum size for both areas would gradually change to either 6 inches of 6-1/2 inches for Outer Cape Cod in Area 3.

Lastly, for Option 3, the PDT proposed an alternative approach to the trigger mechanism. This option would instead implement scheduled changes to the management measures as indicated in the table. In 2023 the minimum size in Area 1 would increase to 3-5/16, and then in 2025 it would increase to 3-3/8. All other measures would remain status quo in Option 3.

Last issue is Issue 3, which again addresses the spatial extent in Area 3, where the modified management measures would apply. Option 1 is status quo, which is that Area 3 would be treated as one unit, so the rules would apply throughout the whole area of Area 3, and Option 2 is that the measures would only apply in part of Area 3. Specifically, Area 3 would be split along the 70-degree west longitude line to create an eastern and western section of Area 3, with an overlap area of 30 minutes on either side of that line.

Under this 0ption, harvesters in LCMA 3 could elect two fish exclusively in the western or eastern portion while being allowed to fish annually in the overlap zone without needing to change their area declaration. In that overlap zone the fishermen would be held to the management measures of the

sub-area they have declared. This second option should be noted.

This would only really apply if the measures selected in the previous issues would result in a change to the current measures for LCMA 3. Those are the proposed options at this point, and now I have some specific questions that the PDT is hoping to get Board guidance on. These questions on this first slide are related to Issue 1, which again is considering standardizing some measures at final approval of the Addendum.

First the PDT would like clarity on whether the Board is interested in including Sub-option 2B under Issue 1 in the Draft Addendum for public comment. Again, this is the option that proposes implementing a standard v-notch requirement across all LCMAs in the Gulf of Maine and Georges Bank stock. Given available data and the issue of enforceability of v-notching, the PDT noted some concern that it would be challenging to estimate the impacts of this option on spawning stock biomass.

They see it more as a policy decision and would like some Board guidance on whether to include this option. Second, also on the issue of v-notching. The PDT is asking whether the Board is interested in considering an option to standardize the v-notch definition to 1/8 of an inch across all areas in the stock.

Additionally, they are wondering if the Board is interested in standardizing the minimum depth of the v-notch and the shape that is required when it is cut. Third, the PDT is wondering if the Board prefers to address the options that are currently under Issue 1 separately from the trigger mechanism, which is what is proposed now, or as part of the management measures that would be implemented upon reaching a certain trigger.

These next questions are related to Issue 2, and specifically the management measures that would be considered for automatic implementation upon reaching defined trigger levels. With regard to the proposed gauge size changes, the TC has advised that increasing the minimum gauge size in LCMA 1 is most likely to have the largest impact on the protection of overall spawning stock biomass.

The PDT is asking if the Board is willing to consider options that would increase the minimum size in LCMA 1 to 3-3/8 of an inch or 3-15/32 of an inch. As a reminder, the current minimum size in Area 1 is 3-1/4 of an inch, which equates to 83 millimeters. The TC also agreed that compared to increasing the minimum size in LCMA 1, decreasing the maximum gauge size in LCMA 3 and Outer Cape Cod to 6 inches or above is likely to have a relatively small positive impact on the spawning stock biomass.

But it would have minimal but permanent impact to Area 3 industry, and there are some great uncertainties surrounding the magnitude of those effects. Given that, the PDT wants to know if the Board is interested or willing to consider any decreases to the maximum gauge size in those areas, and if so, what would be the lowest maximum size the Board would be willing to consider. Would that be 6-1/2 inches, 6-1/4 inches, or 6 inches? That is all I have for the Board, so I'm happy to take any questions.

CHAIR McKIERNAN: Okay, thanks, Caitlin, there is a lot of great information there. We're going to take questions or I'll have you take questions, but I'm going to cut off any discussion at this time about whether one option is better than another, because I think what we need to do is put that motion up that the PDT. Put up as a motion the proposal objective of this Addendum XXVII, to see if we could get consensus on changing that, because that's really what the PDT would like to see.

Why don't we open the floor for questions for Caitlin, but please, please don't go right into your opinions about certain management measures. But I think some of these questions should be asked if there is any need for clarification about how the PDT and TC came to some of their

recommendations. Whoever wants to, raise their hand to ask a question of Caitlin at this time.

MS. KERNS: At this time, Dan, you just have David Borden.

CHAIR McKIERNAN: Okay, David Borden.

MR. DAVID V. BORDEN: Caitlin, a question for you, but you may want to defer it to Kathleen. What is the compliance rate of the v-notch provision in each area? What portion of, for instance what portion of Area 1 fishermen actually v-notch lobsters, as compared to the percent in Area 3, or the Outer Cape?

MS. STARKS: I certainly do not have an answer to that question, and I can ask Kathleen if she does, although I'm pretty sure there is a lot of uncertainty about that.

CHAIR McKIERNAN: David, I would point out that Area 3 has a line drawn, I think it's the 42-40, north of which there already is an existing mandatory v-notching requirement in the federal regulations, I think in the Plan as well.

MR. BORDEN: Yes, thank you, Mr. Chairman. I realize that. But that is not what I'm asking. What I'm asking is, how many fishermen actually comply with it? What is the compliance rate?

CHAIR McKIERNAN: I think Caitlin, I'll speak for her. I don't think you have any data that reveal compliance rates, right?

MR. BORDEN: Okay, and then if I might, Mr. Chairman. One follow-up question. This is to Caitlin or Kathleen, whichever is appropriate. On the uncertainties on the large lobsters. I'm familiar with a number. I think a number of the reasons why the scientists have basically raised those concerns. But just for the rest of the Board, could somebody just summarize what those uncertainties are? I think one of them is the molt frequency changes with large lobsters. Is that correct?

MS. STARKS: I will go ahead and let our TC Chair answer, so Kathleen, feel free.

MS. REARDON: I will try to answer that. I actually just want to comment on the v-notch compliance first. The Law Enforcement Committee might have some idea of this for the compliance rates among fishermen, but we do not have data on that. The only proxy that we might have, is percent of eggers that already have a v-notch, and that is data that we would have in our bio samples information. I know we calculate that for Maine. But I don't know what it is in the other areas, but we do have that information. For the large lobsters, the uncertainties in Area 3, it does come down to data. The parameters in Area 1 or for the whole model, the assessment model. It puts Gulf of Maine and Georges Bank together. To be able to do these analyses we needed to separate them, because there are different selectivity's for the traps, also the size structure is different in Area 3, and just a number of large lobsters that we have in our data, we don't have that many.

There are more uncertainties. Exploitation rate is different, the sex ratio is different in Area 3, and so all of those things we tried to estimate for Area 3, and came up with a model that made some assumptions, but we feel that it was able to replicate the length compositions that we find in the bio sample data.

I don't know if that really answers your question, but there are definitely a number of uncertainties. When it comes to the impact of protecting some of those lobsters, as Caitlin mentioned, the larger lobsters do have potentially a larger capacity for reproduction, but there are many questions about molt frequency, molt increment. Yes, a lot of uncertainty there.

MR. BORDEN: Mr. Chairman, can I make one quick point?

CHAIR McKIERNAN: Certainly.

MR. BORDEN: I think it would be useful if it's not a ton of work, to have a scientist provide us with some estimates of the percent observed v-notching by LMA, and I would just use Area 2 as an example. I know there are a number of fishermen in Area 2 that do it, but the number is really relatively low. In Maine, from what I understand, there is a large number of participants, and the number is really high.

I've heard estimates of that number being as high as like 60 percent. But in Area 3 I think once again, we get into this issue of compliance is fairly low. It would be useful to know what the science says, and if the TC could or somebody on the TC could summarize in their next document to the Board what the sources of uncertainty are with the large lobsters, to follow up on the points that Kathleen made, I think that would be helpful.

CHAIR McKIERNAN: Consistent with the strategy that I weighed out earlier, Caitlin.

MS. KERNS: Dan, you have one more hand, Ritchie White.

MR. G. RITCHIE WHITE: Yes, just a follow up on David's point. I know law enforcement in New Hampshire, it's not uncommon to make cases of v-notch in possession, so I think reaching out to the Law Enforcement Committee and getting a sense of what the number of actions or how common actions are for the different LMAs could also be helpful.

It obviously will tell you how many lobsters are being v-notched, but it is going to tell you that lobsters are being v-notched, and they are being encountered illegally with the possession. I would just try to get that stated, and see if that can help at all. Thanks.

CHAIR McKIERNAN: Is there anyone else?

MS. KERNS: Dan, we do have Delayne Brown. I don't know if he wants to speak to that from the Law Enforcement Committee. He is on the call today. I don't know if you wanted to have him address any of those issues or not. I know that all states do not have a searchable record of cases. Some do, some don't.

CHAIR McKIERNAN: Toni, I've been listening to the discussion very carefully, and I think what David is describing is compliance with the rule to actually notch the flipper. That is different than compliance with the rule about a newly caught, a lobster with an old notch, whether it be from the day prior, sharp, no setal hairs, to something that may have molted once or twice with still a remnant that might fall under the protection of a zero-tolerance rule.

I don't know if the Law Enforcement representative could tease that out. I would like to hear from the Law Enforcement representative about whether or not cases can be made about noncompliance with the rule that says one must v-notch an egger. I think that would be more consistent with what David's asking.

MS. KERNS: Well, Delayne, I unmuted you if you wanted to speak to that or not.

MR. DELAYNE BROWN: Yes, so possession of v-notch, we do make cases of that. Possession of mutilated, we also make cases on that. But to actually observe a violation on a boat when the lobster is in hand and not v-notched. I don't know if one would do that. Does that answer your question?

CHAIR McKIERNAN: Yes, thanks for that. I just want to be clear, in terms of what the questions are that compliance levels with possession of previously notched lobsters are different than compliance with a mandate of v-notching. I don't know if the Technical Committee could look at the available incidents of v-notched lobsters, assess encounter rate, and come up with some kind of a conclusion.

I'm not sure how reliable that would be, but I think that is essentially the question that David is asking. Is there any way to reveal the compliance rate with the mandate to v-notch? I'll just say as Board Chair, and as someone who has been on the Board for a

couple of decades. There is no question that the v-notch conservation program over the last 20 years has increased the number of protected females.

I think the Technical Committee has certainly concluded that whatever compliance rate we have, even if it's less than 100 percent, there has been a lot of enhanced protection. There are egg-bearing females in the population that there otherwise wouldn't be living had there not been a v-notch rule. But to David's point, I don't know if we can tease that out. But Caitlin, maybe we can ask the TC in a question after the meeting to give us a response on that between now and the next meeting. Are there any other folks who want to ask questions of Caitlin or Kathleen?

MS. KERNS: Kathleen has her hand up.

CHAIR McKIERNAN: Great, go ahead, Kathleen.

MS. REARDON: I just wanted to go back to the large lobster question that David asked. This is actually discussed in the TC materials relatively extensively. This was something we talked about a lot, the uncertainties, and we tried to lay that out in the document in both the impacts, kind of I think it's considered an appendix to our memo.

Please, review that in looking for that information. I'm not sure we would be able to provide that much more than what is already in the document, the v-notching question of percent of v-notched eggers is something that we can probably come up with, but yes, I think this is an enforcement issue, and that is something that we pointed out in the memo.

CHAIR McKIERNAN: All right, thank you very much. Is there anyone else? No hands, Toni?

MS. KERNS: That's it, no more hands.

CHAIR McKIERNAN: All right, thank you. As I mentioned earlier, bear with me, and Caitlin if you could put up that new language that the PDT suggested that the Board consider as the new objective for this Addendum. I think we owe it to the PDT to give them this kind of guidance. Clearly the Board voted in 2017 to move forward with an Addendum.

We were quite clear looking for uniform measures among the LCMAs, lobster conservation management areas, the most recent version we changed course and we wanted to focus more on a trigger mechanism, less so on the uniform measures.

Although the TC clearly stated that assessments will become much easier if there were more uniform measures across LCMAs within the stock unit. But I think we owe it to the PDT to give a clearer message, and I would just like to get some discussion about this, and whether the Board would embrace this as the new objective of the Addendum. Can I get some hands to weigh in on this at this time?

MS. KERNS: Pat Keliher.

MR. PATRICK C. KELIHER: Mr. Chairman, I wouldn't have any objections to this. I know the TC and the PDT did struggle with this a little bit when they talked about resiliency. This seems to help give some additional clarity moving forward. I would be okay with the change.

CHAIR McKIERNAN: Thanks, Pat. I appreciate your feedback on that, since you were the maker of the previous motion. Maybe you made both previous motions going back to 2017 as well. Would you be willing to make this motion?

MS. STARKS: I don't know if we need a motion, Mr. Chair, as long as there is no objection from the Board.

CHAIR McKIERNAN: All right. I appreciate that. Is there any objection from the Board to this language?

MS. KERNS: I don't see any hands up.

PROVIDE FEEDBACK TO PDT ON PROPOSED OPTIONS

CHAIR McKIERNAN: Well, that's awesome. Well, thank you, Pat. I think the PDT will be appreciative of that moving forward. Now we can go into the three issues that have been laid out before us. That would be standardizing measures upon approval of the addendum, establishing triggers in these management responses.

Then whether to create some language about Area 3 permit holders and making these rules different, and also issuing different stock tag types for the Area 3 fishermen fishing east and west. Why don't we bring up the issue of what should be standardized? Caitlin, do the five questions that you present get us to sufficient clarity on the three issues that you would like the Board to resolve?

MS. STARKS: I believe so. The questions on this slide here are related to that first issue. I think if we could handle them one at a time that might be easier.

CHAIR McKIERNAN: Sure, okay. First issue; is the Board interested in including Sub-option 2B for public comment. The PDT has some concerns about estimating impacts on SSB given available data, and the issue of enforceability of v-notching. It's my understanding that Issue 2B is a proposal where upon approval all the LMAs within the Gulf of Maine/Georges Bank stock would be required to notch all egg bearing females that come over the rail.

MS. KERNS: I have David Borden.

CHAIR McKIERNAN: David Borden, go ahead.

MR. BORDEN: Actually, I'm going to pass at this point, Mr. Chairman.

CHAIR McKIERNAN: Okay, so just to be clear. What we're doing in this conversation is we are deciding whether to leave some of these options on the cutting room floor and moving forward with a draft addendum that could be finalized by the PDT over the next three or four months, with this possibly not included or included. Are there any Board members who would like to speak to whether to include 2B?

MS. KERNS: I have three names, Dan. I have Steve Train, Ritchie White, and Cheri Patterson. I'm going to open up Steve Train's microphone, and his microphone goes live, just as an FYI when I open it up.

CHAIR McKIERNAN: Okay, Steve Train.

MR. STEPHEN TRAIN: Thank you, Mr. Chair. Good to hear from you, Dan. I'm in favor of this, but it's easy for me to say that, I already have it. You said earlier, you know regardless of the percentage of compliance we have it's still working. I mean it's not that I want to force it on any other zone, but I just don't see how anybody couldn't see the benefit of this with all the science we have behind it, so I'm in favor of including it.

CHAIR McKIERNAN: Thank you, Steve. Ritchie White.

MR. WHITE: I'm in favor of keeping this as well. Regardless of the percentage, we know that there is a certain amount that is being accomplished, and that is a positive. I think it is unfair for a zone to catch lobsters that have been v-notched in another zone, so I think leaving 2B in is an important factor.

CHAIR McKIERNAN: Ritchie, just to clarify. Lobsters that are notched in one zone and caught in another. If the standard of possession is similar, I'm not sure that this rule would affect that. But I hear you clearly that you would like to see this remain in the proposed document. All right, Cheri Patterson.

MS. CHERI PATTERSON: Thank you, Mr. Chair. I agree with both Steve and Ritchie. I think that this could be in addition to resiliency there is some information that indicates that it does work. It would also add to equality amongst all the LCMAs. Thanks.

MS. KERNS: Dan, you also now have David Borden's hand up.

CHAIR McKIERNAN: David Borden.

MR. BORDEN: I can support leaving this in, because what we're talking about is the requirement to mandate and not how we judge v-notch lobsters. For a public hearing document, I think this is fine to have this option out.

CHAIR McKIERNAN: All right, anyone else? It sounds like we'll be including this in the document, unless we get a groundswell of position. But is there anyone else who would like to speak on it at this time?

MS. KERNS: I just want to make sure Ritchie's hand is up just from before and not a new hand. I think it's from before.

CHAIR McKIERNAN: All right, no other hands, let's go to Caitlin's second burning issue, second question. Is the Board interested in considering an option to standardize the v-notch definition to 1/8 inch across all areas of the stock, or standardizing minimum depth of the v-notch and shape when it is cut? I think those are two separate issues.

Caitlin, I don't know if it would be possible for you to actually create this as a 2A or 2B, because I would like to address this separately. The first has to do with the v-notch possession definition, which is the recapture of a female lobster that appears to have a notch that may have molted over, and the depth of which this must be for it to be protected.

I guess the question that I would pose is, I'll put it out there. I'm assuming this would allow jurisdictions that have a zero-tolerance standard now to maintain that, because I know some jurisdictions are quite satisfied with the zero-tolerance language. Caitlin and Toni, can we assume that if a more standard definition was created that states with zero tolerance would be able to keep that?

MS. STARKS: I think it's up to the Board to define whether or not states can be more conservative than what is implemented. You know previously with this Addendum there was discussion about standardization. I think we've moved a little bit away from that. I would tend to say yes, it makes sense to say that a state could be more conservative on this particular measure of the v-notching definition. But I do think it's up to the Board.

CHAIR McKIERNAN: Yes, thank you, Caitlin, and as someone who has been around awhile, I'll just observe that the state of Maine has a prohibition on the landing of lobsters by dragger, even though the interstate plan and the federal plan allow 100 count per day. Maine has maintained that more strict rule, and I believe that rule has been held up in court.

I'm confident that legally a more restrictive rule would be able to be applied, and I'm not sure the Commission could prevent that. I just want that to be clear that this particular amendment wouldn't necessarily mandate a state that has zero tolerance to amend that. Let's take it out to the Board. Is there interest in creating a 1/8 inch across all areas within the stock, with the potential to maintain a zero-tolerance standard if a state chose to do that?

MS. KERNS: Pat Keliher from the Board, and I think Caitlin has something she wants to add.

MS. STARKS: Yes, if I could, Mr. Chair, I just wanted to put up the current measures so folks can see what the definitions are. As you can see here, we just talked about Area 1, zero tolerance requirements for v-notching possession, and really if there is a desire to let that stay, then zero tolerance for Area 1.

Then the only issue of inconsistency I believe is this Outer Cape Cod 1/4 inch versus 1/8 inch. I think that would also be resolved. Yes, that is something that would be resolved in Issue 2A, so it's maybe

doesn't make sense to include this as a separate issue if that's already resolved, if the desire is to let Maine be more restrictive than 1/8 of an inch.

CHAIR McKIERNAN: If I could take my Board Chair hat off for a second. The Massachusetts may want to go with the 1/8 inch for more standard measure within the state, and allow the states of New Hampshire and Maine to continue with a zero-tolerance standard. I'm not sure it's a moot point if the southernmost jurisdiction in Area 1 would like to see the more uniform measure. But I'll let the Board members weigh in. Any hands, Toni?

MS. KERNS: You had Pat Keliher and David Borden.

CHAIR McKIERNAN: Okay great, go ahead, Pat.

MR. KELIHER: I would, and I understand where Caitlin was going. But I would have no qualms of leaving it in. I mean Maine has zero tolerance; it's worked very well here. I can tell you whether you have zero tolerance, so a 16th or an 8th or whatever the measurement is. There is always going to be some interpretation of whether it is legal or not. We've dealt with this; I've dealt with it for over a decade now. Zero tolerance has worked for us, and we very likely, unless there was a major change within the industry, very much likely keep that in place. As long as it goes into the document with the understanding that jurisdictions can be more conservative, I'm fine with leaving it in.

CHIAR McKIERNAN: Thanks, Pat, that's helpful. David Borden. David, are you there?

MR. BORDEN: Excuse me. I'm on, Dan. I get a little bit confused discussing this, because we're using two or three different documents here. To me it would be a lot easier to deal with this if we just dealt with the document that the PDT circulated with the specific language in it. In other words, the language that has been put up on some issues is slightly different than the language in the document that got circulated, so it just adds to the confusion. What we're talking about on this item is Sub-option 2A, if I understand it. Is that correct, Caitlin?

MS. STARKS: Yes. Currently, I'm going to pull up the options as written that you are suggesting, David. We are talking about 2B, which is standardizing the v-notch requirement. The Board, I just heard, is in favor of leaving this in. Previously this option had an additional statement about standardizing the v-notch definition to 1/8 of an inch.

The PDT was not sure if that was something the Board was interested in, and so we're asking today if the Board would like that standardization of the v-notch definition to be considered as well across areas in the stock. Sub-option 2A is specific to inconsistencies within LCMAs. Sub-option 2B is getting at across LCMAs.

MR. BORDEN: See that's where I'm getting confused. I thought we just dealt with Area 2B.

MS. STARKS: We did.

MR. BORDEN: Didn't the last discussion deal with 2B?

MS. STARKS: Yes, this part of 2B, what has been proposed by the PDT is what the Board just dealt with. I heard that the Board is in favor of this staying in the document. What we're looking at now is potentially another option that would be to standardize the v-notch definition across LCMAs to 1/8th of an inch.

MR. BORDEN: That is the last portion of the last sentence in Option 2A, is that correct?

MS. STARKS: Yes. Option 2A is specific to inconsistencies within LCMAs. That will address the inconsistency.

MR. BORDEN: We're talking about a portion of another option, so I'm fine with that, Mr. Chairman, in terms of standardizing. I think that to the extent

that any standardization takes place, it should apply to a number of different areas. We may want to consider areas from the Mid-Atlantic on some of these provisions.

Just so that we don't have to deal with this repeatedly, I think jurisdictions should have the right to be more restrictive. Maine has chosen, and New Hampshire have chosen to be more restrictive, in terms of their implementation plan, and they should have that right going forward, so that we don't have to repeat that during each one of these discussions.

CHAIR McKIERNAN: Thank you for pointing that out, David. Caitlin, I just so it doesn't fall through the cracks, just so everyone is clear. The way I see this, then Massachusetts would be able to have a statewide 1/8-inch v-notch standard, because it would be able to adopt a 1/8-inch standard for its Area 1 fishermen.

I heard Pat not object to that, because the other northern states would be able to keep the zero tolerance at their discretion. But the way that the question was posed if we went forward with this, then there would be an opportunity to move from zero tolerance to 1/8 for Area 1 fishermen in Massachusetts.

MS. KERNS: Dan, can I just, It seems like there is a little confusion that comes here, and I just want to point out to everyone that the v-notch definition is standard across all the LCMAs except for Outer Cape Cod and Area 1, and Area 1 as you just said, we discussed the states can be more conservative. That is what, if you were to have a standard definition across all areas, then Area 1 would just be considered more conservative. But the only place we don't have that standard is Outer Cape Cod. The Mid-Atlantic states are already at this.

MS. STARKS: Dan, I do think I hear the question that you're asking, which is within Area 1 could Massachusetts allow their fishermen to use a 1/8 definition rather than zero tolerance. Is that what you're asking?

CHAIR McKIERNAN: Yes.

MS. STARKS: Okay, so I think if that is the desire of the Board is to standardize it to 1/8 of an inch across all areas, and just say that Maine can implement a zero-tolerance rule for their Area 1 fishermen. I think that is a different question than standardizing it to 1/8 except for Area 1, which would remain zero tolerance.

If you want to get some clarity from the Board on that. One comment on that is that I do think in general this Addendum is trying to improve stock health, and so I'm not sure if moving from a more conservative measure to a less conservative measure is consistent with that. I think that is one thing to consider.

CHAIR McKIERNAN: Thank you, Caitlin. Anyone else on the Board want to weigh in on this one?

MS. KERNS: I have Cheri Patterson and Sarah Peake.

CHAIR McKIERNAN: Cheri.

MS. PATTERSON: I agree with Pat. I think Maine and New Hampshire should be able to maintain the zero tolerance, so I would like to see that written in, to assure that more conservative measures are allowable. I really am struggling with if these numbers are what we're kind of basing some of our thoughts on maintaining some resiliency, how is this changing from zero tolerance to 1/8 in Area 1 be effective? Because Area 1 goes all the way down through Massachusetts state waters, so I guess I'm struggling with having Area 1 indicate 1/8 inch with or without setal hairs, and then Maine and New Hampshire maintaining that zero tolerance. What would be the benefit of resiliency to that possibility?

CHAIR McKIERNAN: That sounds like a rhetorical question, so I would still go back to you, Cheri. Are you opposed to including an option, or instructing the PDT to craft a rule where we would have 1/8 inch in all of Area 1, but the allowance to allow those two jurisdictions to maintain, well three

jurisdictions, if that is how the Massachusetts fishermen feel as well, to go with zero tolerance?

MS. PATTERSON: Well, I'm for putting it in the public document.

CHAIR McKIERNAN: All right, that's helpful. Sarah.

REPRESENTATIVE SARAH PEAKE: Thanks, Dan. I think if we're going to put this in the public document just for the sake of clarity, because I like some of my colleagues here on the Board are confused by this conversation, so I can imagine how the public will be confused if we don't carefully lay out what we mean, to carve out for Maine and New Hampshire, what Massachusetts wants to do in Area 1 in state waters.

I think it's important to be clear on this. But all of this sort of begs the question about why are we leaving Sub-option 2B in the document for public comment, because I think as I'm reading it anyway, what 2B purports to do is standardizing the measures across all LCMAs, which in general the Board is moving away from, and even within this conversation we're moving away from that, because Maine has a program that works well for them.

I know in my conversations with you and others at DMF and the Law Enforcement, zero tolerance has some enforcement issues, and what the practical matter of that is. But if it's going to be in there, let's put in all of these details about where the carve outs are going to be from the 1/8 inch with or without setal hairs.

CHAIR McKIERNAN: Okay, thank you, Sarah.

MS. KERNS: You have David Borden and then Steve Train.

CHAIR McKIERNAN: Okay, David followed by Steve. David.

MR. BORDEN: Yes, I'll just follow up on what Sarah said and reiterate what I said before, which is I think jurisdictions should have the right to be more restrictive. Two jurisdictions are doing that now, and they should have that right in the future. Then as far as the rest of the areas, we should have a standard definition for one reason and one reason only, one major reason, I should say is for to promote compliance. Enforcement officers should be able to go into a facility and look at a lobster tank, and pick a lobster out, and know what the definition is.

Not get involved in these discussions, oh I caught it south of the Cape, I caught it in state waters, and some of the other jurisdictions. We just complicate greatly the enforcement of these provisions by having disparate definitions, so we have to have a standard definition for the right of states to be more restrictive.

CHAIR McKIERNAN: David, are you suggesting that the language in the document proposed this new standard, but have an asterisk that any state jurisdiction within LCMA 1 would be allowed to maintain the existing more conservative standard, as opposed to carving out naming states?

MR. BORDEN: Yes, I don't think it's necessary to do a so-called carve out or jurisdiction. States should have the right to be more conservative. That's all, thank you.

CHAIR McKIERNAN: Okay, Steve Train.

MR. TRAIN: Actually, David said what I wanted to say, so I can step back. I see it as an enforcement issue, and I think it makes things easier for Massachusetts.

CHIAR McKIERNAN: Okay, thank you.

MS. KERNS: You have one more hand, Alli Murphy.

CHAIR McKIERNAN: Okay, Alli.

MS. ALLISON MURPHY: I'll start out by saying I see no problem with adding this to the document. It's a

reasonable option, and I think should generate some good public comment. I'll just note, you know with different jurisdiction potentially considering different definitions here that could make it challenging for us to try to complement the different states, so it's something that we'll be looking at and probably commenting on when it comes time. Thank you.

CHAIR McKIERNAN: You're welcome, Alli, thank you. Toni, anyone else?

MS. KERNS: That's all your hands.

CHAIR McKIERNAN: Okay, Caitlin let's go back to the questions and see if we can create some more clarity. Under 2 there is that second question, it has to do with standardizing the minimum depth of v-notching the shape when it is cut. I brought this up on a PDT call, because I think the jurisdictions just by chance. You know I don't think there was any intention to have a different standard.

I know in my state the definition of a v-notched lobster or the mandate for v-notching does prescribe a minimum notch size, I think it's 1/4, not to exceed 1/2 inch, so it's in that range. That is just one of the differences between states. I don't think that this is necessarily going to add to a lot of resilience, but it might be worthwhile having the states will get their v-notching requirements, that is for the active notching. I don't know if this requires a lot of debate. Maybe the PDT could examine that and come back with a recommendation as to whether or not this is necessary. Anyone on the Board object to simply asking the PDT to examine the state-by-state rules as to whether or not it would be appropriate to establish a minimum depth of notch in the act of notching. No objections to that?

MS. KERNS: I don't have any hands raised at this time.

CHAIR McKIERNAN: All right, I'm going to use my discretion to move on then, thank you for that. Okay Number 3, does the Board prefer to address the options under Issue 1 separately, no trigger, or part of the measures that would be implemented upon reaching the defined triggers? I think this is one of the trickiest parts of the impacts of this Addendum is that the longer we wait the more likely we're actually going to have to pull the trigger on something.

Because the purpose of the modified Addendum language was to get out ahead of stock declines, and stock declines appear to be occurring on our watch. These are really important questions. The PDT has recommended that some of these actions, such as the minimum size increase and even the more uniform v-notch standards at a minimum within the Outer Cape Cod state/federal jurisdictions be implemented without reaching that trigger.

Alternatively, we could adopt the 17 percent as a trigger, and if so the smart money among the TC members is that it is probably going to result in having to implement those triggerable actions right away. The fork test, the talk among some of the TC members is by the time next summer comes around, and we have another year under our belts of the ventless trap surveys, and the state trawl surveys and federal trawl survey, that we might be passing that 17 percent or reaching it.

This is an important issue for the Board to discuss now, whether they've seen enough, in terms of Kathleen's presentations on the decline of the indices, especially those that were well forecasted, given the reduced young of the year numbers. Can we get some discussion on whether we want to move forward with this as a Board, or do we just want to take it out to the public and have the public weigh in on undoing these as triggerable? Then we're going to have to get into what is the trigger. Let's have some open discussion about that.

MS. KERNS: I'm waiting for hands. I have Pat Keliher and then Ray Kane.

CHAIR McKIERNAN: Great. Go ahead, Pat.

MR. KELIHER: Mr. Chairman, mine is one more process. I think it goes to what Dave Borden brought up earlier. I'm having a little bit of trouble following around by using just this main slide. I think it would be very beneficial to put up the options from the document that was in the supplemental material, and work through that. At least that is how my brain is thinking about it.

CHAIR McKIERNAN: I appreciate that. Caitlin, can you accommodate that? I think we want to be in the Board guidance on Page 5, right?

MS. STARKS: Sure, I wasn't sure if Pat was looking for the options themselves or the question. But just to clarify, this question is asking whether all of these options for standardizing measures at final approval of the addendum. We're wondering if the Board would like these to remain as a separate issue, which is how it's currently proposed, or whether the Board prefers they be added to the options that would be implemented upon reaching a certain trigger. Those sub-options could be added to any of these options under Issue 2.

MS. KERNS: Dan, I think before I said you had Pat and Ray Kane and to this list, I'll add David Borden.

CHAIR McKIERNAN: Okay, so could you go back to the slide, or the previous page where we see the trap tag programs? Yes, I think under Sub-option 2C, Caitlin, we should probably just park that for a bit, because all these others have to do with biological measures and enforcement. This 2C is more of an administrative one. This might be, if the question is whether we do it right away or we do it eventually. I think the state administrators are still struggling with this, and may want to park that for now. But let me get Ray Kane's comments on these options.

MR. RAYMOND W. KANE: Yes, thank you, Mr. Chairman. It's more to the point, what does this Board want to do? I mean this was brought forth back in what, 2017, and we're four years into it? Are we going to be reactive or proactive in this management plan? That is my question.

CHAIR McKIERNAN: I think that question is what we're asking you as a Board member to comment on. Are we willing to make these actions upon approval of the Addendum, or do we want a trigger, and what should that trigger be? I know there are a lot of questions here. But Ray, do you have any recommendation?

MR. KANE: Well, I've heard already this morning that we're going to read some 17 percent all by this summer, so I think if we're talking about triggers it's going to have to be more than 17 percent. The other option I saw was what, 34 percent, 32 percent? Those are my feelings, but it's time the Board was proactive as opposed to reacting to public comment on this. I mean if we're trying to save a species or incorporate an FMP so we have a harvestable species, years down the road. I think it's time for the Board to take action on a trigger.

CHAIR McKIERNAN: Do I have David Borden next, Toni?

MS. KERNS: You forgot about Pat in there, and then David.

CHAIR McKIERNAN: Oh, Pat Keliher, sure. Go ahead, Pat.

MR. KELIHER: Just going back in time here to one of the prior meetings where we did task the PDT to develop triggers, and during that tasking I was clear, at least in my statement, and I think that's where the Board was going at the time, that we were going to be developing triggers for the future, not for something that would be triggered now.

Whether that is proactive or reactive, I mean we would certainly, depending on which triggers were chosen after we take this document out to public hearing. We could be much more proactive, because it's likely to be triggered before the document is even finalized. I am supportive of moving forward with triggers. I am concerned

about the lower end trigger, and would want to see some potential modification or new option, and I can come back to that later, if somebody else doesn't discuss it. Then within these options there is also around the minimum size, I believe the PDT asked for some guidance on where that minimum size should lie as it's being increased. I would recommend for 1A that it not go above 3-3/8, so it is consistent with the other areas.

CHAIR McKIERNAN: Okay, thanks, Pat. David Borden.

MR. BORDEN: There is a lot on the table here, but on the material that's on the board in front of us. That option, Option 2 as it's stated, says whatever those items are, and I'm not arguing for any of those items specifically. I'm just saying whatever is listed under Option 2 would get implemented when the Addendum is approved.

The PDT clearly recommended standardizing some measures for implementation upon approval was one of the keys that we should deal with. I think that should stay the way it is, and then we should have a separate discussion on the trigger options, which are futuristic in nature. That would be my guidance, this separate discussion. What management changes do we want to implement immediately upon implementation, and what would be triggered in the future? Then discuss them separately, because it gets very confusing when we try to comingle those two.

CHAIR McKIERNAN: At this point, David, Sub-option 2A, 2B, and the unnamed one, standardized v-notch. You're comfortable leaving all those in the document for immediate implementation, once the Addendum is approved, well within whatever the timeframe the jurisdictions can implement those changes, leaving it in the document as stated?

MR. BORDEN: We haven't discussed some of those, Mr. Chairman. I'm comfortable with some of those, but like 2C we haven't discussed.

CHAIR McKIERNAN: Understood, but the first three bullets we have discussed those, and are you comfortable with leaving those in the document as upon final approval? It sounds like you are, at least for public comment.

MR. BORDEN: Well, once again, Mr. Chairman, we haven't really discussed standardizing measures within each area, well, I guess we have, excuse me I'll withdraw that comment. I guess we've discussed three of these, and we have not discussed 2C.

CHAIR McKIERNAN: Okay, do we have any objection to leaving these three bullets in, the top three bullets that is called 2A, 2B, and the unnamed one, in the document. Recommending to the PDT that those go into the document. Okay that's good. Sub-option 2C, can I hear from the Administrative Commissioners, Cheri or Pat Keliher?

As the Director at Mass DMF, I think this needs a little bit more work among my colleagues, Cheri and Pat, because of all the administrative changes this would encounter. Can we get some conversation, Pat or Cheri about whether or not this is ready for primetime?

MS. KERNS: You have Cheri and then Pat.

CHAIR McKIERNAN: Thank you, Cheri.

MS. PATTERSON: I think this needs to get refined a little bit more, especially when we are talking about maybe changing trigger percentages, or if we're going to be talking about that, and how that would play into adding these standardized measures that could be notably increasing resiliency pretty quickly, if the trigger percentages are going to be adjusted in any way.

CHAIR McKIERNAN: Pat.

MR. KELIHER: I think, you know 3C is kind of leaning the direction that Maine is currently administrating our trap tag program now. Maybe what I would

recommend is that the three or four northern states, if Rhode Island wants to get involved as well, that we put a little work group together, kind of talk through, explain how we do it, so you would understand the administrative burdens that come along with the approach that we take.

It works, but again there are some administrative components to it I think that folks would need to have an understanding of. Maybe if we park Sub-option 2C until we have a conversation amongst jurisdictions, to check whether people like the idea of a more administratively burdensome approach.

CHAIR McKIERNAN: Okay.

MS. STARKS: If I could follow up, Mr. Chair.

CHAIR McKIERNAN: Yes, go ahead, Caitlin.

MS. STARKS: Based on these comments, I think my thinking is that it would make sense to leave this option in, where it is currently, and between now and the next time the Board meets, have the PDT have a discussion on that, maybe get those states to provide some explanation of the administrative process. We could include that information in the document, so that it can be discussed in the next Board meeting. Then if the Board wishes to keep it in for public comment they can, and if they don't it can be pulled out at that next meeting. Does that make sense?

CHAIR McKIERNAN: It does to me, any objections?

MR. KELIHER: No objections, I think it's a really good idea.

CHAIR McKIERNAN: All right, thank you, so just to repeat. It's going to be transmitted to the PDT that it's still a potential option, but the working group that Pat described will be convened in advance of that, and the PDT will receive a document from the working group as to the wisdom of that moving forward.

MS. KERNS: You have David Borden with his hand up.

CHAIR McKIERNAN: Go ahead, David Borden.

MR. BORDEN: I support that action. I think we may want to reserve some flexibility, depending upon what the conclusions are that come out of it, to extend it to other areas, other than the Gulf of Maine and Georges Bank. In other words, if there is a logic in changing the trap tag issuance process in numbers and percent, maybe that should also apply to Southern New England and the Mid states.

I would hope you would maintain that flexibility. Then the second point is a quick point, which I think it's critical on this issue. If you want effective enforcement of these regulations, we have to have a number of enforcement personnel involved in this whole issue. I'll just point this out that one of the ways people use to circumvent the trap tag requirement is the timing does not align particularly well with the fishery.

If these tags are issued so their new tags are viable on June 1st. Up until that date you put all your traps that have last year's tags in the water. Then when you get your new allocation of trap tags, you simply put more traps in the water with a new tag. In other words, some fishermen are not retagging traps.

If circumventing the requirement solely, almost entirely based on the date that we issue the tag. If we want compliance, I think we have to integrate the enforcement discussion into this as part of the recommendation, and specifically look at things like the timing in the area.

CHAIR McKIERNAN: Caitlin, I think based on David's comments, it would make sense to invite other jurisdictions, even beyond the area of Georges Bank and Gulf of Maine to maybe participate in that discussion, because there may be some issues to consider, or lessons learned among the

jurisdictions. Thanks for that, David. Okay, moving on.

I think at this point we should probably be talking about the triggers and the actions that would result from those triggers. I don't think there is any debate about the nature of the trigger itself. I think we're all confident in the TCs guidance about what that trigger will entail. But then the question becomes, how much do we want to change the biological measures and in response to what? Pat, you spoke earlier about wanting to act after a certain trigger is struck.

You know you made that motion in February. That guidance is still in play. The PDT appears to be asking if we would consider having an instantly pulled trigger or something that is not in the future? What is your feeling about that as the former maker of the motion? And I would welcome other Board members to weigh in, if I could put you on the spot on that, Pat. I apologize in advance, but I'm trying to get us from your motion back in February to where we are today with the PDTs guidance or question.

MR. KELIHER: I'm going to have to apologize, Mr. Chairman. I just ran down the hall to fill up my water glass, and was trying to listen as I was doing it.

CHAIR McKIERNAN: In essence, Pat. Your motion, which is still in play, the PDT is struggling with, because your recommendation, or the Board's. The Board of course voted this up, so it is the Board's motion that was approved, didn't really call for any change to the resiliency necessarily until a certain trigger was going to be met. I think we're all looking at these major changes to the minimum size and possible maximum size, as big resiliency contributions, or certainly to the spawning stock biomass. Can we get some discussion? I'm not going to put you on the spot to lead it, but I have a feeling you may be one of the first to weigh in, about whether or not we would like the document to go forward, to only have the triggerable actions, to have some actions.

Obviously, we have some proposals here, but some actions would occur right away. But on the bigger issues such as gauge increase sizes, if that's what's going to be adopted. What is the trigger and how far do we want to go? What's on the board right now is Issue Number 4. Is the Board willing to consider options that increase the minimum size to 3-3/8 or 3-15/32? I guess that's a fundamental question, so I would put that to the Board, because the PDT has asked, or do you want to put both in the document as options? Anyone.

MS. KERNS: I have Pat Keliher.

CHAIR McKIERNAN: Great, thanks, Pat.

MR. KELIHER: Number 4, is the Board willing to consider options that increase the minimum size. Are you suggesting that that would be automatic the way it would be going into the document? I still see that as related to the triggers. Where it's a trigger then it would increase.

CHAIR McKIERNAN: It is. Do we want to peel back the larger gauge increase, or drop it from the document? That is one question. The second one is, do we want to go right away or do we want it to be triggerable? There are all kind of options here.

MS. STARKS: Dan, if I could interrupt. I think I have some clarification that could help.

CHAIR McKIERNAN: Please do.

MS. STARKS: The PDT is not proposing necessarily, there are three options here for Issue 2 with the trigger mechanism. The first is two triggers, which would make changes to minimum and maximum gauge sizes. The second is one trigger, which would make changes incrementally to the minimum gauge size in Area 1, and then maximum gauge sizes in Area 3 and Outer Cape Cod, and then the third option is an option that would do things more immediately on a schedule.

Starting in 2023, the minimum size would change in Area 1, and then it would change again in 2025. That was an alternative that the PDT put forward, given the Technical Committee's advice that more immediate action could be more effective. The question I had on the screen is related to what minimum sizes in Area 1 the Board is willing to consider. As you can see on this slide, there is some bold text where we're not sure what minimum size to put in, as the option for public comment, because we're not clear on what the Board is looking for.

CHAIR McKIERNAN: Right, thanks, Caitlin. That is a good set of clarifying points. I guess my question to the Board is, is there interest in any of these alternative biological measures that is going to be instant, or are we still going to make it based on a trigger? That is most likely imminent, as Pat mentioned in his earlier comments. Go ahead, Pat.

MR. KELIHER: I think to Caitlin's question. Really for me it revolves around the minimum. If a trigger is pulled, at whatever level we could talk about later, the minimum gauge size would increase, and it would increase to what? I would suggest that the document shows it would increase to 3-3/8, not 3-5/32. I would remove the 3-15/32 from the document.

CHAIR McKIERNAN: Okay Pat, let's stop there. Is there any objection to Pat's recommendation?

MS. KERNS: I don't see any hands.

CHAIR McKIERNAN: Great, okay hearing none, thank you, Pat. Then the two issues that stayed before us are, do we want to consider any actions such as Option 3, with no trigger and only affecting Area 1? Do we want to consider that, and do we want to put that into the document? Let's take comments on that, because then I'll go to the triggers of Option 1. Is there support to go to these more or less, not instantaneous, but phased in minimum size increases for Area 1 beginning in 2023, that are not trigger based?

MS. KERNS: We have David Borden.

CHAIR McKIERNAN: Go ahead, David.

MR. BORDEN: Given the Technical Committee advice on this and the PDT advice on this, they basically pointed out to the Board that, I mean we're growth overfishing, particularly the resource in Area 1. You've got these declining indices. If you want to do something to enhance the biological resilience of this stock, according to our new definition of objective.

The most appropriate way to do that is to raise size. I think there is a logical sequence of events to put in the document. One would be status quo, the second one would be a series of gauge increases, that would get triggered based upon implementation. Then the third option would be triggers that would be put off until the stock declines. That to me would be a logical sequence of options for the public to comment on.

I think we all know before going to the public hearings that the industry is going to be really sensitive about triggering minimum size limits, but that doesn't mean you don't want to ask them what they think and how to develop a good record on that for whatever one of those options you decide to implement finally.

I would support keeping an option in there for gauge increases upon implementation, as an option for public hearing purposes, to generate discussion on it, and also to frame the discussion on the trigger. Then if they don't like that then they can say, well I prefer a trigger which is not as conservative, but it's something we're going to do in the future. I think it's a good range of options.

CHAIR McKIERNAN: Is there anyone else who would like to speak, because it sounds like we have a path forward to keep these options? One based on the trigger of the new index, and the other cannot be triggered by the index, but to do it right

away, without looking at the percent declines in the index. If there is no objection to those, we'll keep those, any comments?

MS. KERNS: Pat Keliher.

CHAIR McKIERNAN: Go ahead, Pat.

MR. KELIHER: I think this is a question to David, if you'll so indulge me. It sounds like David was talking about potential for this to go out to public comment as is, but if I was hearing him right, it sounded like maybe there needs to be something in the middle here from an option perspective.

CHAIR McKIERNAN: It sounded to me like in the range of options, David, it sounded to me like you were leaving the door open for, let's say a Board member to make a recommendation of a different percent decline in the trigger. Is that my interpretation, to Pat's question?

MR. BORDEN: To Pat's question, Mr. Chairman, if I might. I'm suggesting just having a standalone option that basically would raise the minimum size at implementation sequentially, not talking about major changes. That I would point out is another discussion we need to have. Then you would have an alternative, which is the trigger.

The industry would have three choices, as I said before. Do nothing, minimum size changes, or minimum size changes potentially in the future if a stock declines. I think that's a good range, and given the fact that the TC analysis basically indicates that at least in the Area 1A, you can increase SSB by 38 percent.

Kathleen, correct me if I'm wrong. That is a huge increase in spawning stock biomass by triggering. Then the issue for the industry becomes, do you want to go there, yes or no, and how do you want to get there, which one of these options do you prefer? I think it's a good range of options to frame the discussion.

CHAIR McKIERNAN: Okay, David, I think that's helpful. Pat, are you comfortable with that?

MR. KELIHER: I am. Although while I'm concerned about moving forward with a document with a 17 percent trigger in it, because I think it will trigger almost immediately. I think the idea of an option that has a slightly higher percentage for a trigger may be appropriate to include in the document, so we have a broader range of options for industry to consider.

CHAIR McKIERNAN: Okay, well that advice could be captured, Caitlin, to the PDT, because the 17 percent trigger is essentially, it's almost an instantaneous action if the TCs forecast is correct. I think what Commissioner Keliher is asking for is the potential to have a trigger that might be higher than 17 that the industry could consider. Is that accurate, Pat?

MR. KELIHER: Yes, it is, Mr. Chair.

MS. STARKS: I just want to maybe ask a more pointed question. To get to Pat's suggestion. Would it make sense, is what you're asking to essentially take something like Option 2, and change that 17 percent to 32 percent? Is that what you're looking for, Pat?

MR. KELIHER: No, I think what I was thinking of is potentially even a new option, or you know an Option 1A, and instead of increasing the trigger or set as a trigger going off at 22, maybe it would be 20. I mean this is an industry target, right, so I'm not sure it's really based in good science, it's just where we start.

MS. STARKS: Okay, I think I understand, thank you.

CHAIR McKIERNAN: Well, Pat, that makes a lot of sense to me, because the instantaneous and 17 percent options are probably very close to one another. I think you're adding another option the industry could consider, so thank you. I think the other sort of unanswered questions is the reduction in the maximum size for LCMA 3 and OCC, down from the 6-3/4 to 6-1/2 or 6.

I don't know if that needs to be resolved now, but I think the PDT was kind of struggling with that. I don't know if we'll have the time to resolve that now. Is there any discussion that should be had on that? Does anybody want to weigh in, because I do want to move on. I think we're running out of time on this issue.

MS. KERNS: Two things, Pat Keliher your microphone is still open, and David Borden has his hand up.

CHAIR McKIERNAN: Go ahead, David.

MR. BORDEN: Sorry to speak so much, but this is a really important issue. On the triggers, if we structure the document the way I proposed, then we would have triggers. I think it makes perfect sense to have some option other than the options that we're presented with, and I'll be explicit. I think it's fine to keep a trigger at 17 percent in the document. That was the industry recommendation, and it's fine to keep the second trigger at 32.

I think we should have a second set of options on the triggers, and those would basically be a trigger at 20 percent, that would be 4 percent higher than we are now, and a second trigger that would be at 30 percent. That would be more conservative than the science-based trigger that was recommended by the technical folks.

The whole logic of that, I think, is that we're going to be in this position where when this goes out to public hearing, and you say to the average industry member we're at 16 percent, and the trigger is 17 percent. This is a knife edge type situation, just a wobble in the indices is going to put you over the value.

The concept of reducing the second trigger, making it more scientifically conservative, to balance out liberalizing the first one, I think would be appealing to some members of the industry, and I think that should be a second option. As far as the rest of the triggers in the document, I think they should be eliminated. That is probably a separate discussion, Mr. Chairman, but triggering action at 45 percent, at that point you've lost almost 50 percent of the value in a fishery that I think Maine estimates is worth 1.5 billion dollars. You will have lost 750 million dollars for coastal economies. We don't even want to consider something like that. This has to be prospective not retroactive. I think we should limit the triggers to Trigger 1, Trigger 2, the Option 1 and Option 2 with two different values. Thank you.

MS. STARKS: If I could follow up, Mr. Chair.

CHAIR McKIERNAN: Go ahead, Caitlin.

MS. STARKS: I just want to clarify that 45 percent is not being considered at all anymore, that was the recommendation of the TC and the PDT. We're just looking at a 17 percent and 32 percent at this point, but I think I hear you that we want to look at other options for 20 percent and 30 percent, and I think we can do that.

I think that is noted and the PDT can make those changes. What I'm still unclear on is for the purposes of public comment, what maximum size is the Board interested in considering, or is the Board interested in considering dropping it down to 6 inches for LCMA 3 and Outer Cape Cod, or 6-1/4 or 6-1/2.

I think we would like to get some guidance on what to consider just for public comment, and again once that goes out for public comment, the Board always has the opportunity to choose a final option that falls within the range. For example, if you were to take out 6 inches for public comment, you could ultimately choose something less conservative than that, which would be 6-1/2.

CHAIR McKIERNAN: But Caitlin, given that the PDT is still going to have a chance to go over this, do we need to make that decision as a Board now, or can we just leave it as small as 6 inches?

MS. STARKS: The PDT asked this question, because it couldn't agree amongst themselves, so that is why we're asking for Board guidance on it.

CHAIR McKIERNAN: We could try to get that Board guidance. Is there any objection to leaving it in the advice to the PDT that the Board would go as small as 6 inches, and seeks comments, or does the Board feel the need to either eliminate any reduction in the maximum size for those two areas, or eliminating one of them?

MS. KERNS: I have Pat and David with their hand up.

CHAIR McKIERNAN: Okay, Pat.

MR. KELIHER: First of all, I just want to just echo where David was, and how Caitlin rephrased that for the trigger of 20 percent and then an upper trigger of 30 percent. I really like that concept that David put on the table, and I think it would be something that would be well received within the document, compared to just leaving that 17 percent, so I would fully support that. As far as the upper max on Area 3. I would like to hear from, I think we've got three permit holders here in Maine, so I would like to hear what the other jurisdictions who have the predominant bulk of the permit holders in their jurisdiction. I would like to hear what they might have to say on that.

CHAIR McKIERNAN: Pat, to my question, are you comfortable just communicating to the PDT that you would like to just keep all the options available, to go as low as 6, either status quo or down to 6 inches?

MR. KELIHER: Yes, I certainly would be comfortable with that, but I certainly again, I don't have a lot of permit holders here right in the state of Maine who fish Area 3, so hearing from Cheri and David and yourself, as well as Jason, might be a good thing.

CHAIR McKIERNAN: Okay. Toni, is anyone else on the list?

MS. KERNS: Sorry, you have had David and then Cheri.

CHAIR McKIERNAN: All right, David.

MR. BORDEN: On the issue of the max size adjustment, so no one misinterprets what I'm going to say, that Area 3 has a long and distinguished history, I would point out, of taking proactive measures. I don't say that in a self-flattering manner. This is more, most of these measures were implemented by the Commission, and the National Marine Fisheries Service, based on recommendations from the people that preceded me in the Association.

I would also point out that most of the changes when there was any discussion of changing regulations to help the faltering Southern New England stock, the industry always recommended applying those additional restrictions throughout Area 3. Area 3 has developed a whole series of restrictions that were far more restrictive than they actually had to.

At the time, based on a desire to be more conservative and risk averse. Now when we get to this issue of lowering the maximum size. If I go to my members in the Association, I start discussing that. The first thing they're going to want to know is, what is going to happen in the area that catches 90 percent of the lobsters?

Lacking some kind of immediate action in that area, they are not going to want to alter the regulations in Area 3, and there is some logic for doing that. It's based on the fact that as our technical folks have already noted. You're not going to make major changes in SSB in the inshore area, in the stock area, based on fooling around with the maximum size in Area 3. It's just not going to work. I think any change in the Area 3 maximum size should be linked to the changes in the minimum size in the inshore area, would be my recommendation.

CHAIR McKIERNAN: Okay, so if we transmit that advice to the PDT then that should come out as a clear option in the document. That is what you're asking for, so I think that's reasonable. Cheri.

MS. PATTERSON: I agree with Dave. According to TC there is just not a lot of standing for adjusting the maximum in LCMA 3. I would go along with what David was recommending.

CHAIR McKIERNAN: Okay, and again, this is just advice back to the PDT, this isn't a final action by any means. I think that's good advice and it's well stated. I think those are the fundamental questions, right Caitlin, that we needed discussion on?

MS. STARKS: Yes, I think so. You know I was going to ask the question about the trigger levels, and I think that's already been answered for me as well.

CHAIR McKIERNAN: Good, okay. Well, we're running late in the agenda, so if there is no other discussion on that which we will communicate to the PDT, then I think we'll move on, if there are no objections. Hearing none, we'll move on. Thank you very much for that substantive discussion.

I know the PDT will appreciate as much clarity as we gave them.

PROGRESS UPDATE ON DRAFT ADDENDUM XXIX: ELECTRONIC VESSEL TRACKING DEVICES IN THE FEDERAL AMERICAN LOBSTER AND JONAH CRAB FISHERIES

CHAIR McKIERNAN: Next on the agenda is Progress Update on Draft Addendum XXIX: Electronic Vessel Tracking Devices in the Federal American Lobster and Jonah Crab Fisheries. I believe, Caitlin, do you have a presentation on that?

MS. STARKS: I do, I'm pulling it up, one second.

CHAIR McKIERNAN: All right, so I'll just talk while you're working there. I know that this is a really challenging issue among the states and ASMFC, because we really do need to work with our federal partners on this issue. Like a lot of things in lobster management especially, to get out ahead of federal partners, a lot of time the foundations of your measures just don't work out.

We're working very diligently with the GARFO office to try to make these as compatible as possible, to work out some of the questions on state and federal jurisdictions and standards. I think you're going to be speaking to that shortly. I want to thank the federal partners in advance for the cooperative work that they've done on this, and just so the full Board knows, that this is being worked on diligently behind the scenes, but is delayed somewhat by the need to make these compatible between the jurisdictions. Go ahead, Caitlin.

MS. STARKS: For some background. At the Lobster Board meeting in August, 2021, the Board initiated this Draft Addendum XXIX to consider vessel tracking requirements for federally permitted lobster and Jonah crab vessels. This action was initiated based on recommendations of a work group that the Board established in May, and aim to address the need for high resolution spatial and temporal data on effort in the fishery.

As the Board has discussed at the last few meetings, these data are critical for addressing a number of challenges associated with stock assessment, protected species interactions, marine spatial planning and offshore enforcement. Considering that the objective statement for the Addendum is to collect high resolution spatial and temporal data, to characterize effort in the federal American lobster and Jonah crab fisheries for management and enforcement needs. Again, these data will improve stock assessments, inform discussions on management decisions related to protected species, and marine spatial planning, and enhance offshore enforcement. So far, the PDT has met several times in the last few months, and has discussed what requirements would be needed for this program to ensure the data collection objective

is met. The PDT has broken those requirements out into three groups.

Separating out what is needed from the tracking devices and the vendors, what would be needed or required of harvesters, and what processes and rules would be needed at the state level to implement this program, and go into examples of each of those in the next slide. For the tracking devices themselves, the PDT has agreed on the preference for cellular-based tracking devices, given the low cost and accessibility when compared to satellite based systems.

In order to collect the spatial data at the resolution needed to identify fishing or hauling activity from transiting, the PDT recommends the devices be required to report their locations at a rate of 1 ping per minute. The PDT has had some discussions on whether it would be necessary to maintain that rate at all times, even when the vessel is tied up.

They ultimately agreed that the rate could be slowed down when a vessel is moored, but they did note that would require the devices to be capable of recognizing when that vessel is tied up at their dock and not moving. That would put the onus on those tracker devices and vendors to be able to do that.

The PDT also recommended that to be approved for this program, the devices must at a minimum meet the current requirement for precision and accuracy that are specified by the VMS program, and the devices must include the horizontal accuracy of the location data for each ping, as well as a vessel identifier.

They also recommended the devices must be able to provide data in accordance with ACCSPs trip locations API specification. The PDT has had some discussion about the Addendum needing to describe the process for approving devices for use in the fishery, and this has not fully been fleshed out yet, but it's possible that this could be a work group process at the Commission to approve devices for this program. Moving on to the PDT recommendations for harvester requirements.

The recommendation is to keep the language fairly basic and straightforward. For example, the Addendum could simply specify that if adopted, federal permit holders would be required to report spatial data via an approved electronic tracking device at the established rate, and that federal permit holders would be required to have the tracking device onboard their vessel and powered at all times when the vessel is in the water, unless the device is under repairs.

In terms of the state level requirements, the PDT recommendation is that the states would need to administer this program for their federal permit holders, and which federal permit holders are the responsibility of each state could be determined by the primary port identified by the permit holder.

The states would be responsible for verifying that those federally permitted harvesters have installed an approved device to their vessel, and certifying that installation before the vessel goes on a fishing trip. Additionally, there would need to be a process for associating the trackers with a new vessel or new permit holder, if the vessel ownership were to change. The PDT has started working through the processes that will be needed on the data side for this program. For data validation they recommend that GARFO would be responsible for ensuring harvesters are complying with the trip reporting requirements, and the states would be responsible for making sure the harvesters are reporting their required tracking data.

Again, in the case of vessels that land in multiple states, the Addendum would need to be clear on how the states would determine which federal permit holders they are responsible for. ACCSP will then be responsible for linking the tracked location data to the appropriate trip reports, and those are the basics, but the PDT is still working out the details of all of these data processes, in corroboration with some ACCSP staff on the calls, so

we will be providing more clear guidance on this moving forward.

To wrap up, this is the proposed timeline of this Addendum's development. We're currently in October, the Board is getting a progress update from the PDT, and after this meeting the plan is to continue with PDT meetings to develop a draft addendum for public comment. Given the Board's desire to get through this Addendum process relatively quickly, it's been proposed that the Board could meet to consider the Draft Addendum for public comment in December at a special virtual meeting.

If that is possible, then the public hearings and public comment period could occur in January of 2022, and then if desired the Board could have a second special meeting scheduled for late winter or early spring of 2022, where they could consider the Addendum for final approval. Under this timeline NOAA intends to complete the federal rule making process in time for a concurrent implementation with the states in 2023. That is my brief update on the development of Addendum XXIX, and I can take any questions.

CHAIR McKIERNAN: Thank you, Caitlin, well done. Are there any questions for Caitlin at this time?

MS. KERNS: We have Jason, Pat, David, and Steve Train. I just want to make sure it's clear, Dan, since a lot of the discussions that we've been having about trackers at the beginning were at times focused on maybe some of the northern states, but that as Caitlin had in her presentation, it would be any state with a federal permit holder would have to administer the program. This would also be impacting the states south of New England.

CHAIR McKIERNAN: Just a point of clarification. This is designed to monitor the trap fishery, vessels deploying traps. Is that still the expectation?

MS. KERNS: Yes.

CHAIR McKIERNAN: All right, Jason McNamee.

DR. JASON McNAMEE: Just a quick one, it has to do with a state validation. I was just curious. You know a couple states are doing stuff already with these devices, and we have systems. In general, the way it's validated as a state is communicating with the vendor, as far as it being, it was installed, it was installed correctly and it's operational. That's not with that in bounds, as far as the slide you had on that topic? Hopefully that made sense.

MS. STARKS: Yes, I think I've got you, Jason. I think it's worth noting that the Addendum, I think we intend it to be relatively open, so that the states can have flexibility with the processes that makes sense for them, to make sure those federal permit holders have these devices installed on their vessels.

But in general, I don't think that the vendors of these cellular tracking devices would be the ones that are installing them on the vessels, it would be that the harvesters are installing them, and someone would just need to make sure that those harvesters have the approved devices, and they are functioning to send in their data as required first.

CHAIR McKIERNAN: Pat Keliher.

MR. KELIHER: I want to just thank Caitlin for the presentation, and the work of the working group here. There is a lot that's been done in a short amount of time. Caitlin, can you go back to the slide where it talked about, I think it was compliance, and it referenced GARFOs role. I just want to make sure I understood that. The idea of data validation, GARGO responsible for trip reporting compliance and validation. Are you referencing here that GARFO is responsible for making sure that the unit is on as well? Just to clarify that, between that and the second bullet.

MS. STARKS: Sure, Pat. To be clear, this is saying GARFO is responsible for the trip ticket reporting, as they currently are for these federal permit holders. It would be the state's responsibility to make sure

that these tracking devices are reporting the location data for the federal permit holders.

MR. KELIHER: Okay, thank you. I misheard that the way you said it the first time then, thank you for that clarity.

CHAIR McKIERNAN: David Borden.

MR. BORDEN: Caitlin, on the issue of who this applies to. Most of the discussion that I've been privy to, and I've listened to a number of these prior discussions that talked about all federal permit holders, lobster permit holders having to comply with this. I'm a little troubled by this suggestion that we're going to only apply it to pot fishermen.

How about gillnet fishermen? How about trawlers? It seems to me that we have some elements of the fishery that at certain times of year they are trap fishermen, other times of year they are gillnet fishermen. I even know a few boats that comingle dragging with the gear. I don't know how anyone would manage that. To me it would be much cleaner if you've got a federal permit then you have to have a tracking device on. That is just an observation. I would hope that the Committee that's developing this would reflect on that point.

MS. STARKS: If I could follow up.

CHAIR McKIERNAN: Go ahead, Caitlin.

MS. STARKS: Thanks David for that question. I think the clarification here is that these trackers that we are proposing for this program would be collecting spatial data at a much finer resolution than VMS, which those federal permit holders in the offshore fishery that are not fishing with pots and traps, I believe are already required for the most part to use VMS. There is location data for those vessels, it's just not going to be through these finer scale tracking devices.

MS. KERNS: To add to that, the group did discuss, David the fact that we don't need the finer scale for the gillnet fishery, that their VMS data would provide the information that is needed, versus the finer scale that that fishery needs.

MR. BORDEN: If I might, Mr. Chairman. Is the requirement going to be, you either have a VMS on the boat or a tracking device? Maybe I can simplify this. If the answer to that is yes, then I think you've answered by question. I would simply note, there are a bunch of boats out there that don't have, or they do have VMS on the boat but they are not trap vessels.

I think you're going to find there is going to be a group of boats with federal permits that won't have one of the two. To me it is clearer if you just say, if you're a trap fishing vessel you have to have a tracker onboard. If you're going to fish with traps at any point during the year, and if you've got a lobster permit the rest of the lobster permit holders have to have either a tracking devise or a VMS.

CHAIR McKIERNAN: Okay David that's good advice, and because this is still a work in progress, I'm sure the Committee is going to take that into account. Steve Train.

MR. TRAIN: My question is, when this comes in, since we already have similar technology on the scallop fleet and the groundfish fleet. We know there is a failure rate. We know that there are boats that have to stay tied to the dock at times, while they wait for the unit to be changed out or a Tec to show up, so we're talking about a much smaller number of boats.

As we increase the fleet, it might be different technology with cellular. Are we going to have, I don't know what the term, the reference for that, soft opening or something? You know if these things aren't working, are we going to have people tied up instead of fishing because of a new rule we put in, and the technology isn't keeping up with it? I just want to make sure we've got room to try to make this work in the front end, before we start having boats tied to the dock.

CHAIR McKIERNAN: Steve, I'm hearing that as a recommendation to the PDT, and it is noted. Thank you for that. Toni, anyone else on the list?

MS. KERNS: I have no other hands, Dan.

CONSIDER NEXT STEPS FOR THE DEVELOPMENT OF A MANAGEMENT STRATEGY EVALUATION FOR THE AMERICAN LOBSTER FISHERIES

CHAIR McKIERNAN: Excellent, all right next is Considering Next Steps for the Development of a Management Strategy Evaluation for the American Lobster Fisheries. I assume Caitlin you have a presentation.

MS. STARKS: Jeff will actually be presenting. Maya, could you pull up the slide show, please? Making sure, Jeff, are you set to go?

MR. JEFF KIPP: I'm all set, thank you, Caitlin. As the Chairman laid out, I'll be going over some information for considering development of a potential lobster management strategy evaluation, which was postponed back at the August meeting. Going back to the May, 2021 Board meeting.

The Technical Committee presented some recommendations for developing a lobster management strategy evaluation. They proposed sort of an overall path being a prioritized two-phased management strategy evaluation for the Gulf of Maine/Georges Bank stock specifically, and the TC also provided a couple of recommendations, in terms of next steps for developing this potential MSE.

Those included forming a steering committee, sort of their guide development of the MSE, and to convene a Management Objectives and Goals Workshop. After the Board heard these recommendations, they ended up postponing further consideration of MSE development until the August, 2021 meeting, in order to prioritize work on Draft Addendum XXVII.

That brought us to the August, 2021 meeting, our last meeting where this Board met. Again, the Board met and reviewed and considered the TCs recommendations, specifically on the next steps for lobster MSE, and again that consideration was postponed, in order to prioritize workloads for the continuing ongoing actions for Addendum XXVII, and also the initiated Addendum XXIX Caitlin just went over.

That brings us back to considering this potential development of lobster MSE again at this meeting, so in terms of the TCs recommendations for next steps, again was to develop a steering committee. The purpose of this steering committee would be to complete additional scoping, including format of stakeholder outreach, and identifying funding and personnel necessary for an MSE.

The steering committee's charge would be to develop a comprehensive work plan, to ensure a successful MSE process, and not to direct content within the MSE process, which would be handled once that MSE was initiated. The MSE start date would depend on completion of the Management Workshop recommended and the outcome of the Steering Committee's findings.

The Steering Committee was recommended mostly based on some noted limitations in expertise during preliminary MSE discussions. There were things discussed like how important are economic considerations, and what sort of personnel would be needed to fully address those considerations.

The idea here was that we would have a steering committee with a comprehensive coverage of the expertise and folks that would be needed to include in an MSE. Those representatives recommended as part of the Steering Committee would be Board members, Technical Committee members, ASMFC staff, some industry stakeholders, folks from the Commission's Committee on Economic and Social Sciences, and also the Commission's Assessment and Science Committee. The Technical Committee noted that it would be valuable to have some members with applied management strategy

evaluation experience, and the Technical Committee recommended 12 or fewer members on this Steering Committee. The other recommended next step by the Technical Committee was to hold a formal Management Objectives Workshop.

The purpose of this workshop would be to obtain necessary stakeholder input and Board input on big picture goals for both the short- and long-term lobster fishery management to guide this focus of these two phases of this recommended Gulf of Maine/Georges Bank MSE. The Technical Committee noted the Menhaden Management Objectives Workshop that was held before doing ecosystem-based reference points, as a potential example to follow here for a Lobster Management Objectives Workshop.

The idea here would be that this would be conducted parallel to the Steering Committee's work, so that final recommendations from the Steering Committee are relevant to the objectives and goals for the future of the lobster fishery. I did just want to bring some recent developments to the Board's attention.

Since the last time the Board considered this topic at the August meeting, the Commission did hold a Management Strategy Evaluation Training Workshop, and there were several Lobster Technical Committee members that participated on that training workshop. Some promising sign there, and some formal exposure to MSE.

That's certainly a help in bringing some expertise on MSE into the lobster world here, but certainly some room to grow for MSE. This would be sort of the first full blown MSE process by the Commission, so kind of a new frontier here. Then the other thing that's been formalized now since the last time the Board met was that Yong Chen's lab, which is now at Stonybrook University.

One of their projects submitted for funding to Sea Grant has been funded, it's a simulation project. There are a couple of things from this project that are relevant to sort of ASMFCs direction on lobster MSE. First, this project will provide tools that would be necessary to support a lobster MSE, and then also this simulation project is sort of seen as a precursor to a traditional full blown management strategy evaluation.

It would include scenario testing, and I think the PIs on this project have noted that any sort of formal movement and development, in terms of a lobster MSE by the Commission, would certainly be beneficial to this project, to help guide some of those scenarios that are being tested within that simulation project. Just to bring us back to what I think the Board is to consider here under this agenda item. It would be the TCs recommended next steps, I think those are seen as the next steps here for development of a lobster MSE.

These next steps, I just wanted to note, are not intended to represent a commitment by the Board to the full MSE, it's more seen as sort of preliminary steps to an MSE, to get to a comprehensive work plan again, to understand fully what resources are needed, what a timeline would be dependent on, objectives and goals of the Lobster Management Board. I think for consideration here is whether we move forward with development of the Steering Committee, and that would be something where staff would work with the Board and TC members to populate the Steering Committee, and then the Board would meet back once that Steering Committee was populated, and review and determine whether there is consensus on that Steering Committee membership. The last time we had talked about this was the plan with this would be following the completion of Addendum XXVII.

As we've seen earlier this morning, Addendum XXVII is still in development, and also Addendum XXIX is as well. Then very soon here, we will be ramping up work on starting the 2023 Jonah crab stock assessment, which was formalized after the last Board meeting, and so there are again remaining several priorities that would overlap with

some of the folks that would be working on any potential development of an MSE, and are important to consider here.

Just to note, if there is no interest and/or sufficient resources at this time, the Board can postpone considering action to initiate an MSE indefinitely, and revisit this once those resources are freed up, instead of continuing to postpone this into each subsequent Board meeting, so just to pass that note along as well. That is all I have for lobster MSE, and I can stop and see if there are any questions on that.

CHAIR McKIERNAN: Thanks, Jeff. Given that we have ten minutes left in the meeting, I will welcome questions and comments, kind of simultaneously. Is there anyone who would like to ask Jeff a question or comment on this? I think it was a fairly clear presentation.

MS. KERNS: You have Pat Keliher.

CHAIR McKIERNAN: Great, okay Pat.

MR. KELIHER: Considering the competing Board priorities don't include either the ongoing whale issues or wind issues that we're all facing, I can't see moving ahead. I would recommend that we postpone MSE indefinitely at this time.

CHAIR McKIERNAN: Okay Pat, any other Board members wish to weigh in on this?

MS. KERNS: You have Jason.

CHAIR McKIERNAN: Go ahead, Jason.

DR. McNAMEE: I'm actually going to consider what Commissioner Keliher just said, so I'm going to hold off for right now.

CHAIR McKIERNAN: Anyone else?

MS. KERNS: I have no other hands.

CHAIR McKIERNAN: I think we need to give the Commission some signal here. Pat, do you want to speak to your recommendation in any more detail, or do you want me to just put it to the full board for some kind of a consensus vote?

MR. KELIHER: Yes, I think the detail really is around the priorities that we're all facing, right? I mean you can't go without saying that the whale issue alone is going to be a massive driver. Not to take anything away from the important work of the Addendums and the stock assessment that's going to come up. I don't see engaging a lot of staff in this at this time. I don't want to diminish its importance, it's a timing issue, and I think what Jeff put on the board, as far as potential action is appropriate at this time.

CHAIR McKIERNAN: Thank you for that honest assessment. Any other Board members?

MS. KERNS: You have Jason and then Cheri.

CHAIR McKIERNAN: Jason.

DR. McNAMEE: Yes, (muffled) for all of that. This is tough. I feel super disappointed. I think though, Commissioner Keliher is right. Just so much going on on this panel, and again it's all the same people that are impacted by all of these things, plus the stuff that aren't in this really short long list here.

I'm just not sure. Maybe I can ask a question, sorry, I'm struggling a little bit, given my disappointment. What does that mean to postpone considering action indefinitely? It doesn't make it go away forever, correct? Like we can pull it back up at some point, maybe next year at some point? That's a question.

CHAIR McKIERNAN: Jeff, do you want to answer that?

MS. STARKS: Or I can, Mr. Chair.

CHAIR McKIERNAN: Thanks, Caitlin.

MS. STARKS: Yes. If the Board chooses to postpone it indefinitely, it just means that we won't be bringing it up at the next meeting, or the next

meeting until the Board says, we want to talk about MSE again.

DR. McNAMEE: Okay, thanks, Caitlin. It's still alive, it just needs us to sort of prod it back into existence at some point, so that makes sense. With that I guess, you know I kind of support what Commissioner Keliher said. I think it probably makes sense to clear the decks a little bit here. I don't know that the decks every get completely clear with lobster and/or Jonah crab, but there is a lot sort of pending right now, so it does make sense to concentrate, get past those things, and then reengage on this, so thanks, Mr. Chair.

CHAIR McKIERNAN: Thank you, Jason, Cheri.

MS. PATTERSON: I just would not like to see the word indefinitely here. I would like to see postpone these actions until winter 2023, and have it brought forward again at that point in time.

CHAIR McKIERNAN: Pat, any objection to putting this off for about a year and a half?

MS. KELIHER: I don't have any qualms about doing it to a time certain, as Cheri has said. I was looking for more flexibility in case we could bring it up sooner, but in reality, we likely won't, so I'm fine with that approach.

CHAIR McKIERNAN: All right, so that is in the form of a motion, or is it just general consensus, no objection, we won't do a formal motion on that, so it's winter meeting of 2023 we'll reassess the potential for an MSE for the lobster fishery. Any other comments? Hearing none, thank you very much. Is there any other business to come before the Board this morning? Hearing none.

MS. KERNS: No other hands.

ADJOURNMENT

CHAIR McKIERNAN: Great, well thank you everyone, enjoy your four extra minutes for lunch, and thank you all for attending and for some great discussion today. I know the PDT will be pleased that I think we've given them some good guidance today, so thank you everyone, and have a great day.

(Whereupon the meeting adjourned at 11:56 a.m. on October 18, 2021.)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

AMERICAN LOBSTER MANAGEMENT BOARD

Webinar
December 6, 2021

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

Draft Proceedings of the American Lobster Management Board Webinar
December 2021

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ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Sen. David Miramant, ME (LA)
Cherie Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Dan McKiernan, MA (AA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Colleen Bouffard, CT, proxy for J. Davis (AA)
Maureen Davidson, NY, proxy for J. Gilmore (AA)
Joe Cimino, NJ (AA)
Peter Clarke, NJ, proxy for T. Fote (GA)
Adam Nowalsky, NJ, proxy for Sen. Houghtaling (LA)
David Stormer, DE, proxy for J. Clark (AA)
Roy Miller, DE (GA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Pat Geer, VA, proxy for S. Bowman (LA)

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

Ex-Officio Members

Kathleen Reardon, Technical Committee Chair
Rob Beal, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Maya Drzewicki
Tina Berger
Emilie Franke
Jeff Kipp
Mike Rinaldi
Julie Defilippi Simpson
Caitlin Starks
Deke Tompkins

Guests

Nicholas Buchan, MA DMF
Nathaniel Burola, MLA
Andrew Button, VMRC
Beth Casoni, MLA
Walter Chew
Bill DeVoe, ME DMR
Marianne Ferguson, NOAA
Joe Fessenden, Am. Comm. Fishing
Erica Fuller, Earth Justice
John Fullmer
Sonny Gwin
Amelia Harrington, Univ ME
Heidi Henninger, Offshore Lobster
Jay Hermsen, NOAA
Chip Lynch, NOAA
Patrice McCarron, MLA
Conor McManus, RI DEM
Zaid Mdaini
Nichola Meserve, MA DMF
Mark O'Brien. NorstarConsulting
Story Reed, MA DMF
Scott Shaffer, MA DMF
Burton Shank, NOAA
Somers Smott, VMRC
Lange Solberg
Rene St. Amand CT DEP
Kristina Thorpe, NOAA
David Thompson, BlankRome
Smit Vasquez, NOAA
Jesica Waller, Univ ME
Anna Webb, MA DMF
Craig Weedon, MD DNR
Jay Wegimont, RI DEM
Angel Willey, MD DNR

The American Lobster Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Monday, December 6, 2021, and was called to order at 1:00 p.m. by Chair Daniel McKiernan.

CALL TO ORDER

CHAIR DANIEL McKIERNAN: All right, welcome everyone to the American Lobster Management Board meeting. Today is December 6, 2021. My name is Daniel McKiernan; I am the Director at the Division of Marine Fisheries in Massachusetts, and the Board Chair.

APPROVAL OF AGENDA

CHAIR McKIERNAN: First on the agenda, I will ask for an approval of the agenda. Is there any objection to the agenda as drafted?

MS. TONI KERNS: I don't see any hands.

CHAIR McKIERNAN: Thank you, I'm going to declare that approved by consent.

PUBLIC COMMENT

CHAIR McKIERNAN: Next, well not on the agenda, I think we should probably give an opportunity for public comment. Is there anyone who would like to speak on anything not on the agenda?

MS. KERNS: Giving it a second. I don't see any hands.

CHAIR McKIERNAN: Great, all right well thank you for that, Toni, and the Board. Today we have a Draft Addendum to approve for public hearing over the next month or two, it is an addendum that relies heavily on our federal partners. I want to thank the ASMFC staff, the ACCSP staff, state agency contributors, and of course those from NMFS who have worked diligently to bring this Addendum forward.

This in my opinion is a crucial issue for the sustainability of this lobster trap fishery. I have seen firsthand, and I'm sure the other directors have as well, the firsthand the challenges of trying to describe the footprint of this very valuable fishery in the face of offshore development of wind and aquaculture, and the need to understand the impacts of any conservation closures that will be designed to protect right whales and other endangered species.

I am really pleased today that this is coming forward. I know we're trying to fast track this is a way that accelerates its development. It is always a little more difficult when you have to work with another jurisdiction, namely the National Marine Fisheries Service, but I've been really grateful for their cooperation.

A lot of the workload that will fall on them as well, as they proceed with their own rulemaking. At this time, I think Caitlin has a presentation. Caitlin, would you like to take it from here?

CONSIDER DRAFT ADDENDUM XXIX ON ELECTRONIC VESSEL TRACKING IN THE FEDERAL AMERICAN LOBSTER AND JONAH CRAB FISHERIES FOR PUBLIC COMMENT

MS. CAITLIN STARKS: Yes, thank you, Mr. Chair. Again, I'll be giving this presentation today on Draft Addendum XXIX to Amendment 3 to the American Lobster Fishery Management Plan, which is also Draft Addendum IV to the Jonah Crab Fishery Management Plan. I just want to make that note, but I will be referring to it as Draft Addendum XXIX, and it's on electronic vessel tracking in the federal lobster and Jonah crab fisheries.

In the presentation today, I am first going to go over the background on this action leading up to this meeting. The objective of the Addendum proposed action timeline, and then go into the details of the proposed management options. Then I'll wrap up

with the Board action for consideration today and next steps.

For the background. At the Lobster Board meeting in August, 2021, the Board initiated this Draft Addendum XXIX to consider vessel tracking requirements for federally permitted lobster and Jonah crab vessels. This action was initiated based on recommendations from a work group that the Board established in May, 2021, and aims to address the need for high resolution spatial and temporal data on effort in the lobster fishery, to address multiple challenges that are currently affecting the fishery, and will into the future.

The Board has recognized the critical need for these data, to characterize effort in the federal fisheries for several years prior to initiating this action. In February, 2018, the Board approved Addendum XXVI, and that was aimed at improving the spatial resolution of lobster and Jonah crab harvester data.

A one-year pilot program was also completed to test electronic tracking devices in the lobster and Jonah crab fisheries, with the goal of identifying appropriate tracking devices for use in these fisheries, and informing the Board on whether electronic tracking should be pursued. Then additional work was also performed, focusing on the data integration and hardware testing aspects of electronic vessel tracking.

The objective for this Addendum is to collect high resolution spatial and temporal data to characterize effort in the federal American lobster and Jonah crab fisheries for management and enforcement needs. Specifically, these data will allow for improvements to the stock assessment, inform discussions and management decisions related to protected species, as well as marine spatial planning efforts for other ocean uses, like land protected areas and aquaculture, and will also enhance offshore enforcement efforts.

The proposed timeline for this Addendum's development is shown here in this table. Again, this Addendum was initiated in August, 2021. The Plan Development Team has been meeting a number of times between then and now to develop the Draft Document, and today the Board is meeting to consider the Draft Addendum XXIX document for public comment.

Then if approved today, the public hearings could occur in January of 2022, and another Board meeting could be held in early 2022 to consider the Addendum for final approval. Following this timeline, the guidance we've gotten from NOAA is that it should be possible to complete their federal rulemaking process in time for the program to be implemented in the federal rules for fishing year 2023. With that I'm going to move into the draft management options that are proposed in the Addendum. There are just two options being considered. Option A is status quo, or no additional requirements for electronic vessel tracking in the lobster and Jonah crab fisheries. Then Option B proposes to implement electronic tracking requirements for federally permitted lobster and Jonah crab vessels with commercial trap gear area permit.

This would mean that all federal lobster and Jonah crab vessels with applicable permit, commercial trap gear area permit, would be required to install an approved electronic tracking device to collect and transmit spatial data, and that device would always have to be remaining onboard the vessel and powered on while the vessel is in the water.

The only exception to that would be if the state that is declared as the principal port of the vessel authorizes that device to be powered down. The intent of this is to allow for devices to only be turned off if the vessel is hauled out for repairs, or not fishing for long periods of time, or if the device itself has to be repaired.

Additionally, I want to make a note of this last item in red, which was not included in the draft document that you received in materials. But under Option B, the Law Enforcement Committee also recommends specifying that tampering with these devices would be prohibited, and if the Board agrees with that language, the intention is to add it

to the document before it goes out to public comment.

These are the federal permit categories for which the tracking requirements under Option B would apply. This includes all of the commercial trap gear area permits for Areas 1 through 5 and Outer Cape Cod. In the last row is the commercial trap gear Area 5 waiver permit, and that's the permit that allows Area 5 permit holders to be exempt from the more restrictive lobster trap gear specifications and trap tagging requirements, so that they can target black sea bass with un-baited traps.

It's in red on this slide again, because it's not currently listed in the draft document, but it is recommended that it be added before the document goes out for public comment. As another note, commercial trap gear Area 6 is excluded from the proposed electronic tracking requirements, because Area 6 is in state waters only.

In this table, these are the numbers of federal permit holders per state that purchased one of the applicable permits in 2020. To clarify, these numbers are the total permits purchased, but not necessarily all these were actively fished. We do not have the data for 2021, but this gives you a frame of reference to approximate the number of permit holders with their principal port in each state that would be required to have a tracking device under Option B.

In terms of the requirements for trackers and vendors, Option B in the Draft Addendum also include the list of minimum criteria and specifications that must be met by tracking devices and product vendors for approval for use in the fishery. First, the devices must be capable of collecting location data at one ping per minute for at least 90 percent of the fishing trip.

This is the rate that was determined to be able to differentiate fishing activity from transiting activity, and to allow the estimation of the number of traps per trawl. I want to note here that the Addendum does not specifically say that cellular devices must be used, but this collection and rate does make cellular the most cost-effective option over satellite. There is a choice there, but with current technology the expectation is that cellular would be the preference. Second, the data that are submitted in each ping must include the devices current date time, the latitude and longitude, and both a device and vessel identifier.

The minimum accuracy of these devices must be within 100 meters and the position fixed precision must be to the decimal, minute hundredth. The devices must have ruggedness specifications that allow them to function in the marine environment, and that can vary, depending on where the device is installed on the vessel.

Then for vendors, they must be able to push the location data to the ACCSP Trip Location's API. They have to provide customer service for the devices to the harvesters, and they must maintain the confidentiality of any personally identifying information and other protected data in accordance with federal law.

The implementation and enforcement of these tracking requirements would require several levels of administrative processes, including at the Commission level, state management agencies, and federal level. I will go through each of these in the next few slides. At the Commission level, a workgroup which would be comprised of state, federal and Commission staff would be established to approve the electronic tracking devices for use in the fishery.

Device approval would be based on required information that would be provided by the vendors to the working group, to demonstrate that they can meet the minimum requirements that are established in the Addendum. The working group would then build and maintain a list of approved devices and additional information on those technologies, so that the states know what devices are acceptable, and can provide that information to their harvesters.

Then additionally, the PDT recommends that changes to those tracking device requirements

could be made by this working group, with approval of the Lobster Board, and that would allow for this program to evolve with technology, as it inevitably changes and improves over time. Then at the state level, the states would be responsible for certifying that approved devices are installed on all vessels in the applicable permit categories before the vessel goes out on a fishing trip.

The state that is responsible for each permit holder would be determined by the principal port location declared on their federal permit. If the permit lists Gloucester as a principal port, then Massachusetts is the state that is responsible for certifying that permit holder has installed their approved tracking device.

The PDT recommended that its standard affidavit be used across the states to certify the devices installation. That language is included in Appendix B to the Draft Addendum for the states to use. Then GARFO would be providing the states with a federal trap gear area permit data needed, to determine which permit holders each state is responsible for. The states would also be responsible for providing support to permit holders, to help them with properly complying with the vessel tracking requirements. This doesn't mean that the states would be responsible for helping with installation or troubleshooting of the vessel trackers, rather that would be a task that would also impact the vendors. Then the states would also be responsible for data validation and compliance monitoring, including contacting permit holders if there are data issues that need to be resolved, like incomplete tracking data or mismatches between vessel trip reports and associated vessel track.

The states would also be the ones making sure that those track data being collected by their permit holders are coming in and meeting the specifications that are established in the Addendum. At the federal level, GARFO will be responsible for providing up-to-date information to the states on American lobster trap gear area permit ownership.

That would include the database information on vessel permit numbers, names, full ID, endorsements, issuance and expirations dates and permit holder information. Then GARFO will also incorporate federal lobster eVTR data into its quality assurance program, once the rulemaking is complete for implementing the federal harvester electronic vessel trip report requirements for a federal lobster permit.

This means that as eVTRs are submitted they will be further validated to ensure data quality, and any errors that are identified through that process will be resolved by GARFO outreach efforts to correct and resubmit trip reports. ACCSP will also have near real time access to the federal eVTR data, so that they can be used to identify fishing activity in the vessel tracking data that is coming in to ACCSP.

There are also recommendations in the Addendum for the data processes that are needed for this program. The main takeaway being that ACCSP will be housing the tracking data. ACCSP would receive the location data from the tracking vendors, and they would get the eVTR data from GARFO.

All of those data must be submitted in accordance with the ACCSP trip locations, API specifications, and with those data ACCSP will be able to match the vessel tracks with trip reports. Then as with all of the data that ACCSP handles, they'll maintain the data confidentiality in accordance with federal law, and allow data access to only the authorized entities with confidential access.

Regarding the trip report data, the state and federal agencies will remain responsible for ensuring compliance with data reporting requirements. GARFO will remain responsible for the validation of eVTR data, and the state management agencies would be responsible for validation of trip location data. To give you a general idea of the data flow and integration process for the vessel tracking data and trip data.

This diagram color codes the two data types with location data from trackers represented by blue, and trip report data in yellow. You can see that

from each vessel trip, location data would be collected on the vessel, sent to the tracking vendor, and then would go either straight to SAFIS before being matched with a vessel trip or could be sent to the eVTR system that would match the location and trip data before they go to SAFIS. Then on the bottom you can see the trip report data would similarly either go straight to SAFIS from the eVTR system without location data, or it would get matched with location data prior to going to SAFIS. That concludes my review of the Draft Addendum options and details, and now I just want to highlight the suggested changes to the document that I mentioned earlier. First, there is the Law Enforcement Committee recommendation on adding language to explicitly prohibit tampering with the tracking devices, and that language is proposed here in italics.

Then secondly, there is a recommendation to add the Area 5 waiver permit category to the list of applicable permits that would be required to use these tracking devices. Again, that Area 5 waiver permit allows Area 5 permit holders to target black sea bass with un-baited lobster traps. But since those permit holders would still be permitted to harvest lobster, the intent is to include them in the vessel tracking requirements as well.

With that, these are the Board considerations for today. First the Board can consider making any modifications to the Draft Addendum document, including those that I've mentioned already, or any additional changes. Then the Board can consider the Draft Addendum document for approval for public comment.

The next step if the Addendum is approved for public comment today is that the public hearings could be held in January of next year, and then following that comment period a virtual board meeting could be held in February or early march, outside the regular ASMFC winter meeting, to consider the Addendum for final approval.

If or when the Addendum is approved, the states could implement the requirements through their state laws and regulations, and NOAA would then go through the rulemaking process to include the requirements in the federal rules. That is the end of my presentation, and I'm happy to take any questions.

CHAIR McKIERNAN: Thanks, Caitlin. Board members, let's take some technical questions for Caitlin if there is anything you are confused by or you think needs clarification. Raise your hand to get into the queue.

MS. KERNS: Dan, in the queue right now I have Cheri Patterson first, Roy Miller, and then Megan Ware.

CHAIR McKIERNAN: Great, thank you. Cheri, my neighbor.

MS. CHERI PATTERSON: Thank you, Mr. Chair. I have a couple questions. On Page 5, on the Offshore Enforcement 2.5. the second paragraph. It indicates enforcement personnel have consistently noted the ability to determine where a boat is steaming versus hauling is critical to determining when fishermen are using illegal gear. Should that just be gear, because how can they determine if they're using illegal gear? I thought the whole purpose of this was to determine where they were fishing, so law enforcement could go out there and check the gear.

MS STARKS: Right, I think maybe we could clarify the language a little bit. But I think the idea is that without knowing where those gear are being set, they cannot go check them to make sure that they are legal. I could probably modify that sentence a bit.

MS. PATTERSON: Okay, thanks. On Page 10, the Federal Permit Data. The first sentence it indicates to successfully administer a vessel tracking program states will need access to up-to-date federal American lobster permit data. Is this going to be guaranteed by NOAA to be real time data, or just up to date? Sometimes up to date means a week over a period of time, as opposed to real time.

CHAIR McKIERNAN: Cheri, what do you mean by real time and which parameters are you looking to be updated?

MS. PATTERSON: Well, if we're having to validate vessels and their gear, and they are not showing up that they are permitted on a real time basis, as opposed to maybe every week or two-week update. This is something that we run into a little bit at times with trap tags.

Sometimes we have to wait for a period of time or give them a call to find out if somebody is permitted, in order for us to issue trap tags. It's not real time, necessarily. Whereas, if we're going to be validating tracking programs, I would like to see real time access, as opposed to a weekly up-to-date data.

MS. KERNS: Dan, I think we can help you some, and then I'm going to go to Alli Murphy. On the PDT level, Cheri, we have, we meaning ASMFC and state staff have specifically requested to NOAA that there is a notification that goes to the states, so we don't have to dig around the permits and find new people. That is what we have asked for. It hasn't been guaranteed to be responded in that way yet. It's something that I haven't heard the resolution on yet, but maybe Alli has a resolution.

CHAIR McKIERNAN: Alli.

MS. ALLISON MURPHY: I don't have a specific mechanism yet, but I know some of our technical staff are working with ACCSP staff to be able to provide this data to the states, I'm going to say in near real time, because it might be one of those things where, you know at the end of the day the data somehow gets refreshed and then becomes visible. We are working to provide this in very near real time to the states, to be able to administer this program. I just don't have that specific mechanism yet.

MS. KERNS: Dan, a lot of specificity for what the states and the Commission are asking NOAA is to provide a notification to us, not necessarily so that the data are available to us, because the burden on the states to find those individuals is significant, and if people are having to apply and check off permits at the NOAA Office, then we're hoping they will provide a notification to Julie. If you have a clarification for a resolution, we would love to hear it, but if there hasn't been a resolution yet, then I'm not sure it's helpful.

CHAIR McKIERNAN: Toni, given my experience with lobster permitting, it seems to me that the challenges you're describing, because this is a limited entry fishery and we don't have that much turnover in permits. Generally, people get them and drop them, and they are usually transferred between parties. It seems to me we're talking about transfers as a case, and a permit coming out of CPH, maybe, where all of a sudden, it's been activated. Are the those the kind of things that have been identified as needing to be near real time?

MS. KERNS: Yes. In addition, though, Dan, when the permit gets renewed, we would need to know that as well, obviously.

CHAIR McKIERNAN: Okay.

MS. KERNS: If someone goes from a non-trap gear to a trap gear permit, we would need to be notified of that.

CHAIR McKIERNAN: Got it, okay.

MS. PATTERSON: Thank you, that helps. Dan, I have one more question, is that okay?

CHAIR McKIERNAN: Yes, go ahead.

MS. PATTERSON: On Page 12, Trip Data. It has eVTR data must be submitted using a NOAA Fisheries, GARFO approved eVTR application. Currently, there is no eVTR data required of those that are lobster only permitted, is that correct? If that is correct, when is the start date? This might be a question for Alli. When is the start date of that? Is that starting in 2023, January or May?

CHAIR McKIERNAN: Go ahead, Alli.

MS. MURPHY: Good question. I think where I've been working away on that proposed rule, and I expect it to be out, you know hopefully in the next couple weeks. I think we're probably targeting January 1, 2023 for the start of the collection of logbook data for the federal lobster fishery.

MS. PATTERSON: Okay, thank you, Alli, because I think that we need to have this Addendum timed to when NOAA has the requirements for mandatory reporting for lobster. That's it, thank you, very much.

CHAIR McKIERNAN: Thank you, Cheri, Roy Miller.

MR. ROY W. MILLER: I'm wondering if I could ask Caitlin to bring up the language for the Area 5 waiver again, since we didn't see that in the draft that was previously sent to us. I may have an additional question.

CHAIR McKIERNAN: There it is, what is your question, Roy?

MR. MILLER: Caitlin, so see bass potters who take lobsters in Area 5, they would be required to have the vessel tracking gear that we're talking about here, or they wouldn't?

MS. STARKS: If included in this table then they would be required to have the vessel tracker. The idea is to take this out for public comment, and as you all are aware, when this comes back to the Board if there was a desire to remove it, that would be up to the Board. But I think the intent is to include it for public comment. It's a very small number of permit holders, but they do harvest lobster, and so getting those effort data on them for the purposes that we've described for this Addendum might be important.

MR. MILLER: The use of the nomenclature waiver confused me at first. I just wanted to make sure that these folks were included in the tracking requirements.

MS. STARKS: Yes, correct, that's the intention here.

CHAIR McKIERNAN: Okay thanks, Megan Ware, you're up next.

MS. MEGAN WARE: I have one question and one suggestion, if that's okay, Mr. Chair. I can hold off on the suggestion if you would like, but my question is. Caitlin, I had a question on the hundred-meter accuracy requirement. That sounds pretty lenient to me, and then it also said in that section that many of the trackers that have been looked at have a much better accuracy than those hundred meters. I was just curious why the PDT set 100 meters as the accuracy minimum. We are kind of ahead of that time I'll say, in terms of what technology is capable of.

MS. STARKS: My understanding is that that came from VMS, kind of trying to be in line with what the VMS requirements are. Yes, the cellular devices that have been tested are mostly much more accurate than that. But we didn't want to exclude, I guess, to just leave some room for things to change. I don't think there was a good rationale for coming up with another number. We believe all of the cellular devices that have been tested and looked at, and most of the other ones on the market would definitely meet that requirement, and would be better than that.

MS. WARE: Okay, thanks, that's helpful. I think maybe this is something we could just watch over for a couple of years maybe. If the tracking addendum is approved, to see if that needs tweaking or not, but I appreciate the answer. Then I had one suggestion/question we'll call it also. I'll also start just by complementing the PDT. I thought this was a really well written document.

One suggestion I had was, I noticed there was no information about cost in the Addendum, and I think the number one question we're going to get at public hearings is what is the cost of this. I'm wondering if some information on that could be added to the document. I realize we may not want to specify cost for specific companies, but if a general range could be provided, I think that might be helpful in kind of up front addressing some of the questions we'll get. In particular, highlighting

that the cost of the cellular device is less than typical VMS.

CHAIR McKIERNAN: I think that's a really good point. Caitlin, do you think it's possible to have a slide in the formal presentation that describes the margin of error around cost?

MS. STARKS: Yes, so my intention was definitely to include cost information in the information that I would present during public hearings. Like Megan said, we didn't include specific companies in the document and their cost information, because A, it's changing constantly, and B, we didn't want to kind of identify or single out companies and leave others out in the document. I would be happy to, either or both add a general range into the document itself if that's desired by the Board, and/or just present cost information during the public hearing.

CHAIR McKIERNAN: I think that would be great, and maybe I could follow up with a brief question. Having looked at the population of potential buyers of these devices, which means the sum within each state of who would be required to get this. That is a list of vessels that hold the permit, as opposed to active vessels. Is it likely that the cost per unit would change if the number of units sold was less, because of the list that we're showing in this public document might be higher, because it includes inactive vessels? Could that have an impact on cost, do you think?

MS. STARKS: That's a good question, and I'm not sure I have an answer. But my understanding is that the cost estimates were not based on a number, like a total number of trackers. I don't think at this point that is expected to change it, but I'm not sure.

CHAIR McKIERNAN: Okay, and if I could do another follow up question, and maybe this is for the folks over at NMFS, Alli. Is it possible to put a federal lobster permit into CPH? If we had a dual permit holder who wanted to fish in state waters and didn't want to participate in this program, they could put their federal permit into CPH, confirmation of permit history? Is that a scenario that is possible in your view? Please, go ahead, Alli.

MS. MURPHY: Yes, I think that is certainly a possibility. I think another caveat to this table is that because we were only considering, or the PDT was only considering boats that were in the water to need these devices that permits that are in CPH would not. I think if a vessel made that business decision, they wouldn't need this tracking device.

CHAIR McKIERNAN: Would that include a business that was in the water but fishing with other non-lobster trap gears?

MS. MURPHY: We don't allow, we treat all of the permits in a permit suite together, so it's kind of an all or nothing thing. Either the entire permit suite gets put in that confirmation of permit history, kind of on the shelf status, or it's on the vessel element.

CHAIR McKIERNAN: Understood, you can't parse out various federal aspects of the permit, it's all or nothing.

MS. MURPHY: Correct.

CHAIR McKIERNAN: Okay, great, that's a good clarification. All right, Toni, do we have any other hands up?

MS. KERNS: We have David Borden, but before you go to David, I just wanted to touch base on the cost question you asked. I know that in some of the discussions that states have had when using trackers in other fisheries. There have been discussions of number of permits and kind of bulk ordering, you may call it. I think that the number of permits and cost of devices could also depend on, in the end, how many different devices get approved. Obviously, the more types of devices that get approved in the larger pool of devices and potentials for competition gets wider. I think there are a lot of factors in there that may impact price.

CHAIR McKIERNAN: David Borden.

MR. DAVID V. BORDEN: I want to pursue the same issue that the Chair just pursued, and I'm looking at Option B, Caitlin, if you could put that up on the screen, please, so everybody will be clear. The first time I read through this, I basically read it in the manner that I assume that everybody with a permit and a trap allocation was going to have to put a tracker on the boat.

But then I kind of got to the realization of the point that Dan just made, which is we do have boats, for instance in Area 3, that they are not active boats, they don't fish. They may be in the water pursuing some other fishery. In some cases, they have all the traps, with the exception of numbers under 10, because you can't transfer numbers under 10, and Alli, correct me if I'm misspeaking.

But because you can't transfer traps under 10, I just don't see any reason to require somebody in that situation to put a tracker on their boat. They are not fishing in the lobster fishery, and that's the logic for it. But rather than have the Board get into the weeds on this, more than I'm already getting into the weeds on it. It might be useful to have more language put around that option.

In other words, ask a couple of questions. Should this apply to everyone with a trap allocation, or should this just apply to boats that are actively fishing in the lobster fishery, and get some input on that. I think that is going to be a question that various members of the public are going to raise.

For instance, another example would be, there are boats that have offshore lobster permits that are actively fishing in the red crab fishery, and they might have an end trap allocation on the boat, clearly, they are not lobstering. I think we've got to be clearer on where this applies, and then I have a question for Caitlin. Caitlin, could you put up the list of active boats? I think it's a previous slide. This is just, as I understand, this is a list of all the permit holders by state, so Rhode Island has 99 permits, is that correct?

MS. STARKS: Right, this is the number of permits purchased in each state, and that is counting as the principal port state in 2020, so it's not necessarily active permits.

MR. BORDEN: Does this include draggers?

MS. STARKS: No.

MS. KERNS: David, this only applies to the individuals that we think would need a tracker from the permits. There are more federal permits in each state that don't need trackers that can have lobster.

MR. BORDEN: Okay, so what I guess the point is the same. We're likely looking at a number less than this. In other words, somebody in Rhode Island may have a federal boat that doesn't fish at all, and therefore wouldn't be required to get a tracker.

MS. KERNS: Because they are not actually actively fishing.

MR. BORDEN: Right.

MS. KERNS: We don't know if these are active or not, and again these were the numbers.

MS. KERNS: Once again, as you move south, and Roy spoke about Area 5. As you move south into those offshore areas, only about half of the permit holders or less are actively fishing. I guess my point, Mr. Chairman, is I think we need more discussion on this, and maybe ask a couple of questions, because we may want to implement a slightly different definition of how this applies in the end.

CHAIR McKIERNAN: Yes, and it just dawned on me that there is a trap tag program, and those could be linked in some fashion, so that if a boat isn't ordering trap tags in a fishing year, then they are not fishing traps. We have that information. I guess the question I would ask, to follow up with what your questions are.

Would a jurisdiction be eligible to seek a waiver for a vessel like you just described? Let's say it's a Rhode Island boat with an 8-trap allocation that they don't want to put their permit in CPH, because

as Alli just mentioned, this suite goes together. It might be of benefit to see if we could create exemptions. David, are you suggesting that we add some questions to the document, so that we can get good feedback?

MR. BORDEN: Exactly, Mr. Chairman. I don't think the Board needs to sort through this, but if we ask some questions we'll get feedback from the industry, and then we can decide what the appropriate course of action is.

MS. KERNS: Dan, can I ask one follow up question?

CHAIR McKIERNAN: Yes, please do.

MS. KERNS: David, in essence what we as a PDT discussed is that if a boat that is using trap gear to catch lobster leaves port, then they would be required to have a tracker. That is in essence who we are trying to capture here.

MR. BORDEN: That's correct.

MS. KERNS: You would know if someone didn't have a tracker, because they would put in a catch report and you would have lobster on there but no track associated with them. That's how you would know that they weren't using a tracker. Are you feeling like that isn't being captured in the document?

MR. BORDEN: Yes, and I'm just nervous, because I don't understand the question Dan asked about, of all the possible combinations that boats can have, can a boat be in confirmation of permit history? Are there circumstances where boats will be in that, and then you've got this whole secondary issue of, do we really want somebody to put a tracker device if they only have 8 pots on the boat?

I know for a fact we can generate a list and circulate it to the Board from the Association. We can give you a list of all those boats that have 8 pot allocations, and the reason they only have 8 pot allocations is because they've consolidated all those traps on other boats. In the case of that boat with an 8-pot trap allocation, there is no need for them to have a tracking device on a boat, because they're not fishing.

CHAIR McKIERNAN: Toni, it seems to me there is a bit of a disconnect, at least conceptually on how a vessel is permitted versus what activities the vessel is conducting. What David is asking for, I think, is to ask the questions of the public, should the Commission's plan and ultimately NMFS regulations, allow vessels that are permitted for traps, but aren't fishing traps from being exempt, maybe with a state issued waiver, or something like that.

MS. KERNS: Okay, I think it would be helpful for someone to give us those questions that you are looking for us to ask, because I'm not sure we will capture all of them. Then if you let me know when you're ready to go to the public, there is some public with their hand up.

CHAIR McKIERNAN: Do we have any more Board members?

MS. KERNS: No.

CHAIR McKIERNAN: Okay, then we'll go to the public.

MS. KERNS: We have Sonny Gwin.

MR. SONNY GWIN: This is Sonny, I did have a quick question. I was looking at like Maryland, and you have eight vessels. Now out of them eight vessels, I believe some of them already have tracking devices. Would that be considered the same, or would you have to get another tracking device for the lobster fishery?

CHAIR McKIERNAN: Caitlin.

MS. STARKS: I'm thinking. I think the intent is that if you have a device that meets the requirements that are laid out in the Addendum, you would not have to get a separate one. Maybe I misheard the question.

MR. GWIN: I just wanted to hear that. I just wasn't sure that you didn't have to get a separate lobster tracking device, that if you already have a tracking device for another fishery that you would be good to go.

MS. STARKS: Yes, the distinction is that these devices that are being required in the Addendum have to be able to get that one ping per minute data collection rate. If the device can do that and it meets the requirements that are in the Addendum, then no, you don't have to get a different specific lobster device. But if it doesn't do that, then you would. This is just for, again trap gear, so something on a mobile fleet. We're not trying to capture mobile gear here.

CHAIR McKIERNAN: Sonny, if I could follow up. Are you envisioning a vessel that has a VMS that is satellite based?

MR. GWIN: I believe so, yes. I think the longline fishery, aren't they tracked? Am I correct in saying that?

CHAIR McKIERNAN: I would look for help from Toni.

MS. KERNS: I believe Sonny is correct, but again Sonny it's a VMS device, and so therefore it's not going to be pinging at one minute, it's going to be pinging at every 30 minutes or every 15 minutes. The reason you want that 1 minute ping rate is because we want to be able to see the difference between transiting and hauling, and then seeing those hauls, so that we can tell the difference between a 5-trap trawl and a 20-trap trawl. You wouldn't be able to see that with a VMS device.

MR. GWIN: Okay, got you. That is the answer I'm looking for. Then the other clarification, one more thing if I could, Mr. Chair.

CHAIR McKIERNAN: Yes, go ahead.

MR. GWIN: Like I know we have a vessel in Maryland that has a lobster permit, and it's on the bank, and he doesn't lobster fish now. I'm reading that right, if the water goes in the boat you have to get the device, but if he keeps that boat on land, and is using it just for permits, he will not have to get a tracking device, is that correct?

MS. STARKS: Yes, I believe that is correct.

MR. GWIN: Okay, I just want to clarify, thanks very much, I appreciate it.

CHAIR McKIERNAN: You're welcome. Toni, anyone else?

MS. KERNS: Yes, Maureen Davidson, and then David, your hand is up again, I'm not sure if that is on purpose or not.

MR. BORDEN: It is.

MS. KERNS: Maureen fist and then David.

CHAIR McKIERNAN: Go ahead, Maureen.

MS. MAUREEN DAVIDSON: I just wanted on Page 10, fourth paragraph, on a sentence that says that Data QA/QC and validation systems for each state must be developed and tested prior to implementation of the program. Each state plans to develop its own system? I'm just kind of curious what specifically are we going to have to develop and test prior to the program initiating?

MS. STARKS: I can try to answer it, Mr. Chair. I might ask for help. I think my understanding is that the states would be looking at the trip data that comes in, making sure that there are no mismatches between the trip reports and the track data. Making sure the track data are complete, and the states would need to set up a way to do this, so that they have a system in place to look at those track data, compare it with their trip report data, to make sure everything is looking good. That is the general, and I don't know if I can get into the details, but maybe Julie could help if she has something to add.

CHAIR McKIERNAN: Julie, are you out there?

MS. JULIE DeFILIPPI SIMPSON: Yes, Mr. Chair. Caitlin covered the majority of it, but yes, we will have those data available for the states, and we're going to try to put together different kinds of reports to help them be able to use the data in the way that they need to.

CHAIR McKIERNAN: Thank you, and if I could follow up. I think to her same question, but with a slightly different twist, compliance monitoring. Could that not include marine patrol observing a vessel coming ashore with lobsters and with traps, and sharing that with the folks in the data collection part of the state agency, and that could be part of the compliance? Hey, there's a lobster boat coming in home ported in your state, without any associated trackers. Wouldn't that also be part of compliance?

MS. STARKS: Yes, I think that is definitely something the states could implement. That is not something we specified in this document, but it is a process that definitely would fit under the compliance making sure that vessels have these trackers installed. I think we were thinking more from a data compliance aspect of being able to just look at the trip data and say, we have this trip with lobster catch, do we have the track data that is required of the trip?

CHAIR McKIERNAN: I have a general question for, probably Toni, since you've been around and seen a lot of these addendums come and go, and understand the dynamics of it. In my experience this is going to be an interesting one, because we're going to pass an addendum that may not have all the details about this level of state compliance.

Could you envision states getting together two or three years into this and say, we need to elevate the standards of compliance? Let's say my state isn't asking the environmental police to look for that, and other states would. Some of that unevenness, do you envision like an MOU among the states, or just maybe something that is short of an addendum, to fill in some of these details. What ASMFC plan mechanism could fill in those kinds of details, without us having a full-blown addendum to add the housekeeping stuff?

MS. KERNS: Dan, it is our intention to create a SOPs for administration, SOPs for approving devices, and a couple other pieces, which we will work on, present to the Board and come back. I think that those types of things could be a part of the SOPs document.

CHAIR McKIERNAN: Standard operating procedures.

MS. KERNS: Procedures, sorry, yes. It doesn't necessarily have to be called SOPs either, it could be general guidelines for the administration of this process for pieces that everybody would be generally that the states would be following, and then states could then be a little bit more specific within their own administration to carry out what they need to do.

CHAIR McKIERNAN: This could be a work product of the monitoring team that look at the compliance with the lobster plan in general. That could be just an added aspect when we do the annual compliance reports.

MS. KERNS: It could be a part of that or it could be something, if those aren't the right people to have that discussion, we can create a different group for trackers and have them meet annually, if necessary.

CHAIR McKIERNAN: You've envisioned kind of a vehicle for those kinds of details that will become apparent after this Addendum would be approved.

MS. KERNS: Correct, and we know that we're going to have a group of individuals that will be doing the vendor verification or device verification and applications, so there will already be that group. But Bob has his hand up as well. I don't know if he has anything to add.

CHAIR McKIERNAN: Bob Beal.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Just to add to what Toni said. You know I think the guidelines or SOPs or whatever this document is called is important, and something that is in the works. Just as a reminder though, if the Board wants to go

down the Atlantic Coastal Act noncompliance route with some of these provisions, and they want them to be binding that all states have to implement them.

Then those measures would need to be recorded in either an addendum or an amendment to the FMP. Including something in a guidelines document doesn't necessarily obligate all the states to comply with that, using the compliance definition under the Atlantic Coastal Act.

CHAIR McKIERNAN: Understood, thanks for that, Bob. Toni, any other hands up?

MS. KERNS: We have David Borden and then you have a member of the public again.

CHAIR McKIERNAN: Great, okay David Borden, go ahead.

MR. BORDEN: Under data integration you've got the words tracking vendors must be able to push location data. My suggestion there is we ask the technical people to insert a minimum standard there, how often. The reason I say that is enforcement is going to want to get access to this data, and we envision them getting access to this data to improve enforcement. When a boat is within 20 miles of the coast, they are going to know exactly where that boat is every minute.

But, we need to ensure that the data is being pushed on a routine basis so they can get it. It might be pushed once a minute, it might be every five minutes, I don't know. That is outside my league. But I think we should state how often in the document, so that it is standardized across all vendors. I've got another point, Mr. Chairman.

CHAIR McKIERNAN: Let me get back to your next point. Julie, can you speak to this? That is kind of a technical aspect, like how frequently the data is pushed.

MS. SIMPSON: I'm sorry, Mr. Chair, can you clarify. How often the data are pushed from the device?

CHAIR McKIERNAN: I think so. I think that was one of the details that is in the Addendum saying it must be pushed, and David Borden is asking that if it should be pushed at a minimum time interval or on a regular basis. Yes, go ahead, David.

MR. BORDEN: Yes, can I just interject this? The language says tracking vendors must be able to push. The way I read this is the device will ping the boat as soon as it comes within cell service the boat is going to get pinged once a minute. That pinging information goes to a vendor, what this is talking about is how often the vendor has to submit the data to the ACCSP program. All I'm suggesting is they put in a timeline there, so that it is standardized across vendors, that's all.

CHAIR McKIERNAN: Julie, is David onto something there? Is that accurate, his concerns?

MS. SIMPSON: Right, so if I were to say the sentence of like, all of the pings must be submitted to the ACCSP within X amount of hours of the trip ending and the boat docking, then would that fit the language you're looking for?

MR. BORDEN: I actually thought that this would be routine, like every couple of minutes. I had a conversation with one of the technical people the other day and said that they could do it so it's real time information not every hour. Most of these boats can cover ten miles in an hour, so if you want this device to be used to improve enforcement, we need almost real time information on the location of the boat when it's within cell service. That means the vendors have to push the data on a routine basis.

MS. SIMPSON: I think the key thing of what you said there, sir, is the within cell service. They usually leave cell service fairly quickly. The device itself will constantly be pinging while they are out on the water, but with the way that the cellular technology works, the pings that are recoded on that device won't be transmitted off that device to the vendor and to ACCSP, until that boat comes back into cellular range. This is one of those places where it does differentiate between something

more like the satellite, where the pings can actually be transmitted differently.

The device has to be within cellular range, in order to submit that. This is more of a post trip rather than a while the vessel is at sea knowing where that vessel is. I'm not a device expert, so I would defer to a few of the other public attendees who are more familiar with devices to correct anything that I may have said incorrectly.

MS. STARKS: If I could follow up, Mr. Chair.

CHAIR McKIERNAN: Certainly, go ahead, Caitlin.

MS. STARKS: Yes, I believe what Julie just stated is correct, and kind of the crux of what we're looking at with this program. The intention throughout the discussions with the PDT was not for real time vessel location data to be accessible by law enforcement or the states, given that limitation of needing the cellular service to transmit those location data.

The expectation is that these data would be selected during the trip, and then would get pushed to ACCSP after the boat is back into cellular service, after the data goes to the vendor and then gets pushed to ACCSP. I just want to make sure that that is clear to everyone. Yes, I think.

CHAIR McKIERNAN: Caitlin, it sounds to me like the uploading of the data once the vessel gets back into cellular service is one aspect, but then the data getting transmitted from the vendor to ACCSP is a second step. Am I correct?

MS. STARKS: Yes, I believe so. I think we could put in language for how often the data need to be pushed from the vendor to ACCSP. I think leaving it as a number of hours is probably more appropriate than minutes, in that case. But if we wanted to add language there, we could.

MR. BORDEN: That's all I'm asking, Mr. Chairman. That should be decided by the technical folks, not us.

CHAIR McKIERNAN: Sounds good. Okay, Caitlin, are we good?

MS. STARKS: Yes, I think so.

CHAIR McKIERNAN: Toni, anyone else?

MS. KERNS: You have members of the public.

CHAIR McKIERNAN: Okay, who is first?

MS. KERNS: First we have Sonny Gwin and then Mark O'Brien.

CHAIR McKIERNAN: Okay, Sonny.

MR. GWIN: I would like to see in the document when it comes out to the public to see what the active vessels would be, all the vessels. I think it would be a great thing to have the cost of some kind of cost, give us some kind of idea. Then also, I don't know if this is a question for the Board or for our state directors. When the states are doing all this work that they have to do, what is the cost of that going to be, and is that going to be transferred to the fishermen? I don't know who could answer that question. I just want to know, is the state going to take the cost of monitoring and doing all this, or is it going to fall back to the fisherman?

CHAIR McKIERNAN: Thanks, Sonny, Caitlin, is it possible for states to add another column to this table that would describe the number of active vessels in say the most recent complete fishing year for which we have data?

MS. STARKS: I can try to work with the states on that. We took this from the federal permit database, and so we haven't run this, I don't believe, Toni, like haven't validated these numbers with the states yet. I could send this table out to the states and try to get that information back, but I think that's a matter of whether the states are able to easily find out how many active permits they had in 2020.

MS. KERNS: David, I actually will come back and say differently than Caitlin. I do not think we can do

that in the amount of time that we will have to turn this document. Matching up federal permits with those vessels that are reporting is not an easy task, especially since there is not required reporting. We would have to go to dealer reports as well in some cases, and we just would not have time for that. Unless Alli can tell me, she could give me a list of active permit holders, but I'm pretty sure she can't, since she wasn't able to give it to us for this.

MS. STARKS: Apologies for my mis-answer.

MS. KERNS: I'm just trying to realistically have a timeframe in which we can get this out to public comment quickly enough. I have Alli with her hand up.

CHAIR McKIERNAN: Yes, well if I could, just back to Sonny. Sonny, I know for my state I'll want that number, and I'll ask my staff to do it. We have trip level reporting, so we could probably do that. I imagine some of the other states may want to have that just for their own edification or own incorporation into the approval of this. Toni, you said you had Alli?

MS. KERNS: Correct.

CHAIR McKIERNAN: Yes, go ahead, Alli.

MS. MURPHY: That is not something that's within my technical expertise to be able to get to you. But I'm happy to speak with our statisticians and see if that is a data request that I can put in, and see if I can get that within the timeframe that you're comment period and public hearings would take place in. I can't promise, but I can put that request in.

CHAIR McKIERNAN: Alli, if I could follow up. Wouldn't you need that information for your rulemaking? Would you not be turning to the states and asking us to estimate that parameter? Well, maybe it's a rhetorical question. I would expect you would, so maybe all of our individual states could try to come up with a precise number, or a ballpark figure of how many vessels we actually have fishing lobster who have federal permits.

MR. GWIN: A follow up question, please?

CHAIR McKIERNAN: Is this Sonny?

MR. GWIN: Yes.

CHAIR McKIERNAN: Go ahead, Sonny.

MR. GWIN: Do you know exactly, isn't there a control date for the American lobster in federal waters, and what is it?

CHAIR McKIERNAN: I'll turn to Alli. Alli, can you weigh in on the control date?

MS. MURPHY: I think we've had several control dates. I don't know the dates off the top of my head, but I think we've had a variety of control dates by management area.

CHAIR McKIERNAN: Each LMA has its own control date.

MR. GWIN: All right, thank you.

CHAIR McKIERNAN: How about Mark O'Brien from the public.

MR. MARK O'BRIEN: Yes, good afternoon, my name is Mark O'Brien, I'm a VMS telematics consultant, and I just thought I would add a couple things to some of the questions that Dave Borden asked. I've been through type approval with NOAA, with 50 governments and a lot of states.

Typically, on the pull data, they will pull the data every five minutes from our database, so it is fairly real time. Secondarily, the one thing that I would add to your specification is that if you have cellular trackers, they should be able to log up to 20,000 GPS reports, because if you're on a two-week trip and out of cellular range, you'll have to log 18 to 20,000 reports and uplink them when they come back into port.

CHAIR McKIERNAN: Okay. All right, thank you. Toni, any other comments or questions?

MS. KERNS: I have David Borden and then another member of the public, John Fullmer.

CHAIR McKIERNAN: Okay, David, we'll go to you and then we'll go to John.

MR. BORDEN: Yes, I just wanted to thank John O'Brien for clarifying that. If the technical people think that that is a good system to have to push the data every five minutes, that totally addresses my concern, so thank you for pointing that out, John.

MS. KERNS: Dan, to follow up from David's point. We will talk to the state folks that have been testing the devices, to figure out what is an appropriate timeframe for pushing the data to ACCSP.
CHAIR McKIERNAN: Okay, thanks. From the public, John Fullmer.

MR. JOHN FULLMER: I'm Jack Fullmer from the New Jersey Council of Diving Clubs. My question, the main question relates to the commercial dive boats, who also take lobsters. Do they have to have, some of these dive boats have a lobster permit and some of them don't, they're not required to, to service the diving public. The question is, what is the story relating to the dive boats?

CHAIR McKIERNAN: They have federal permits? You have a federal lobster permit?

MR. FULLMER: Some may have permits and some may not. They are not required to have a permit just to serve the divers.

MS. STARKS: I can try to respond, Mr. Chair.

CHAIR McKIERNAN: Yes, take a shot.

MS. STARKS: I think the way to be most clear about it is that if this vessel has a permit that's in one of the categories we listed in the table, then yes, it would be required to have a tracker, and if it doesn't then it would not. These are right now the applicable permit categories that are being considered for these tracker requirements. If the vessel has one of these permits, then yes, it would need a tracker.

MR. FULLMER: Two other questions.

CHAIR McKIERNAN: Go ahead, Jack.

MR. FULLMER: It seems to me that requiring the device to be on 24 hours a day while they are in the water in port seems a little extreme. What would happen if the boats power went off and the device turned off, and would they then be in violation?

MS. STARKS: I can try to respond. There is some language in the document already on the ping rate while the vessel is at berth. The idea is that if the tracker can identify the berth location of the vessel, it could automatically slow down the ping rate, so that it would only be pinging not every one minute, once every 24 hours until it leaves berth again.

That is if the device is capable of doing that, and I think many of them are. That would help with both our savings and data storage savings, although data storage really is not a concern, because my understanding is that these devices can handle a lot of data. But if the device can't recognize when it's at berth, then it would still need to ping at its one-minute ping rate.

That is to encourage these vendors to make it possible to determine the berth location, and be able to automatically slow that ping rate down. I think the other part is that from what I understand the power, we did not make power specifications in this document, because it depends on the device whether it would have its own battery backup or be hardwired into the boat, or be powered by some other way. There is a lot of flexibility there, and I don't think it's a concern that I've heard from the folks who have tested these devices that they would shut off just because they've been on overnight at port. But if I've mischaracterized that at all, anyone from the PDT is welcome to raise their hand and follow up.

MR. FULLMER: But the question remains, is he in violation if it goes off through not a fault of his own?

MS. STARKS: I guess the answer is, technically, it doesn't fit with the requirements of the Addendum but we've kind of put the requirement on the vendor to say your device needs to be able to stay powered at all times. The harvester's responsibility is to install an approved device, and if that device has been approved, it means that it should be able to maintain power as required, if that makes sense.

MR. FULLMER: Would there be a phone number that the captain could call to report that his power went off or something like that?

MS. STARKS: Yes, absolutely. That is, I think, part of the affidavit language as well as that the harvesters would notify the state that is responsible for them if there was a problem with their device, so that the states would be aware that it was not collecting the data that it was supposed to be collecting while the harvester works with the vendor to get that device back up and running.

MR. FULLMER: A third question. Who is paying for the tracking vendor? Does that go back to, it may relate something to your previous question really of the cost. But does that go back to the fisherman, or the state has to pay for it, or whatever?

MS. STARKS: Right now, I think that's not determined yet, but I think each individual state is having conversations about that, but I don't think we have an answer to that question yet.

MS. KERNS: Caitlin, I can add to that. Jack, there is a cost for the device, and then each of these companies have a subscription fee, in terms of the data that are associated with them. Some have very low-cost subscription fees, other ones have, I would say medium price subscription fees. You know as Caitlin said, it could be up to the state, but it's likely to be a cost for the fisherman on an annual basis. Dan, you have Eric Reid and Megan Ware.

CHAIR McKIERNAN: I wanted to follow up with Jack, and maybe Alli could help me answer this question. Jack, the dive boat vessel you described, it sounds like it's like a for-hire, like a charter vessel.
MR. FULLMER: Commercial dive boat, there are commercial dive boats, correct.

CHAIR McKIERNAN: Right, but those vessels aren't authorized to set lobster traps for commercial purposes, are they?

MR. FULLMER: No, unless they have the trap code. Some of them have, they had previously been involved in doing both, serving as dive boats and also doing their own trapping. That was what it related to.

CHAIR McKIERNAN: Yes, so it seems to me, Toni and Caitlin, that Jack brings up another example of a vessel that may be authorized to fish traps, but if they're only diving, I wonder if this should be an opportunity for the vessel owner to opt out of the tracking, especially if they didn't order trap tags and they weren't going to participate in the trap fishery. But I'm not sure what data on a dive boat's fishing location is going to give us, in terms of the objectives of this program.

MS. KERNS: Yes, and I can talk to Alli to see if those are separated or not.

CHAIR McKIERNAN: Yes, okay, very good. Toni, you had Eric Reid and who else?

MS. KERNS: Megan Ware.

CHAIR McKIERNAN: Okay great, go ahead, Eric.

MR. ERIC REID: Good afternoon. The vessel and the operator have a certain requirement to supply data to, it sounds like the states and the feds. My question is, what happens when the inevitable discrepancy arises between some entity and the data itself? You can't renew your permits unless all your paperwork is in perfect order, so what's the mechanism to solve discrepancies without having to call two states and the feds and the service provider? Has that been thought through at all, just

to streamline that process, which certainly will happen at least once or twice?

CHAIR McKIERNAN: Toni or Caitlin, do you want to take a shot at that?

MS. KERNS: Eric, I think what we're trying to do. Well one, to renew your permit having a tracker on your boat isn't a condition of renewing the permit, leaving the dock is the condition of the permit to use the tracker. If you're data aren't linking or syncing correctly, you know I think ACCSP is hoping to try to help out the states to create algorithms that would kind of indicate that to us, to give us warnings that things aren't meshing correctly.

Then from there we would say, mmm that's a problem of the device, or mmm, that's a problem of the user. If it's a problem of the device then the fishermen knows to go talk to the vendor. If it's a problem of the user, then maybe that's to go to the state and the state can help them perhaps figure out what's going on with the data.

MR. REID: Okay, so as far as matching up vessel number, trip number, et cetera, et cetera, that would be handled on a reasonably timely, in a fashion pretty timely, so we don't have to go back nine, ten, eleven months to figure out what went wrong.

MS. KERNS: That is our hope, and it is our hope that these sort of regular checks of the data through these magical formulas, I'll call them, will help us see that.

MR. REID: Okay, thank you, and just a quick follow up if I might, Mr. Chair.

CHAIR McKIERNAN: Yes, go ahead, Eric.

MR. REID: As far as if you're offshore and your tracker fails. I can tell you that in the scallop fishery and in some cases of other fisheries, if your device fails, you're getting a note from Uncle Sam saying, your trip is over you're coming home, so that's how that works in reality.

CHAIR McKIERNAN: Yes, I'm not sure this device can tell you it's failing until it goes to push the data when you get back into cell phone service. But yes, I think we'll learn as we go on this one. Thanks, Eric. Megan Ware.

MS. WARE: Not to harp on the pushing of data from one source to another, but I just wanted to confirm my understanding is true, and that when a vessel comes into port and gets cell service, whatever data is on that tracker will automatically be uploaded to the vendor, and then that would automatically be sent to ACCSP. My understanding is it's not a manual push, it's an automated push. Is that correct?

MS. KERNS: Megan, I'm going to phone a friend and ask either Bill DeVoe or Nick to answer that question.

CHAIR McKIERNAN: You could recognize them, Toni, if you want.

MS. KERNS: Okay, I know I've seen Nick on here already. Nick, do you want to answer that? I just need you to raise your hand so I can find you so you can speak. All right, you can go.

MR. NICHOLAS BUCHAN: Bill is definitely the expert on APIs, but the idea is that the data will be pushed from the vendor to ACCSP, if Bill is available to talk.

MS. KERNS: I just unmuted Bill to see if it goes automatically or not. You can go, Bill.

MR. WILLIAM DeVOE: Yes, thank you, Toni. Yes, so it's for the most part, once the device actually publishes that ping. I mean we typically won't see a couple second lag as that ping blows through the various data flows, eventually to ACCSP. Where there can be some delays, depending on the manufacturer of the device, is how long the cache data takes to upload.

For example, with our tracking devices, we're able to push one ping per second, so uploading the entire cache, while the device is out of cell service takes, the one-minute ping rate it takes 1/60 the

time that the device is out of cell range. But once the device actually pushes that ping, we see that in our databases within a couple of seconds.

CHAIR McKIERNAN: It's an automated process, not a manual, right?

MR. DeVOE: Absolutely, I'm not sure who the person would be pushing the manual button if there was one.

CHAIR McKIERNAN: Right, understood. Megan, are you good?

MS. WARE: I'm good, thank you, Bill.

CHAIR McKIERNAN: Toni, anyone else?

MS. KERNS: All right, Dan, I do not see any other hands at this time.

CHAIR McKIERNAN: Okay, so we have a few amendments, obviously the text in red. I mean we've had some other questions come up that have been raised that might improve the document. What do you recommend for us to capture some of those minor amendments into something that could be a motion, to approve this for public hearing?

MS. STARKS: Mr. Chair, I had been keeping a running list of the suggestions, and I think this covers it. I don't know if this looks good to you.

MS. KERNS: Caitlin, could you just add a little text so that people remember what Section 2.2.5 is?

MS. STARKS: Sure, that was on the enforcement background, so I will do that.

MS. KERNS: Just as a memory jogger.

CHAIR McKIERNAN: I guess to follow up on one of the issues that came up, because we want this to be embraced by the National Marine Fishery Service ultimately. I guess maybe a question for Alli. Should the Service consider exempting a vessel that has a permit but has not ordered trap tags and doesn't intend to be trap fishing? Is that something that the Service might want in this document? Is that something the Service would want to see in the final program? Alli, are you there?

MS KERNS: She has her hand up.

CHAIR McKIERNAN: Okay, yes go ahead, Alli.

MS. MURPHY: I think there are a number of ways that this could be implemented and you know I guess I would look to the Board and the PDT for the best way to do that. I mean on the federal side we have most of our fishery is that by issuing a permit you need to have a VMS. By having a federal permit, you need to have a VMS.

We have another fishery where we can issue that permit, but you have to have a VMS on and working before you take your first trip. We do have two models here, and I guess I think it's up to the Board and the PDT for how they want to design this and we can try to work with that.

CHAIR McKIERNAN: Are there any Board members that want to weigh in on that particular issue?

MS. KERNS: You have a member of the public.
CHAIR McKIERNAN: Who is that?

MS. KERNS: Sonny Gwin.

CHAIR McKIERNAN: Oh, go ahead, Sonny.

MR. GWIN: Yes, just to let you know that the Area 5 waiver, you would not buy trap tags, so I don't know how we would fit that in if you're buying the trap tags or not buying trap tags. But you would still have a federal lobster permit.

CHAIR McKIERNAN: And they are fishing traps capable of taking lobsters and that look like lobster traps. I guess I'm thinking about the case of the vessel that doesn't participate in the lobster trap fishery but have the lobster trap permit, and should there be an out for those vessels, like a preseason waiver?

MS. KERNS: David, I don't know how to resolve this problem specifically. I think I would need to have a couple of conversations with Alli to understand how some of these permit's work, and what people are doing, and I don't fully understand that right now. I think what we could do is just add an option for the ability to create a waiver.

That maybe we could go back to the PDT while the document is out for public comment to talk through that, to see if these waivers would actually be something that we need, or if we can resolve this issue some other way or not, and work through it there. I don't know how to move us forward otherwise.

CHAIR McKIERNAN: I think that's an excellent suggestion, Toni, is to put an option in there and accept public comment on the potential for the jurisdiction, I guess that would be NMFS, to allow for a waiver for a vessel, a permitted vessel that would opt out of participating in the trap fishery.

MS. KERNS: We would work with Alli to make sure we're crafting the option in a way that would be viable for rulemaking. You know, it might be that we can solve this problem some other way. But if this is what we need in order to move this Addendum out for public comment today, I think that this is the only thing that I can think of to do.

CHIAR McKIERNAN: Okay, I think it's a good suggestion.

MS. KERNS: Sonny, do you have a follow up to that specific point? Your hand is up again. He took it down. Then you had two Board members that had their hand up previously, the first was Ritchie White and the second was David Borden.

CHAIR McKIERNAN: Okay, Ritchie White, go ahead.

MR. G. RITCHIE WHITE: Just out of curiosity, when the data is pushed to ACCSP, does law enforcement have immediate availability at that point?
CHAIR McKIERNAN: Toni or Caitlin.

MS. KERNS: Actually, Caitlin had a conversation with Mike Rinaldi about this question earlier today. I think it depends on how we build the platform in which you can view the data for the states, and for Law Enforcement Committee. I don't want to say it's immediate, Ritchie. That hasn't been done yet, and so that platform hasn't been built yet. It is our intention to provide the information as quickly as possible, but I don't want to promise that it's real time until we've built the platform. Julie or Mike, if you want to fill in from there, if you have something different, please do.

MS. SIMPSON: I would just second what you said. That was what I would have said.

CHAIR McKIERNAN: All right, David Borden.

MR. BORDEN: Thank you, Mr. Chairman, are you ready for a motion?

CHAIR McKIERNAN: I could be, although the last bullet that Caitlin has on the screen. I wonder if we should say for a state or federal waiver, because I'm thinking ultimately this may be up to NMFS, but maybe state and/or federal waiver, just to include the Service in that. But yes, otherwise I would be ready for a motion.

MR. BORDEN: Okay, so I would move to approve Draft Addendum XXIX for public hearing purposes as perfected by the discussion today.

CHAIR McKIERNAN: Is there a second?

MS. KERNS: You have Megan Ware.

CHAIR McKIERNAN: Very good, discussion on the motion.

MS. STARKS: Maya, could you modify the language of the motion so that it says move to approve Draft Addendum XXIX for public comment with the following modifications. The motion had "approve." Is this okay, David?

MR. BORDEN: That's an excellent perfection.

CHAIR McKIERNAN: All right, do we have any hands up to discuss the motion?

MS. KERNS: We do, we have David Borden with his hand up, and Dan, just before you vote, if you could read the motion into the record once we're ready that would be great.

CHAIR McKIERNAN: I would be happy to. David Borden, you want to speak to the motion?

MR. BORDEN: I had my hand up erroneously, Mr. Chair, thank you.

CHAIR McKIERNAN: Anyone else, Toni?

MS. KERNS: I see no hands.

CHAIR McKIERNAN: Shall I read it?

MS. KERNS: That would be fantastic, thank you.

CHAIR McKIERNAN: All right, here we go. **Move to approve Draft Addendum XXIX for public comment with the following modifications: Add language to prohibit tampering with devices. Add Area 5W permit to applicable permit table. Clarification of Section 2.2.5 on enforcement background.**

Provide a general range of costs of trackers/data. Questions about applicability of tracking requirements. Add language to specify how frequently vendors must PUSH data. Add option to allow for a state or federal waiver for permitted vessels to opt out of participating in the trap fishery. Motion by Mr. Borden, seconded by Ms. Ware.

CHAIR McKIERNAN: Is there any objection to the motion as presented?

MS. KERNS: I see no hands.

CHAIR McKIERNAN: Are there any abstentions?

MS. KERNS: I see no hands.

CHAIR McKIERNAN: Any null votes?

MS. KERNS: I see no hands.

CHAIR McKIERNAN: Then by unanimous consent the motion is approved, so thank you.

OTHER BUSINESS

CHAIR McKIERNAN: Any other business?

MS. KERNS: David Borden has his hand up.

CHAIR McKIERNAN: Go ahead, David.

MR. BORDEN: Yes, Mr. Chairman, as you know, this has been one of the issues which I have advocated for a long time as a mechanism for protecting the lobster industry, given what we all know about it, in which you eloquently characterized at the beginning. I would just like to go on record as thanking Caitlin, and Toni in particular.

But all of the technical people that supported them, I think they really did a wonderful job of putting this together. It was a labor of love, I'm sure, and difficult, given some of the guidance we gave them. But I think they really did an outstanding job, so thank you very much.

CHAIR McKIERNAN: I agree, David, well put. Any other business or any other comments to come before the Board?

MS. STARKS: Mr. Chair, I have one item I wanted to address with the Board if that is all right.

CHAIR McKIERNAN: Yes, please do.

MS. STARKS: I just wanted to let the Board know that I sent out the list of Jonah crab Stock Assessment Subcommittee members for Board approval via e-mail, and I did not receive any objections to that list of task members, so that list is approved.

CHAIR McKIERNAN: Great, thank you, Caitlin. All right, can I get a motion to adjourn?

MS. KERNS: Before you do, David, I just wanted to say one more piece. Thank you, David Borden for those comments. The Committee has been working really hard, and I do appreciate all the help that they have given us. I know Caitlin has e-mailed all the states on public hearings, and so just please continue to work with Caitlin as quickly as you can.

We would like to try to get a press release out once all of those hearings have been finalized on the approval of the addendum for public comment, so just a little pitch to try to solidify those hearings as quickly as possible, and for those members of the public that are here today, we're going to have definitely some virtual hearings, and perhaps a couple in-person ones.

CHAIR McKIERNAN: Great, thank you, Toni. Any motions to adjourn?

MS. KERNS: I'm waiting for a hand. I have motion to adjourn by Cheri Patterson.

CHAIR McKIERNAN: All right, a second.

MS. KERNS: Megan Ware.

CHAIR McKIERNAN: All right, thank you, no objections?

MS. KERNS: No hands.

ADJOURNMENT

CHAIR McKIERNAN: All right, this meeting is adjourned, thank you everyone, have a great holiday season, be safe, and thanks for your attendance today.

(Whereupon the meeting adjourned at 2:40 p.m. on December 6, 2021.)

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

November 30, 2021

Bob Beal
Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Dear Bob:

Acting within the authority granted under the Antiquities Act of 1906, President Biden issued a Proclamation on October 8, 2021, reinstating a prohibition on commercial fishing within the boundaries of the Northeast Canyons and Seamounts Marine National Monument, except for red crab and American lobster commercial fishing, which may be permitted until September 15, 2023. This new Proclamation reinstates the original prohibited and regulated activities within monument boundaries, consistent with the 2016 monument designation. This 2021 Proclamation also directed the Secretary of Commerce, in consultation with the Secretary of Interior, to manage the activities and species within the Monument under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable statutes. Both agencies are directed to prepare a joint management plan for the monument by September 15, 2023.

Therefore, by this letter, I am informing the Atlantic States Marine Fisheries Commission of our intent to work with the Mid-Atlantic and New England Fishery Management Councils to undertake an action to amend, as expeditiously as possible, all of their approved fishery management plans to reflect the action of the President and implement the appropriate fishing regulations for the Marine National Monument. We must also consult directly with the Commission, under the provisions of the Atlantic Coastal Fisheries Cooperative Management Act, in order to develop and implement necessary regulations for the American lobster and Jonah crab fisheries.

To support this effort, staff at the Greater Atlantic Regional Fisheries Office and the Northeast Fisheries Science Center have begun gathering the information and data necessary to implement the prohibitions and restrictions enumerated in the President's Proclamation. This process will culminate in Federal rulemaking consistent with the Magnuson-Stevens Act and the Administrative Procedure Act to issue new regulations amending the fishery management plans prepared by the Councils.

We have requested both Councils to take this issue up as a priority action in 2022. Should the Councils decline to take up this action, we would rely on the authority granted to the Secretary at section 304(c) of the Magnuson-Stevens Act to prepare such amendments as are necessary. As provided at section 304(c)(l)(A) of the Magnuson-Stevens Act, the Secretary may prepare an amendment to a fishery management plan if "the appropriate Council fails to develop and submit

to the Secretary ... any necessary amendment to such a plan."[1] Pursuant to the procedures required under the Magnuson-Stevens Act for such Secretarial action, we would, at a minimum, conduct public hearings and submit the proposed amendments to the Councils for consideration and comment.

In either case—Council-led amendments or Secretarial amendments—our objective is to complete the action and implement the necessary regulations within two years. In striving to meet this objective, we would seek to address prohibited and permitted activities, and to provide clear guidance for affected fisheries on operations within, transiting, or occurring near the Monument within the Magnuson-Stevens Act regulatory framework by which such fishing activities can be most effectively regulated.

We look forward to working with the Commission on this action as we move forward in 2022. Please contact Sarah Bland, Assistant Regional Administrator for Sustainable Fisheries, if you have any questions or would like to discuss further (Sarah.Bland@noaa.gov, 978-281-9257).

Sincerely,

Michael Pentony
Regional Administrator

[1] The full text of section 304(c), with respect to the Secretarial preparation of fishery management plans or amendments to such plans reads as follows:

> (c) Preparation and Review of Secretarial Plans.-(1) The Secretary may prepare a fishery management plan, with respect to any fishery, or any amendment to any such plan, in accordance with the national standards, the other provisions of this Act, and any other applicable law, if-(A) the appropriate Council fails to develop and submit to the Secretary, after a reasonable period of time, a fishery management plan for such fishery, or any necessary amendment to such a plan, if such fishery requires conservation and management; (B) the Secretary disapproves or partially disapproves any such plan or amendment, or disapproves a revised plan or amendment, and the Council involved fails to submit a revised or further revised plan or amendment; or (C) the Secretary is given authority to prepare such plan or amendment under this section.

Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM XXVII TO AMENDMENT 3 TO THE AMERICAN LOBSTER FISHERY MANAGEMENT PLAN FOR PUBLIC COMMENT

Increasing Protection of Spawning Stock in the Gulf of Maine/Georges Bank

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. However, comments on this draft document may be given at the appropriate time on the agenda during the scheduled meeting. Also, if approved, a public comment period will be established to solicit input on the issues contained in the document.

January 2022

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Public Comment Process and Proposed Timeline

In August 2017, the American Lobster Management Board (Board) initiated Draft Addendum XXVII to increase the resiliency of the Gulf of Maine/Georges Bank (GOM/GBK) stock. Work on this addendum was paused due to the prioritization of work on take reduction efforts for Atlantic right whales. The Board reinitiated work on Draft Addendum XXVII in February 2021, and has since revised the goal of the addendum to 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. This management action was initially in response to signs of reduced settlement and the combining of the GOM and GBK stocks following the 2015 Stock Assessment, and more recently in response to a continuation of those trends observed in the 2020 Stock Assessment. This document presents background on the Atlantic States Marine Fisheries Commission's management of lobster, the addendum process and timeline, a statement of the problem, and management measures for public consideration and comment.

The public is encouraged to submit comments regarding the proposed management options in this document at any time during the addendum process. The final date comments will be accepted is **Month, Day 2022 at 5:00 p.m**. **EST.** Comments may be submitted by mail, email, or fax. If you have any questions or would like to submit comments, please use the contact information below.

Mail: Caitlin Starks
Atlantic States Marine Fisheries Commission
1050 N. Highland St. Suite 200A-N
Arlington, VA 22201
Fax: (703) 842-0741

Email: comments@asmfc.org
(Subject line: Lobster Draft Addendum XXVII)

May – Dec 2021	Draft Addendum for Public Comment Developed
January 2022	Board Reviews Draft and Makes Necessary Changes
February 2022	Public Comment Period Including Public Hearings
May 2022	Board Reviews Public Comment, Selects Management Measures, Final Approval of Addendum XXVII
TBD	Implementation of Addendum XXVII Provisions

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1.0 Introduction

The Atlantic States Marine Fisheries Commission (ASMFC) has coordinated the interstate management of American lobster (*Homarus americanus)* from 0-3 miles offshore since 1996. American lobster is currently managed under Amendment 3 and Addenda I-XXVI to the Fishery Management Plan (FMP). Management authority in the Exclusive Economic Zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. The management unit includes all coastal migratory stocks between Maine and Virginia. Within the management unit there are two lobster stocks and seven management areas. The Gulf of Maine/Georges Bank (GOM/GBK) stock (subject of this draft addendum) is primarily comprised of three Lobster Conservation Management Areas (LCMAs), including LCMA 1, 3, and Outer Cape Cod (OCC) (Figure 1). There are three states (Maine through Massachusetts) which regulate American lobster in states waters of the GOM/GBK stock; however, landings from the GOM/GBK stock occur from Rhode Island through New York and these states regulate the landings of lobster in state ports.

The Board initiated Draft Addendum XXVII as a proactive measure to protect the GOM/GBK spawning stock. Since the early 2000's, landings in the GOM/GBK stock have exponentially increased. In Maine alone, landings have increased three-fold from 57 million pounds in 2000 to a record high of 132 million pounds in 2016. Maine landings have declined slightly but were still near time-series highs at 101.8 million and 96.6 million in 2019 and 2020, respectively. However, since 2012, lobster settlement surveys throughout the GOM have generally been below the time series averages in all areas. These surveys, which measure trends in the abundance of newly-settled and juvenile lobster, can be used to track populations and forecast future landings. Consequently, persistent lower densities of settlement could foreshadow decline in recruitment and landings. In the most recent years of the time series, declines in recruit indices have already been observed.

Given the American lobster fishery is one of the largest and most valuable fisheries along the Atlantic coast, potential decreases in abundance and landings could result in vast economic and social consequences. In 2016, the at-the-dock value of the American lobster fishery peaked at $670.4 million dollars, representing the highest ex-vessel value of any species landed along the Atlantic coast that year. Ex-vessel value has since declined slightly but not proportionally to declines in landings. The vast majority of the overall landings value (>90%) comes from the GOM/GBK stock, and more specifically from the states of Maine through Rhode Island. As a result, the lobster fishery is an important source of jobs (catch, dock side commerce, tourism, etc.) and income for many New England coastal communities. The lack of other economic opportunities, both in terms of species to fish and employment outside the fishing industry, compounds the economic reliance of some coastal communities on GOM/GBK lobster – particularly in Maine.

Draft Addendum XXVII responds to signs of reduced settlement and the combination of the GOM and GBK stocks following the 2015 Stock Assessment and the continuation of reduced settlement observed in the 2020 Stock Assessment. The Board specified the following objective statement for Draft Addendum XXVII:

***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*.**

Draft Addendum XXVII considers implementing management measures—specifically gauge and vent sizes—that are expected to add an additional biological buffer through the protection of spawning stock biomass (SSB). The addendum also considers immediate action upon final approval to standardize some management measures within and across LCMAs in the GOM/GBK stock. The purpose of considering more consistency in measures is to resolve discrepancies between the regulations for state and federal permit-holders, to provide a consistent conservation strategy, and simplify enforcement across management areas and interstate commerce.

2.0 Overview

2.1 Statement of Problem

While 2016 landings in the GOM/GBK lobster fishery were the highest on record, settlement surveys over the past five years have consistently been below the 75th percentile of their time series, indicating neutral or poor conditions. Additionally, there is evidence of declines in recruit abundance in ventless trap survey and trawl surveys for the GOM/GBK stock since the most recent stock assessment. These declines could indicate future declines in recruitment and landings. Given the economic importance of the lobster fishery to many coastal communities in New England, especially in Maine, potential reductions in landings could have vast socioeconomic impacts. In addition, the 2015 Stock Assessment combined the GOM and GBK stocks into a single biological unit due to evidence of migration between the two regions. As a result, there are now varying management measures within a single biological stock. In response to these two issues, the Board initiated Draft Addendum XXVII to consider the standardization of management measures across LCMAs.

However, in 2021, the Board revised the focus of Addendum XXVII to prioritize increasing biological resiliency of the stock over standardization of management measures across LCMAs. Increased resiliency may be achieved without completely uniform management measures, so the main objective of the Addendum is to increase the overall protection of SSB while also considering management options that are more consistent than status quo. Increasing consistency across management areas may help to address some assessment and enforcement challenges, as well as concerns regarding the shipment and sale of lobsters across state lines.

2.2 Status of the GOM/GBK Fishery

The GOM/GBK fishery has experienced incredible growth over the last two decades. Throughout the 1980s, GOM/GBK landings averaged 35 million pounds, with 91% of landings coming from the GOM portion of the stock. In the 1990s, landings slightly increased to an average of 53 million pounds; however, landings started to rapidly increase in the mid-2000s. Over a one year span (2003-2004), landings increased by roughly 18 million pounds to 86 million pounds. This growth continued through the 2000s with 97 million pounds landed in

2009 and 113 million pounds landed in 2010. Landings continued to increase and peaked at 156 million pounds in 2016 (Figure 2).

In the peak year of 2016, Maine alone landed 132.7 million pounds, representing an ex-vessel value of over $541 million. The states of Maine through Rhode Island (the four states that account for the vast majority of harvest from the GOM/GBK stock), landed 158 million pounds in 2016, representing 99% of landings coastwide. Total ex-vessel value of the American lobster fishery in 2016 was $670.4 million, the highest value recorded for the fishery and the highest valued fishery along the Atlantic coast in 2016. While landings and ex-vessel value have both declined slightly from peak levels in 2016, they remain near all-time highs. Coastwide landings and ex-vessel value for 2017-2020 averaged 133.2 million pounds and $591.5 million, respectively.

2.3 Status of the GOM/GBK Stock

2.3.1 *2020 Stock Assessment*

Results of the 2020 Benchmark Stock Assessment indicate a dramatic overall increase in the abundance of lobsters in the GOM/GBK stock since the late 1980s. After 2008, the rate of increase accelerated, and the stock reached a record high abundance level in 2018. Based on a new analysis to identify shifts in the stock that may be attributed to changing environmental conditions and new baselines for stock productivity, the GOM/GBK stock shifted from a low abundance regime during the early 1980s through 1995 to a moderate abundance regime during 1996-2008, and shifted once again to a high abundance regime during 2009-2018 (Figure 3). Spawning stock abundance and recruitment in the terminal year of the assessment (2018) were near record highs. Exploitation (proportion of stock abundance removed by the fishery) declined in the late 1980s and has remained relatively stable since.

Based on the new abundance reference points adopted by the Board, the GOM/GBK stock is in favorable condition. The average abundance from 2016-2018 was 256 million lobsters, which is greater than the fishery/industry target of 212 million lobsters. The average exploitation from 2016-2018 was 0.459, below the exploitation target of 0.461. Therefore the GOM/GBK lobster stock is not depleted and overfishing is not occurring.

Stock indicators based on observed data were also used as an independent, model-free assessment of the lobster stocks. These indicators included exploitation rates as an indicator of mortality; young-of-year (YOY), fishery recruitment, SSB, and encounter rates as indicators of abundance, and total landings, effort, catch per unit effort, and monetary measures as fishery performance indicators. Additionally, annual days with average water temperatures >20°C at several temperature monitoring stations and the prevalence of epizootic shell disease in the population were added as indicators of environmental stress. The 20°C threshold is a well-documented threshold for physiological stress in lobsters. Epizootic shell disease is considered a physical manifestation of stress that can lead to mortality and sub-lethal health effects.

While the stock assessment model and model-free indicators supported a favorable picture of exploitable stock health during the recent 2020 Stock Assessment, the assessment conversely

noted YOY indices did not reflect favorable conditions in recent years and indicate potential for decline in recruitment to the exploitable stock in future years (Table 1). Specifically, YOY indices in two of five regions were below the 25th percentile of the time series (indicating negative conditions) in the terminal year of the assessment (2018) and when averaged over the last five years (2014-2018); the remaining three regions were below the 75th percentile (indicating neutral conditions).

Mortality indicators generally declined through time to their lowest levels in recent years. Fishery performance indicators were generally positive in recent years with several shifting into positive conditions around 2010. Stress indicators show relatively low stress, but indicate some increasingly stressful environmental conditions through time, particularly in the southwest portion of the stock.

As recommended in the 2020 stock assessment, a data update process will occur annually to update American lobster stock indicators, including YOY settlement indicators, trawl survey indicators, and ventless trap survey indices. The first annual data update was completed in 2021 and the results are provided in Appendix A.

2.3.2 *YOY Surveys*

Since the terminal year of the assessment (2018), YOY indices have continued to show unfavorable conditions in the GOM/GBK stock. There have been sustained low levels of settlement observed from 2012 through the assessment and in the time period since the assessment terminal year in 2018. In Maine, 2019 and 2020 YOY indices were below the 75th percentile of their time series throughout all statistical areas sampled. In New Hampshire, sustained low levels of settlement have been seen from 2012 through 2020. In Massachusetts, the 2019 index was below the 25th percentile of its time series and rebounded slightly in 2020, but remained well below the 75th percentile.

Sustained and unfavorable YOY indices are concerning as they could foreshadow poor future year classes in the lobster fishery. Lobster growth is partially temperature-dependent and it is expected that it takes seven to nine years for a lobster to reach commercial size. Thus, decreased abundance of YOY lobsters today could foreshadow decreased numbers of lobsters available to the fishery in the future. Given there have been eight consecutive years of low YOY indices in the GOM, this trend may soon be reflected in the GOM/GBK stock. What is more concerning is that declines in the Southern New England (SNE) stock, which is currently at record low abundance, began with declines in YOY indices. Specifically, SNE YOY indices began to decline in 1995, two years before landings peaked in 1997, and roughly five years before landings precipitously declined in the early 2000's.

There are several hypotheses as to why the YOY indices have been low and what this could mean for the future of the GOM/GBK stock. One hypothesis is that declines in the YOY indices are reflecting a true decline in the newly-settled portion of the stock, and are related to declining food resources (specifically zooplankton). Carloni et al. (2018) examined trends in lobster larvae to explore linkages between SSB and YOY abundance. The study found a

significant increasing trend in stage I larval abundance consistent with the increases in SSB in the GOM. Planktonic postlarvae on the other hand, had a declining trend in abundance similar to trends for YOY settlement throughout western GOM. The study also found significant correlations between lobster postlarvae and the copepod *C. finmarchicus*, but there were no relationships with other zooplankton. This suggests recruitment processes in the GOM could be linked to larval food supply.

Declines in the YOY indices could also be an artifact of the lobster population moving further offshore. Recent work suggests warming in the GOM on the scale of decades has expanded thermally suitable habitat areas and played a significant role in the increase of observed settlement into deeper areas, particularly in the Eastern Gulf of Maine (Goode et al. 2019), so lobster settlement may be diluted across a greater area. Given the YOY surveys typically occur inshore, the surveys may be unable to account for increased abundance of YOY lobsters farther offshore. In an effort to test this theory, the TC looked at potential increases in the habitat available for recruitment in the GOM/GBK stock due to warming waters. Specifically, the TC calculated the quantity of habitat by depth in the GOM. Results showed that incremental increases in depth result in incremental increases in recruitment habitat and small observed decreases in recruit densities in shallow waters; there is no evidence that incremental increases in depth result in exponential increases in available habitat. In order for the diffusion of YOY lobsters over a larger area to completely explain the observed decreases in the YOY indices, the habitat available to recruitment would have to more than double. This suggests dilution effects from increased habitat availability alone are not sufficient to explain decreases in the YOY indices, and there are likely other changes occurring in the system.

2.3.3 *Ventless Trap Surveys and Trawl Surveys*

While YOY surveys have detected declines in the number of newly settled lobsters, results of the ventless trap survey (VTS) and trawl surveys, which encounter larger sized lobsters just before they recruit to the fishery, have only exhibited evidence of potential decline in the most recent years and interpretation of these trends are complicated by sampling restrictions and limited surveys in 2020 resulting from the COVID-19 pandemic. VTS indices show declines since peaking in 2016, especially in the eastern regions. The ME/NH Fall Trawl Survey, which was the only trawl survey to sample in 2020, showed a decline in recruit lobster abundance, while 2019 indices for other trawl surveys remained at high levels and were above the previous year for spring surveys but consistently below the 2018 levels for the fall surveys.

It is important to continue to closely monitor these surveys as marked decreases in the VTS and/or trawl surveys would confirm the declines seen in the YOY surveys.

2.4 Economic Importance of the American Lobster Fishery

Much of the concern regarding the declines in the lobster indices result from the vast economic importance of the lobster fishery to much of the GOM. For the states of Maine through Massachusetts, lobster is one of the most valuable fisheries and the large majority of landings come from the GOM/GBK stock.

For Maine, American lobster is an essential economic driver for the coastal economy. Lobster annually represents more than 75% of Maine's marine resource landings by ex-vessel value (79% in 2020). The landings and value peaked in 2016 with more than 132 million pounds harvested and provided more than $540 million dollars in ex-vessel value[1]. The lobster harvester sector includes more than 5,770 license holders of which 4,200 are active license holders who complete more than 270,000 trips a year selling to 240 active lobster dealers (Maine DMR, unpublished data). The lobster distribution supply chain contributes an additional economic impact of $1 billion annually ("Lobster to Dollars", 2018). Not included in these numbers are the vessel crew members and other associated businesses (bait vessels and dealers, boat builders, trap builders, and marine supply stores) that are essential in delivering lobsters to consumers worldwide, supporting the industry, and driving Maine's coastal communities.

The American lobster fishery is the most valuable commercial fishery in New Hampshire with an ex-vessel value of over $35 million in 2019, the last year prior to the economic impacts of the COVID-19 pandemic, and over $25 million in 2020. The value of lobster landed accounted for over 94% of the value of all commercial species landed in New Hampshire. The lobster fishery in New Hampshire includes over 300 licensed commercial harvesters, over 200 of which are active, who sold to more than 30 licensed lobster dealers (Renee Zobel, personal communication). The importance of the economic impact of the lobster fishery to New Hampshire is also seen in the over 450 businesses licensed to sell lobster to consumers at the retail level.

For Massachusetts, American lobster is the second most valuable fishery in terms of overall landings value, and the most valuable of all fisheries conducted within Massachusetts state waters. The total estimated value for annual lobster landings in Massachusetts has been over $85 million per year on average for 2015-2019. On average, landings from the GOM/GB stock make up 93% of the total lobster landings for Massachusetts; 70% of this comes from LCMA 1, 14% from LCMA 3, and 8% from LCMA OCC (Massachusetts DMF, unpublished data).

Though the state is not directly situated on the GOM, a significant contingent of the Rhode Island commercial lobster fleet harvests lobsters in GOM/GBK. In 2019 and 2020, approximately 30% of Rhode Island's commercial landings (2019: 604,459 pounds, 2020: 497,705 pounds) came from statistical areas in GOM/GBK. The estimated ex-vessel value for lobsters from this stock was approximately $3.8 million in 2019 and $2.9 million in 2020.

2.5 Current Management Measures in the GOM/GBK Stock

Lobster are currently managed under Amendment 3, and its 26 addenda. One of the hallmarks of Amendment 3 was the creation of seven LCMAs along the coast. The GOM/GBK stock is primarily comprised of LCMAs 1 and OCC as well as the northern half of LCMA 3. Each management area has a unique set of management measures. Table 2 shows the current measures for each area. Because the GOM/GBK stock is now assessed as a single area the result

[1] https://www.maine.gov/dmr/commercial-fishing/landings/documents/lobster.table.pdf

is a diverse suite of regulations for each LCMA within a single stock unit, creating challenges for assessing the impacts of management measures within the stock. Specifically, the minimum gauge size (the smallest size lobster that can be legally harvested) in LCMA 1 is 3 ¼" while it is $3^{3}/_{8}$" in LCMA OCC and $3^{17}/_{32}$" in LCMA 3. Likewise, the maximum gauge size (the largest size lobster that can be legally harvested) differs among the three areas, with a 5" maximum gauge size in LCMA 1, a 6 ¾" maximum gauge size in LCMA 3 and for federal permit holders in LCMA OCC, and no maximum gauge size for state-only OCC permit holders. V-notch definitions are inconsistent where LCMA 1 implements a no tolerance for possession of any size v-notch or mutation and LCMA 3 defines a v-notch as greater than $^{1}/_{8}$" with or without setal hairs while OCC has different definitions for federal permits (similar to LCMA 3) state only permits (> ¼" without setal hairs). V-notch requirements are also inconsistent, with LCMA 1 requiring all egg-bearing lobsters to be V-notched, LCMA 3 only requiring V-notching above 42°30' line, and no requirement in OCC.

Several concerns have been noted regarding the current management measures beyond these disparities. At the current minimum sizes, growth overfishing is occurring in the LCMAs within the GOM/GBK stock. Growth overfishing refers to the harvest of lobsters at sizes smaller than the size where their collective biomass (and fishery yield) would be greatest, and when they have very large scope for additional growth. This is demonstrated by the potential increases in catch weight associated with increasing the minimum gauge size (see Appendix B). In LCMA 1, most of the catch consists of individuals within one molt of minimum legal size, which results in a much smaller yield-per-recruit (YPR) than could be achieved if lobsters were allowed to survive and grow to larger sizes before harvest. While the size distribution of the lobsters harvested lobsters in LCMA 3 is much broader than inshore (the fishery is less recruit-dependent) there is still considerable potential for additional growth, and delaying harvest could increase yield per recruit in this region as well. Another concern is the loss of conservation benefit of measures across LCMA lines due to inconsistent measures between areas. The 2015 assessment combined the GOM and GBK areas into one stock because the NEFSC trawl survey showed evidence of seasonal exchange and migration of lobsters between areas. Loss of conservation benefit occurs when lobsters are protected in one area but can be harvested in another when they cross the LCMA boundaries.

2.6 Biological Benefits of Modifying Gauge Sizes

Of the existing biological management measures for the lobster fishery, the minimum and maximum gauge sizes are most likely to have biological impacts on the GOM/GBK stock and fishery. Analyses were performed by the American Lobster Technical Committee to evaluate the impacts of alternate minimum and maximum sizes for the LCMAs within the stock. For LCMA 1, analysis involved updating existing simulation models with more recent data to estimate the impacts of specific minimum and maximum gauge size combinations on total weight of lobsters landed, number of lobsters landed, SSB and exploitation. A separate analysis for LCMA 3 was performed due to concerns that the offshore fishery in LCMA 3 is considerably different from the inshore (which tends to drive stock-wide modelling results). For OCC, simulations were run with both LCMA 1 and LCMA 3 parameters because it is considered a transitional area. The full report on these analyses is included in Appendix B.

Based on these analyses, several general assumptions can be made about potential changes to the minimum and maximum gauge sizes. Increasing the minimum legal gauge size in LCMA 1 is projected to result in large increases in SSB; while increasing the minimum gauge size for LCMA 3 and OCC is projected to result in much smaller increases in SSB relative to LCMA 1. This is primarily because of the significantly larger magnitude of the LCMA 1 fishery and that the current minimum legal size in LCMA is significantly below the size at maturity; meanwhile, the current minimum gauge sizes in LCMA 3 and OCC are much closer to the size at maturity and, additionally, landings from these areas account for only a small fraction of the fishery. Minimum sizes that approach or exceed the size at maturity produce increasing returns on SSB as this allows a much larger portion of the population to reproduce at least once. Therefore, increasing minimum legal size in LCMA 1 to $3^{15}/_{32}$" (88 mm) is projected to result in a near doubling of SSB. This would significantly increase egg production potential and may provide some buffer against the effects of future changes in productivity. At the same time, this change would be expected to produce only marginal decreases in the total number of lobsters landed but result in a net increase in YPR and total weight of catch.

Generally, decreasing maximum gauge sizes is projected to have larger effects for LCMA 3 both relative to increasing the minimum size in LCMA 3 and to changing the maximum sizes for the other LCMAs. However, relative to increasing the minimum size in LCMA 1, the positive impact to the overall stock projected to result from decreasing the maximum gauge sizes in LCMA 3 and OCC is significantly smaller.

2.7 Potential Benefits of Increasing Consistency of Measures

Beyond the biological concerns for the GOM/GBK lobster stock, the disparities in the current measures also create challenges for stock assessment, law enforcement, and commerce. Increasing consistency among the measures for the LCMAs within the stock could have benefits in each of these areas, which are described in the following sections.

2.7.1 Stock Boundaries

A complicating factor in the management of lobster is that the boundaries of the LCMAs do not align with the biological boundaries of the stocks (GOM/GBK vs. SNE). This is particularly challenging in LCMA 3 which spans both GOM/GBK and SNE. The intricacy of the stock boundaries is further complicated by the fact that many vessels fishing out of Rhode Island and Massachusetts, which are harvesting lobsters on Georges Bank, must travel through the SNE stock area to reach their port of landing. In addition, these vessels may be permitted to fish in multiple management areas, including areas that span both lobster stocks.

To date, no Commission addendum has included a recommendation that Federal permits delineate which stock a harvester in LCMA 3 is eligible to fish. In addition, management actions responding to the decline in the SNE stock have been applied throughout LCMA 3. In this case, management measures targeting the GOM/GBK stock would also be applied to all LCMA 3 harvesters regardless of location and stock fished.

2.7.2 Improve Enforcement

A potential advantage of more consistent management measures is the ability to improve enforcement throughout the stock. Currently, disparate management measures hinder the ability for law enforcement to enforce various regulations in the lobster fishery. For example, vessels landing in Massachusetts harvest lobsters from four LCMAs, each of which has a different set of minimum gauge sizes (ranging from 3 ¼" to 3 $^{17}/_{32}$") and maximum gauge sizes (ranging from 5" to no maximum gauge size). As a result, at dealers only the most liberal measure can be implemented as a strict possession limit. The Law Enforcement Committee has continually recommended the use of standardized management measures in the lobster fishery, as inconsistent regulations mean that the least restrictive regulations becomes the enforceable standard once product leaves the dock. In addition, regulatory inconsistencies decrease the likelihood of successful prosecution of violators.

2.7.3 Interstate Shipment of Lobsters

Increasing consistency in regulations may also address concerns regarding the sale and shipment of lobsters across state lines. With decreased landings in SNE and expanding markets for the GOM/GBK stock, there has been increased demand for the shipment of lobsters across state lines. This movement of lobster can be complicated by the fact that the gauge sizes differ across LCMAs, and many states implement the minimum and maximum gauge sizes as possession limits rather than landing limits per state regulation or law. This means the gauge sizes apply to anyone in the lobster supply chain, not just harvesters. While these strict regulations improve the enforcement of gauge sizes, it can complicate interstate shipment of lobsters, particularly given the minimum size in LCMA 1 is smaller than the other management areas. As a result, some dealers must sort lobster by size in order to ship product across state lines.

Moving toward more consistent minimum sizes within the inshore LCMAs would help alleviate this issue by easing the ability of states to participate in the GOM/GBK lobster supply chain. This would not only reduce the burden on dealers that sort product by size but also enhance the enforcement of gauge sizes in the fishery.

3.0 Proposed Management Options

The following management options consider modifications to the management program with the goal of increasing protection of the GOM/GBK spawning stock. The final management program selected will apply to LCMAs 1, 3, and OCC.

- Issue 1 addresses the standardization of a subset of management measures within LCMAs and across the GOM/GBK stock.
- Issue 2 considers applying either a trigger mechanism or a predetermined schedule for implementing biological management measures that are expected to provide increased protection to the SSB.

3.1 Issue 1: Measures to be standardized upon final approval of Addendum XXVII

This issue considers options to modify some management measures immediately upon final approval of the Addendum to achieve more consistency in measures within and across LCMAs.

One option proposes to modify some of the OCC measures to address differing regulations for state and federal permit holders. Specifically, for state-permitted fisherman in state waters there is no maximum gauge size and the V-notch definition is $^1/_4$" without setal hairs. For federal permit holders, the maximum gauge size is 6 $^3/_4$" and the V-notch definition is $^1/_8$" with or without setal hairs. The disparity between regulations for different harvesters within the same area creates challenges for enforcement.

Options are also proposed to standardize V-notch regulations across the LCMAs within the GOM/GBK stock, as well as regulations related to the issuance of tags for trap tag losses. Uniformity in these measures would benefit enforcement and apply a consistent conservation strategy across the stock unit.

Option A: Status Quo
This option would maintain the current management measures for each LCMA at final approval of the addendum.

Option B: Standardized measures to be implemented upon final approval of addendum
The Board may select more than one of the below options. The states would be required to implement the selected management measures for the fishing year specified by the Board at final approval of the addendum.

- **Sub-option B1**: Upon final approval of the addendum, implement standardized measures within an LCMA to the most conservative measure where there are inconsistencies between state and federal regulations within GOM/GBK stock LCMAs. This would result in the maximum gauge being standardized to 6-3/4" for state and federal permit holders, and the V-notch possession definition being standardized to $^1/_8$" with or without setal hairs in OCC. This means harvest is prohibited for a female lobster with a V-shaped notch greater than $^1/_8$".
- **Sub-option B2**: Upon final approval of the addendum, implement a standard V-notch requirement across all LCMAs in the GOM/GBK stock. This would result in mandatory V-notching for all eggers in LCMA 1, 3, and OCC.
- **Sub-option B3**: Upon final approval of the addendum, implement a standard V-notch possession definition of $^1/_8$" with or without setal hairs for LCMAs 1, 3, and OCC. Any jurisdiction could implement more conservative regulations.
- **Sub-option B4:** Upon final approval of the addendum, standardize regulations across LCMAs 1, 3, and OCC 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.

3.2 Issue 2: Implementing management measures to increase protection of SSB

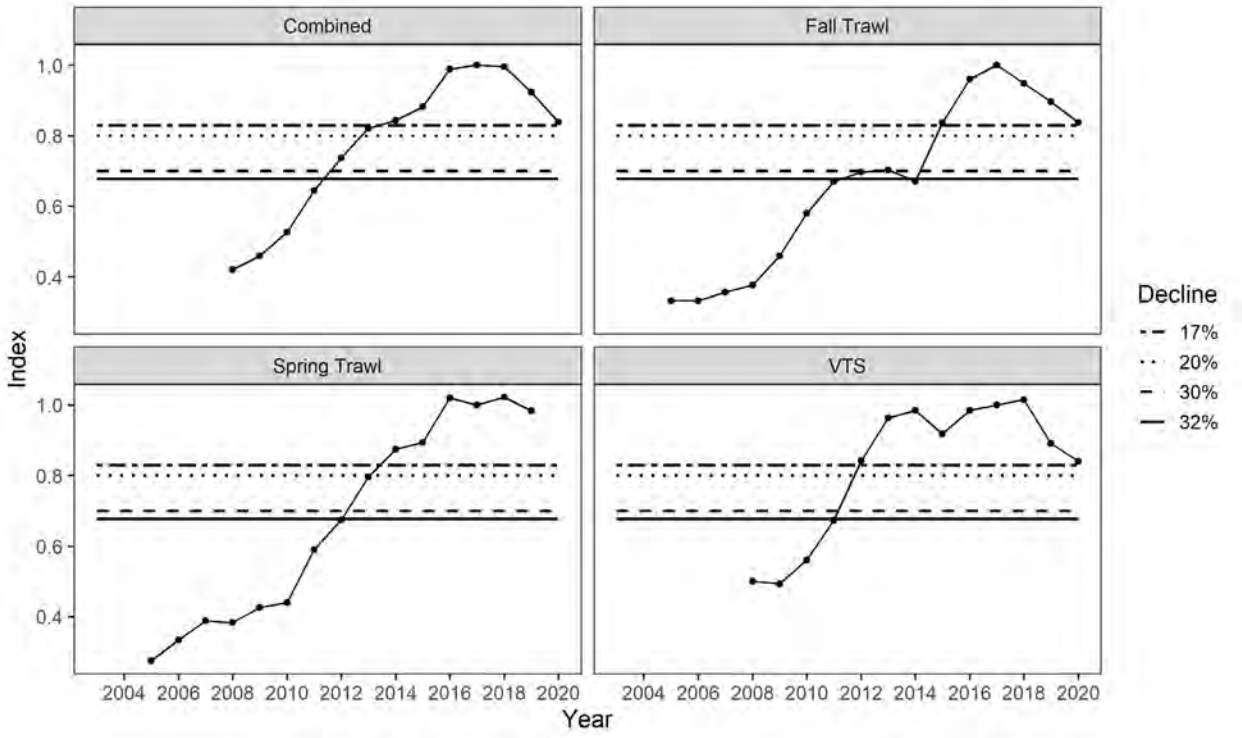
The primary objective of this action is to increase the protection of SSB in the GOM/GBK stock. The proposed options consider changes to the minimum and maximum gauge sizes along with corresponding vent sizes for the LCMAs within the stock. The proposed measures are expected to 1) increase SSB, and 2) result in the minimum gauge size increasing to meet or exceed the size at 50% maturity (L50) for each LCMA (LCMA 1: eastern GOM L50 = 88 mm, western GOM L50 = 83 mm, LCMA 3: Georges Bank L50 = 91 mm). Appendix B includes a full technical report of analysis performed to project the impacts of various gauge size combinations on total weight of lobsters landed, number of lobsters landed, SSB and exploitation.

This issue proposes two approaches for implementing management changes to increase protection of SSB. One approach, which is applied in Options A through D, is to establish a trigger mechanism whereby pre-determined management changes would be triggered upon reaching a defined trigger level based on observed changes in recruit (71-80 mm carapace length) abundance indices. The proposed mechanism includes establishing up to two management triggers based on recruit conditions observed in three surveys that were used to inform the assessment model estimates of reference abundance and stock status for the GOM/GBK stock. These recruit indices include: 1) combined ME/NH and MA spring trawl survey index, 2) combined ME/NH and MA fall trawl survey index, and 3) model-based VTS index.

Each management 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 index values from 2016-2018. The percent declines in the indices are expected to approximate comparable declines in overall abundance of the stock, and relate to the abundance reference points established by the Board. The analyses conducted to develop the trigger mechanism and evaluate its performance in appropriately triggering management are described in detail in Appendix C. Figure 1 (top left panel) shows the calculated trigger index compared to the four proposed trigger levels in this document.

A second approach, which is applied in Option E, is to establish a pre-determined schedule for future changes to the management measures. This approach is proactive in nature and addresses the issue of growth overfishing by increasing the minimum legal size while the stock conditions are favorable.

Figure 1. Scaled survey-specific indices and combined trigger index compared to proposed trigger levels. Top-left: combined trigger index which would be used to trigger changes in management measures. Top-right: moving three year average of fall trawl survey indices. Bottom-left: moving three year average of spring trawl survey indices. Bottom-right: moving three year average of VTS indices.



Option A: Status Quo
Under this option there would be no additional changes to the management measures for the LCMAs within the GOM/GBK stock beyond the option selected under Issue 1.

Option B: Gauge size changes triggered by 17% decline, and 32% decline in trigger index
This option would establish two triggers based on observed changes in indices of recruit abundance compared to the reference level of the trigger index. The first trigger point would be a change in the recruit abundance indices greater than or equal to a 17% decline from the reference abundance level (equal to the average of the index values from 2016-2018). Upon this trigger level being reached, the minimum gauge size for LCMA 1 would increase by $^{1}/_{16}$" from the current size (3¼") to $3^{5}/_{16}$" for the following fishing year. All other measures would remain status quo unless triggered by a change in recruit abundance indices. The second trigger point would be a change in the recruit abundance indices greater than or equal to a 32% decline from the reference abundance level. Upon this trigger level being reached, the minimum gauge size for LCMA 1 would increase again by $^{1}/_{16}$" from the $3^{5}/_{16}$" to $3^{3}/_{8}$" for the following fishing year, and the maximum gauge size in LCMA 3 and OCC would decrease to 6". The table below lists the management measures that would be automatically implemented when each trigger point is reached, with changes from the current measures in bold. The vent size in LCMA 1 would be adjusted once, corresponding with the final minimum gauge size

change associated with Trigger 2. The final gauge and vent size changes are expected to maintain similar retention rates of legal lobsters and protection of sub-legal sizes to the current gauge and vent sizes. The final vent size is also consistent with the current vent size used in SNE for the same minimum gauge size of $3\frac{3}{8}$".

Option B	LCMA 1	LCMA 3	OCC
Trigger 1 (17% decline)	**Minimum gauge: 3 5/16" (84 mm)** Maximum gauge: status quo, 5" Vent size: status quo	Minimum gauge: status quo, 3 17/32" (90 mm) Maximum gauge: status quo, 6 ¾" (171 mm) Vent size: status quo	Minimum gauge: status quo, 3 3/8" (86 mm) Max: status quo, 6 ¾" (171 mm) Vent size: status quo
Trigger 2 (32% decline)	**Minimum gauge: 3 3/8" (86 mm)** Maximum gauge: status quo **Vent size: 2 x 5 3/4" rectangular; 2 5/8" circular**	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo

The proposed increases to the minimum gauge sizes in LCMA 1 and OCC are expected to increase the proportion of the population protected from harvest by the fishery before being able to reproduce. The proposed decreases to the maximum gauge sizes in LCMA 3 and OCC are expected to enhance resiliency by placing forever protections on a small proportion of the population, including larger lobsters of both sexes.

Option C: Gauge size changes triggered by 20% decline, and 30% decline in trigger index
This option is identical to Option B above, with the exception of the trigger levels that would result in changes to the management measures. Under this option, the first trigger point would be a change in the recruit abundance indices greater than or equal to a 20% decline from the reference abundance level (equal to the average of the index values from 2016-2018), and the second trigger point would be a change in the recruit abundance indices greater than or equal to a 30% decline from the reference abundance level. The measures that would be implemented when each trigger level is reached are shown in the table below.

Option C	LCMA 1	LCMA 3	OCC
Trigger 1 (20% decline)	**Minimum gauge: 3 5/16" (84 mm)** Maximum gauge: status quo, 5" Vent size: status quo	Minimum gauge: status quo, 3 17/32" (90 mm) Maximum gauge: status quo, 6 ¾" (171 mm) Vent size: status quo	Minimum gauge: status quo, 3 3/8" (86 mm) Max: status quo, 6 ¾" (171 mm) Vent size: status quo

Trigger 2 (30% decline)	**Minimum gauge: 3 3/8" (86 mm)** Maximum gauge: status quo **Vent size: 2 x 5 3/4" rectangular; 2 5/8" circular**	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo

Option D: Gradual change in gauge sizes triggered by 17% decline in trigger index

This option considers establishing a trigger level which, upon being reached, would initiate a series of gradual changes in gauge sizes for the LCMAs in the GOM/GBK stock. The minimum gauge size would change in increments of 1/16", and the maximum gauge size would change in increments of ¼". The first change would be triggered by a change in the recruit abundance indices greater than or equal to a 17% decline from the reference abundance level (equal to the average of the index values from 2016-2018). Following this initial change, incremental changes to the gauge sizes would occur every other year. The gauge size changes that would be implemented at each step, and the final gauge sizes that would be reached for each area are shown in the table below. The vent size in LCMA 1 would be adjusted once, corresponding with the final minimum gauge size change in year 5. The final gauge and vent size changes are expected to maintain similar retention rates of legal lobsters and protection of sub-legal sizes to the current gauge and vent sizes. The final vent size is also consistent with the current vent size used in SNE for the same minimum gauge size of 3 3/8".

Option D	LCMA 1	LCMA 3	OCC
Current Measures (Year 0)	Minimum gauge: 3 ¼" Maximum gauge: 5" Vent size: status quo	Minimum gauge: 3 17/32" Maximum gauge: 6 ¾" Vent size: status quo	Minimum gauge: 3 3/8" Maximum gauge: 6 ¾" Vent size: status quo
Trigger 1 (17% decline) (Year 1)	**Minimum gauge: 3 5/16" (84 mm)** Maximum gauge: status quo Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6 ½"** Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6 ½"** Vent size: status quo
Intermediate gauge sizes (Year 3)	**Minimum gauge: 3 3/8" (86 mm)** Maximum gauge: status quo Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6 ¼"** Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6 ¼"** Vent size: status quo
Final gauge and vent sizes (Year 5)	Minimum gauge: 3 3/8" Maximum gauge: status quo **Vent size: 2 x 5 3/4" rectangular; 2 5/8" circular**	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo	Minimum gauge: status quo **Maximum gauge: 6"** Vent size: status quo

Option E: Scheduled changes to minimum gauge size in LCMA 1
This option considers establishing a predetermined schedule for implementing gradual changes to the minimum gauge and vent size in LCMA 1 to increase the SSB (see table below for the proposed changes). The first step increases the minimum gauge size in LCMA 1 by $^{1}/_{16}$" to $3^{5}/_{16}$" for the 2023 fishing year. In the final year of adjustments, the minimum gauge size in LCMA 1 would be increased to $3\ ^{3}/_{8}$" for the 2025 fishing year. The vent size in LCMA 1 would also be adjusted once, at the same time the final gauge size is implemented in 2025. The final gauge and vent size changes are expected to maintain similar retention rates of legal lobsters and protection of sub-legal sizes to the current gauge and vent sizes.

Option E	LCMA 1	LCMA 3	OCC
2023 fishing year measures	**Min: $3\ ^{5}/_{16}$" (84 mm)** Max: status quo Vent size: status quo	Min: status quo Max: status quo	Min: status quo Max: status quo
2025 fishing year measures	**Min: 3-3/8 (86 mm)** Max: status quo **Vent size: 2 x $5\ ^{3}/_{4}$" rectangular; $2\ ^{5}/_{8}$" circular**	Min: status quo Max: status quo	Min: status quo Max: status quo

3.3 Implementation of Management Measures in LCMA 3
Although only a portion of LCMA 3 encompasses the GOM/GBK stock (see Section 2.8 Stock Boundaries for additional information), any measures selected by the Board pertaining to LCMA 3 would apply to all LCMA 3 permit holders, including those that fish in the SNE stock.

Given the objective of this addendum is specific to protecting the GOM/GBK spawning stock, new management measures must either apply to all LCMA 3 harvesters regardless of location and stock fished (and therefore also impact the SNE fishery) or new measures would have to be stock (and geographic area) specific in order to only affect the GOM/GBK fishery. For example, an LCMA 3 harvester seeking to continue fishing in GOM/GBK would either have to declare and be permitted to fish within the GOM/GBK stock area to be held accountable, or opt to not participate in the GOM/GBK fishery to avoid the more restrictive measures. Applying the selected measures to only the GOM/GBK portion of LCMA 3 would create a significant administrative burden to appropriately divide LCMA 3 in a way to minimize impacts and issue permits and enforce measures based on this division. In addition, dividing LCMA3 creates potential for confusion and noncompliance among LCMA 3 permit holders, particularly as there are other ongoing activities in this area affecting a permit holder's fishing plans, including closures for protected species, development of other ocean uses, and the overlap with the Jonah crab fishery. To date, there have been no Commission addenda that included a recommendation that Federal permits specify the stock area in which an LCMA 3 harvester is eligible to fish.

Applying the measures across the entire management area is consistent with previous changes to the management measures in LCMA 3. When several addenda implemented reductions in

fishing capacity (Addendum XVIII) and the Area 3 conservation tax (Addendum XIX) to address the declining condition of the SNE stock, the measures were also applied to the GOM/GBK portion of LCMA 3, which was not overfished nor experiencing overfishing. Though the impacts of the proposed measures on the SNE stock and fishery have not been analyzed, it is likely that the proposed changes would have only trivial negative impacts to catch and positive impacts to SSB considering the current depleted status of the stock.

4.0 Compliance

If the existing FMP is revised by approval of this draft addendum, the American Lobster Management Board will designate dates by which states will be required to implement the provisions included in the addendum. A final implementation schedule will be identified based on the management tools chosen.

5.0 Recommendations for Actions in Federal Waters

The management of American lobster in the EEZ is the responsibility of the Secretary of Commerce through the National Marine Fisheries Service. The Atlantic States Marine Fisheries Commission recommends that the federal government promulgate all necessary regulations in Section 3.0 to implement complementary measures to those approved in this addendum.

6.0 References

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Steneck, R. S., Hughes, T. P., Cinner, J. E., Adger, W. N., Arnold, S. N., Berkes, F., Boudreau, S. A., Brown, K., Folke, C., Gunderson, L., Olsson, P., Scheffer, M., Stephenson, E., Walker, B., Wilson, J., and B. Worm. 2011. Creation of a Gilded trap by the High Economic Value of the Maine Lobster Fishery. *Conservation Biology,* 25(5):904-912.

7.0 Tables and Figures

Table 1. Existing LCMA specific management measures.

Mgmt. Measure	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	OCC
Min Gauge Size	3 1/4"	3 3/8"	3 17/32"	3 3/8"	3 3/8"	3 3/8"	3 3/8"
Vent Rect.	1 15/16 x 5 3/4"	2 x 5 3/4"	2 1/16 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"
Vent Cir.	2 7/16"	2 5/8"	2 11/16"	2 5/8"	2 5/8"	2 5/8"	2 5/8"
V-notch requirement	Mandatory for all eggers	Mandatory for all legal size eggers	Mandatory for all eggers above 42°30'	Mandatory for all eggers in federal waters. No V-notching in state waters.	Mandatory for all eggers	None	None
V-notch Definition[1] (possession)	Zero Tolerance	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	State Permitted fisherman in state waters 1/4" without setal hairs Federal Permit holders 1/8" with or w/out setal hairs[1]
Max. Gauge (male & female)	5"	5 ¼"	6 3/4"	5 ¼"	5 ¼"	5 ¼"	State Waters none Federal Waters 6 3/4"
Season Closure				April 30-May 31[2]	February 1-March 31[3]	Sept 8-Nov 28[4]	February 1-April 30

Table 2. GOM/GBK model-free indicators for the 2020 Stock Assessment. The left table shows the GOM spawning stock abundance, the right table shows GBK spawning stock abundance.

SPAWNING STOCK ABUNDANCE Mean weight (g) per tow of mature females						
Survey	NESFC		ME/NH		MA 514	
	fall	spring	fall	spring	fall	spring
1981	175.32	400.28			502.65	430.53
1982	39.45	113.58			626.48	151.21
1983	206.03	234.21			844.76	67.08
1984	234.64	443.81			593.77	126.47
1985	499.62	2771.23			919.56	93.81
1986	267.97	502.99			231.88	112.97
1987	85.35	497.40			194.34	148.62
1988	186.56	244.92			200.58	88.14
1989	325.69	247.15			293.61	230.26
1990	216.65	516.20			1048.72	241.94
1991	247.11	430.56			335.80	165.54
1992	193.95	453.31			512.83	212.89
1993	284.34	484.30			120.59	229.72
1994	430.32	720.67			783.17	285.01
1995	464.96	390.15			520.26	171.71
1996	734.25	872.53			569.39	156.53
1997	568.34	1083.76			235.18	114.78
1998	381.81	1182.44			282.79	170.21
1999	1444.07	807.41			365.53	282.12
2000	585.66	1281.05	4430.55		533.40	236.55
2001	511.25	1498.42	2446.85	690.89	165.74	235.85
2002	1789.42	2022.04	4638.64	1436.34	324.34	175.73
2003	985.93	2343.63	3949.63	1226.05	129.67	72.99
2004	685.89	2773.35	3610.67	907.07	120.27	259.35
2005	465.35	1670.29	4805.25	1990.08	248.23	489.12
2006	681.87	1810.96	3698.94	1327.93	240.27	410.97
2007	445.78	1536.47	3163.24	1437.85	176.95	139.94
2008	805.10	1894.91	4080.36	1107.00	559.70	300.35
2009	1787.92	1864.92	6906.45	1747.30	630.52	219.83
2010	2850.60	2476.79	5793.51	1886.61	1424.75	211.52
2011	2317.94	2089.39	6169.40	2013.80	1268.44	267.51
2012	3215.29	3516.38	4174.85	2287.55	889.87	124.81
2013	3299.56	2499.71	5363.14	2007.92	1135.54	300.86
2014	4979.28	3083.09	5891.58	3010.73	768.88	382.81
2015	3553.44	3665.39	8488.62	2233.05	1947.04	418.46
2016	3692.26	5142.42	7691.01	2613.49	3712.66	1119.26
2017	3274.69	6566.80	4629.68	2530.74	2309.44	564.30
2018	2093.20	3555.09	5242.34	2005.07	2782.55	550.68
2014-2018 mean	3518.57	4402.56	6388.65	2478.62	2304.11	607.10
25th	272.06	487.57	4015.00	1355.03	242.26	149.27
median	539.79	1389.74	4638.64	1938.34	526.83	224.78
75th	1789.05	2443.50	5842.54	2178.24	878.60	296.52

SPAWNING STOCK ABUNDANCE Mean weight (g) per tow of mature females		
Survey	NESFC	
	fall	spring
1981	707.14	69.71
1982	670.07	123.96
1983	643.84	152.05
1984	397.33	45.17
1985	504.87	39.00
1986	491.96	307.05
1987	537.31	113.27
1988	695.27	307.49
1989	933.18	161.43
1990	761.64	103.62
1991	848.03	164.32
1992	817.25	213.11
1993	626.81	126.03
1994	774.61	41.77
1995	939.85	71.74
1996	1051.09	482.61
1997	754.00	62.46
1998	993.56	64.67
1999	1363.68	395.66
2000	945.69	132.57
2001	1756.38	313.41
2002	2183.80	341.90
2003	1030.19	842.92
2004	1557.16	298.95
2005	1404.20	491.00
2006	2123.43	465.72
2007	1859.53	728.26
2008	3074.33	1827.61
2009	3703.99	1336.34
2010	2120.51	1126.52
2011	4681.76	1113.11
2012	2696.38	1510.08
2013	2530.26	1369.39
2014	3012.69	1833.98
2015	3743.71	1509.13
2016	3020.98	2138.96
2017	6627.18	3749.60
2018	9630.86	725.09
2014-2018 mean	5207.09	1991.35
25th	755.91	124.47
median	1040.64	310.45
75th	2443.64	1045.56

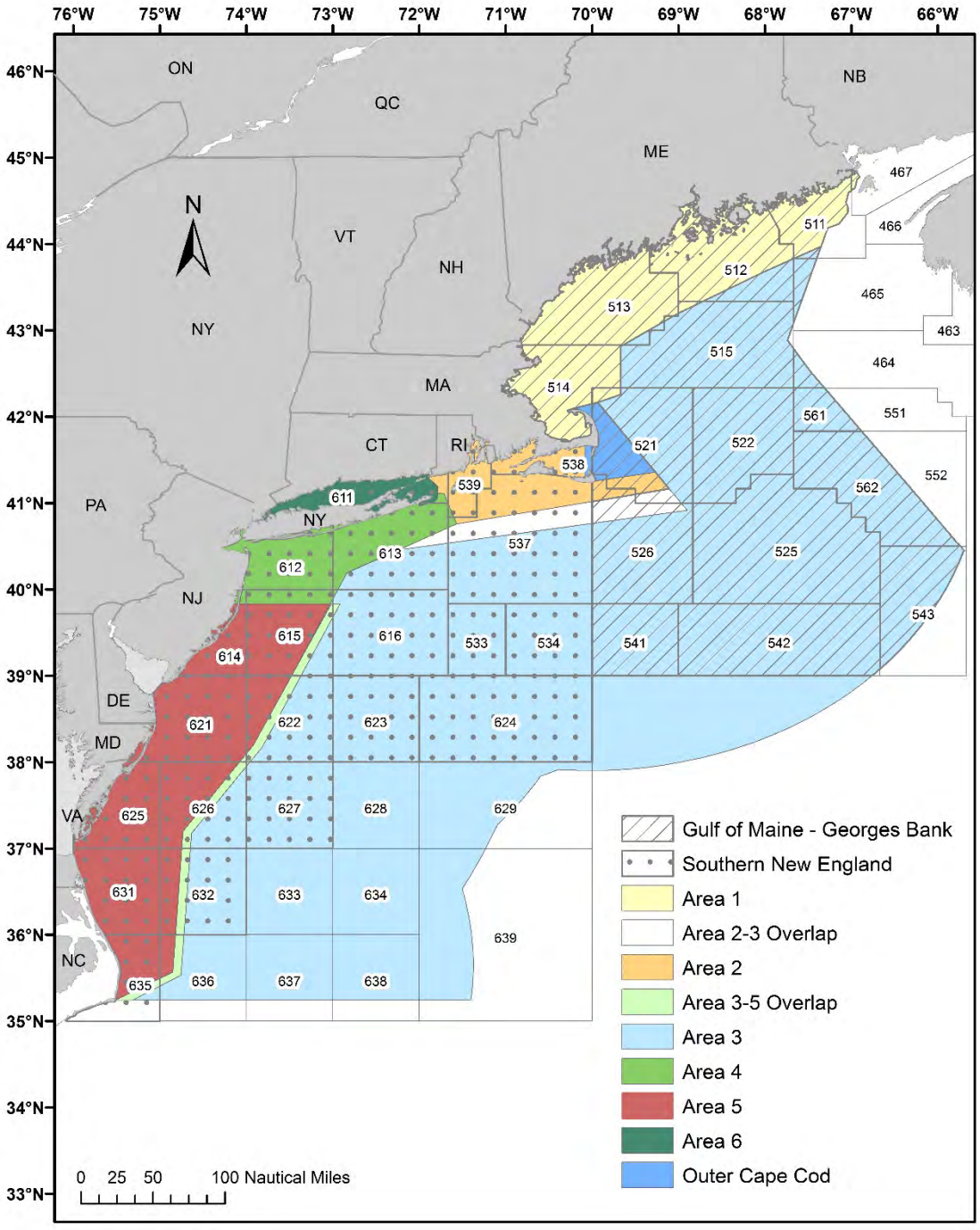

Figure 1. Lobster conservation management areas (LCMAs) in the American lobster fishery. LCMAs 1, 3, and OCC make of the majority of the GOM/GBK stock.

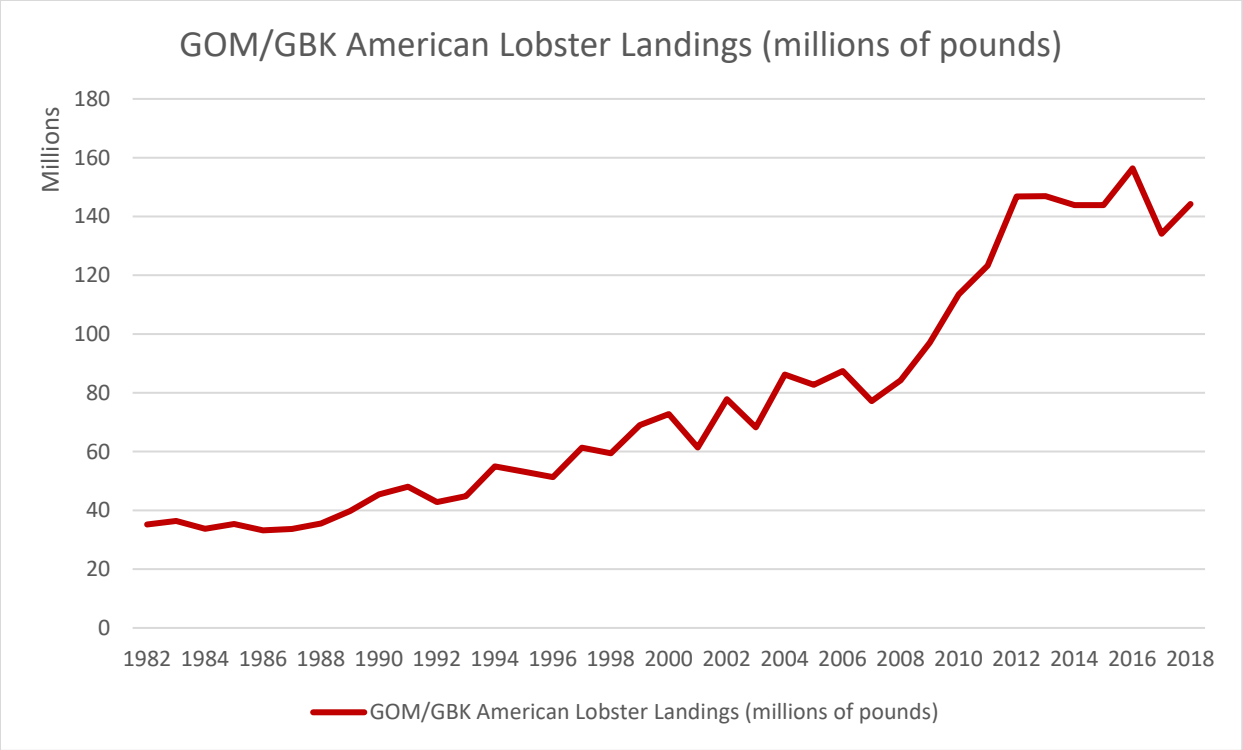

Figure 2. Landings in the GOM/GBK stock (1982-2018). Stock specific landings are updated during each benchmark stock assessment.

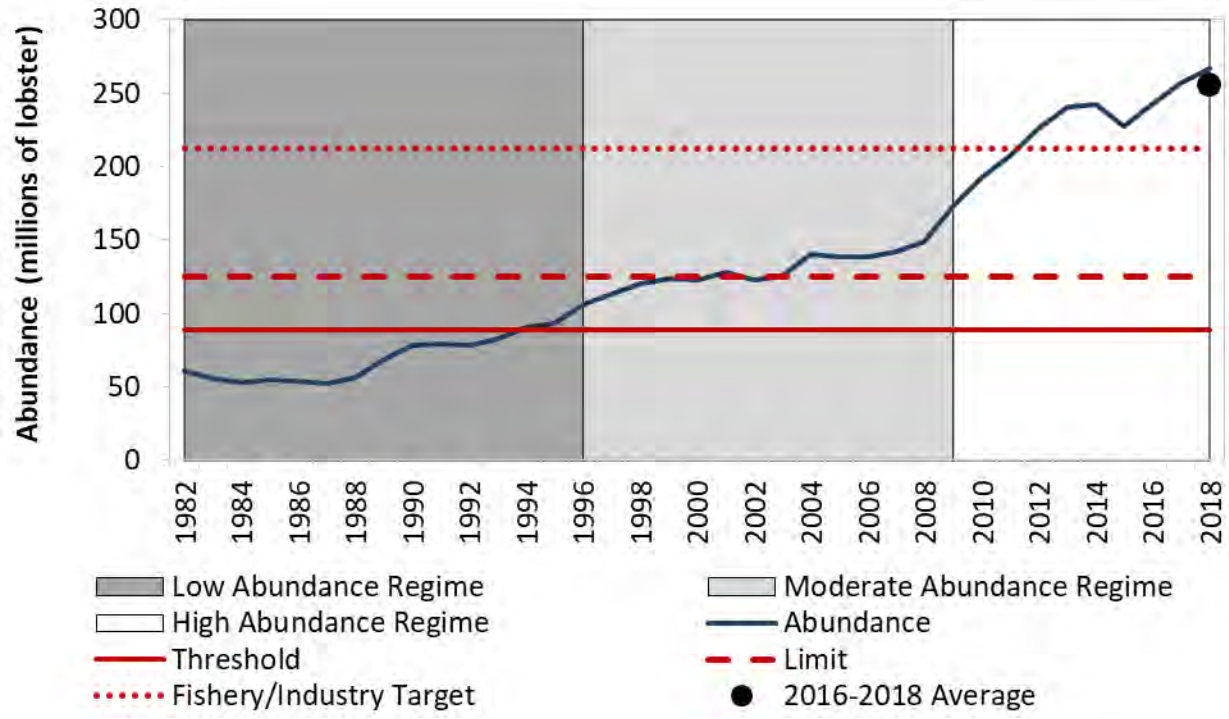

Figure 3. Stock abundance

Appendix A. 2021 Annual Data Update of American Lobster GOM/GBK Stock Indicators

Background

An annual Data Update process between American lobster stock assessments was recommended during the 2020 stock assessment to more closely monitor changes in stock abundance. The objective of this process is to present information—including any potentially concerning trends—that could support additional research or consideration of changes to management. Data sets recommended for this process were generally those that indicate exploitable lobster stock abundance conditions expected in subsequent years and include:

- YOY settlement indicators
- Trawl survey indicators, including recruit abundance (71-80 mm carapace length lobsters) and survey encounter rate
- Ventless trap survey sex-specific model-based abundance indices (53 mm+ carapace length lobsters)

For this first Data Update, data sets were updated with data since the stock assessment (i.e., 2019 and 2020). Indicator status (negative, neutral, or positive – see table below) was determined relative to the percentiles of the stock assessment time series (i.e., data set start year through 2018).

Indicator	< 25th percentile	Between 25th and 75th percentile	> 75th percentile
YOY settlement (larval or YOY)	Negative	Neutral	Positive
Trawl survey recruit abundance	Negative	Neutral	Positive
Trawl survey encounter rate	Negative	Neutral	Positive
Ventless trap survey abundance	Negative	Neutral	Positive

The five year means provided during the stock assessment (2014-2018) for terminal indicator status determinations were also updated with the new years of data. This treatment of data is consistent with the stock indicators provided during stock assessments (see Section 5 in the stock assessment report for more detail) with two important notes. First, the ventless trap survey abundance indices have not been presented as stock indicators in past assessments due to concerns that the short time series is not representative of the stock's productivity potential. These indices are included in this Data Update, along with the other data sets, specifically to show changes in stock conditions since the 2020 stock assessment. The Technical Committee recommended these indices be presented as indices by NOAA statistical area. Stratification of the ventless trap survey was designed around these statistical areas, unlike the trawl surveys, and these indices provide better spatial resolution to examine abundance trends within the stock boundary. The ventless trap survey index model developed during the stock assessment was structured to estimate stockwide indices and has not been evaluated for estimating indices by statistical area, so these indices are design-based calculations as opposed to model-based indices originally recommended for the Data Update process. Second, the covid-19 pandemic had substantial impacts on data collection in 2020 and many of the trawl surveys providing these data sets did not sample which impacts the updated five year means provided in the results. Below are the results of the data updates by sub-stock.

Results

Gulf of Maine (GOM)

- YOY conditions showed improvements, but were still not positive (Table 1 and Figure 1).

  - Updated five year means were all neutral, whereas two of five were negative during the stock assessment.
  - All 2019 and 2020 values were neutral except the MA 514 value in 2019 which was negative.
- Trawl survey recruit abundance indicators showed positive conditions similar to conditions during the stock assessment (Table 2 and Figure 2).
  - Five of six indicators were not available for 2020 due to covid-19 sampling restrictions.
  - Updated five year means were all positive, as they were during the stock assessment.
  - The only value available for 2020 (ME/NH Fall) was the first neutral annual value observed since 2015.
  - Fall indicators tended to show declining trends in the last few years of available data that were not apparent in spring indicators.
- Trawl survey encounter rates were similar to conditions during the stock assessment, but did show some deterioration from positive to neutral conditions (Table 3 and Figure 3).
  - Five of six indicators were not available for 2020 due to covid-19 sampling restrictions.
  - Three of six updated five year means were neutral, whereas only one was neutral during the stock assessment. All others were positive.
- Ventless trap survey indices showed abundance declining since the stock assessment (Table 4 and Figure 4).
  - Six of eight updated five year means were neutral, whereas only four of eight were neutral during the stock assessment. All others were positive.
  - The two positive updated five year means were for the two sexes in the northern-most statistical area (511). Despite the positive means, the 2020 values for both sexes showed strong declines to neutral conditions.
  - The female survey value in 2020 and the male value in 2019 and 2020 in the southern-most statistical area (514) were negative, the first negative values observed in the stock since 2014.

Georges Bank (GBK)

- Trawl survey recruit abundance indicators showed deteriorating conditions since the stock assessment (Table 5 and Figure 5).
  - No indicators were available for 2020 due to covid-19 sampling restrictions.
  - Updated means for one of the two indicators changed from neutral to negative. Both were neutral during the stock assessment.
  - These indicators tend to be noisier than some of the other abundance indicators, with high interannual variability and lack of discernible trends.
- Trawl survey encounter rates were positive and similar to conditions during the stock assessment (Table 6 and Figure 6).
  - No indicators were available for 2020 due to covid-19 sampling restrictions.
  - Updated means for both indicators were positive. This is unchanged from the stock assessment.

Tables and Figures

Table 1. GOM abundance indicators: YOY indices.

YOUNG-OF-YEAR INDICES					
Survey	*ME*				*MA*
	511	*512*	*513 East*	*513 West*	*514*
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989			1.64		
1990			0.77		
1991			1.54		
1992			1.30		
1993			0.45		
1994			1.61		
1995		0.02	0.66		1.01
1996		0.05	0.47		0.00
1997		0.05	0.46		0.10
1998		0.00	0.14		0.03
1999		0.04	0.65		0.43
2000	0.00	0.10	0.13	0.17	0.07
2001	0.24	0.43	2.08	1.17	0.43
2002	0.13	0.29	1.38	0.85	1.00
2003	0.22	0.27	1.75	1.22	0.78
2004	0.18	0.36	1.75	0.67	1.13
2005	1.59	1.36	1.77	0.82	1.11
2006	0.58	1.13	0.84	0.82	0.46
2007	0.84	1.34	2.01	1.27	1.38
2008	0.42	0.83	1.08	0.97	0.33
2009	0.69	0.48	1.25	0.45	0.17
2010	0.28	0.72	0.80	0.47	0.50
2011	0.41	1.10	2.33	0.67	0.64
2012	0.53	0.73	1.06	0.22	0.09
2013	0.10	0.20	0.48	0.12	0.00
2014	0.16	0.43	0.83	0.33	0.11
2015	0.11	0.22	0.43	0.05	0.00
2016	0.13	0.21	0.47	0.12	0.08
2017	0.16	0.36	0.70	0.20	0.08
2018	0.27	0.32	0.71	0.20	0.03
2014-2018 mean	0.17	0.31	0.63	0.18	0.06
2019	0.42	0.61	1.03	0.35	0.06
2020	0.29	0.49	1.17	0.25	0.19
2016-2020 mean	0.25	0.40	0.82	0.23	0.09
25th	0.15	0.18	0.52	0.20	0.08
median	0.24	0.34	0.84	0.47	0.25
75th	0.48	0.72	1.59	0.84	0.67

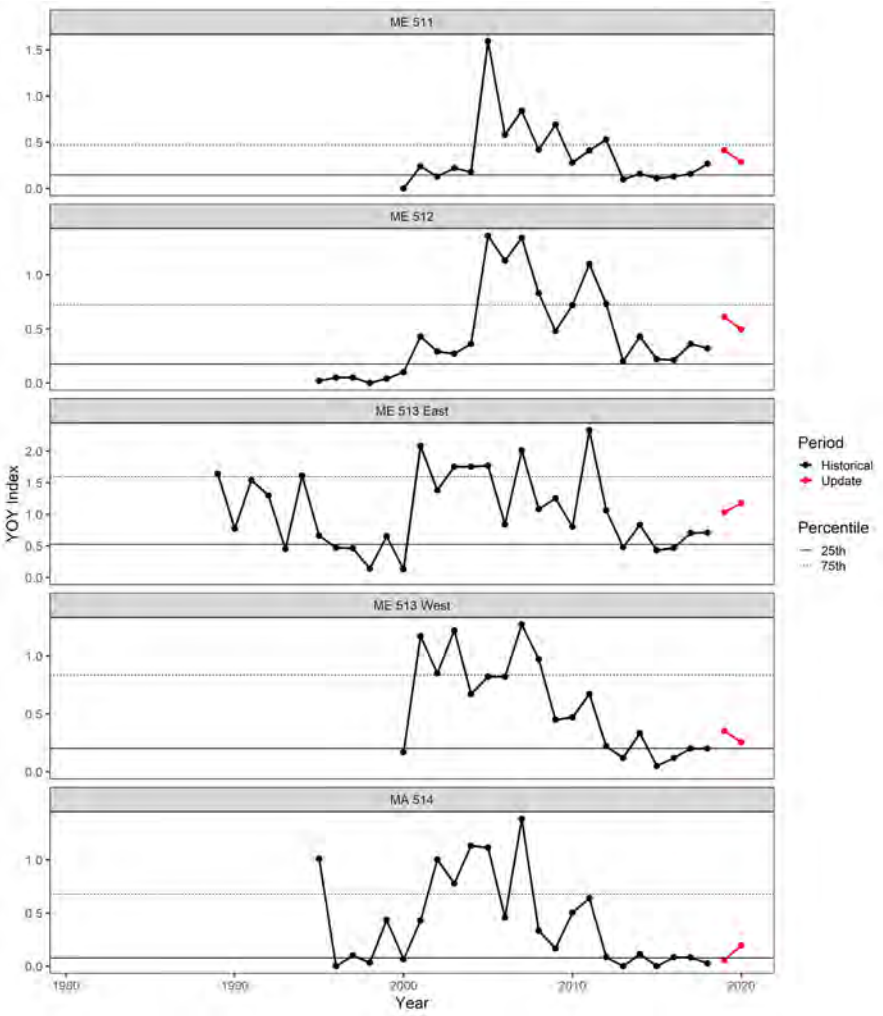

Figure 1. GOM abundance indicators: YOY indices.

Table 2. GOM abundance indicators: trawl survey recruit abundance.

RECRUIT ABUNDANCE (SURVEY)						
Abundance of lobsters 71 - 80 mm CL (sexes combined)						
Survey	*NEFSC*		*ME/NH*		*MA 514*	
	Spring	*Fall*	*Spring*	*Fall*	*Spring*	*Fall*
1981	0.13	0.06			6.43	4.80
1982	0.29	0.42			2.77	3.89
1983	0.28	0.90			1.77	9.71
1984	0.20	0.31			2.17	6.13
1985	0.14	1.41			4.44	9.50
1986	0.27	1.29			2.99	3.83
1987	0.67	0.57			2.42	1.17
1988	0.67	1.21			2.50	4.14
1989	0.00	1.61			4.45	7.53
1990	0.27	1.76			6.12	15.36
1991	0.55	1.41			2.74	7.55
1992	0.50	1.37			4.32	9.01
1993	0.25	0.86			5.14	3.20
1994	0.15	2.75			7.54	13.87
1995	1.45	1.44			4.55	12.18
1996	0.76	4.59			3.11	11.96
1997	2.02	2.12			4.59	6.48
1998	1.59	2.16			4.52	7.54
1999	1.51	3.01			4.25	8.73
2000	4.64	3.01		24.09	4.25	8.89
2001	1.05	1.51	9.28	17.81	4.31	1.59
2002	1.08	1.91	22.00	22.41	3.41	5.00
2003	1.41	0.36	10.65	18.32	1.96	0.67
2004	0.84	2.26	7.55	12.29	2.47	1.30
2005	0.34	0.87	18.51	25.90	4.40	2.12
2006	2.17	1.27	18.07	18.30	6.09	5.29
2007	1.62	0.64	15.91	16.82	0.77	1.58
2008	0.99	2.41	17.88	31.61	2.54	6.14
2009	4.88	4.90	24.72	32.67	3.20	8.91
2010	2.98	4.53	17.66	37.35	2.20	9.53
2011	10.27	11.83	39.25	46.09	5.24	14.98
2012	11.25	6.74	36.55	37.12	3.03	11.35
2013	10.93	18.12	34.50	37.86	4.82	12.16
2014	11.66	21.54	50.79	41.95	3.35	7.05
2015	14.44	17.89	38.51	67.99	7.09	17.86
2016	13.25	22.54	50.83	60.07	13.58	17.41
2017	15.74		48.42	48.13	7.85	13.63
2018	14.15	15.87	42.77	55.84	5.25	25.62
2014-2018 mean	13.84	19.46	46.27	54.80	7.43	16.31
2019	16.69	7.62	46.37	50.85	10.78	14.61
2020				34.65		
2016-2020 mean	14.95	15.34	47.10	49.91	9.37	17.82
25th	0.30	1.21	17.72	20.36	2.75	4.30
median	1.07	1.76	23.36	32.67	4.28	7.55
75th	4.23	4.53	39.07	44.02	5.06	11.81

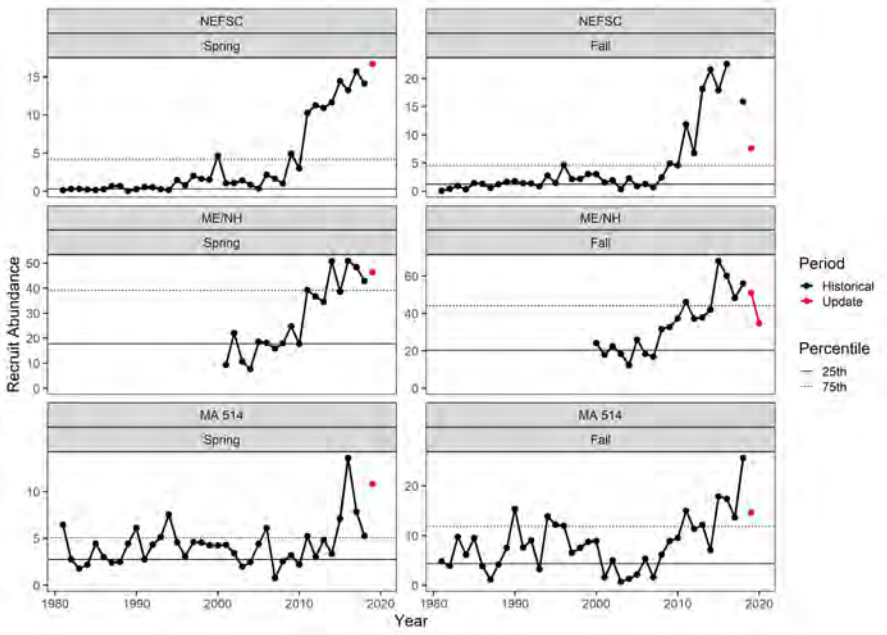

Figure 2. GOM abundance indicators: trawl survey recruit abundance.

Table 3. GOM abundance indicators: trawl survey encounter rate.

SURVEY LOBSTER ENCOUNTER RATE						
Proportion of postive tows						
Survey	*NEFSC*		*ME/NH*		*MA 514*	
	Spring	*Fall*	*Spring*	*Fall*	*Spring*	*Fall*
1981	0.44	0.25			0.86	0.73
1982	0.34	0.18			0.50	0.70
1983	0.26	0.33			0.76	0.76
1984	0.28	0.36			0.76	0.76
1985	0.38	0.49			0.71	0.67
1986	0.33	0.47			0.68	0.83
1987	0.43	0.24			0.85	0.54
1988	0.31	0.30			0.76	0.58
1989	0.19	0.35			0.78	0.95
1990	0.41	0.32			0.86	0.95
1991	0.42	0.32			0.87	0.94
1992	0.40	0.24			0.93	0.77
1993	0.41	0.39			0.97	0.82
1994	0.45	0.40			1.00	0.93
1995	0.41	0.37			0.93	0.93
1996	0.54	0.54			0.91	0.96
1997	0.64	0.35			0.93	0.86
1998	0.52	0.40			0.76	0.69
1999	0.51	0.42			0.73	0.91
2000	0.63	0.42		0.94	0.93	0.98
2001	0.57	0.40	0.88	0.86	0.93	0.72
2002	0.75	0.53	0.94	0.95	0.91	0.73
2003	0.69	0.44	0.92	0.85	0.82	0.55
2004	0.87	0.31	0.89	0.86	0.84	0.56
2005	0.77	0.36	0.95	0.91	0.95	0.67
2006	0.72	0.60	0.93	0.93	0.91	0.88
2007	0.72	0.43	0.97	0.85	0.51	0.54
2008	0.84	0.49	0.92	0.86	0.83	0.75
2009	0.82	0.63	0.98	0.92	0.89	0.87
2010	0.85	0.75	0.98	0.96	0.87	0.98
2011	0.83	0.74	0.99	0.96	0.89	0.85
2012	0.86	0.78	0.98	0.98	0.91	0.95
2013	0.87	0.73	1.00	0.93	0.96	0.96
2014	0.90	0.71	1.00	0.99	0.79	0.96
2015	0.93	0.69	1.00	0.96	0.98	0.95
2016	0.94	0.75	1.00	0.96	0.96	0.97
2017	0.86		0.99	0.94	0.84	0.98
2018	0.86	0.71	0.98	0.96	0.84	0.90
2014-2018 mean	0.90	0.72	0.99	0.96	0.88	0.95
2019	0.83	0.71	0.99	0.95	0.85	0.93
2020				0.96		
2016-2020 mean	0.87	0.72	0.99	0.95	0.87	0.94
25th	0.41	0.35	0.93	0.89	0.78	0.72
median	0.60	0.42	0.98	0.94	0.86	0.86
75th	0.84	0.60	0.99	0.96	0.93	0.95

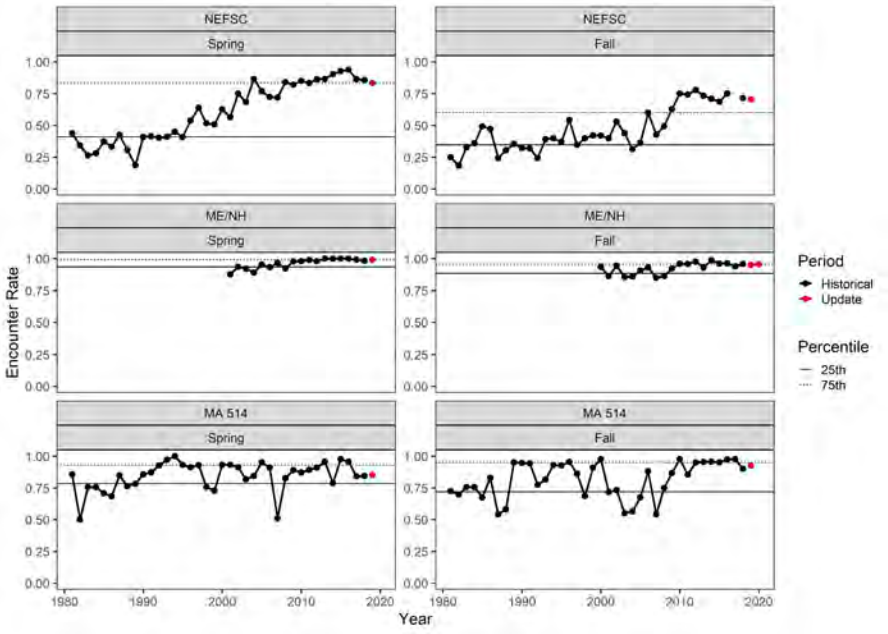

Figure 3. GOM abundance indicators: trawl survey encounter rate.

Table 4. GOM abundance indicators: ventless trap survey abundance.

VENTLESS TRAP ABUNDANCE								
Abundance of lobsters ≥ 53 mm CL								
Survey	*511*		*512*		*513*		*514*	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
1981								
1982								
1983								
1984								
1985								
1986								
1987								
1988								
1989								
1990								
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1992								
1993								
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2006	7.65	5.34	6.87	5.38	5.73	4.37	3.10	3.40
2007	5.06	3.91	3.95	3.83	5.82	4.35	1.85	1.84
2008	4.94	3.87	5.78	4.95	5.78	4.97	2.77	2.51
2009	3.60	2.65	6.31	5.35	6.89	5.53	2.72	2.66
2010	5.66	3.90	6.95	5.69	6.61	5.27	2.49	2.22
2011	8.70	6.52	11.10	8.48	7.32	5.60	3.47	2.60
2012	10.95	7.64	12.06	9.47	11.40	7.72	5.21	4.52
2013	11.14	7.95	11.87	8.64	9.36	6.49		
2014	10.38	6.63	11.92	8.04	7.74	4.96	3.15	2.35
2015	8.47	4.63	10.39	7.70	8.57	5.50	4.01	3.16
2016	14.59	9.15	14.34	10.75	10.78	7.56	4.79	3.56
2017	11.69	7.07	11.61	8.52	8.46	5.56	3.38	2.45
2018	15.10	9.43	11.26	8.23	9.57	6.37	3.47	2.43
2014-2018 mean	12.05	7.38	11.90	8.65	9.02	5.99	3.76	2.79
2019	12.93	8.27	8.23	5.96	8.59	5.20	2.85	1.93
2020	7.65	5.44	7.95	5.95	9.29	6.61	2.50	1.69
2016-2020 mean	12.39	7.87	10.68	7.88	9.34	6.26	3.40	2.41
25th	5.66	3.91	6.87	5.38	6.61	4.97	2.76	2.41
median	8.70	6.52	11.10	8.04	7.74	5.53	3.27	2.56
75th	11.14	7.64	11.87	8.52	9.36	6.37	3.61	3.22

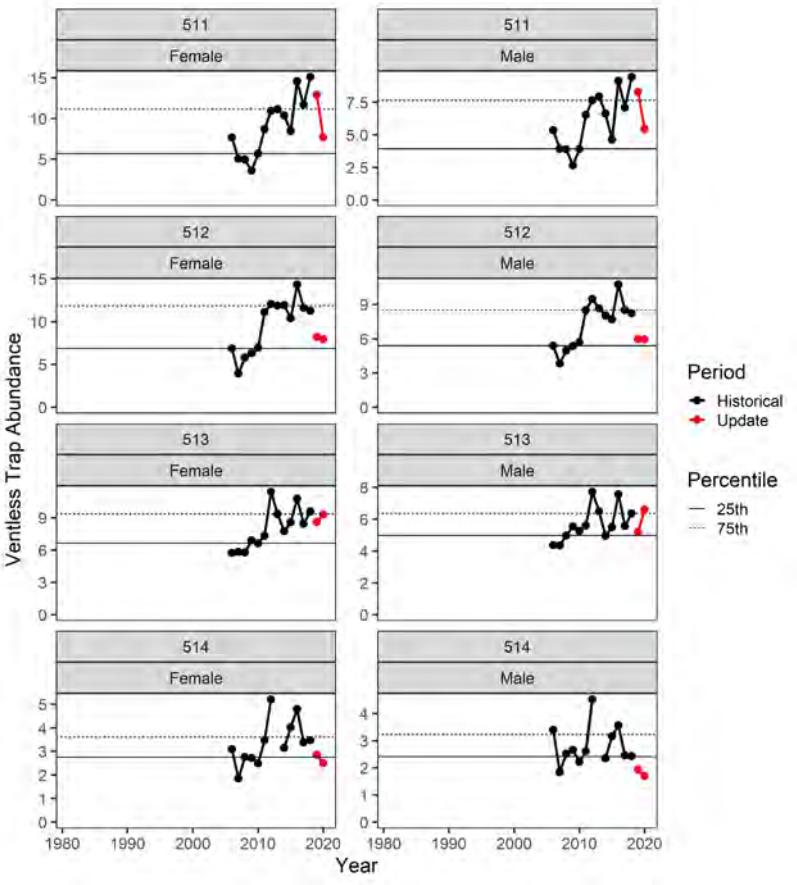

Figure 4. GOM abundance indicators: ventless trap survey abundance.

Table 5. GBK abundance indicators: trawl survey recruit abundance.

RECRUIT ABUNDANCE (SURVEY)		
Abundance of lobsters 71 - 80 mm CL (sexes combined)		
Survey	*NEFSC*	
	Spring	*Fall*
1981	0.08	0.28
1982	0.18	0.41
1983	0.16	0.33
1984	0.09	0.40
1985	0.19	0.26
1986	0.57	0.64
1987	0.43	0.54
1988	0.09	0.36
1989	0.04	0.23
1990	0.44	0.47
1991	0.08	0.34
1992	0.13	0.62
1993	0.50	0.22
1994	0.01	0.13
1995	0.03	0.14
1996	0.00	0.35
1997	0.06	0.90
1998	0.01	0.33
1999	0.07	0.29
2000	0.27	0.33
2001	0.47	0.45
2002	0.06	0.56
2003	0.29	0.16
2004	0.04	0.18
2005	0.09	0.13
2006	0.16	0.12
2007	0.03	0.23
2008	0.05	0.17
2009	0.30	0.33
2010	0.30	0.15
2011	0.09	0.35
2012	0.15	0.17
2013	0.14	0.24
2014	0.16	0.21
2015	0.06	0.44
2016	0.15	0.13
2017	0.35	
2018	0.04	0.22
2014-2018 mean	0.15	0.25
2019	0.16	0.13
2020		
2016-2020 mean	0.17	0.16

25th	0.06	0.18
median	0.11	0.29
75th	0.25	0.40

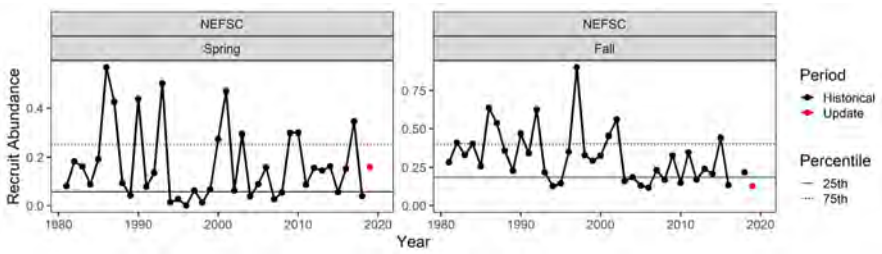

Figure 5. GBK abundance indicators: trawl survey recruit abundance.

Table 6. GBK abundance indicators: trawl survey encounter rate.

SURVEY LOBSTER ENCOUNTER RATE		
Proportion of postive tows		
Survey	*NEFSC*	
	Spring	*Fall*
1981	0.23	0.52
1982	0.23	0.43
1983	0.18	0.38
1984	0.12	0.34
1985	0.19	0.35
1986	0.27	0.36
1987	0.18	0.35
1988	0.34	0.40
1989	0.14	0.38
1990	0.18	0.44
1991	0.19	0.45
1992	0.26	0.49
1993	0.22	0.36
1994	0.11	0.38
1995	0.14	0.42
1996	0.16	0.40
1997	0.10	0.48
1998	0.10	0.40
1999	0.16	0.58
2000	0.23	0.41
2001	0.23	0.49
2002	0.29	0.55
2003	0.27	0.44
2004	0.18	0.53
2005	0.16	0.58
2006	0.24	0.54
2007	0.26	0.46
2008	0.29	0.55
2009	0.34	0.54
2010	0.38	0.62
2011	0.30	0.69
2012	0.35	0.57
2013	0.33	0.65
2014	0.37	0.61
2015	0.27	0.59
2016	0.45	0.55
2017	0.40	
2018	0.29	0.59
2014-2018 mean	0.36	0.58
2019	0.36	0.57
2020		
2016-2020 mean	0.37	0.57

25th	0.18	0.40
median	0.23	0.48
75th	0.29	0.55

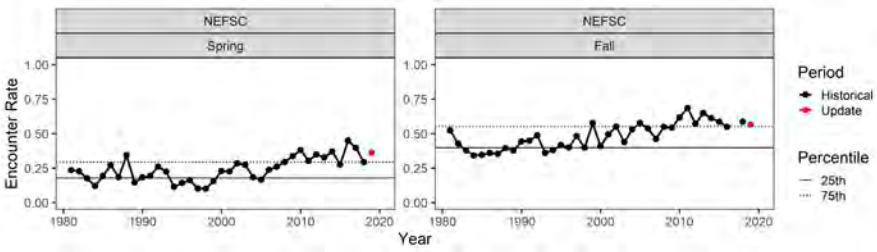

Figure 6. GBK abundance indicators: trawl survey encounter rate.

Appendix B. Analysis of alternate minimum and maximum sizes as management options for Lobster Management Areas in the Gulf of Maine. Report to the ASFMC Lobster TC and PDT.

Burton Shank and Jeff Kipp

Sept. 9, 2021

The Lobster TC provided analysis to the ASFMC Lobster Board ahead of the Spring 2021 meeting with estimated outcomes to the Gulf of Maine / Georges Bank lobster fishery given the implementation of alternative management measures (min and max gauge size), including changes to total weight of lobsters landed, number of lobsters landed, Spawning Stock Biomass (SSB) and Exploitation. The analysis included an attempt to examine how fisheries in different LCMAs would be affected though the population simulation model was not re-parameterized for each LCMA. In discussions, we concluded that the simulations for LCMA1 were probably reasonably accurate because:

1. Many of the inputs for the simulations are taken from the 2020 stock assessment. Because the vast majority of the landings come from LCMA1, the stock assessment parameters are essentially already tuned to the parameters of the LCMA1 fishery.
2. LCMA1 is primarily a recruitment-based fishery in inshore or nearshore habitats and, therefore, likely to be representative of the full stock model.

However, there was concern that the offshore fishery in Lobster Management Area 3 was considerably different from the full stock model and, thus, may have inaccurate outcomes due to a mis-parameterized simulation model. The parameters for the Outer Cape Cod fishery are probably somewhere between LCMA1 and LCMA3 as it consists of both a resident lobster population and a seasonally-migrating population, moving between inshore and offshore habitats.

To address these differences between the LCMAs in population simulations, we performed the following:

1. For the LCMA1 simulations, we used the stock assessment parameters as the inputs.
2. For LCMA3 simulations, we attempted to manually tune the population simulation model to match the catch characteristics of the LCMA3 fishery, under the assumption that a simulation model that could reproduce the catch characteristics of the fishery may more accurately project changes in the fishery given changing management measures.
3. For the OCC simulations, we ran two sets of simulations, using the input parameters for both LCMA1 and LCMA3 under the assumption that this bounds the dynamics we might see in OCC.

For all simulations, populations were initiated with zero abundance and run for 50 years with constant recruitment to allow population abundances and length comps to reach equilibrium.

The equilibrium populations were then compared across the various legal selectivity scenarios to determine the effect of these different management alternatives.

For a simple, model-free analysis of the fishery catch composition for LCMA1 and LCMA3, we calculated the cumulative proportion of catch by weight at length by converting catch-at-size to weight-at-size and weighting for unequal sex ratios and seasonality of landings.

LCMA1 Simulations

The input parameters for the LCMA1 simulations were primarily drawn from the 2020 stock assessment. This includes the recruitment seasonality, length composition and sex ratio, growth model, gear, legal and conservation selectivities and mean estimated fishing mortality from the terminal years.

LCMA1 Results

The cumulative catch weight-by-length curve indicates that the mean size of lobsters landed in the LCMA1 fishery is within the smallest legal size bin (83-91mm, Figure 1). Nearly 90% of the catch are below 100mm CL and only about 2% of the catch are over 120mm CL. This supports the perspective that LCMA1 landings involve a narrow range of small lobster sizes and is primarily a recruitment-dependent fishery.

Increasing the minimum legal size is projected to decrease the total number of lobsters landed but result in a net increase in yield-per-recruit (YPR) and total weight of catch (Table 1 and 2). However, the magnitude of these changes are small enough that they may not be detectable in the actual fishery given inter-annual variations in recruitment and catch. Changing the maximum legal size is projected to have very little effect on either catch number or weight.

Note that these are purely yield-per-recruit simulations so recruitment subsidies from increased SSB are not assumed in the calculations of catch weight or number so, thus, probably represent a conservative, lower bound. A less conservative upper bound would be the product of change in YPR and the change in SSB.

Increasing the minimum legal size is projected to result in large increases in SSB (Table 3). Minimum legal sizes that approach or exceed the size of maturity produce increasing returns on SSB as this allows a much larger portion of the population to reproduce at least once. Thus, increasing minimum legal size to 88mm is projected to result in a near doubling in SSB. Increasing maximum size can result in a large decrease SSB, particularly as the minimum legal size increases and more of the population survives to reach the current maximum legal size.

Increasing legal size would result in moderate to large decreases in exploitation as more of the stock becomes protected (Table 4) with exploitation decreasing by nearly 30% at a minimum legal size of 88mm. As with catch weight and number, changing maximum legal size has little effect on exploitation rates as these sizes represent a very small portion of the LCMA1 population.

LCMA3 Simulations

We first analyzed the port and sea sampling data provided for the 2020 benchmark assessment but constrained to LCMA3 to estimate fishery characteristics, including catch size composition, catch sex ratio, and conservation selectivity (discarding due to egg-bearing or V-notch status).

We then specified the conservation selectivity from the biosamples and current legal selectivity appropriate for LCMA3 in the population simulation model and iteratively tuned the following parameters:

1. Fully-selected fishing mortality, assumed constant across seasons
2. Recruitment sex ratio
3. Recruitment size composition for each sex.

For a given tuning run, the population simulation model was provided an updated set of input parameters and projected forward 25 year to reach equilibrium. The resulting catch composition from the model run was then compared to the average catch composition from the last five years of the biosamples to determine accuracy of the simulation models. Comparisons were conducted both visually for obvious lack-of-fit and by correlating the simulated and observed catch compositions. Correlations were performed on both the catch proportions and logit-transformed catch proportions, the latter to place more emphasis on length compositions that occur in smaller proportions.

Once the model was tuned to perform as well as might be expected, given minor, seasonal lack-of-fit that could not be easily resolved, the simulation model was then run with the tuned parameters for all combinations of proposed minimum and maximum size limits. We then summarized the outputs from the different simulations as values relative to the current minimum and maximum size regulations in place for LCMA3.

Results

The cumulative catch weight-by-length curve indicates that 110 mm carapace length is the approximate mean size of lobsters landed in the LCMA3 fishery (Figure 1). However, the cumulative curve is nearly linear from 90mm through 130mm, indicating lobsters across this size range are about equally important to the landings of this fishery. Lobsters less than about 92mm constitute the lower 10% quantile of landings while lobsters greater than 136mm constitute the upper 10% quantile with lower and upper quartiles around 98mm and 123mm respectively. This suggests that LCMA3 landings include a broad range of lobster sizes, unlike typical inshore lobster fisheries that are primarily recruitment-driven.

The final tuned parameters included a quarterly fishing mortality of 0.1 (0.4 total annual mortality) and a 70:30 female to male recruitment sex ratio. The tuned recruit length compositions are bi-modal for both sexes, indicating recruitment to the fishery comes both from growth of smaller individual within the LCMA and immigration from outside the LCMA (Figure 2). With these compositions, about 80% of male recruitment and 30% of female

recruitment is attributed to growth with the remainder of new individuals coming from immigration from outside the LCMA.

Fitting the simulation length comps by manually tuning these parameters resulted in reasonably good fits to the observed length compositions (Figures 3, 4, and 5). Some lack-of-fit is still evident within seasons but this lack-of-fit is generally contrary to the lack-of-fit observed in other seasons, making it difficult to further improve the fit with just the parameters of interest. Correlations between observed and predicted compositions were 0.981 for simple proportions and 0.97 for logit-transformed proportions, suggesting both high and low proportion values for observed length comps are well matched by the simulation and we deemed this adequate to a basis to examine alternative management options.

Decreasing either the minimum or maximum legal size is projected to decrease total weight of catch (Table 5). However, contrary to the previous analysis for the full stock or inshore LCMA's, changes to the maximum size have much larger impacts on landings than changes to the minimum size, particularly once the maximum size drops to between 140 and 150mm. Decreasing the maximum size from 171mm to 127mm is projected to decreases landings by about 30% while decreasing the minimum size from 90mm to 83mm is only projected to decrease landings by a couple of percent.

Decreasing the minimum legal size is projected to marginally increase the number of lobsters being landed but decreasing the maximum size marginally to moderately decreases the number of lobsters landed, producing neutral effects for many of the management options explored here (Table 6).

Decreasing maximum legal size from current regulations is projected to increase SSB, possibly significantly, but decreasing minimum sizes would decrease SSB (Table 7). The greatest observed increase would be from holding the minimum size at current values but maximally decreasing maximum sizes, essentially narrowing the length range where lobsters are legal, which is estimated to result in a 64% increase in spawning stock. As above, changes to maximum size have bigger effects on SSB than changes to minimum sizes.

Decreasing maximum sizes would result in a decrease in exploitation but decreasing minimum sizes would increase exploitation (Table 8), countering each other and paralleling patterns observed for SSB. Because the calculation of exploitation is based on numbers of individuals rather than mass, decreasing minimum sizes have larger effects on exploitation than observed above for landings or SSB. Again, changes in exploitation increase rapidly with decreasing maximum sizes once the alternate maximum gauge size reaches a size that includes a significant portion of the catch for the LCMA.

OCC Simulations

Due to time and data constraints, we did not attempt to tune a simulation model for OCC. Rather, we assume that population dynamics and fishing mortality rates in OCC are bounded by

the conditions observed in the LCMA1 and LCMA3 fisheries. Thus, we ran simulations for OCC using the OCC legal size range with both the LCMA1 and LCMA3 parameterizations and present both sets of results with the understanding that results for OCC should fall between these extremes.

In general, outputs (catch weight, number, SSB and exploitation) show different responses for the LCMA1 than the LCMA3 parameterizations. LCMA1 parameterizations tend to produce simulations that are very sensitive to changes in minimum legal size but not maximum legal size, while simulations with LCMA3 parameterization only slightly sensitive to changes in minimum legal size but moderately to highly sensitive to changes in maximum legal size.

Total weight of landings is projected to be sensitive to changing minimum legal size with the LCMA1 parameterization but be insensitive with the LCMA3 parameterization (Table 9 A & B). With the LCMA1 parameterization, decreasing minimum size is projected to decrease landings by ~5% while increasing legal size to 88mm would increase landings by 8%. Conversely, landings weight is insensitive to changes in maximum legal size for the LCMA1 parameterization but sensitive to changes for the LCMA3 parameterization.

Total catch number simulations shows trend similar to catch weight with the LCMA1 parameterization being sensitive to changes in minimum size and the LCMA3 parameterization sensitive to changes in maximum size (Figure 10 A & B). The pattern otherwise holds that larger minimum legal sizes result in lower catch numbers.

For SSB, the LCMA1 parameterization is responsive to both changes in minimum and maximum legal size while the LCMA3 parameterization is more sensitive to changes in maximum size (Figure 11 A & B). For example, decreasing minimum legal size to 127mm would increase SSB by between 24% and 65% for the LCMA1 and LCMA3 parameterizations, respectively. The ranges of minimum size tested in simulations produce changes in SSB in the rage of -26% to +76% for the LCMA1 parameterization and -1% to +6.8% for the LCMA3 parameterization.

Decreasing minimum legal size produce increases moderate to small increases in exploitation (16% to 4% for LCMA1 and LCMA3 parameterizations, respectively, Figure 12 A & B). Either increasing minimum legal size or decreasing maximum legal size decrease serve to decrease exploitation with a maximum decrease of ~39% observed at the largest minimum and smallest maximum size and the LCMA3 parameterization.

Discussion

There is a stark difference in cumulative landings by size between LCMA1 and LCMA3. LCMA1 is clearly a recruitment-based fishery that would be highly sensitive to variations in recruitment. The LCMA3 fishery, in contrast, is fishing a broad range of lobster sizes, and therefore ages, and is thus somewhat buffered from interannual variation in recruitment dynamics.

The LCMA1 fishery is highly sensitive to changes in minimum legal size because of high exploitation rates on newly-recruited lobsters. The range of minimum sizes tested in

simulations encompasses size range that represents the majority of landings for the inshore / nearshore fishery. Thus, changes to minimum size would dramatically change the length composition of the catch. Increases in the minimum size will have temporarily but significantly depress landing in the years immediately after are implemented but the benefits to SSB would be similarly immediate. Increasing the minimum legal size can add to the resilience of the fishery by marginally increasing the spread of effort across multiple year classes and significantly increasing SSB and egg production which may buffer the effects in any future change in productivity.

Generally, decreasing maximum gauge sizes have larger effects for LCMA3 both relative to decreasing minimum sizes in LCMA3 or for changing maximum sizes for the other LCMAs. This matches the conclusions based on the cumulative catch curve (Figure 1) that showed that the LCMA3 fishery lands a much broader size range of individuals than the inshore LCMAs, with the upper portion of length compositions overlapping proposed alternative maximum sizes.

This analysis for LCMA3 matches previous analysis conducted for inshore LCMAs, finding that larger minimum legal sizes had positive effects across population parameters including higher catch weights, increased SSB and decreased exploitation. However, decreasing maximum legal sizes has mixed effects, decreasing immediate landings but increasing SSB, potentially by a larger margin. Because recruitment subsidies from increasing SSB are not included in this simulation, the net effect of these two opposing changes are uncertain. While decreasing maximum legal sizes would decrease immediate landings and make a larger portion of the population inaccessible to the fishery permanently (i.e. excluded lobsters won't grow into a legal size in the future), this increase in SSB may eventually produce a recruitment subsidy that could offset this loss of catch. The net effect would depend on multiple factors including the connectivity of the added SSB to larval settlement habitat and the migration patterns of these large females into adjacent habitats including inshore Gulf of Maine and international waters.

Finally, it is important to note the importance of large female lobsters that dominate the landings for much of LCMA3. This both highlights the partial dependence of this fishery on immigration from adjacent habitats and adds uncertainty to this analysis. The growth and molt cycling of such large females is poorly understood and are not particularly well informed in the current growth model. Thus, the tuned parameters may be biased by mis-specification of the growth model and results in this analysis may be sensitive to the growth model used in some cases. Interpretation of tuned parameters and confidence in the precise results of this analysis should be taken with some caution. However, the general patterns of changing catch, SSB and exploitation with changes in minimum and maximum legal sizes is consistent across this and previous analyses so may be treated with higher confidence.

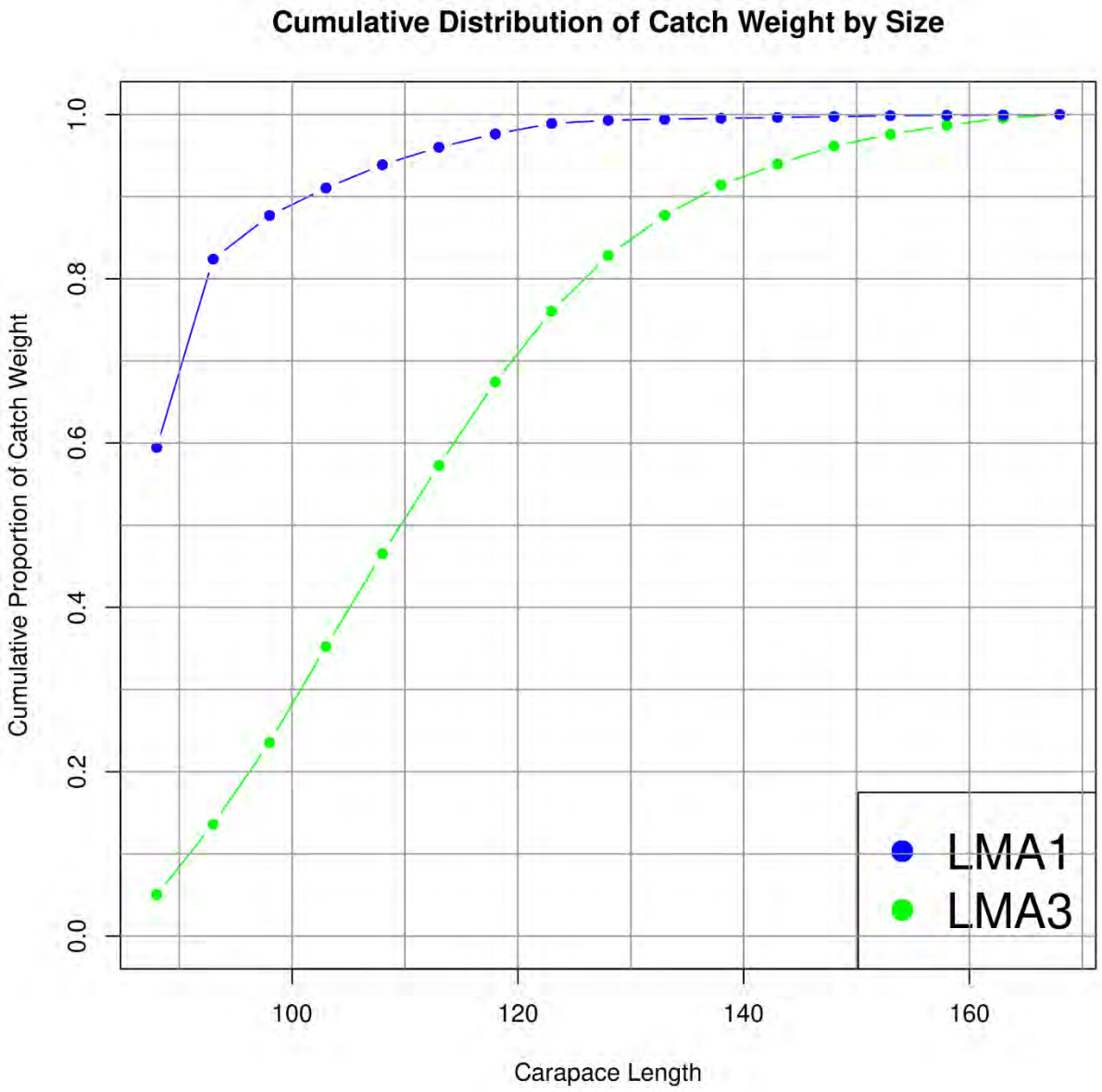

Figure 1. Cumulative proportion of catch weight by carapace length. To interpret, lobsters less than 90mm constitute approximately 8% of landings, while lobsters less than 130mm constitute approximately 85% of landings.

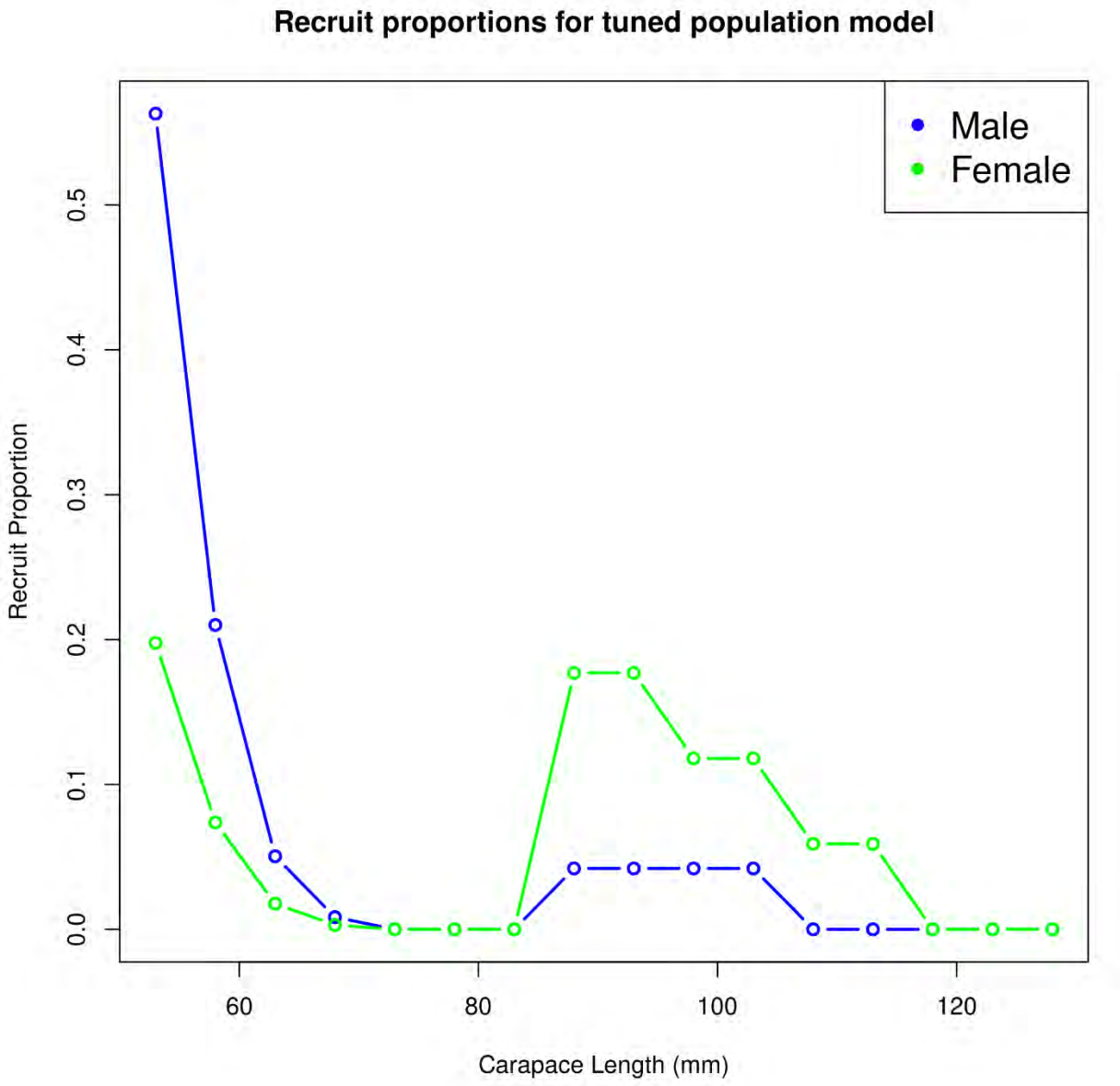

Figure 2. Tuned recruitment length compositions for the fitted model. The bi-modal length distribution suggests a combination of recruitment by growth (individuals <70mm) and migration (individuals >85 mm) with males primarily recruiting by growth and females primarily recruiting by migration as mature adults.

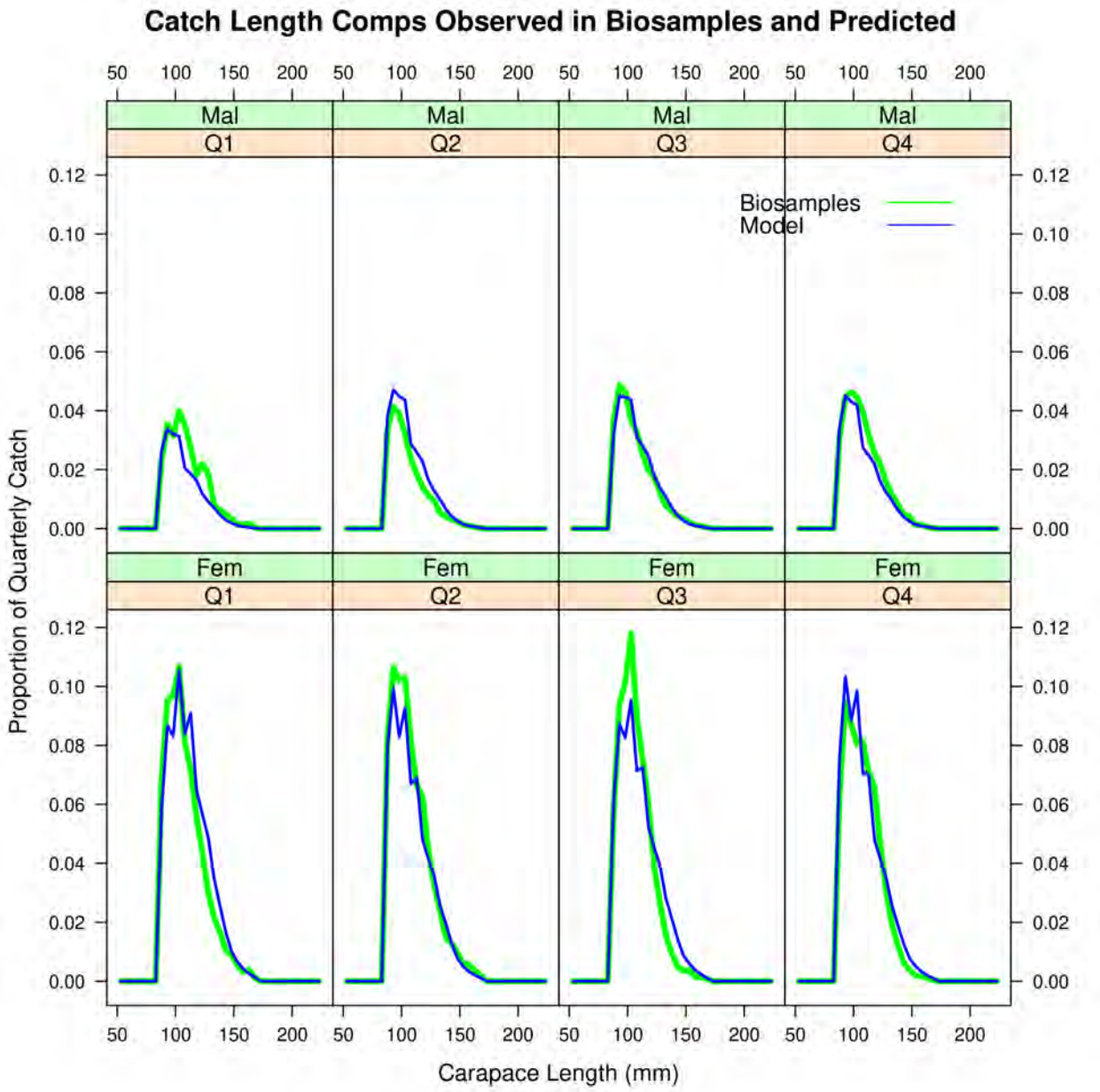

Figure 3. LCMA 3 catch length compositions by sex and quarter based on biosampling and from the tuned population model.

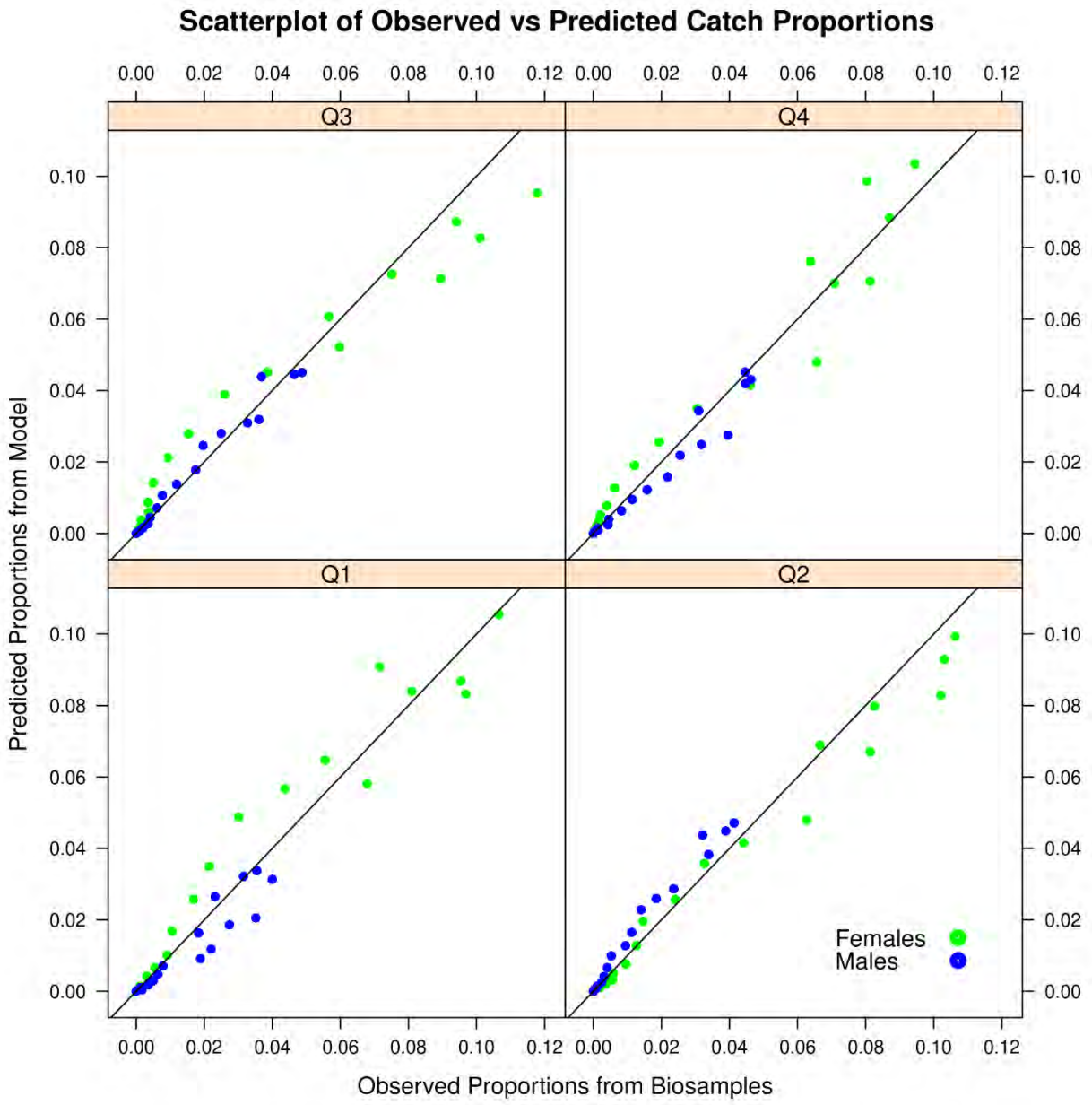

Figure 4. Relationship between length composition proportions observed in biosamples and predicted in the tuned population model by quarter and sex. The diagonal 1:1 line shows an ideal fit between the data sets.

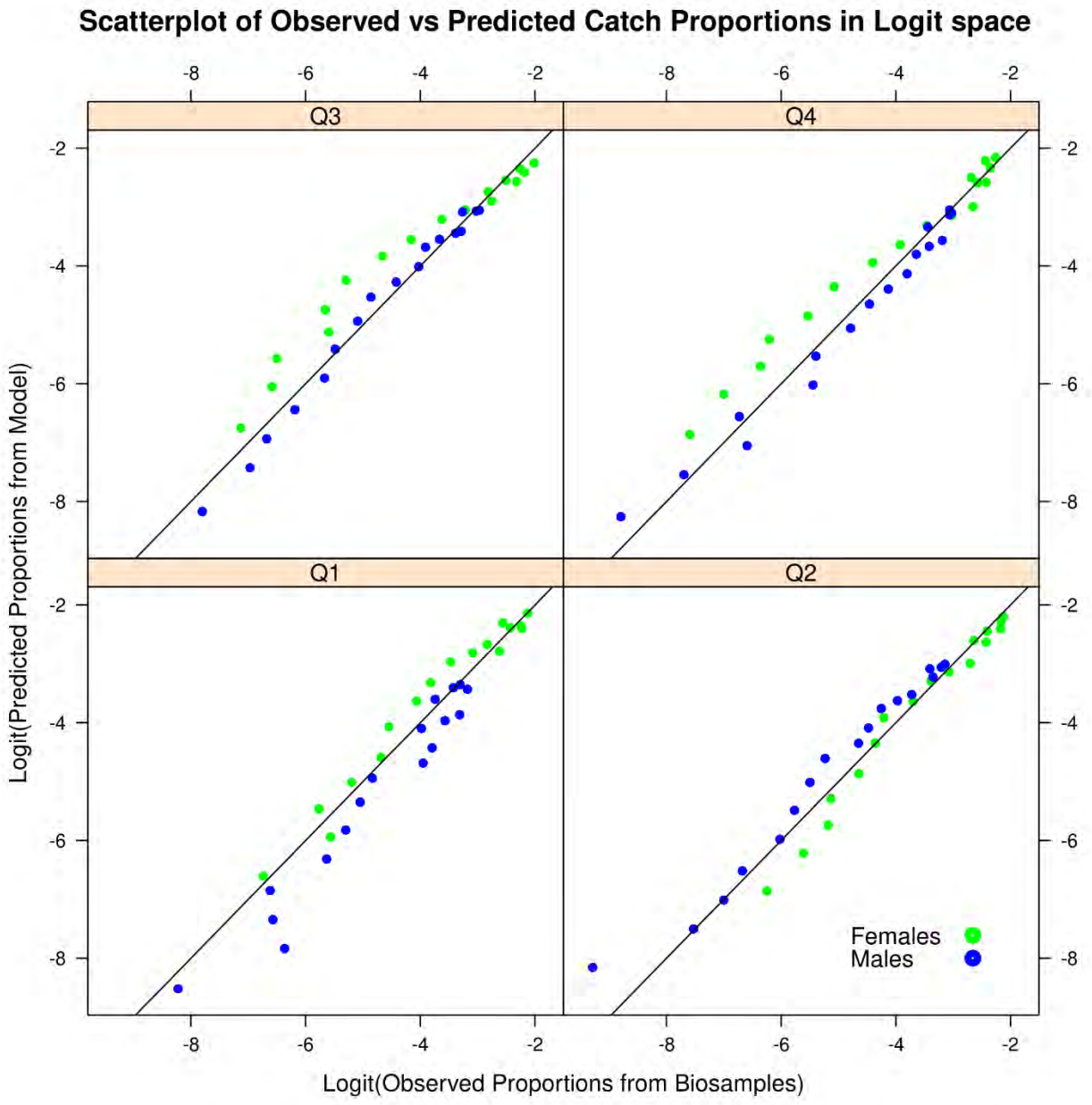

Figure 5. Relationship between length composition proportions observed in biosamples and predicted in the tuned population model by quarter and sex. Data points are logit-transformed to emphasize fit to lengths that occur in low proportions. The diagonal 1:1 line shows an ideal fit between the data sets.

Table 1. LCMA1 projected relative changes to Weight of Landings resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
3.31in / 84mm	3.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
3.38in / 86mm	5.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
3.47in / 88mm	13.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%
3.53in / 90mm	14.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
3.594in / 91mm	16.00%	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%

Table 2. LCMA1 projected relative changes to Number of lobsters Landed resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	0.00%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
3.31in / 84mm	-2.00%	-1.80%	-1.80%	-1.80%	-1.80%	-1.80%	-1.80%
3.38in / 86mm	-3.60%	-3.30%	-3.30%	-3.30%	-3.30%	-3.30%	-3.30%
3.47in / 88mm	-8.50%	-8.10%	-8.00%	-8.00%	-8.00%	-8.00%	-8.00%
3.53in / 90mm	-9.50%	-9.00%	-9.00%	-9.00%	-9.00%	-9.00%	-9.00%
3.594in / 91mm	-11.30%	-10.80%	-10.70%	-10.70%	-10.70%	-10.70%	-10.70%

Table 3. LCMA1 projected relative changes to Spawning Stock Biomass resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	0.00%	-16.50%	-18.30%	-18.50%	-18.50%	-18.60%	-18.60%
3.31in / 84mm	19.00%	-1.40%	-3.60%	-3.80%	-3.90%	-3.90%	-3.90%
3.38in / 86mm	38.00%	13.90%	11.30%	11.00%	10.90%	10.90%	10.90%
3.47in / 88mm	98.00%	61.00%	56.90%	56.60%	56.50%	56.40%	56.40%
3.53in / 90mm	117.00%	75.80%	71.30%	70.90%	70.70%	70.70%	70.70%
3.594in / 91mm	151.00%	101.70%	96.40%	95.90%	95.70%	95.70%	95.60%

Table 4. LCMA1 projected relative changes to Exploitation resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	0.00%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%
3.31in / 84mm	-8.50%	-7.70%	-7.60%	-7.60%	-7.60%	-7.60%	-7.60%
3.38in / 86mm	-14.40%	-13.60%	-13.50%	-13.50%	-13.50%	-13.50%	-13.50%
3.47in / 88mm	-29.40%	-28.40%	-28.30%	-28.30%	-28.30%	-28.30%	-28.30%
3.53in / 90mm	-32.10%	-31.00%	-30.90%	-30.90%	-30.90%	-30.90%	-30.90%
3.594in / 91mm	-36.50%	-35.40%	-35.30%	-35.20%	-35.20%	-35.20%	-35.20%

Table 5. LCMA3 projected relative changes to Weight of Landings resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-31.30%	-14.60%	-6.30%	-4.20%	-2.80%	-2.10%	-0.80%
3.31in / 84mm	-31.20%	-14.30%	-6.00%	-3.80%	-2.40%	-1.60%	-0.40%
3.38in / 86mm	-31.20%	-14.00%	-5.60%	-3.40%	-2.00%	-1.20%	0.00%
3.47in / 88mm	-31.10%	-13.60%	-5.00%	-2.70%	-1.30%	-0.50%	0.80%
3.53in / 90mm	-31.40%	-13.40%	-4.60%	-2.30%	-0.90%	0.00%	1.30%
3.594in / 91mm	-31.70%	-13.20%	-4.10%	-1.70%	-0.30%	0.60%	1.90%

Table 6. LCMA3 projected relative changes to Number of lobsters Landed resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-11.10%	-0.80%	3.20%	4.00%	4.50%	4.70%	5.00%
3.31in / 84mm	-12.20%	-1.70%	2.30%	3.20%	3.70%	3.90%	4.20%
3.38in / 86mm	-13.20%	-2.60%	1.50%	2.30%	2.80%	3.10%	3.40%
3.47in / 88mm	-15.20%	-4.20%	-0.10%	0.80%	1.30%	1.50%	1.80%
3.53in / 90mm	-17.10%	-5.90%	-1.70%	-0.80%	-0.30%	0.00%	0.30%
3.594in / 91mm	-19.50%	-7.90%	-3.60%	-2.60%	-2.10%	-1.90%	-1.50%

Table 7. LCMA3 projected relative changes to Spawning Stock Biomass resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	56.00%	19.00%	3.00%	-1.50%	-3.80%	-5.20%	-6.90%
3.31in / 84mm	57.00%	20.00%	3.00%	-0.80%	-3.10%	-4.50%	-6.20%
3.38in / 86mm	59.00%	21.00%	4.00%	0.00%	-2.40%	-3.70%	-5.50%
3.47in / 88mm	61.00%	23.00%	6.00%	1.50%	-0.90%	-2.30%	-4.10%
3.53in / 90mm	64.00%	25.00%	8.00%	3.80%	1.40%	0.00%	-1.80%
3.594in / 91mm	69.00%	29.00%	11.00%	6.70%	4.20%	2.80%	1.00%

Table 8. LCMA3 projected relative changes to Exploitation resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell).

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-20.40%	-0.30%	8.40%	10.30%	11.40%	11.90%	12.50%
3.31in / 84mm	-22.30%	-2.40%	6.30%	8.10%	9.20%	9.70%	10.30%
3.38in / 86mm	-24.10%	-4.40%	4.10%	6.00%	7.00%	7.50%	8.10%
3.47in / 88mm	-27.40%	-8.10%	0.30%	2.20%	3.10%	3.70%	4.30%
3.53in / 90mm	-30.60%	-11.60%	-3.30%	-1.50%	-0.50%	0.00%	0.60%
3.594in / 91mm	-34.20%	-15.60%	-7.50%	-5.70%	-4.80%	-4.20%	-3.70%

Table 9. OCC projected relative changes to Weight of Landings resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell), based on (A) LCMA1 or (B) LCMA3 paramerizations.

A.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-5.60%	-5.00%	-4.90%	-4.90%	-4.90%	-4.90%	-4.90%
3.31in / 84mm	-2.70%	-2.00%	-1.90%	-1.90%	-1.90%	-1.90%	-1.90%
3.38in / 86mm	-0.90%	-0.10%	0.00%	0.00%	0.00%	0.00%	0.00%
3.47in / 88mm	6.60%	7.80%	8.00%	8.00%	8.00%	8.00%	8.00%
3.53in / 90mm	7.40%	8.80%	8.90%	8.90%	8.90%	8.90%	8.90%
3.594in / 91mm	9.30%	11.00%	11.20%	11.20%	11.20%	11.20%	11.20%

B.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-30.40%	-13.50%	-5.20%	-3.00%	-1.60%	-0.80%	0.00%
3.31in / 84mm	-30.30%	-13.20%	-4.80%	-2.60%	-1.20%	-0.40%	1.00%
3.38in / 86mm	-30.30%	-13.00%	-4.40%	-2.20%	-0.80%	0.00%	1.00%
3.47in / 88mm	-30.30%	-12.50%	-3.80%	-1.50%	-0.10%	0.70%	2.00%
3.53in / 90mm	-30.60%	-12.40%	-3.40%	-1.10%	0.40%	1.20%	3.00%
3.594in / 91mm	-30.90%	-12.10%	-2.90%	-0.50%	1.00%	1.90%	3.00%

Table 10. OCC projected relative changes to Number of lobsters Landed resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell), based on (A) LCMA1 or (B) LCMA3 parameterizations.

A.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	3.40%	3.60%	3.60%	3.60%	3.60%	3.60%	3.60%
3.31in / 84mm	1.30%	1.60%	1.60%	1.60%	1.60%	1.60%	1.60%
3.38in / 86mm	-0.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3.47in / 88mm	-5.40%	-4.90%	-4.90%	-4.90%	-4.90%	-4.90%	-4.90%
3.53in / 90mm	-6.40%	-5.90%	-5.90%	-5.90%	-5.90%	-5.90%	-5.90%
3.594in / 91mm	-8.30%	-7.70%	-7.70%	-7.70%	-7.70%	-7.70%	-7.70%

B.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-13.80%	-3.70%	0.10%	0.90%	1.40%	1.60%	1.90%
3.31in / 84mm	-14.80%	-4.60%	-0.70%	0.10%	0.60%	0.80%	1.10%
3.38in / 86mm	-15.80%	-5.50%	-1.50%	-0.70%	-0.20%	0.00%	0.30%
3.47in / 88mm	-17.70%	-7.10%	-3.10%	-2.20%	-1.70%	-1.50%	-1.20%
3.53in / 90mm	-19.60%	-8.70%	-4.60%	-3.70%	-3.20%	-3.00%	-2.70%
3.594in / 91mm	-21.90%	-10.70%	-6.40%	-5.50%	-5.00%	-4.80%	-4.50%

Table 11. OCC projected relative changes to Spawning Stock Biomass resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell), based on (A) LCMA1 or (B) LCMA3 parameterizations.

A.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-9.80%	-24.70%	-26.40%	-26.50%	-26.60%	-26.60%	-26.60%
3.31in / 84mm	7.00%	-11.10%	-13.10%	-13.30%	-13.30%	-13.30%	-13.30%
3.38in / 86mm	24.30%	2.70%	0.30%	0.10%	0.00%	0.00%	0.00%
3.47in / 88mm	78.20%	45.10%	41.50%	41.20%	41.10%	41.00%	41.00%
3.53in / 90mm	95.50%	58.50%	54.40%	54.00%	53.90%	53.90%	53.90%
3.594in / 91mm	126.20%	81.80%	77.00%	76.60%	76.50%	76.40%	76.40%

B.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	63.00%	24.00%	7.00%	2.00%	-0.10%	-1.50%	-3.30%
3.31in / 84mm	64.00%	25.00%	7.00%	3.00%	0.60%	-0.70%	-2.60%
3.38in / 86mm	65.00%	26.00%	8.00%	4.00%	1.40%	0.00%	-1.80%
3.47in / 88mm	67.00%	27.00%	10.00%	5.00%	2.90%	1.50%	-0.30%
3.53in / 90mm	71.00%	30.00%	12.00%	8.00%	5.30%	3.90%	2.00%
3.594in / 91mm	75.00%	34.00%	15.00%	11.00%	8.30%	6.80%	4.90%

Table 12. OCC projected relative changes to Exploitation resulting from alternative minimum and maximum options, relative to the current regulations (yellow cell), based on (A) LCMA1 or (B) LCMA3 paramerizations.

A.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	15.60%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%
3.31in / 84mm	5.80%	6.70%	6.80%	6.80%	6.80%	6.80%	6.80%
3.38in / 86mm	-1.10%	-0.10%	0.00%	0.00%	0.00%	0.00%	0.00%
3.47in / 88mm	-18.40%	-17.30%	-17.10%	-17.10%	-17.10%	-17.10%	-17.10%
3.53in / 90mm	-21.50%	-20.20%	-20.10%	-20.10%	-20.10%	-20.10%	-20.10%
3.594in / 91mm	-26.70%	-25.30%	-25.20%	-25.20%	-25.20%	-25.20%	-25.20%

B.

Minimum Gauge Size \ Maximum Gauge Size	5in / 127mm	5.5in / 140mm	6in / 152mm	6.25in / 159mm	6.5in / 165mm	6.75in / 171mm	None
3.25in / 83mm	-26.00%	-7.30%	0.80%	2.60%	3.60%	4.10%	4.60%
3.31in / 84mm	-27.70%	-9.20%	-1.20%	0.60%	1.50%	2.00%	2.60%
3.38in / 86mm	-29.40%	-11.10%	-3.20%	-1.40%	-0.50%	0.00%	0.60%
3.47in / 88mm	-32.50%	-14.50%	-6.70%	-5.00%	-4.10%	-3.60%	-3.00%
3.53in / 90mm	-35.40%	-17.70%	-10.00%	-8.40%	-7.50%	-7.00%	-6.50%
3.594in / 91mm	-38.80%	-21.50%	-13.90%	-12.30%	-11.40%	-10.90%	-10.40%

Appendix C. Trigger Mechanism Analysis and Recommendation

Recruit (71-80 mm carapace length) indices are used as model-free indicators of recruitment to the lobster fishery in the following year. During the 2020 stock assessment, recruit indicators were found to be correlated with the stock assessment model estimates of reference abundance (78+ mm carapace length), providing a reliable means to track abundance changes and potential need for management response more frequently than through intermittent stock assessments. There are eight GOM/GBK stock recruit indicators updated for each assessment: spring and fall indices for each of the ME/NH, MA DMF, NEFSC GOM, and NEFSC GBK bottom trawl surveys. The NEFSC indicators in the GOM and GBK regions are considered to be indicators of offshore recruitment which differs from the GOM/GBK stock-wide recruitment dynamics. Therefore, the American Lobster Technical Committee (TC) recommended using only the inshore surveys (ME/NH and MA DMF) where the bulk of the population and fishery occur, which are assumed to be more representative of stock-wide recruitment. These trawl surveys employ similar methodologies and, along with selectivity and swept area calibration factors, can be combined into two indices, a spring index and a fall index. Additionally, the TC recommends using the standardized index from the Ventless Trap Survey as an indicator of recruitment during the summer.

To calculate a trigger index, each of the three individual indices were scaled to their 2017 reference levels so they are on the same scale. The one year lag expected between recruit indices and reference abundance due to growth results in 2017 recruit indices mapping to the terminal year reference abundance used in the 2020 stock assessment status determination (2018). The TC recommended linking the trigger index to the reference abundance in this way so the trigger index is an indication of proportional changes to the reference abundance since the 2020 stock assessment. Proportional changes in the trigger index are compared directly to proportional changes between the terminal year reference abundance and abundance reference points established in the assessment to provide an early indication of reference abundance falling below the reference points. Scaled indices were then averaged across surveys to generate a single trigger index. The final trigger index value represents proportional change from 2017 recruitment (and, therefore, expected proportional change from the reference abundance one year later in 2018 - the terminal year of the stock assessment). A value of one indicates no change, a value greater than one indicates an increase (e.g., 1.2 indicates a 20% increase), and a value less than one indicates a decrease (e.g., 0.8 indicates a 20% decrease).

During the 2020 stock assessment, the peer review panel supported using a smoothing algorithm, such as the running average used in past assessments, to determine stock status, but also recommended exploring alternatives (e.g., running median) to evaluate the robustness of status determinations. To evaluate performance of different methods for a trigger mechanism, akin to evaluating stock status in a stock assessment, a simulation analysis was conducted using the trigger index annual point value, three-year running average, and three-year running median to identify need for management action. For each method, all three individual indices were scaled to a 2017 reference level calculated with the same method used to calculate the

index. That is, the 2017 reference level was the 2017 point value for the annual index trigger method, the 2015-2017 average for the three-year running average trigger method, and the 2015-2017 running median for the three-year running median trigger method. The scaled individual and combined indices are compared to various trigger points related to assessment abundance reference points in Figure 1.

The TC treated 0.68 (i.e., a 32% decline) as the trigger for action in the simulation analysis. This decline represents the proportional change between the terminal year stock assessment reference abundance level and the boundary between the high and moderate abundance regimes. Each individual index was projected from 2018 to 2025 following a steady decline that reflected a 32% decline from the observed 2017 index value in 2021. This projected trend is hypothetical to evaluate the performance of the three calculation methods being considered and does not necessarily reflect the true status or projection of the population. It was unclear what impacts the method used to calculate the starting point of the projected trend would have on performance of each trigger mechanism, so declines projected from the (1) 2017 point value, (2) 2015-2017 running average, and (3) 2015-2017 running median were evaluated in three separate scenarios. Indices were then sampled from these simulated trends with CVs equal to the average CV over the respective index's time series, assuming a lognormal error structure. These simulations only consider observation error and do not account for process error. Indices were scaled to their reference level as described above, averaged across surveys, and the combined trigger index was evaluated for whether or not it would trigger action ($\leq$0.68) in each year of the projection period. This was repeated 1,000 times for each scenario and action determinations were tallied by year for each of the methods.

Results show similar patterns between the scenarios using a simulated decline from the 2017 point value and from the 2015-2017 average (Table 1; Figures 2-3). The 2015-2017 running median was equal to the 2017 point value for all indices, so the results with a simulated decline from this value were identical to the 2017 point value scenario (Table 2; Figure 4). Incorrect action is triggered very infrequently (< 3% of the time) by the annual and running median methods in the first two years of the projection period and never by the running average method. On average, the annual and running median methods incorrectly triggered action about 9% of the time and about 15 times more frequently than the running average method the year before the decline reached the threshold (2020), but also correctly triggered action ≈38% of the time and roughly twice as frequently as the running average method in the year when the threshold was met (2021). The running average method then tended to perform as well as or better than the other methods from 2022-2025, albeit generally at smaller margins of difference, as all methods tended to perform relatively well in these later years when the decline is exacerbated. The delayed response of the running average method can be seen in Figures 5-7, where the median trigger index value across simulations tends to be slightly higher than the annual and running median methods. The variance in index values, however, is lower for the running average method resulting in more consistency across simulations in terms of guidance for management action, whereas the other methods result in mixed guidance for some of the more extreme simulations in more years than the running average method.

Based on these results, the trigger mechanisms using the annual point value and the running median may be considered precautionary methods that perform better for an immediate trigger, on average, but with more variable guidance than the running average method. The running average method may provide a less responsive trigger mechanism that is less likely to incorrectly trigger premature action, and performs well and more consistently after the initial risk of not triggering action when first needed.

The TC recommended the running average method for calculating the trigger index. The individual surveys display interannual variation that might be related to environmental impacts on catchability (for example), an issue that was identified in the stock assessment and is expected to continue to impact these indices index data sets into the future. This simulation analysis suggests the running average method is more robust to interannual variation than the other methods and therefore can be interpreted with higher confidence.

Table 1. Percentage of 1,000 simulated indices that triggered action for three simulated decline starting point scenarios, and the averages of these scenarios. The simulated stock was projected to decline 32% in 2021.

Simulated Decline Starting Point	Index Calculation Method	2018	2019	2020	2021	2022	2023	2024	2025
2017 Point Value	Annual	0%	2%	12%	50%	85%	97%	100%	100%
	Three-Year Running Average	0%	0%	1%	27%	86%	100%	100%	100%
	Three-Year Running Median	0%	2%	12%	44%	84%	98%	100%	100%
2015-2017 Average	Annual	0%	0%	3%	21%	59%	89%	99%	100%
	Three-Year Running Average	0%	0%	0%	3%	46%	95%	100%	100%
	Three-Year Running Median	0%	0%	3%	19%	60%	90%	99%	100%
2015-2017 Running Median	Annual	0%	2%	12%	50%	85%	97%	100%	100%
	Three-Year Running Average	0%	0%	1%	27%	86%	100%	100%	100%
	Three-Year Running Median	0%	2%	12%	44%	84%	98%	100%	100%
Average	**Annual**	**0%**	**2%**	**9%**	**40%**	**76%**	**94%**	**100%**	**100%**
	Three-Year Running Average	**0%**	**0%**	**1%**	**19%**	**73%**	**98%**	**100%**	**100%**
	Three-Year Running Median	**0%**	**1%**	**9%**	**36%**	**76%**	**95%**	**100%**	**100%**

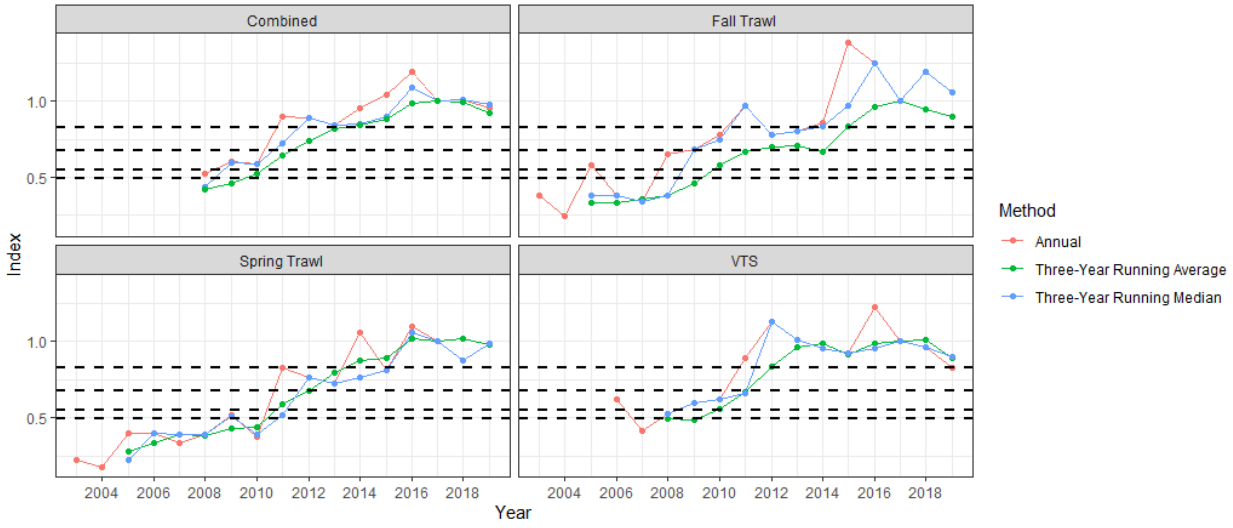

Figure 1. Scaled individual and combined indices using three calculation methods compared to four trigger levels (0.83 – Fishery/Industry Target, 0.68 – Moderate/High Abundance Regime Shift Level, 0.55 – Abundance Limit, 0.49 – Abundance Threshold) identified from potential reference abundance declines (dashed lines).

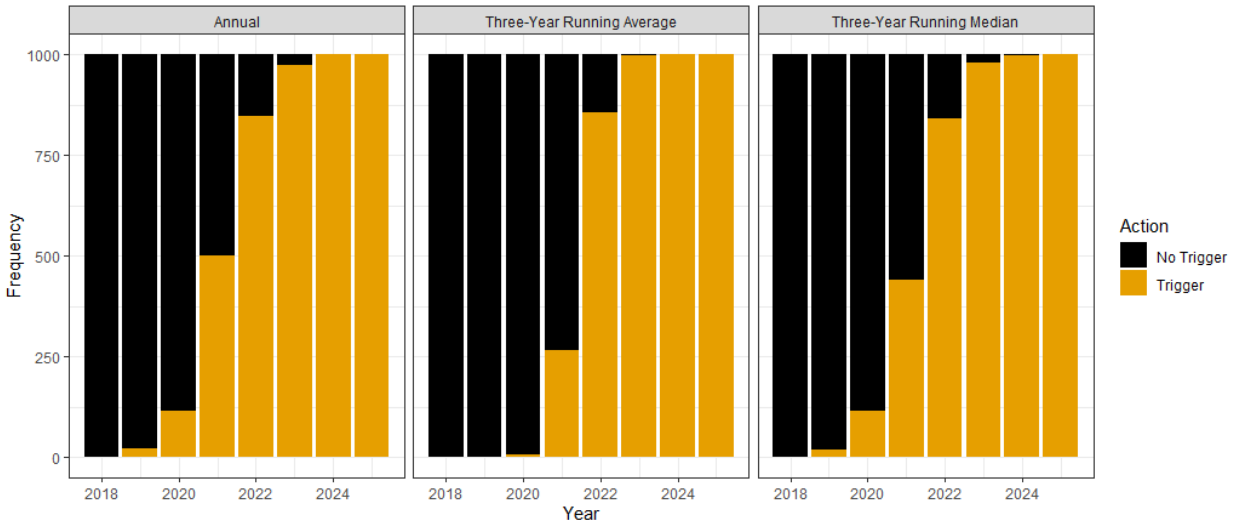

Figure 2. Annual action determinations by method from 1,000 simulated indices with the simulated population declining from the 2017 point value. The simulated stock was projected to decline 32% in 2021.

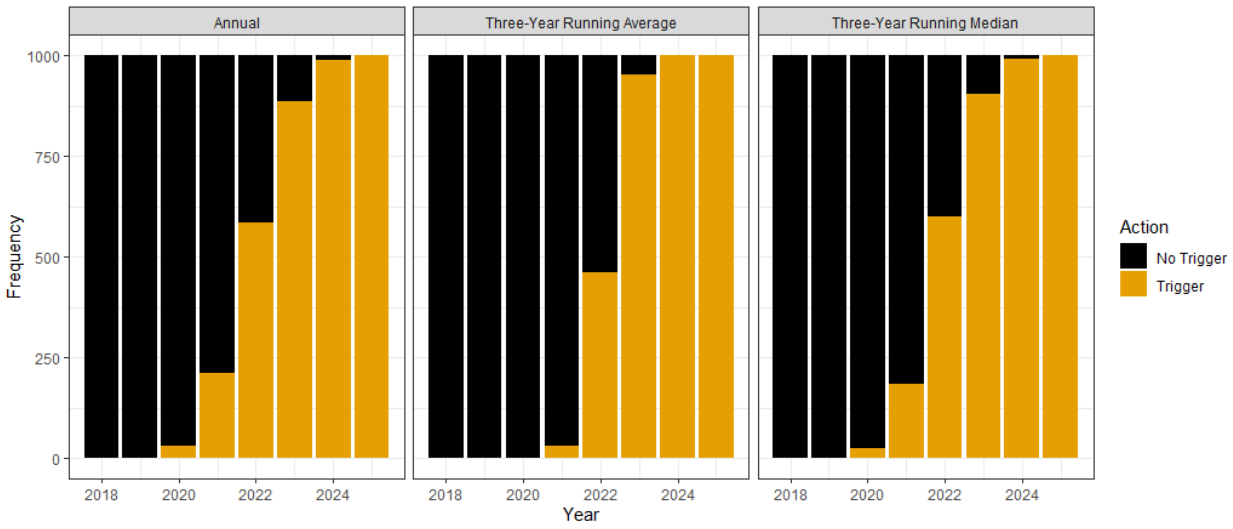

Figure 3. Annual action determinations by method from 1,000 simulated indices with the simulated population declining from the 2015-2017 average. The simulated stock was projected to decline 32% in 2021.

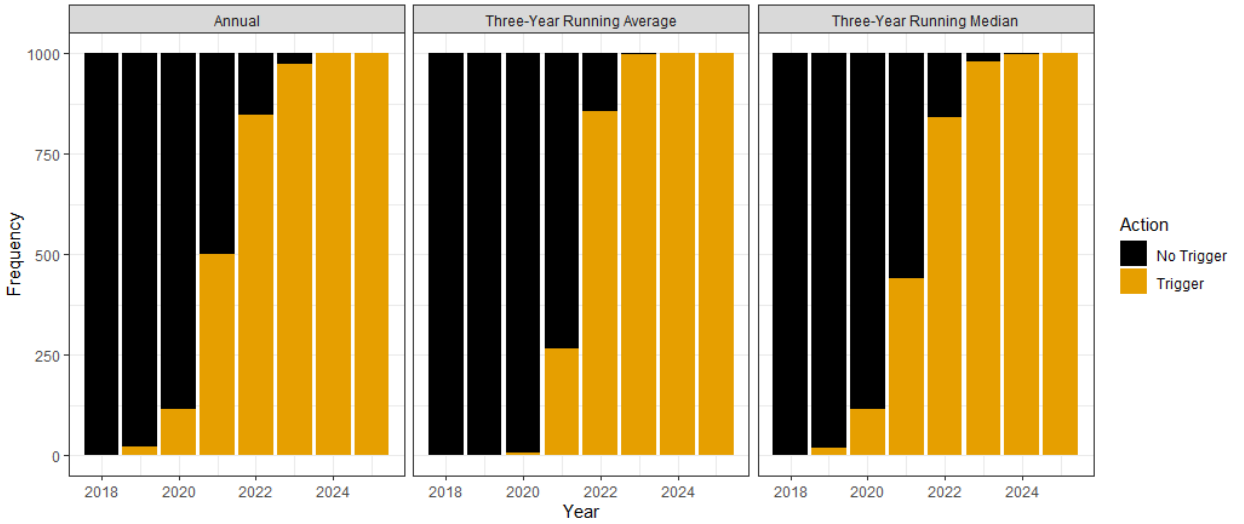

Figure 4. Annual action determinations by method from 1,000 simulated indices with the simulated population declining from the 2015-2017 median. The simulated stock was projected to decline 32% in 2021.

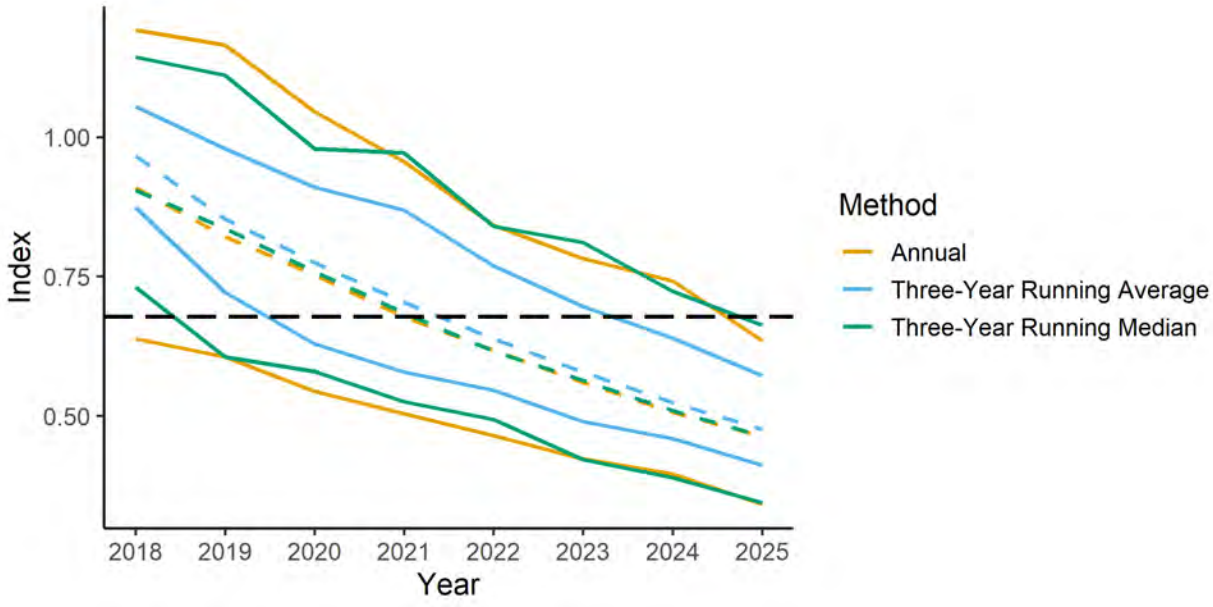

Figure 5. Distribution of index values by method from 1,000 simulations with the simulated population declining from the 2017 point value. The dashed colored lines are the median index values across simulations, the solid color lines are the minimum and maximum index values across simulations, and the dashed black line is the trigger level. The simulated stock was projected to decline 32% in 2021.

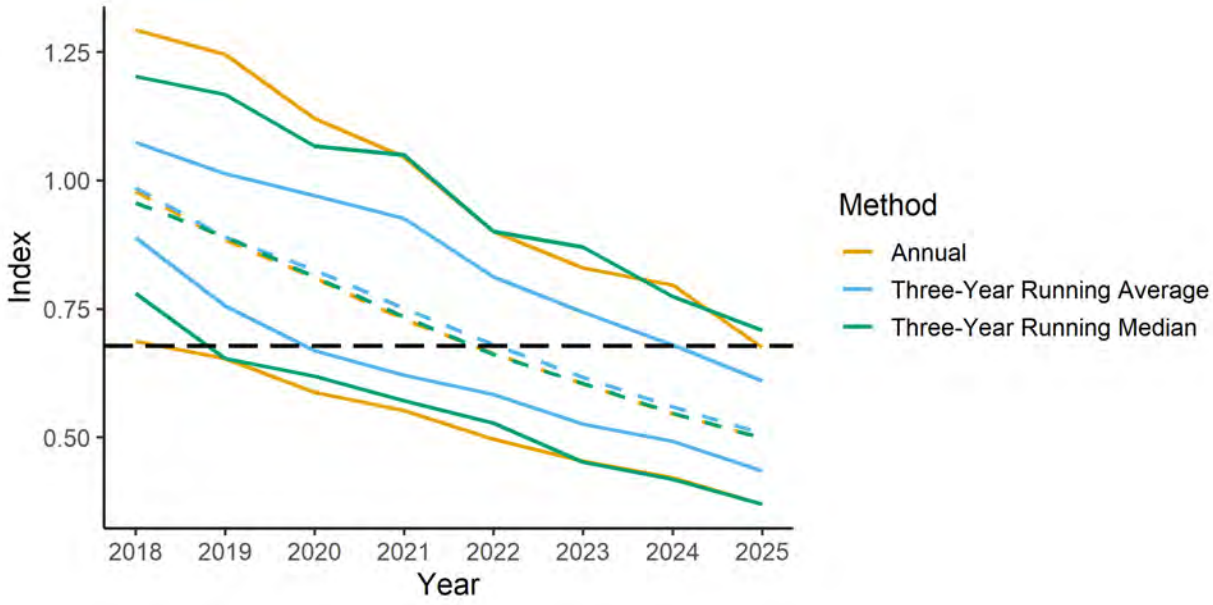

Figure 6. Distribution of index values by method from 1,000 simulations with the simulated population declining from the 2015-2017 running average. The dashed colored lines are the median index values across simulations, the solid color lines are the minimum and maximum index values across simulations, and the dashed black line is the trigger level. The simulated stock was projected to decline 32% in 2021.

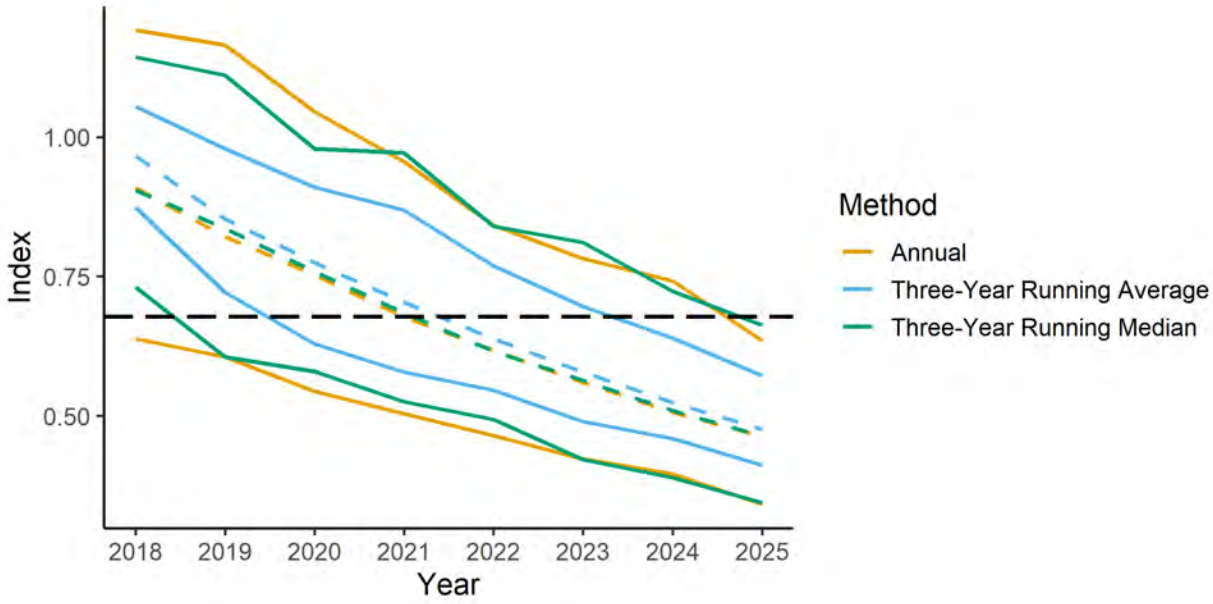

Figure 7. Distribution of index values by method from 1,000 simulations with the simulated population declining from the 2015-2017 running median. The dashed colored lines are the median index values across simulations, the solid color lines are the minimum and maximum index values across simulations, and the dashed black line is the trigger level. The simulated stock was projected to decline 32% in 2021.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: **American Lobster Management Board**

FROM: **Jonah Crab Technical Committee and Jonah Crab Stock Assessment Subcommittee**

DATE: **January 7, 2022**

SUBJECT: **Jonah Crab Stock Assessment Terms of Reference and Timeline**

The first coastwide Jonah crab stock assessment is scheduled to be completed in 2023. The Jonah Crab Technical Committee (TC) and Stock Assessment Subcommittee (SAS) have recommended the Board consider the following terms of reference (TORs). The first set of TORs are to be addressed by the TC and SAS during the stock assessment. The second set of TORs are to be addressed by the peer review panel that reviews that stock assessment upon completion by the TC and SAS. A timeline of the stock assessment process, including major milestones, is also included.

Terms of Reference for the Jonah Crab Assessment

1. Characterize precision and accuracy of fishery-dependent and fishery-independent data used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data).
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors).
    d. Justify inclusion or elimination of available data sources.

2. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, sample size) on model inputs and outputs.

3. Develop simple, empirical indicators of stock abundance, stock characteristics, and fishery characteristics that can be monitored annually between stock assessments.

4. Develop models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, and analyze model performance.
    a. Describe stability of model (e.g., ability to find a stable solution, invert Hessian).
    b. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    c. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    d. Clearly and thoroughly explain model strengths and limitations.

e. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature. If using a new model, test using simulated data.
f. If multiple models were considered, justify the choice of preferred model and the explanation of any differences in results among models.

5. State assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs. Examples of assumptions may include (but are not limited to):
    a. Choice of stock-recruitment function.
    b. Calculation of M. Choice to use (or estimate) constant or time-varying M and catchability.
    c. Choice of equilibrium reference points or proxies for MSY-based reference points.
    d. Constant ecosystem (abiotic and trophic) conditions.

6. Characterize uncertainty of model estimates and biological or empirical reference points.

7. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?

8. Other potential scientific issues:
    a. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.
    b. Explore, identify, describe, and, if possible, quantify environmental/climatic drivers.

9. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.

10. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.

11. Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species.

Terms of Reference for the Jonah Crab Peer Review

1. Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:
    a. Presentation of data source variance (e.g., standard errors).
    b. Justification for inclusion or elimination of available data sources,
    c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, sample size),
    d. Calculation and/or standardization of abundance indices.

2. Evaluate empirical indicators of stock abundance, stock characteristics, and fishery characteristics for their appropriateness to monitor the stock between assessments.

3. Evaluate the methods and models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, including but not limited to:
    a. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).

4. Evaluate the diagnostic analyses performed (e.g., sensitivity analyses to determine model stability and potential consequences of major model assumptions, retrospective analysis).

5. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

6. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.

7. Recommend best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative estimation methods.

8. Evaluate the choice of reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.

9. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

10. Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.

11. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

Jonah Crab Stock Assessment Preliminary Timeline

Item	Participants	Purpose	Date(s)
ASMFC Winter Meeting	Board, Staff	Board approval of ToRs and Timeline	January 2022
Data Submission Deadline	TC, public data holders	Provide data for assessment	April 29, 2022
ASMFC Spring Meeting	Board, Staff	Board update (if necessary)	May 2022
Data Workshop	TC, SAS, Staff	Review data; Identify data tasks	3 days, June 2022
ASMFC Summer Meeting	Board, Staff	Board update (if necessary)	August 2022
Methods Workshop	TC, SAS, Staff	Review results of data tasks from Data Workshop; Identify assessment methods to pursue	3 days, September 2022
ASMFC Annual Meeting	Board, Staff	Board update (if necessary)	October 2022
Assessment Workshop	SAS, Staff	Review results of assessment methods	4 days, February 2023
TC Review Webinar	SAS, TC, Staff	TC review and approval of assessment	May 2023
Peer Review Planning Webinar	TC, SAS, Peer Reviewers, Staff	Introductions, Q&A, reviewer requests for workshop	June 2023
Peer Review Workshop	SAS Subgroup, Peer Reviewers, Staff	Review assessment	July 2023
ASMFC Summer Meeting	Board, Staff	Board update (if necessary)	August 2023
ASMFC Annual Meeting	Board, SAS Chair, Peer Review Chair	Present final reports for Board consideration	October 2023

ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER
(*Homarus americanus*)

2020 FISHING YEAR

Prepared by the Plan Review Team

January 2022

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Table of Contents

***This document covers fishery activities in 2020 as well as trap reductions which took place ahead of the 2021 fishing year*.**

1.0 Status of the Fishery Management Plan

Year of ASMFC Plan's Adoption:	Amendment 3 (1997)
Plan Addenda:	
Addendum II (2001)	Addendum XIV (2009)
Addendum III (2002)	Addendum XV (2009)
Addendum IV (2003)	Addendum XVI (2010)
Addendum V (2004)	Addendum XVII (2012)
Addendum VI (2005)	Addendum XVIII (2012)
Addendum VII (2005)	Addendum XIX (2013)
Addendum VIII (2006)	Addendum XX (2013)
Addendum IX (2006)	Addendum XXI (2013)
Addendum X (2007)	Addendum XXII (2013)
Addendum XI (2007)	Addendum XXIII (2014)
Addendum XII (2008)	Addendum XXIV (2015)
Addendum XIII (2008)	Addendum XXVI (2018)
Management Unit:	Maine through North Carolina
States with a Declared Interest:	Maine through Virginia (Excluding Pennsylvania and DC)
Active Committees:	American Lobster Management Board, Technical Committee, Lobster Conservation Management Teams, Plan Development Team, Plan Review Team, Advisory Panel, Electronic Reporting Subcommittee, Electronic Tracking Subcommittee, Stock Assessment Subcommittee

2.0 Status of the Fishery

2.1 Commercial Fishery

The lobster fishery has seen incredible expansion in landings over the last 40 years. Between 1950 and 1975, landings were fairly stable around 30 million pounds; however, from 1976 to 2008 the average coastwide landings tripled, exceeding 98 million pounds in 2006. Landings continued to increase until reaching a high of 159 million pounds in 2016 (Table 1). In 2020, coastwide commercial landings were approximately 121.9 million pounds, a 4% decrease from 2019 landings of 127.2 million pounds. The largest contributors to the 2020 fishery were Maine and Massachusetts with 80% and 14% of landings, respectively. Landings, in descending order, also occurred in New Hampshire, Rhode Island, New Jersey, Connecticut, New York, Delaware, Maryland, and Virginia. The ex-vessel value for all lobster landings in 2020 was approximately $529 million.

Historically, Lobster Conservation Management Area (LCMA) 1 has had the highest landings, and accounted for 80% of total harvest between 1981 and 2012. This is followed by LCMA 3 which accounted for 9% of total landings during the same time period. In general, landings have increased in LCMA 1 and have decreased in LCMAs 2, 4, and 6. According to state compliance reports, in 2020, approximately 91% of the total landings came from LCMA 1, while the remaining 9% were contributed by LCMA 3, OCC, 2, 4, 6 and 5, in descending order. A map of the LCMAs is found in Figure 1.

Landings trends between the two biological stocks have also changed, as a greater percentage of lobster are harvested from the Gulf of Maine/Georges Bank (GOM/GBK) stock. In 1997, 26.3% of coastwide landings came from the Southern New England (SNE) stock. However, as the southern stock declined and abundance in the Gulf of Maine increased, proportional harvest has significantly changed. In 2000, only 15.6% of landings came from the SNE stock and by 2006, this declined to 7%. In 2020, approximately 2% of coastwide landings came from the SNE stock. In 2020 the GOM/GBK stock accounted for 119 million pounds while the SNE stock accounted for 2.5 million.

2.2 Recreational Fishery

Lobster is also taken recreationally with pots, and in some states, by hand while SCUBA diving. While not all states collect recreational harvest data, some do report the number of pounds landed recreationally and/or the number of recreational permits issued. In 2019, New York reported 1,741 pounds of lobster harvested recreationally, representing 1.4% of state landings. New Hampshire reported 5,305 pounds of lobster harvested recreationally, representing 0.11% of total landings in the state. Maine, Rhode Island, and Connecticut do not collect information on the number of pounds recreationally harvested. For 2020, Rhode Island issued 509 lobster licenses, and lobster licenses sold in Connecticut declined from 875 in 2019 to 286 in 2020. Massachusetts did not provide recreational landings data for 2020 due to data delays related to the COVID-19 pandemic, but for the past five years that data were available (2011-2015) recreational lobster landings represented an average of 1.4% of the total state landings.

3.0 Status of the Stock

The recent 2020 American Lobster Benchmark Stock Assessment presents contrasting results for the two American lobster stock units, with record high abundance and recruitment in the Gulf of Maine and Georges Bank stock (GOM/GBK) and record low abundance and recruitment in the Southern New England stock (SNE) in recent years.

The assessment found that abundance estimates for the GOM/GBK stock show an increasing trend beginning in the late 1980s. After 2008, the rate of increase accelerated to a record high abundance level in 2018, the terminal year of the assessment. The GOM/GBK stock shifted from a low abundance regime during the early 1980s through 1995 to a moderate abundance regime during 1996-2008, and shifted once again to a high abundance regime during 2009-2018 (Figure 2). Current spawning stock abundance and recruitment and are near record highs. Exploitation (commercial landings relative to stock abundance) declined in the late 1980s and has remained relatively stable since.

The GOM/GBK stock is in favorable condition based on the new recommended reference points adopted by the Board (Table 2). The average abundance from 2016-2018 was 256 million lobster, which is greater than the fishery/industry target of 212 million lobster. The average exploitation from 2016-2018 was 0.459, below the exploitation target of 0.461. Therefore the GOM/GBK lobster stock is not depleted and overfishing is not occurring.

In contrast to GOM/GBK, model results for SNE show a completely different picture of stock health. Abundance estimates in SNE have declined since the late 1990s to record low levels. Model estimates of recruitment and spawning stock biomass have also declined to record low levels. Analysis of these estimates indicates a declining trend in stock productivity, indicating reproductive rates are insufficient to sustain a stable population at current exploitation rates. Exploitation of the SNE stock was high and stable through 2002, declined sharply in 2003, and has remained lower and stable since.

Based on the new abundance threshold reference point, the SNE stock is significantly depleted. The average abundance from 2016-2018 was 7 million lobster, well below the threshold of 20 million lobster (Table 2, Figure 3). However, according to the exploitation reference points the SNE stock is not experiencing overfishing. The average exploitation from 2016-2018 was 0.274, falling between the exploitation threshold of 0.290 and the exploitation target of 0.257.

The assessment and peer review panel recommended significant management action be taken to provide the best chance of stabilizing or improving abundance and reproductive capacity of the SNE stock.

4.0 Status of Management Measures

4.1 Implemented Regulations

Amendment 3 established regulations which require coastwide and area specific measures applicable to commercial fishing (Table 3). The coastwide requirements from Amendment 3 are summarized below; additional requirements were established through subsequent Addenda.

Coastwide Requirements and Prohibited Actions

- Prohibition on possession of berried or scrubbed lobsters
- Prohibition on possession of lobster meats, detached tails, claws, or other parts of lobsters by fishermen
- Prohibition on spearing lobsters
- Prohibition on possession of v-notched female lobsters
- Requirement for biodegradable “ghost” panel for traps
- Minimum gauge size of 3-1/4”
- Limits on landings by fishermen using gear or methods other than traps to 100 lobsters per day or 500 lobsters per trip for trips 5 days or longer
- Requirements for permits and licensing
- All lobster traps must contain at least one escape vent with a minimum size of 1-15/16” by 5-3/4”
- Maximum trap size of 22,950 cubic inches in all areas except area 3, where traps may not exceed a volume of 30,100 cubic inches.

Amendment 3 to the Interstate Fishery Management Plan for American Lobster (December 1997)

American lobster is managed under Amendment 3 to the Interstate FMP for American Lobster. Amendment 3 establishes seven lobster management areas. These areas include the: Inshore Gulf of Maine (LCMA 1), Inshore Southern New England (LCMA 2), Offshore Waters (LCMA 3), Inshore Northern Mid-Atlantic (LCMA 4), Inshore Southern Mid-Atlantic (LCMA 5), New York and Connecticut State Waters (LCMA 6), and Outer Cape Cod (OCC). Lobster Conservation Management Teams (LCMTs) comprised of industry representatives were formed for each management area. The LCMTs are charged with advising the Lobster Board and recommending changes to the management plan within their areas.

Amendment 3 also provides the flexibility to respond to current conditions of the resource and fishery by making changes to the management program through addenda. The commercial fishery is primarily controlled through minimum/maximum size limits, trap limits, and v-notching of egg-bearing females.

Addendum I (August 1999)

Establishes trap limits in the seven LCMAs.

Addendum II (February 2001)

Establishes regulations for increasing egg production through a variety of LCMT proposed management measures including, but not limited to, increased minimum gauge sizes in LCMAs 2, 3, 4, 5, and the Outer Cape.

Addendum III (February 2002)

Revises management measures for all seven LCMAs in order to meet the revised egg-rebuilding schedule.

Technical Addendum 1 (August 2002)

Eradicates the vessel upgrade provision for LCMA 5.

Addendum IV (January 2004)

Changes vent size requirements; applies the most restrictive rule on an area trap cap basis without regard to the individual's allocation; establishes LCMA 3 sliding scale trap reduction plan and transferable trap program to increase active trap reductions by 10%; and establishes an effort control program and gauge increases for LCMA 2; and a desire to change the interpretation of the most restrictive rule.

Addendum V (March 2004)

Amends Addendum IV transferability program for LCMA 3. It establishes a trap cap of 2200 with a conservation tax of 50% when the purchaser owns 1800 to 2200 traps and 10% for all others.

Addendum VI (February 2005)

Replaces two effort control measures for LCMA 2 – permits an eligibility period.

Addendum VII (November 2005)
Revises LCMA 2 effort control plan to include capping traps fished at recent levels and maintaining 3 3/8" minimum size limit.

Addendum VIII (May 2006)
Establishes new biological reference points to determine the stock status of the American lobster resource (fishing mortality and abundance targets and thresholds for the three stock assessment areas) and enhances data collection requirements.

Addendum IX (October 2006)
Establishes a 10% conservation tax under the LCMA 2 trap transfer program.

Addendum X (February 2007)
Establishes a coastwide reporting and data collection program that includes dealer and harvester reporting, at-sea sampling, port sampling, and fishery-independent data collection replacing the requirements in Addendum VIII.

Addendum XI (May 2007)
Establishes measures to rebuild the SNE stock, including a 15-year rebuilding timeline (ending in 2022) with a provision to end overfishing immediately. The Addendum also establishes measures to discourage delayed implementation of required management measures.

Addendum XII (February 2009)
Addresses issues which arise when fishing privileges are transferred, either when whole businesses are transferred, when dual state/federal permits are split, or when individual trap allocations are transferred as part of a trap transferability program. In order to ensure the various LCMA-specific effort control plans remain cohesive and viable, this addendum does three things. First, it clarifies certain foundational principles present in the Commission's overall history-based trap allocation effort control plan. Second, it redefines the most restrictive rule. Third, it establishes management measures to ensure history-based trap allocation effort control plans in the various LCMAs are implemented without undermining resource conservation efforts of neighboring jurisdictions or LCMAs.

Addendum XIII (May 2008)
Solidifies the transfer program for OCC and stops the current trap reductions.

Addendum XIV (May 2009)
Alters two aspects of the LCMA 3 trap transfer program. It lowers the maximum trap cap to 2000 for an individual that transfers traps. It changes the conservation tax on full business sales to 10% and for partial trap transfers to 20%.

Addendum XV (November 2009)
Establishes a limited entry program and criteria for Federal waters of LCMA 1.

Addendum XVI: Reference Points (May 2010)
Establishes new biological reference points to determine the stock status of the American lobster resource (fishing mortality and abundance targets and thresholds for the three stock assessment areas). The addendum also modifies the procedures for adopting reference points to allow the Board to take action on advice following a peer reviewed assessment.

Addendum XVII (February 2012)
Institutes a 10% reduction in exploitation for LCMAs within Southern New England (2, 3, 4, 5, and 6). Regulations are LCMA specific but include v-notch programs, closed seasons, and size limit changes.

Addendum XVIII (August 2012)
Reduces traps allocations by 50% for LCMA 2 and 25% for LCMA 3.

Addendum XIX (February 2013)
Modifies the conservation tax for LCMA 3 to a single transfer tax of 10% for full or partial business sales.

Addendum XX (May 2013)
Prohibits lobstermen from setting or storing lobster traps in Closed Area II from November 1 to June 15 annually. Any gear set in this area during this time will be considered derelict gear. This addendum represents an agreement between the lobster industry and the groundfish sector.

Addendum XXI (August 2013)
Addresses changes in the transferability program for LCMAs 2 and 3. Specific measures include the transfer of multi-LCMA trap allocations and trap caps.

Addendum XXII (November 2013)
Implements Single Ownership and Aggregate Ownership caps in LCMA 3. Specifically, it allows LCMA 3 permit holders to purchase lobster traps above the cap of 2000 traps; however, these traps cannot be fished until approved by the permit holder's regulating agency or once trap reductions commence. The Aggregate Ownership Cap limits LCMA fishermen or companies from owning more traps than five times the Single Ownership Cap.

Addendum XXIII (August 2014)
Updates Amendment 3's habitat section to include information on the habitat requirements and tolerances of American lobster by life stage.

Addendum XXIV (May 2015)
Aligns state and federal measure for trap transfer in LCMA's 2, 3, and the Outer Cape Cod regarding the conservation tax when whole businesses are transferred, trap transfer increments, and restrictions on trap transfers among dual permit holders.

Addendum XXVI (February 2018)
Advances the collection of harvester and biological data in the lobster fishery by improving the spatial resolution of data collection, requiring harvesters to report additional data elements, and establishing a deadline that within five years, states are required to implement 100% harvester reporting. The Addendum also improves the biological sampling requirements by establishing a baseline of ten sampling trips per year, and encourages states with more than 10% of coastwide landings to conduct additional sampling trips. Required reporting of additional data elements went into effect on January 1, 2019. The Addendum XXVI requirement for commercial harvesters to report their fishing location by 10 minute longitudinal/latitudinal square was implemented in 2021.

4.2 On-Going Management Actions

In response to signs of reduced settlement in the GOM/GBK, the Board initiated Draft Addendum XXVII in August 2017 to increase resiliency through considering the standardization of management measures in the GOM/GBK stock. Due to the prioritization of actions in response to the Atlantic Large Whale Take Reduction Team recommendations, development of this addendum stalled. Following its review of the 2020 Benchmark Stock Assessment and Peer Review Report, the Board reinitiated development of Draft Addendum XXVII. The Board revised the objective of the addendum given persistent low settlement indices and recent decreases in recruit indices in recent years. The Board specified that 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.

In August 2021, the Board initiated Draft Addendum XXIX to Amendment 3 to the FMP. The Draft Addendum considers implementing electronic tracking requirements for federally-permitted vessels in the American lobster and Jonah crab fisheries, with the goal of collecting high resolution spatial and temporal effort data. Through this action, the Board seeks to significantly improve the stock assessment, identify areas where lobster fishing effort might present a risk to endangered North Atlantic right whales, and document the footprint of the fishery to help reduce spatial conflicts with other ocean uses like wind energy development and aquaculture, and improve the efficiency of offshore enforcement efforts.

5.0 Ongoing Trap Reductions

Addendum XVIII established a series of trap reductions in LCMAs 2 and 3, with the intent of scaling the size of the SNE fishery to the size of the resource. Specifically, a 25% reduction in year 1 followed by a series of 5% reductions for five years was established in LCMA 2; a series of 5% reductions over five years was established in LCMA 3. The fifth year of reductions took place at the end of the 2019 fishing year and affect trap allocations in the 2020 fishery, completing the required LCMA 3 trap reductions. The sixth year of reductions for LCMA 2 took place at the end of the 2020 fishing year and affect trap allocations in the 2021 fishery. Per Addendum XVIII, states with fishermen in LCMAs 2 and 3 are required to report on the degree of consolidation that has taken place. Trap reductions by jurisdiction ahead of the 2020 fishing year can be found in Table 4. It is important to note that trap reductions also occur as the result of trap

transfers as, per Addendum XIX, there is a 10% conservation tax on trap allocation transfers between owners.

6.0 Fishery Dependent Monitoring

The following provisions of Addendum XXVI went into effect January 1, 2019:

- Required reporting of additional data elements;
- Requirement to implement 100% harvester reporting within five years;
- Baseline biological sampling requirement of ten sea and/or port sampling trips per year.

The Addendum XXVI requirement for commercial harvesters to report their fishing location by 10 minute longitudinal/latitudinal square will not be implemented until 2021. Table 5 describes the level of reporting and monitoring programs by each state. *De minimis* states are not required to conduct biological sampling of their lobster fishery.

In 2020, all states except Rhode Island, New Jersey and Connecticut completed the required ten fishery dependent monitoring through sea and/or port sampling trips. Rhode Island completed nine port sampling trips and no sea sampling trips. Due to the COVID-19 pandemic, at sea observer trips were suspended in New Jersey for 2020. New Jersey continues to monitor the situation and has started to develop protocol for a safe return to normal field operations. No fishery dependent sampling has been conducted by Connecticut since 2014 due to reductions in funding and staffing levels.

7.0 Status of Fishery Independent Monitoring

Addendum XXVI also requires fishery independent data collection by requiring statistical areas be sampled through one of the following methods: annual trawl survey, ventless trap survey, or young-of-year survey. In 2020 a number of surveys could not be completed due to the COVID-19 pandemic, as noted below.

7.1 Trawl Surveys

Maine and New Hampshire: The Maine-New Hampshire Inshore Trawl survey began in 2000 and covers approximately two-thirds of the inshore portion of Gulf of Maine. The spring survey was canceled due to the COVID-19 pandemic. The fall survey began September 21, 2020 in Portsmouth, NH and ended on October 23, 2020 off of Lubec, Maine. Ninety-one out of 120 scheduled tows were completed, resulting in a 76% completion rate. A total of 13,250 lobsters were caught and sampled, with 6,570 females and 6,680 males caught and measured. The total weight of lobsters caught was 3,106.3 kg (Figure 4).

Massachusetts: Since 1978, the Division of Marine Fisheries has conducted spring and autumn bottom trawl surveys in the territorial waters of Massachusetts. For the first time since 1978, neither the spring nor fall bottom trawl surveys were conducted in 2020 due to the COVID-19 pandemic. Survey data are provided through 2019 (Figure 5).

Rhode Island: The Rhode Island DFW Trawl Survey program conducted seasonal surveys in the spring and fall, as well as a monthly survey. In 2020, 44 trawls were conducted in both the

spring and fall. 156 trawls were performed as part of the monthly program. Spring 2020 mean catch per unit effort (CPUE) was 0.02 and 0.52 for legal and sub legal lobsters (respectively); fall 2020 CPUE was 0.07 for legal lobsters and 0.68 for sublegal lobsters. The 2020 mean monthly trawl CPUE was 0.16 and 1.08 per-tow for legal and sublegal lobsters, respectively (Figure 6).

Connecticut and New York: Juvenile and adult abundance are monitored through the Long Island Sound Trawl Survey during the spring (April, May, June) and the fall (September, October) cruises. Due to the COVID-19 pandemic, the spring and fall 2020 Long Island Sound Trawl Surveys were not conducted. The spring 2019 lobster abundance index (geometric mean = 0.1 lobsters/tow) was the third lowest in the time series and is similar to the 2017-2018 indices. Spring abundance in the last nine years has been less than 1.0. All indices from 2004-2019 are below the time series median (3.16). The fall 2019 survey marked the first time since the survey began in 1984 that no lobsters were caught in September and October. The fall time series median (3.54) has not been exceeded since 2004 (Figure 7). Both legal and sublegal size lobster abundance has declined with a similar trajectory.

New York: In 2018, New York initiated a stratified random trawl survey in the near shore ocean waters off the south shore of Long Island from the Rockaways to Montauk Point and the New York waters of Block Island Sound. Prior to 2020 sampling was conducted five times a year during the winter (February), spring (May, June), summer (August), and fall (December). Only two sampling cruises were conducted in 2020 due to the COVID-19 pandemic. These cruises took place during the winter (February) and fall (September into October). The spring and summer trips were canceled due to the pandemic. Thirty and 16 stations were sampled respectively. Only one lobster was caught during the 2020 survey during the February trip. It was a female with a 101 mm carapace length (CL).

New Jersey: An independent Ocean Trawl Survey is conducted from Sandy Hook, NJ to Cape May, NJ each year. The survey stratifies sampling in three depth gradients, inshore (18'-30'), mid-shore (30'-60'), offshore (60'-90'). The mean CPUE, which is calculated as the sum of the mean number of lobsters per size class collected in each sampling area weighted by the stratum area, increased from 2017 to 2018 for all size classes grouped and legal sizes, but decreased for sublegal sizes (Figure 8). No April 2019 Survey was conducted due to Research vessel mechanical issues. Due to the COVID-19 pandemic, 2020 CPUE and indices were not obtained.

Maryland: Maryland conducted a 16-foot otter trawl survey in the coastal bays and has not encountered an American lobster in this survey (1989 - 2020).

7.2 Young of Year Index

Several states conduct young-of-year (YOY) surveys to detect trends in abundance of newly-settled and juvenile lobster populations. These surveys attempt to provide an accurate picture of the spatial pattern of lobster settlement. States hope to track juvenile populations and generate predictive models of future landings.

Maine: There are currently 40 fixed stations along the Maine coast. Of these 40 stations 38 have been sampled consistently since 2001 with two additional sites added to Zone D, off midcoast Maine, in 2005. In recent years, these sites are sampled October to December. YOY survey indices in 2019 increased from 2018 in all statistical areas. The 2020 indices in statistical areas 511, 512, and 513 east are near the time series averages, while the indices for 513 west remain below the series averages (Figure 9).

New Hampshire: New Hampshire Fish and Game conducted a portion of the coastwide American Lobster Settlement Index (ALSI). In 2020, a total of 19 juvenile lobsters were sampled from three sites; 13 older juveniles, 1 YOY lobster, and 5 one-year-old (Y+). Figure 10 depicts the CPUE of lobsters for all NH sites combined, from 2008 through 2020. For each of these four indices, CPUE shows a general upward trend to a time series high in 2011, with sustained moderate to low levels from 2012 through 2020.

Massachusetts: Annual sampling for early benthic phase/juvenile (EBP) lobsters was conducted during August and September, 2020. Sampling was completed at 21 sites spanning 7 regions in Massachusetts coastal waters prior to 2019 when changes to the survey were made discontinuing four locations in SNE (two in Buzzards Bay and both Vineyard Sound sites) and five sites in GOM (two South Shore locations and all three Cape Cod Bay locations). Data for all sites were used to generate annual density estimates of EBP lobster and other decapod crustaceans. In 2020 densities of YOY lobsters remained low compared to the time series average in Boston Harbor and Salem Sound, but densities in 2020 were slightly higher than the preceding two years in all GOM locations (Figure 11). In SNE there were no YOY lobsters found in the Buzzards Bay sampling locations.

Rhode Island: For 2020, the YOY Settlement Survey was conducted using suction sampling at a total of six fixed stations with twelve randomly selected 0.5 m^2 quadrats sampled at each survey station. Average site abundance of lobster at sampling sites has generally declined since the mid-1990's (Figure 12). The 2020 YOY Settlement Survey index was 0.14 lobsters/m^2, and with all lobsters was 0.22/m^2.

Connecticut: The CT DEEP Larval Lobster Survey in western Long Island Sound was discontinued after 2012. Alternative monitoring data are available for the eastern Sound from the Millstone Power Station entrainment estimates of all stages of lobster larvae. Both programs show a protracted decline in recruitment following the 1999 die-off (correlation between programs: R=0.35, p=0.066) (Figure 13).

7.3 Ventless Trap Survey

To address a need for a reliable index of lobster recruitment, a cooperative random stratified ventless trap survey was designed to generate accurate estimates of the spatial distribution of lobster length frequency and relative abundance while attempting to limit the biases identified in conventional fishery dependent surveys.

Maine: The Maine Ventless Trap Survey changed strategies in 2015 to cover more area by

eliminating the vented traps at each site. This change allowed the survey to double the number of sites with ventless traps and increase the sampling coverage spatially to 276 sites. Traps were set during the months of June, July, and August. The stratified mean was calculated for each area using depth and statistical area for ventless traps only. Compared to the previous years, in 2020 there were increases in the number of sublegal (<83 mm CL) and legal sized (≥ 83 mm CL) lobsters caught in the NH-Friendship (513) and Friendship-Schoodic (512) areas. However, sublegal lobster catch in Schoodic Pt-Cutler (511) saw a decrease and legal sized lobster catch did not change significantly in this area (Figure 14).

New Hampshire: Since 2009, NHF&G has been conducting the coastwide Random Stratified Ventless Trap Survey in state waters (statistical area 513). A total of six sites were surveyed twice a month from June through September in 2020. Catch per unit effort (stratified mean catch per trap haul) from 2009 through 2020 is presented in Figure 15. The highest catch value (for ventless traps only) of the time series was recorded in 2019.

Massachusetts: The coast-wide ventless trap survey was initiated in 2006 and expanded in 2007 with the intention of establishing a standardized fishery-independent survey designed specifically to monitor lobster relative abundance and distribution. The survey was not conducted in 2013 due to a lack of funding; however, starting in 2014 the survey has been funded with lobster license revenues and will continue as a long-term survey.

Relative abundance of sub-legal (< 83 mm CL) and legal-sized (≥ 83 mm CL) lobsters for statistical area 514 (part of LCMA 1) is shown in Figure 16 as the stratified mean CPUE, including both vented and ventless traps. The average catch of sublegal lobsters is much higher than the catch of legal-sized lobsters, and generally increased from 2006 through 2016 but has been declining since, with the 2019 and 2020 values below the time series average of 4.73 lobsters/trap. The stratified mean catch per trap of legal-sized lobsters in 2020 was 0.60 (± 0.01), and was above the time series average of 0.57.

Figure 17 shows the time series of relative abundance (stratified mean CPUE) for sub-legal (<86 mm CL) and legal-sized (≥ 86 mm CL) lobsters in the southern MA region (Area 538; part of LCMA 2). The mean sublegal CPUE in 2020 was 0.79 (± 0.06), below the time series average of 1.25 lobsters/trap haul. The CPUE of legal-sized lobsters in 2020 was 0.30 (±0.03), above the time series average of 0.22 lobsters/trap haul. These values are calculated using both vented and ventless traps.

Rhode Island: In 2020, the Ventless Trap Survey was conducted during the months of June-August over 24 sampling sites. A total of 2,387 lobsters were collected from 826 traps over 18 trips. The stratified abundance index of sublegal lobsters in the 2020 survey, 3.62 lobsters per ventless trap, remains below the time series mean of 6.05 lobsters per ventless trap. The abundance index for legal-sized lobsters, at 0.62, was above the time series mean of 0.36 lobsters per ventless trap (Figure 18).

Delaware: A pilot study was initiated in 2018 to assess the population structure of structure-

oriented fish in the lower Delaware Bay and nearshore Atlantic Ocean. Sampling was conducted with commercial sized ventless fish pots, from January to December. In 2020, Delaware encountered 8 American lobsters in lower Delaware Bay and 794 American lobsters in the nearshore Atlantic Ocean with a ratio of 56% males, 34% female and 10% egg laden. The survey ran from April to December. The sampled lobsters ranged in length from 44 mm to 134 mm.

8.0 State Compliance

States are currently in compliance with all required biological management measures under Amendment 3 and Addendum I-XXIV; however, the Plan Review Team (PRT) notes that Rhode Island, New Jersey and Connecticut did not conduct the required amount of sea/port sampling in 2020, as specified in Addendum XXVI. Due to the COVID-19 pandemic, some states had to cancel or limit the amount of surveys conducted. The states' reasons for not meeting the requirement are provided in Section 6.0.

9.0 De Minimis Requests

The states of Virginia, Maryland, and Delaware have requested *de minimis* status. According to Addendum I, states may qualify for *de minimis* status if their commercial landings in the two most recent years for which data are available do not exceed an average of 40,000 pounds. Delaware, Maryland, and Virginia meet the *de minimis* requirement.

10.0 Regulatory Changes

Maine:

- In November 2019, the Department of Marine Resources (DMR) amended the gear marking regulations for persons fishing lobster gear and trap/pot gear in all Maine coastal waters. Effective September 1, 2020, gear marking requirements were changed from red to purple marks. Inside the Exemption Area, fishermen are required to have three purple marks: a 36-inch mark in the top two fathom of their endline, and a 12-inch mark in the middle and at the bottom of their endline. Outside the Exemption Area, fishermen are required to have 4 purple marks: a 36-inch mark in the top two fathom of endline, and 3 12-inch marks at the top, middle, and bottom of their endline. Finally, all lobster gear and trap/pot gear fished outside the Exemption Area is required to have an additional green mark of a minimum of 6-inches in the top two fathom of buoy line. Lobster gear fished inside the Exemption Area is prohibited from having a green mark. In April 2020, DMR amended the gear marking regulation to create a new exception to the previously adopted requirements. Buoy lines of 100 feet or less in length are required to have only two purple marks, one of 36 inches in the top two fathom of the line, and one of 12 inches at the bottom of the line.
- A Resolve passed during the spring of 2020 required DMR to provide the joint standing committee of the Legislature having jurisdiction over marine resources matters with a report that evaluates the limited-entry zone system by February 15, 2021. It required DMR to examine the long waiting period for entry to fish in a limited-entry zone and in examining the waiting list, to consider several factors, including, but not limited to, the current biological status of the fishery, current exit-to-entry ratios in each limited-entry zone, latency of licenses and trap tags and the current policy for student lobster and

crab fishing licenses. It required the department to revisit the recommendations made in the report prepared for the department by the Gulf of Maine Research Institute pursuant to Resolve 2011, chapter 62. It required the department to make recommendations regarding the long waiting period for entry into a limited-entry zone. It also required the department to account for possible new federal regulations to address protections for endangered right whales when making any recommendations. The Resolve authorized the joint standing committee of the Legislature having jurisdiction over marine resources matters to report out legislation to the First Regular Session of the 130th Legislature

- A bill passed in 2020 allowed a qualified resident disabled veteran to obtain upon application, at no cost, a noncommercial lobster and crab fishing license.
- A bill passed in 2020 allowed a person who holds a lobster and crab fishing license to raise or haul any lobster trap during any time of the day from September 1st to October 31st in the "gray zone" if that person is authorized to fish in that area.

New Hampshire

- Regulation changes were made to lobster gear marking in 2020, providing an option of red or yellow rope marking until January, 1, 2022 when all fishers will be required to have yellow.

Massachusetts

- 5/1/20 – DMF adjusted coastal lobster permit transfer regulations. The regulations now allow for trap allocations for LCMAs 2 and OCC to be transferred in increments of 10 traps or more (rather than 50 traps or more) and eliminated the requirement that the individual trap allocations for LCMAs 2 and OCC be retired if they fall below 50-traps.

Virginia

- In February 2020, the Virginia Marine Resources Commission passed regulatory language to establish minimum size of escape vents in lobster traps to comply with Addenda II and IV to the Interstate Fishery Management Plan for American Lobster.

11.0 Enforcement Concerns

Maine

- Maine Marine Patrol Officers documented violations for illegal lobsters, gear violations, and license violations in 2020. One fisherman was charged for exceeding the boat trap limit, multiple individuals were charged with molesting lobster gear, one fisherman was charged with fishing improperly tagged gear in a secondary zone and multiple fisherman were charged with possessing a large quantity of undersized lobsters; all are facing lengthy license suspensions. Patrol officers spent thousands of hours conducting complaint investigations, educational outreach; as well as, routine and targeted enforcement patrols both near and offshore. Marine Patrol placed a strong emphasis on proactive enforcement through high visibility patrols on shore and at sea. The Bureau of Marine Patrol continues to consider the Maine lobster fishery as one that operates with

a high degree of regulatory compliance which is supported by evaluating the number of harvesters inspected versus the number of violations documented.

Massachusetts

- The outcome of one potential scrubbed egger case from the fall of 2019 is still pending (the case is progressing the criminal court system), another scrubbed egger case resulted in a three month permit suspension. There are no other enforcement cases that we are aware of for 2020.

New York

- No major enforcement issues in New York during 2020. There were a few gear tagging issues. Due to COVID protocols, limited lobster gear was hauled for inspection.

New Jersey

- During the 2019 calendar year, seven summonses were issued within New Jersey state waters. Of those seven, two were issued due to possession of illegal sized lobster, one for possession of egg bearing female lobsters, and four for permitting violations.

12.0 Research Recommendations

The full list of research recommendations can be found in the 2020 Stock Assessment Report. Below is a summarized list of the high priority research recommendations from the 2020 Stock Assessment that were compiled by the Lobster Technical Committee (TC) and Stock Assessment Subcommittee (SAS).

Port and Sea Sampling - The quality of landings data has not been consistent spatially or temporally. Limited funding, and in some cases, elimination of sea sampling and port sampling programs will negatively affect the ability to characterize catch and conservation discards, limiting the ability of the model to accurately describe landings and stock conditions. It is imperative that funding for critical monitoring programs continues, particularly for offshore areas from which a large portion of current landings originate in SNE. Sea sampling should be increased in Long Island Sound (statistical area 611), and in the statistical areas in federal waters, particularly those fished by the LCMA 3 fleet, via a NMFS-implemented lobster-targeted sea sampling program.

Commercial Data Reporting – Finer resolution spatial data are paramount in understanding how landings align between statistical area and LCMAs. Vessel tracking is recommended for federal vessels. Once in place, the new spatial data should be analyzed for comparison to current spatial understanding of harvest. The growing Jonah crab fishery in SNE continues to complicate the differentiation of directed lobster versus Jonah crab effort. More sea sampling and landings data must be collected to better differentiate the two fisheries' activities.
Ventless Trap Survey - Calibration work to determine how catch in the ventless trap surveys relates to catch in the bottom trawl surveys remains an important and unaddressed topic of research. Ventless traps may be limited in their ability to differentiate between moderately high and extremely high abundance, and calibration with bottom trawl surveys may help to clarify how q might change with changes in lobster density.

NEAMAP Trawl Survey Protocols - The SAS recommends that the NEAMAP Trawl Survey sampling protocol be modified for all lobsters caught to be sorted by sex. If a subsample is necessary, subsamples be taken by sex for additional biological data (size, egg presence and stage, vnotch, etc.) This modification would align the biological sampling methodology with other trawl surveys used in the assessment, and perhaps allow the survey to not be collapsed by sex into survey slots.

Time Varying Growth - Growth of American lobster has been found to change through time (McMahan et al. 2016), yet the ability to incorporate this dynamic in the assessment model currently is unavailable. Accounting for interannual changes in the growth matrix, including those in increment, probability, and seasonality, is imperative for model convergence. Modification to the assessment model is needed to allow for time varying growth matrices to be used to reflect changing growth in the stocks.

Expansion of Growth Matrices - Exploration of expanding the model size structure to smaller sizes could allow the SAS to better capture changes in recruitment for the population by incorporating < 53mm lobster abundances from the surveys currently used, as well as incorporating additional surveys that currently are not model inputs for the assessment, such as those from the young of year settlement surveys. Due to decreased recruitment in SNE and some areas in GOMGBK, available survey data should be evaluated to determine whether current data sources for small sizes are sufficient for expanding the size structure and growth matrices.

Temperature-Molt Dynamics - Understanding how the timing for molting, molt increments, and probability by size vary with temperature for all stocks would allow for more accurate and realistic depictions of growth via updated annual growth matrices. The work of Groner et al. (2018) should be expanded by using the Millstone data to specifically analyze how molt frequency and increment has changed seasonally and interannually.

Larval Ecology - Spatial expansion of larval surveys and further testing is warranted, particularly in areas like the eastern GOM and GBK that lack any studies of this nature. Studies that explore greater spatial coverage of larval sampling and examine lobster larval diets, in situ development time in current conditions, larval interactions with well-mixed versus stratified water columns, and varying growth and mortality with temperature would allow for greater context on these variables' influence on recruitment.

Deepwater Settlement - There is a need to determine settlement success in habitat not currently sampled and its contribution to overall stock productivity. Research needs to explore the levels of detectability, impact of stratification, and interannual temperature effects on the indices. Additionally, it will be important to understand whether there are differences in growth and survival in these deeper habitats, particularly relative to the desire to expand the growth matrix into smaller size ranges for modeling purposes.

SNE Recruitment Failure - The direct cause of the precipitous declines in recruitment under less

variable spawning stock biomass is largely unknown. Research designed to understand the causes driving recruitment failure is vital for any efforts toward rebuilding the SNE stock. In addition, being able to predict similar conditions in GOMGBK could allow management the opportunity to respond differently.

Stock Structure Working Group - The SAS recommends that a workshop on stock boundaries be convened prior to the initiation of the next assessment to review results of any new research and re-evaluate appropriate stock boundaries. Inclusion of Canadian researchers at this workshop would be beneficial to share data and knowledge on this shared resource.

Spatial Analyses of Fisheries-Independent Data – Northeast Fisheries Science Center (NEFSC) trawl survey data remains one of the richest data sources to understand abundance and distribution patterns through time for lobsters by size and sex. Formal analyses of NEFSC trawl survey and the ME/NH trawl survey and should be performed. The Ecosystem Monitoring (EcoMon) Program's larval lobster information should also be considered.

Reevaluate Baseline Natural Mortality Rate - Intensive hypothesis-driven sensitivity analyses should be conducted to evaluate the base mortality rate for both stocks by season and year. Canadian tagging data should be examined to determine how natural mortality rates derived from these data compare to the assumptions used currently in the model and sensitivity analyses. Exploration of additional time series representing natural mortality hypotheses (e.g. sea temperature, shell disease prevalence, predators) should be continued to either inform time-varying natural mortality or correlate to rates produced in sensitivity analyses.

Predation Studies - It is suspected that a given predator's role in lobster natural mortality has changed through time. Predation laboratory studies and gut content analyses would provide greater guidance on individual species' roles in lobster natural mortality. With this information, predation-indices as a function of predator annual abundances and their contribution to stock-specific lobster mortality would be immensely valuable, particularly in SNE.

Management Strategy Evaluation - Developing a true management strategy evaluation tool that can iteratively project and refit the operating model would best inform future management discussions on rebuilding the SNE stock or providing resiliency for the GOM stock and fishery.

Economic Reference Points - Economic analyses considering landings, ex-vessel value, costs, associated economic multipliers, number of active participants, and other factors are imperative to truly discern how declines in the population would impact the GOMGBK industry. The SAS strongly recommends a thorough economics analysis be conducted by a panel of experts to more properly inform economic-based reference points, and ultimately provide resiliency to both the GOMGBK stock and fishery.

13.0 Plan Review Team Recommendations

During their review of the state compliance reports, the PRT noted the following issues:

- Massachusetts and Connecticut were unable to provide compliance reports by the August 1 deadline. This has been a recurring issue over the last few years due to delays in data availability and limited staff resources.
- In 2020, Rhode Island, New Jersey, and Connecticut did not meet the Addendum XXVI minimum requirement of ten sea/port sampling trips, completing nine, zero, and zero trips, respectively. The compliance reports for Rhode Island and New Jersey explain that sampling was impeded by the COVID-19 pandemic. For Connecticut, no fishery dependent sampling has been conducted by since 2014. Reductions in funding and staffing levels have hindered our ability to resume these activities

The PRT Recommends the Board approve the *de minimis* requests of DE, MD, and VA. Other than the issues noted above, all states appear to be in compliance with the requirements of the FMP.

The following are general recommendations the PRT would like to raise to the Board:

- The PRT recommends the Board consider reviewing the monitoring requirements in SNE given the status of the stock and the difficulty obtaining sea sampling trips in a fishery with reduced effort. The TC has discussed the need for additional sampling trips in federal waters as the fishery has shifted offshore.
- The PRT recommends the TC discuss the best way to present state index information in the annual compliance reports to provide more detailed resolution of adult and juvenile abundance and size composition of the stock.
- The PRT recommends the Board engage with the Committee on Economic and Social Sciences (CESS) to consider available socioeconomic data to develop metrics that could be used to characterize changes in the fishery.

14.0 Tables

Table 1. Landings (in pounds) of American Lobster by the states of Maine through Virginia. Source: ACCSP Data Warehouse for 1981-2019 landings; state compliance reports for 2020 landings. *C= confidential data.*

	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	Total
1981	22,631,614	793,400	11,420,638	1,871,067	807,911	890,218	593,801	55,700	63,108	2,173	**39,129,630**
1982	22,730,253	807,400	11,265,840	3,173,650	880,636	1,121,644	846,215	90,700	64,788	4,713	**40,985,839**
1983	21,976,555	1,310,560	12,867,378	5,114,486	1,654,163	1,207,442	769,913	56,700	76,192	20,619	**45,054,008**
1984	19,545,682	1,570,724	12,446,198	5,259,821	1,796,794	1,308,023	927,474	103,800	98,876	37,479	**43,094,871**
1985	20,125,177	1,193,881	13,702,702	5,140,131	1,381,029	1,240,928	1,079,723	118,500	82,295	42,881	**44,107,247**
1986	19,704,317	941,100	12,496,125	5,667,940	1,253,687	1,416,929	1,123,008	109,000	57,593	93,105	**42,862,804**
1987	19,747,766	1,256,170	12,856,301	5,317,302	1,571,811	1,146,613	1,397,138	84,100	49,820	60,241	**43,487,262**
1988	21,739,067	1,118,900	12,977,313	4,758,990	1,923,283	1,779,908	1,557,222	66,200	22,966	53,696	**45,997,545**
1989	23,368,719	1,430,347	15,645,964	5,786,810	2,076,851	2,344,932	2,059,800	76,500	17,502	45,107	**52,852,532**
1990	28,068,238	1,658,200	16,572,172	7,258,175	2,645,951	3,431,111	2,198,867	68,300	24,941	58,260	**61,984,215**
1991	30,788,646	1,802,035	15,998,463	7,445,172	2,673,674	3,128,246	1,673,031	54,700	26,445	7,914	**63,598,326**
1992	26,830,448	1,529,292	14,969,350	6,763,087	2,534,161	2,651,067	1,213,255	21,000	27,279	753	**56,539,692**
1993	29,926,464	1,693,347	14,350,595	6,228,470	2,177,022	2,667,107	906,498	24,000	46,650	2,940	**58,023,093**
1994	38,948,867	1,650,751	16,176,551	6,474,399	2,146,339	3,954,634	581,396	8,400	7,992	460	**69,949,789**
1995	37,208,324	1,834,794	15,903,241	5,362,084	2,541,140	6,653,780	606,011	25,100	26,955	5,210	**70,166,639**
1996	36,083,443	1,632,829	15,312,826	5,295,797	2,888,683	9,408,519	640,198	20,496	28,726	C	**71,311,517**
1997	47,023,271	1,414,133	15,010,532	5,798,529	3,468,051	8,878,395	858,426	C	34,208	2,240	**82,487,785**
1998	47,036,836	1,194,653	13,167,803	5,617,873	3,715,310	7,896,803	721,811	1,359	19,266	1,306	**79,373,020**
1999	53,494,418	1,380,360	15,875,031	8,155,947	2,595,764	6,452,472	931,064	C	41,954	6,916	**88,933,926**
2000	57,215,406	1,709,746	14,988,031	6,907,504	1,393,565	2,883,468	891,183	C	62,416	C	**86,051,319**
2001	48,617,693	2,027,725	11,976,487	4,452,358	1,329,707	2,052,741	579,753	C	31,114	C	**71,067,578**
2002	63,625,745	2,029,887	13,437,109	3,835,050	1,067,121	1,440,483	264,425	C	20,489	C	**85,720,309**
2003	54,970,948	1,958,817	11,321,324	3,561,391	C	946,449	209,956	C	22,778	C	**72,991,663**
2004	71,574,344	2,851,262	11,675,852	3,059,319	646,994	996,109	370,536	13,322	14,931	27,039	**91,229,708**
2005	68,729,623	C	11,291,145	3,174,852	713,901	1,154,470	369,003	C	39,173	21,988	**85,494,155**
2006	75,419,802	2,612,389	12,090,423	3,949,299	806,135	1,252,146	470,878	3,706	26,349	28,160	**96,659,287**
2007	63,987,073	2,468,811	10,046,120	2,299,744	568,696	911,761	334,097	C	26,804	C	**80,643,106**
2008	69,910,434	2,568,088	10,606,534	2,782,000	427,168	712,075	304,479	C	32,932	C	**87,343,709**
2009	81,124,201	2,986,981	11,789,536	2,842,088	412,468	731,811	C	6,064	30,988	21,472	**99,945,609**
2010	96,244,299	3,648,004	12,772,159	2,928,688	441,622	813,513	692,869	C	29,989	16,345	**117,587,488**
2011	104,957,224	3,919,195	13,385,393	2,754,067	198,928	344,232	697,883	8,879	41,077	12,879	**126,319,757**
2012	127,464,332	4,229,227	14,486,344	2,706,384	247,857	550,441	919,351	C	65,813	10,823	**150,680,572**
2013	128,015,530	3,817,707	15,158,509	2,155,762	127,420	496,535	660,367	C	62,522	9,061	**150,503,413**
2014	124,941,217	4,374,656	15,312,852	2,412,875	127,409	222,843	526,368	26,330	57,414	11,099	**148,013,063**
2015	122,685,803	4,721,826	16,450,414	2,315,708	205,099	147,414	445,060	22,894	29,284	9,474	**147,032,976**
2016	132,750,484	5,782,056	17,784,921	2,260,335	254,346	218,846	349,880	C	29,254	2,854	**159,432,975**
2017	112,170,139	5,513,999	16,493,125	2,031,143	130,015	150,317	409,062	32,364	29,136	1,630	**136,960,928**
2018	121,227,261	6,082,881	17,697,083	1,905,689	110,580	112,685	344,547	C	24,893	2,727	**147,508,347**
2019	101,939,979	6,093,615	17,029,462	1,795,212	111,573	112,107	291,072	C	C	1,840	**127,374,858**
2020	97,843,707	5,013,854	16,753,623	1,701,291	125,421	122,655	316,011	C	10,035	C	**121,886,597**

Table 2. Above: Current (2016-2018) reference abundance estimates (millions), current target and threshold abundance (millions), and new recommended abundance reference points for both stocks. Below: Current (2016-2018) exploitation, current target and threshold exploitation, and new recommended target and threshold exploitation for both stocks.

Quantity	GOMGBK	SNE
Current (2016-2018 average)	256	7
Current Target	119	32
Current Threshold	58	25
Fishery/Industry Target	212	NA
Abundance Limit	125	NA
Abundance Threshold	89	20

Quantity	GOMGBK	SNE
Current (2016-2018 average)	0.459	0.274
Current Target	0.457	0.379
Current Threshold	0.510	0.437
Recommended Target	0.461	0.257
Recommended Threshold	0.475	0.290

Table 3. 2020 LCMA specific management measures

Management Measure	LCMA 1	LCMA 2	LCMA 3	LCMA 4	LCMA 5	LCMA 6	OCC
Min Gauge Size	3 1/4"	3 3/8"	3 17/32"	3 3/8"	3 3/8"	3 3/8"	3 3/8"
Vent Rect.	1 15/16 x 5 3/4"	2 x 5 3/4"	2 1/16 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"	2 x 5 3/4"
Vent Cir.	2 7/16"	2 5/8"	2 11/16"	2 5/8"	2 5/8"	2 5/8"	2 5/8"
V-notch requirement	Mandatory for all eggers	Mandatory for all legal size eggers	Mandatory for all eggers above 42°30'	Mandatory for all eggers in federal waters. No v-notching in state waters.	Mandatory for all eggers	None	None
V-Notch Definition[1] (possession)	Zero Tolerance	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	1/8" with or w/out setal hairs[1]	State Permitted fisherman in state waters 1/4" without setal hairs Federal Permit holders 1/8" with or w/out setal hairs[1]
Max. Gauge (male & female)	5"	5 ¼"	6 3/4"	5 ¼"	5 ¼"	5 ¼"	State Waters none Federal Waters 6 3/4"
Season Closure				April 30-May 31[2]	February 1-March 31[3]	Sept 8-Nov 28[4]	February 1-April 30

[1] A v-notched lobster is defined as any female lobster that bears a notch or indentation in the base of the flipper that is at least as deep as 1/8", with or without setal hairs. It also means any female which is mutilated in a manner that could hide, obscure, or obliterate such a mark.

[2] Pots must be removed from the water by April 30 and un-baited lobster traps may be set one week prior to the season reopening.

[3] During the February 1 – March 31 closure, trap fishermen will have a two week period to remove lobster traps from the water and may set lobster traps one week prior to the end of the closed season.

[4] Two week gear removal and a 2 week grace period for gear removal at beginning of closure. No lobster traps may be baited more than 1 week prior to season reopening.

Table 4: Trap allocation reductions as required by Addendum XVIII for LCMA 2 and 3 fishermen. This table only represents trap allocation reductions reported ahead of the 2020 fishing year and does not represent aggregate trap reductions over multiple years. Traps can also be retired due to the 10% conservation tax on trap transfers. Sources of the trap allocations come from state compliance reports and GARFO 2020 trap allocations published for the trap transfer program.

	Jurisdiction	# of Trap Allocated (For 2021 Fishing Year)	# of Traps Retired (from 2020 to 2021 Fishing Year)	Comments on Trap Transfers
LCMA 2	MA	29,244	1,635	368 traps transferred
	RI	60,385	2,226	4,946 traps transferred
	CT	1,815	93	
	NOAA (ME, NH, NY, NJ)	62,480	132	1,320 traps transferred out
LCMA 3	NOAA	103,206	406243	2,430 traps transferred out

Table 5. 2020 sampling requirements and state implementation. All states have 100% active harvester reporting except for Maine which has 10% harvester reporting. Sufficient sea sampling can replace port sampling. *De minimis* states (denoted by *) are not required to conduct biological sampling of their lobster fishery.

State	100% Dealer Reporting	10% Harvester Reporting	Sea Sampling	Port Sampling	Ventless Trap Survey	Settlement Survey	Trawl Survey
ME	✓	✓ (10%)	✓		✓	✓	✓
NH	✓	✓	✓	✓	✓	✓	✓
MA	✓	✓	✓		✓	✓	[a]
RI	✓	✓	[a]	✓	✓	✓	✓
CT	✓	✓	[b]	[b]		[c]	✓
NY	✓	✓	✓	✓			✓
NJ	✓	✓	[a]				[a]
DE*	✓	✓			✓		✓
MD*	✓	✓					✓
VA*	✓	✓					

[a] Sampling hindered or not completed due to the COVID-19 pandemic

[b] No fishery dependent sampling has been conducted by CT since 2014 due to reductions in funding and staffing levels.

[c] Larval data are available for the eastern Sound (ELIS) from the Millstone Power Station entrainment estimates of all stages of lobster larvae (Dominion Nuclear CT, Annual Report 2016).

Table 6. 2020 sea and port sampling trips and samples by state. *De minimis* states (denoted by *) are not required to conduct biological sampling of their lobster fishery.

State	Sea Sampling			Port Sampling		Market Sampling		Totals	
	Trips	Samples	Traps	Trips	Samples	Trips	Samples	Trips	Samples
ME	111	137,378	25,574	0	0	0	0	111	137,378
NH	19	10,579	0	12	1,000	0	0	31	11,579
MA	52	28,036	10,752	0	0	0	0	52	28,036
RI	0	0	0	9	242	0	0	9	242
CT	0	0	0	0	0	0	0	0	0
NY	1	5	No Data	23	1,857	0	0	24	1,862
NJ	0	0	0	0	0	0	0	0	0
DE*	0	0	0	0	0	0	0	0	0
MD*	0	0	0	0	0	0	0	0	0
VA*	0	0	0	0	0	0	0	0	0
Total	183	175,998	36,326	44	3,099	0	0	227	179,097

15.0 Figures

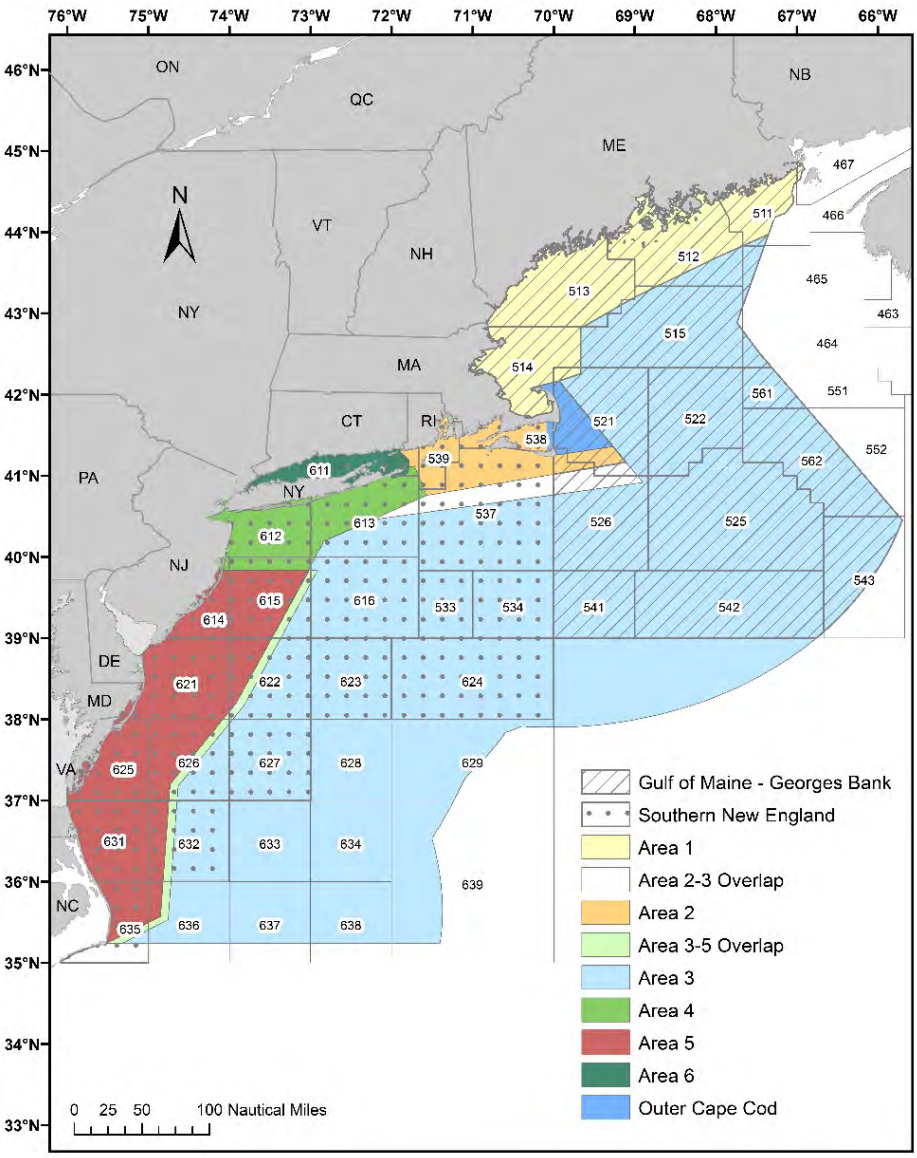

Figure 1. Lobster Conservation Management Areas (LCMAs) and stock boundaries for American lobster.

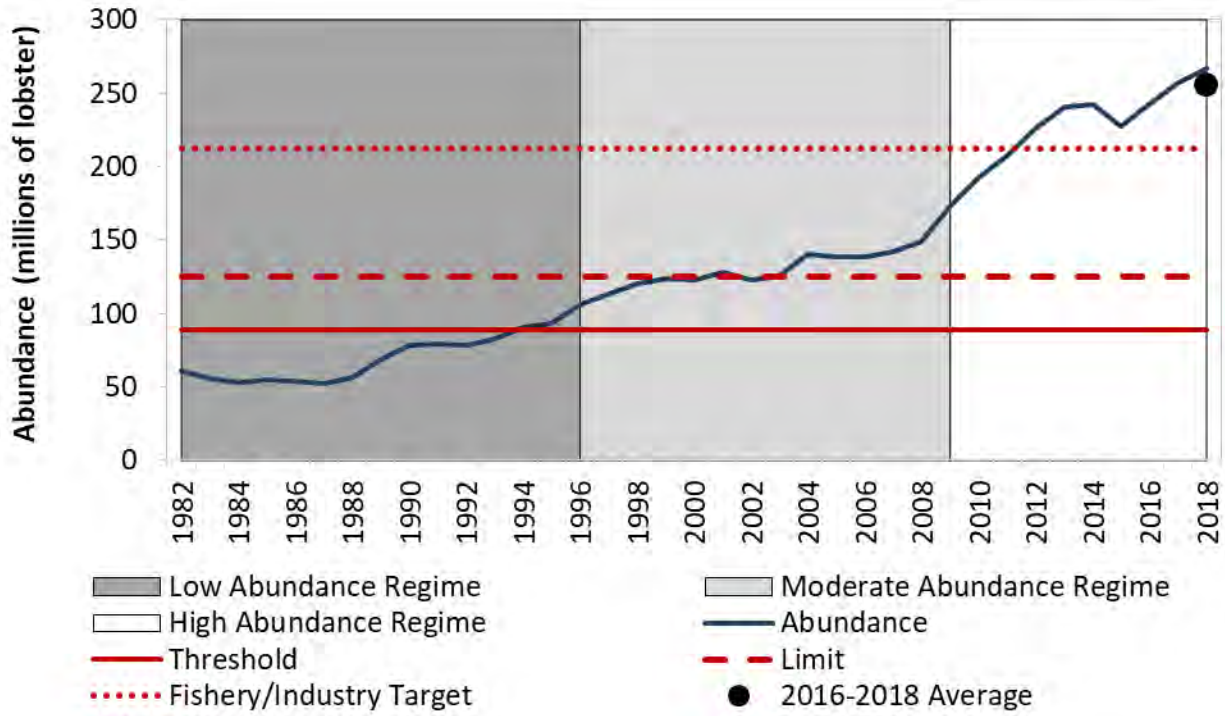

Figure 2. Abundance for GOM/GBK Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

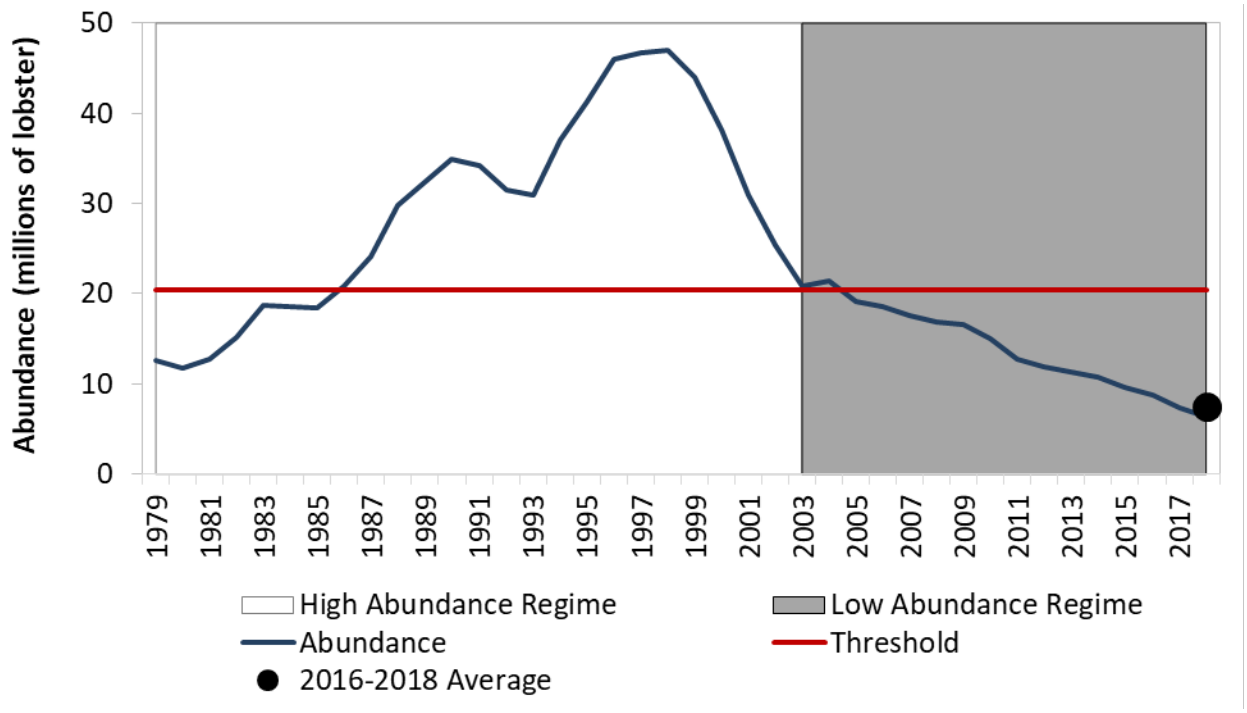

Figure 3. Abundance for SNE Relative to Reference Points. Source: 2020 Benchmark Stock Assessment for American Lobster.

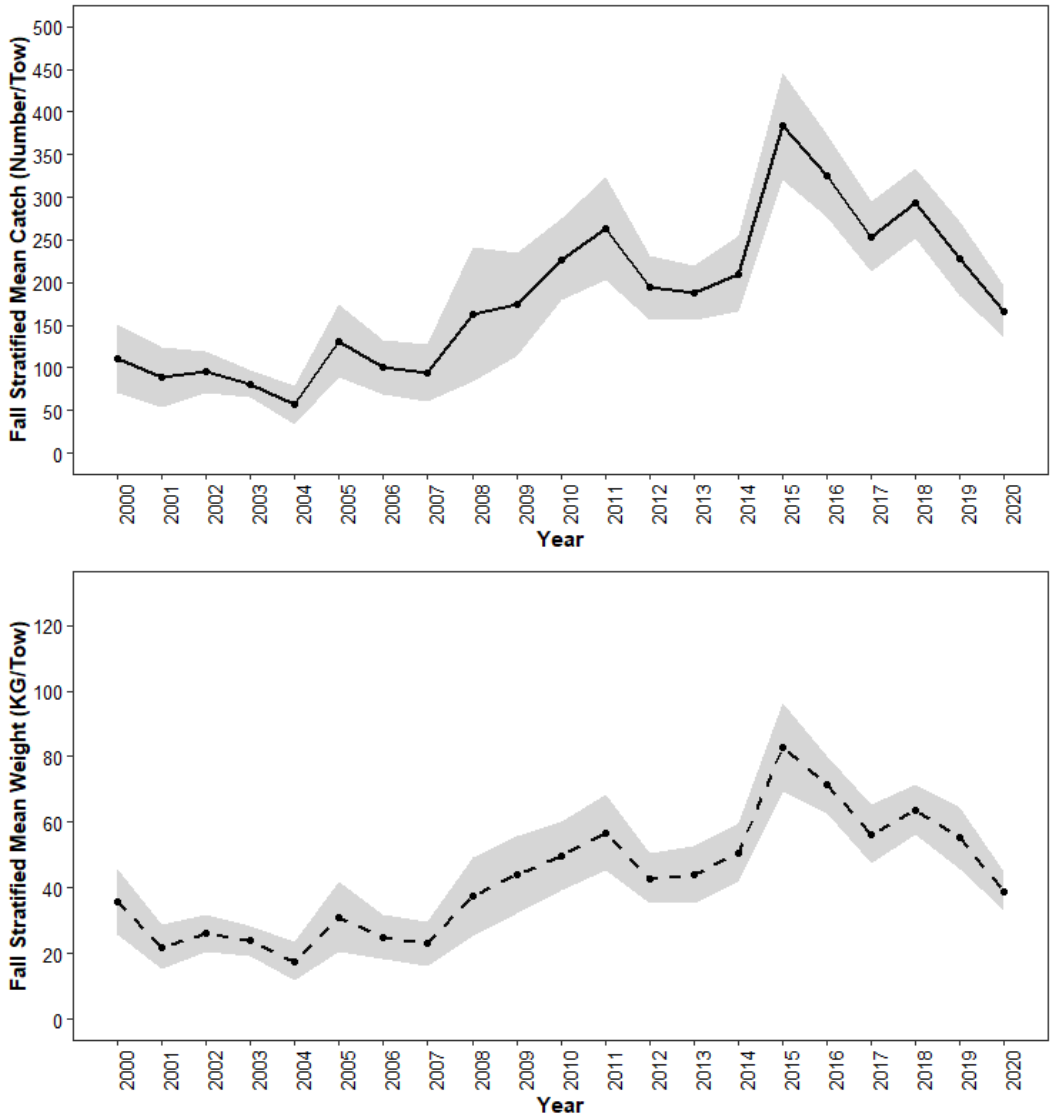

Figure 4. Stratified mean catch and weight indices for American lobster on the fall ME/NH Inshore Trawl Survey (2000-2020).

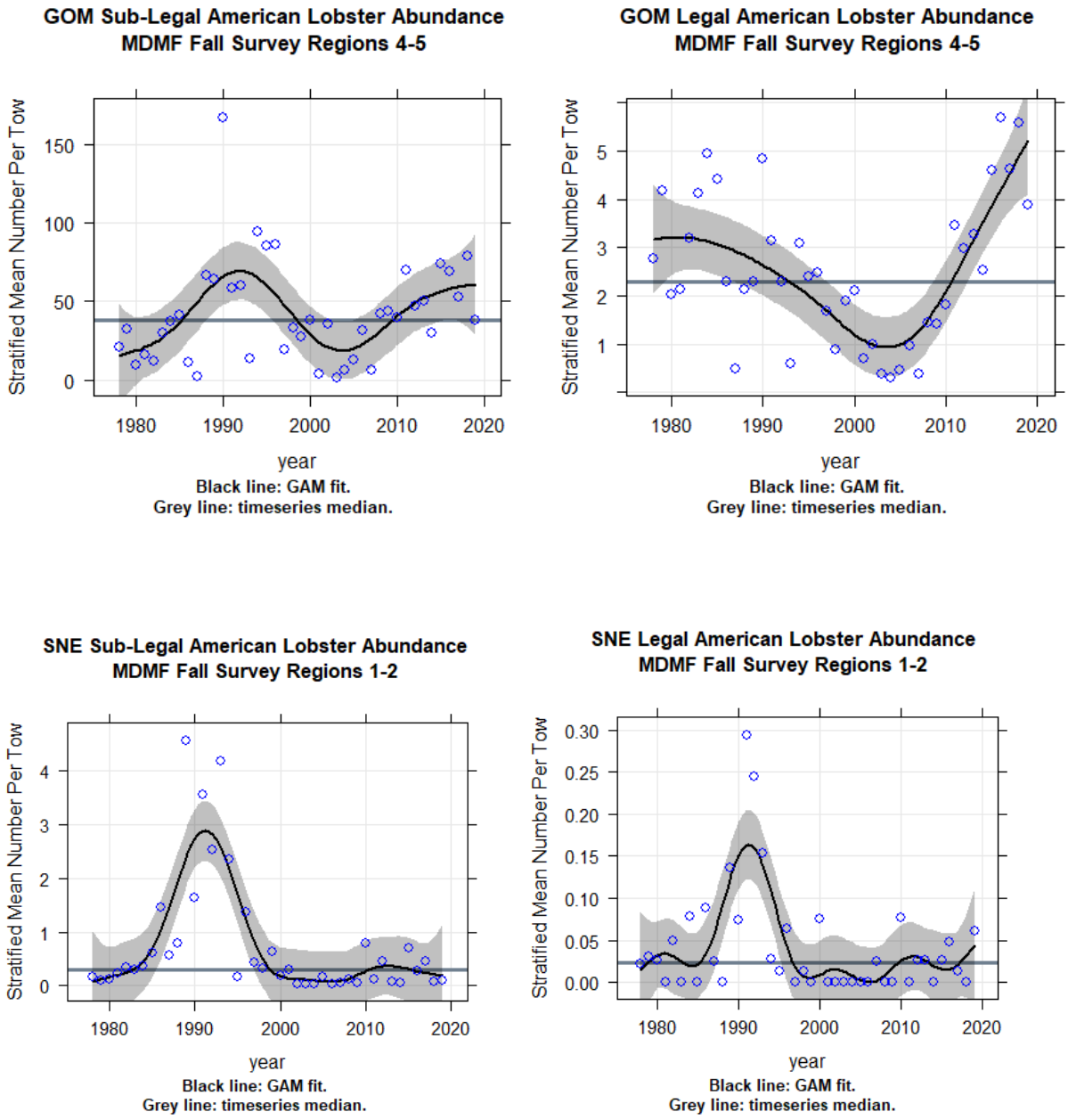

Figure 5. MADMF Fall Trawl Survey sublegal (left) and legal (right) indices from 1978-2019 sexes combined. The top charts are from Gulf of Maine and the bottom charts are from Southern New England.

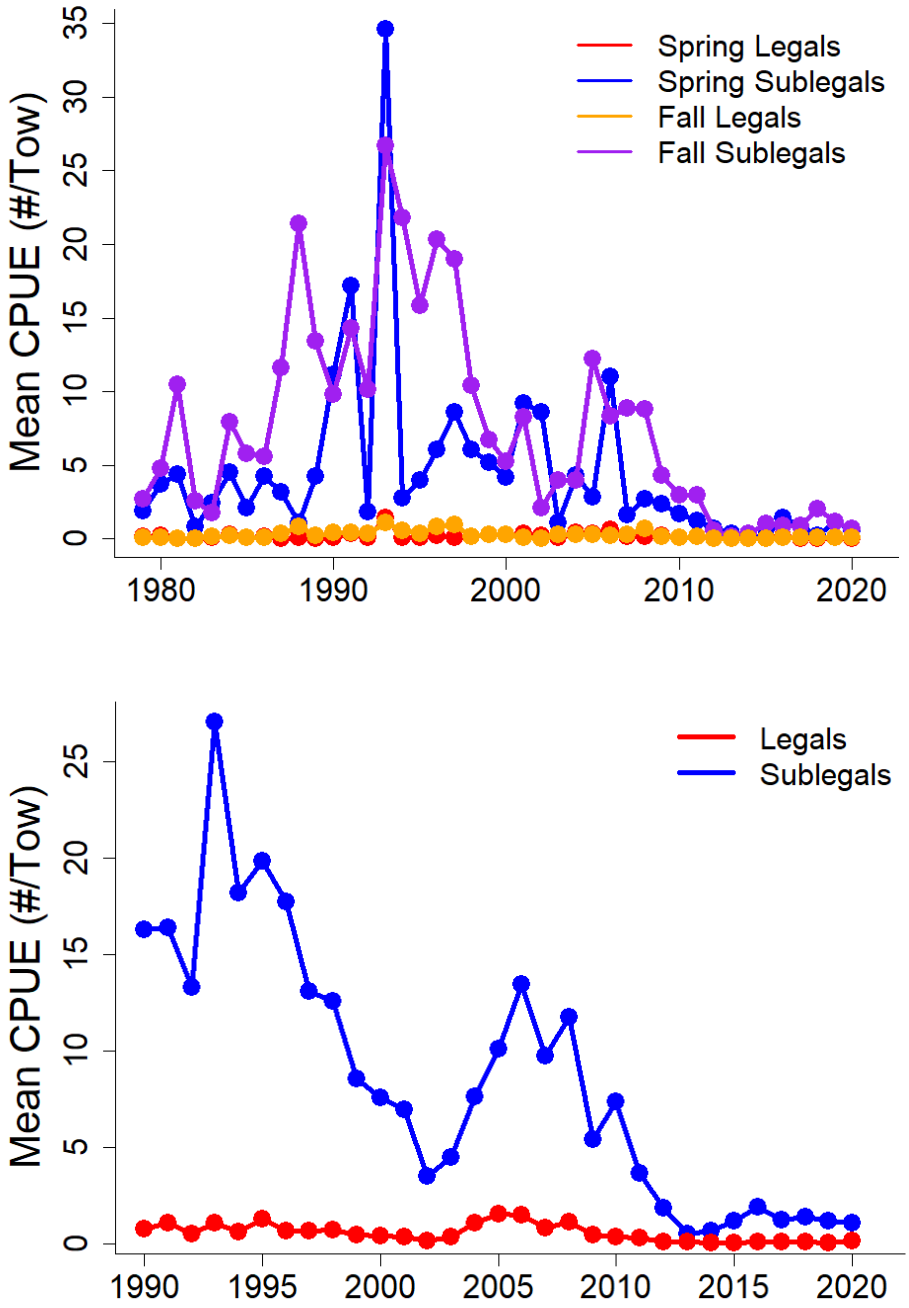

Figure 6. RIDFW Seasonal (spring and fall) Trawl lobster abundances (top) and Monthly Trawl lobster abundances (bottom). CPUE is expressed as the annual mean number per tow for sub-legal (<85.725mm CL) and legal sized (>=85.725mm CL) lobsters.

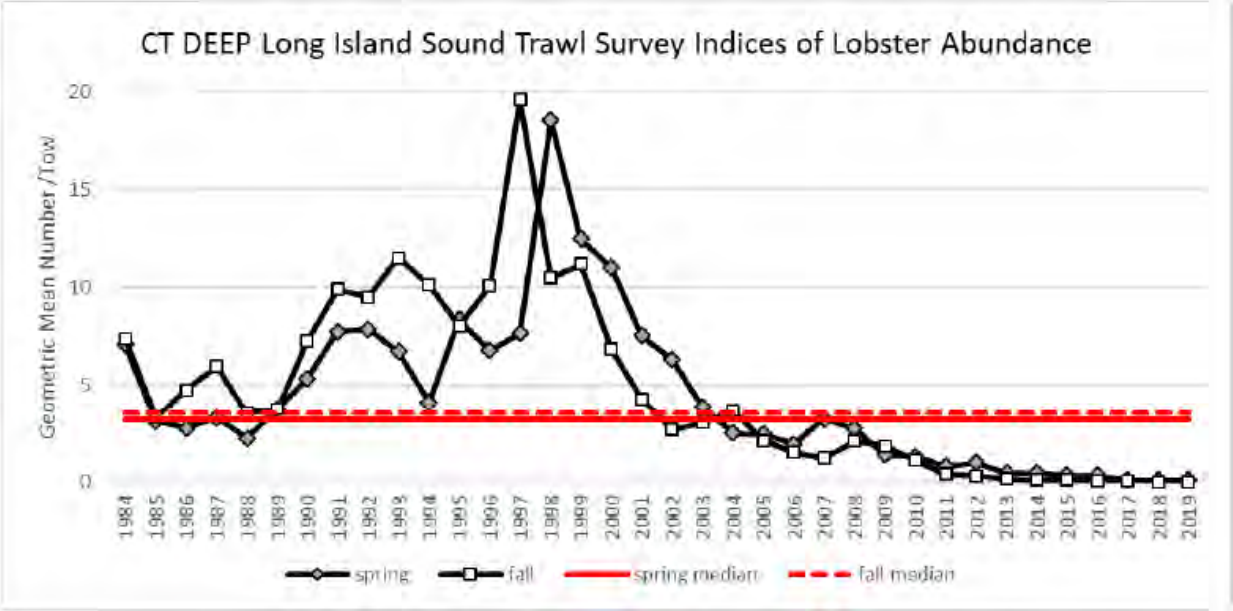

Figure 7. Results of the Long Island Sound Trawl Survey during spring (April-June) and fall (September-October) within NMFS statistical area 611.

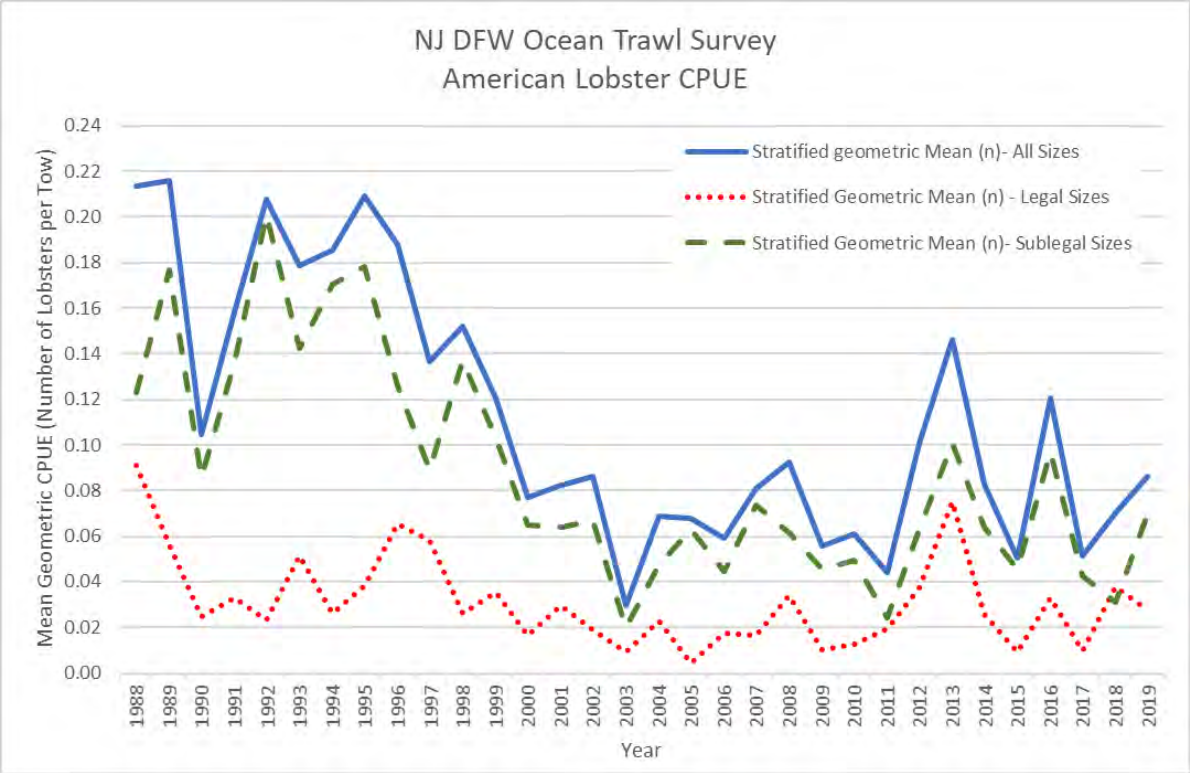

Figure 8. Stratified mean CPUE of all lobsters collected aboard the NJDFW Ocean Trawl Survey. The mean CPUE was calculated as the sum of the mean number of lobsters per size class collected in each sampling area weighted by the stratum area. *NOTE: No April 2019 Survey was conducted due to Research vessel mechanical issues. Due to the COVID-19 pandemic, 2020 CPUE and indices were not obtained.

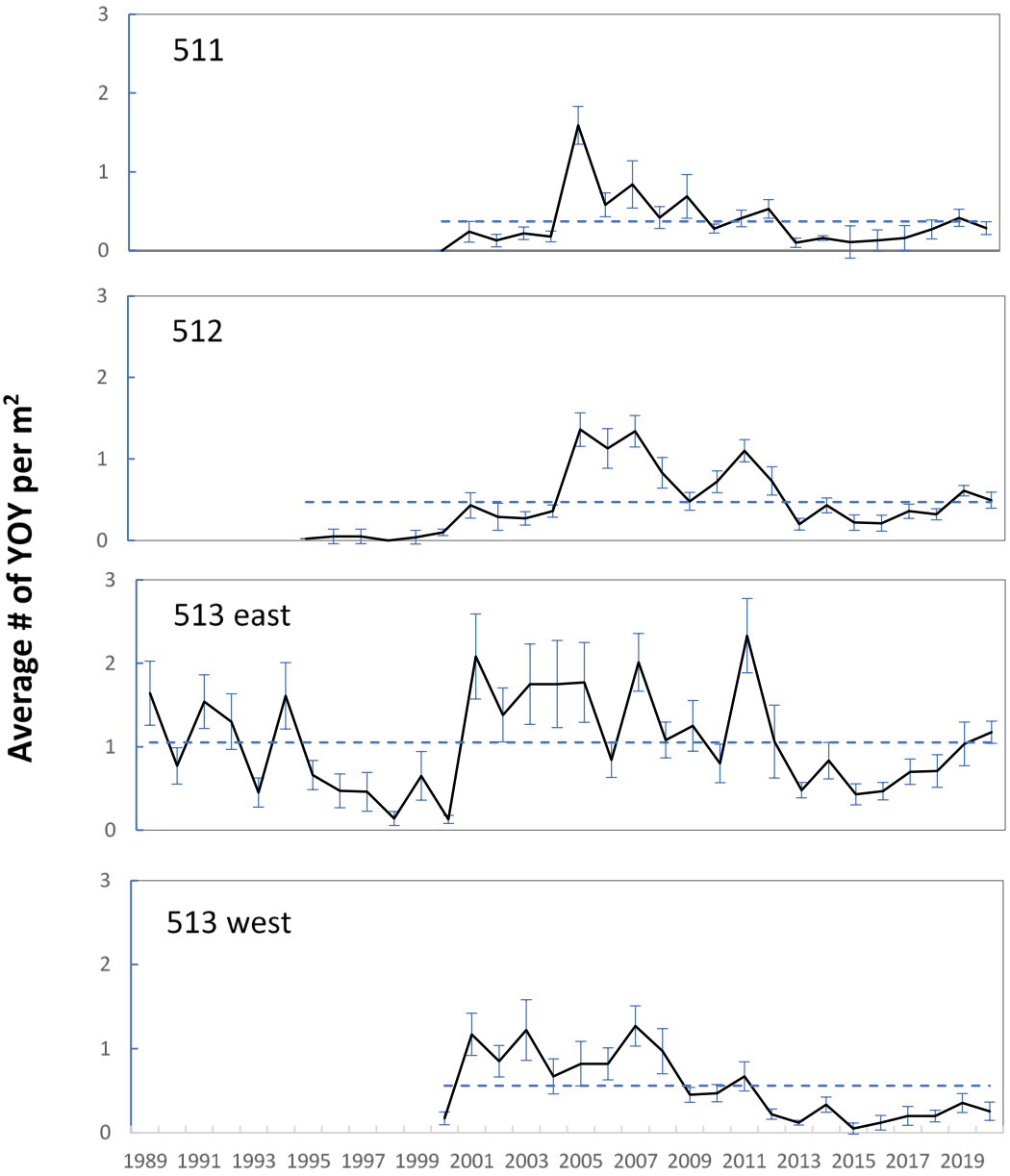

Figure 9. Maine Settlement Survey index 1989-2020 for each statistical area with series average (black line) for each region (blue dashed line) with standard error bars.

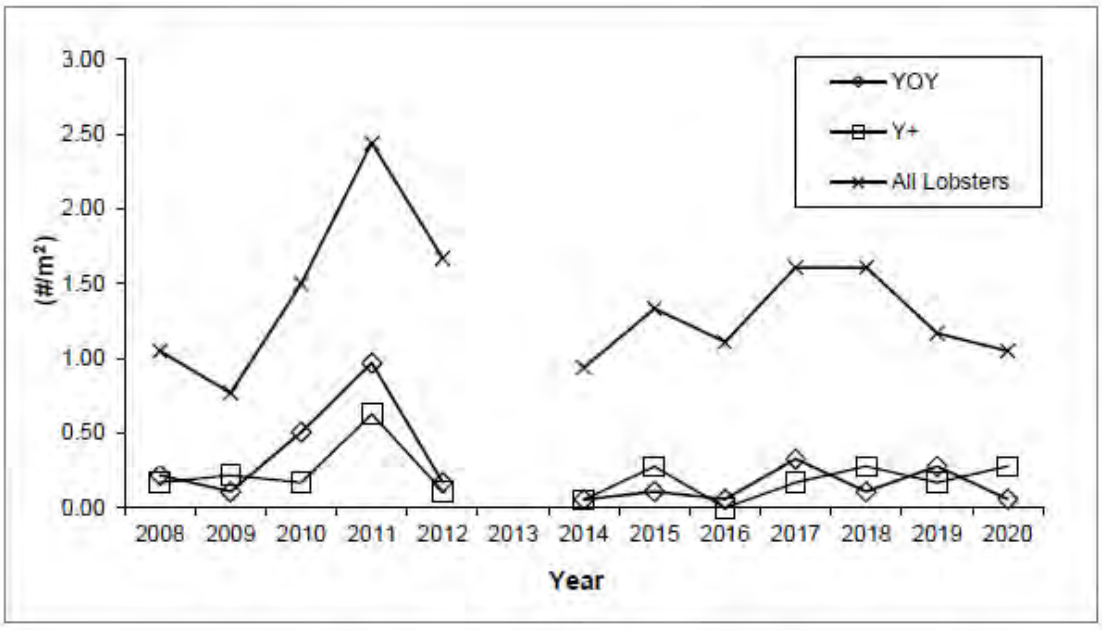

Figure 10. Catch per unit effort (#/m2) of young-of-year (YOY), one-year-olds (Y+), YOY and Y+ combined, and all lobsters during the American Lobster Settlement Index, by location, in New Hampshire, from 2008 through 2020. There were no settlement survey samples collected in NH in 2013.

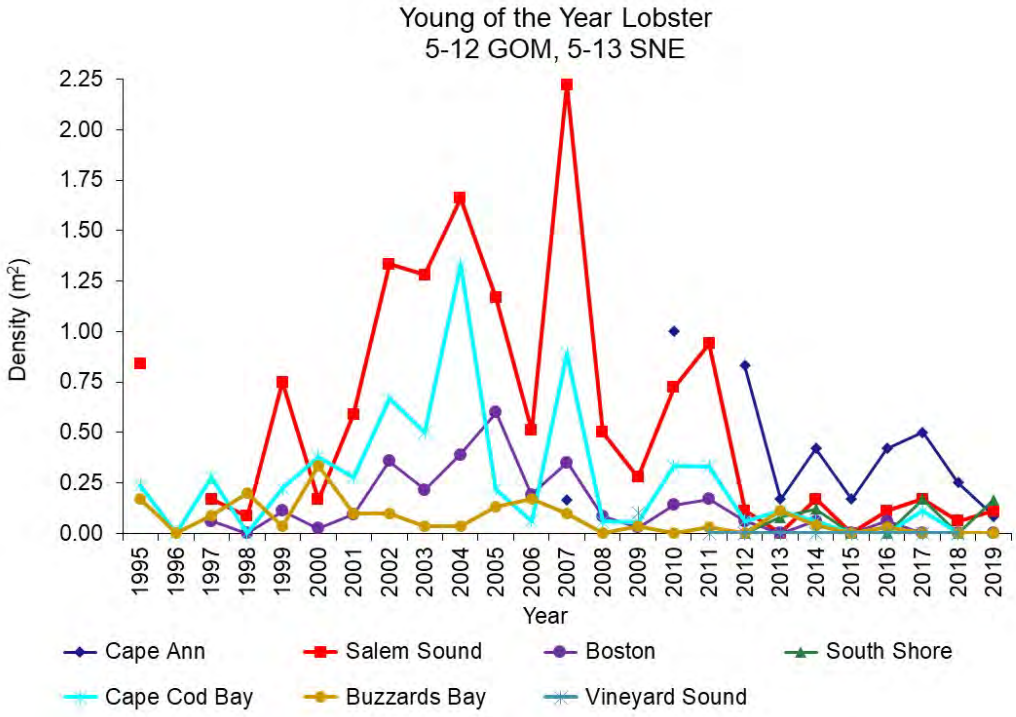

Figure 11. Young-of-year lobster density in seven Massachusetts regions; LCMA 1 – Cape Ann, Salem Sound, Boston, South Shore, Cape Cod Bay, LCMA 2 - Buzzards Bay, Vineyard Sound.

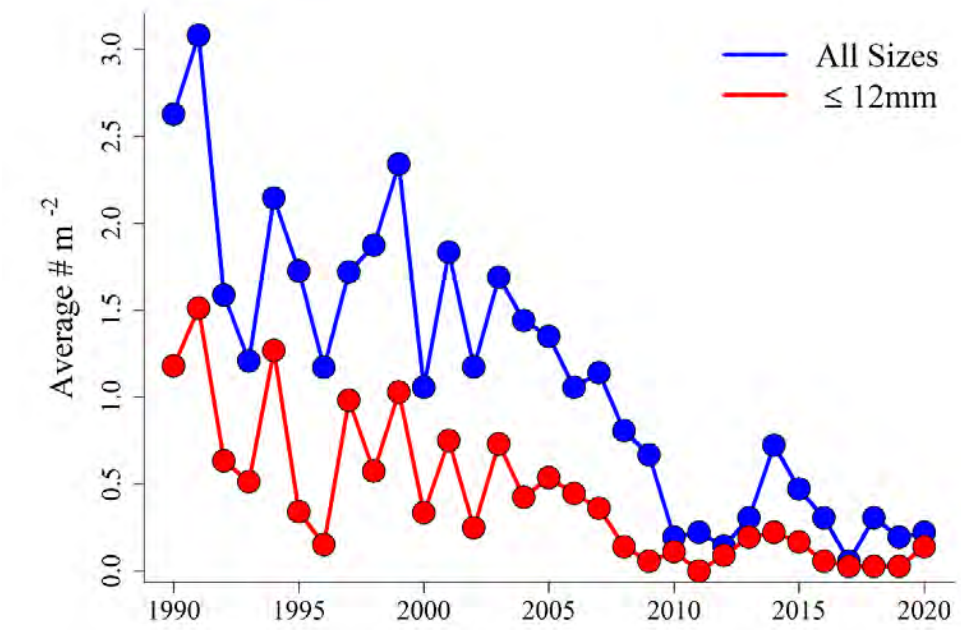

Figure 12. Average abundance of American lobster in Rhode Island suction sampling sites. Abundances are presented for lobsters 12mm and smaller (red line) and all sizes (blue line).

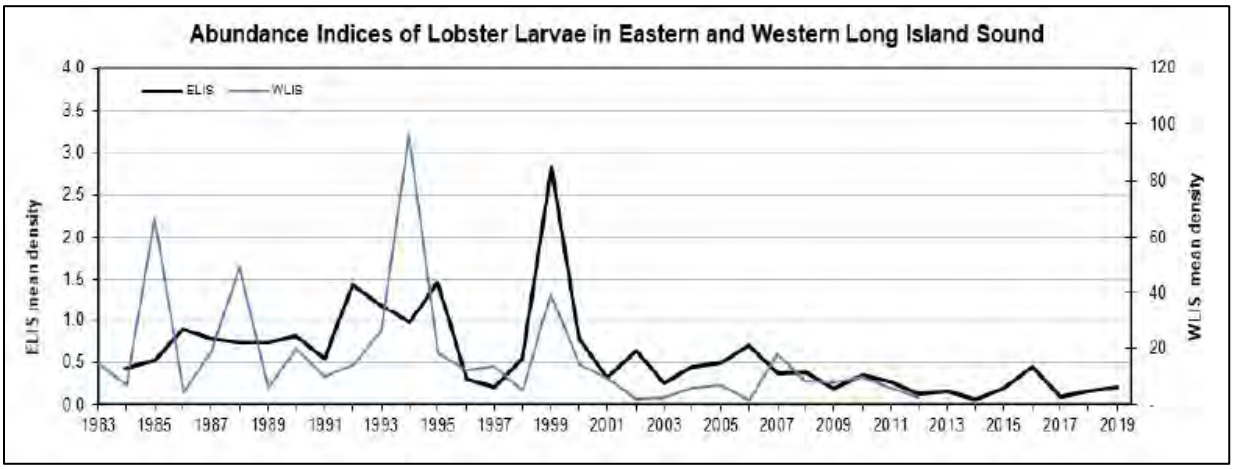

Figure 13. Abundance indices of lobster larvae from the Connecticut DEEP Larval Lobster Survey in western Long Island Sound and from the Millstone Power Station entrainment estimates in eastern Long Island Sound. The Connecticut DEEP survey was discontinued in 2013.

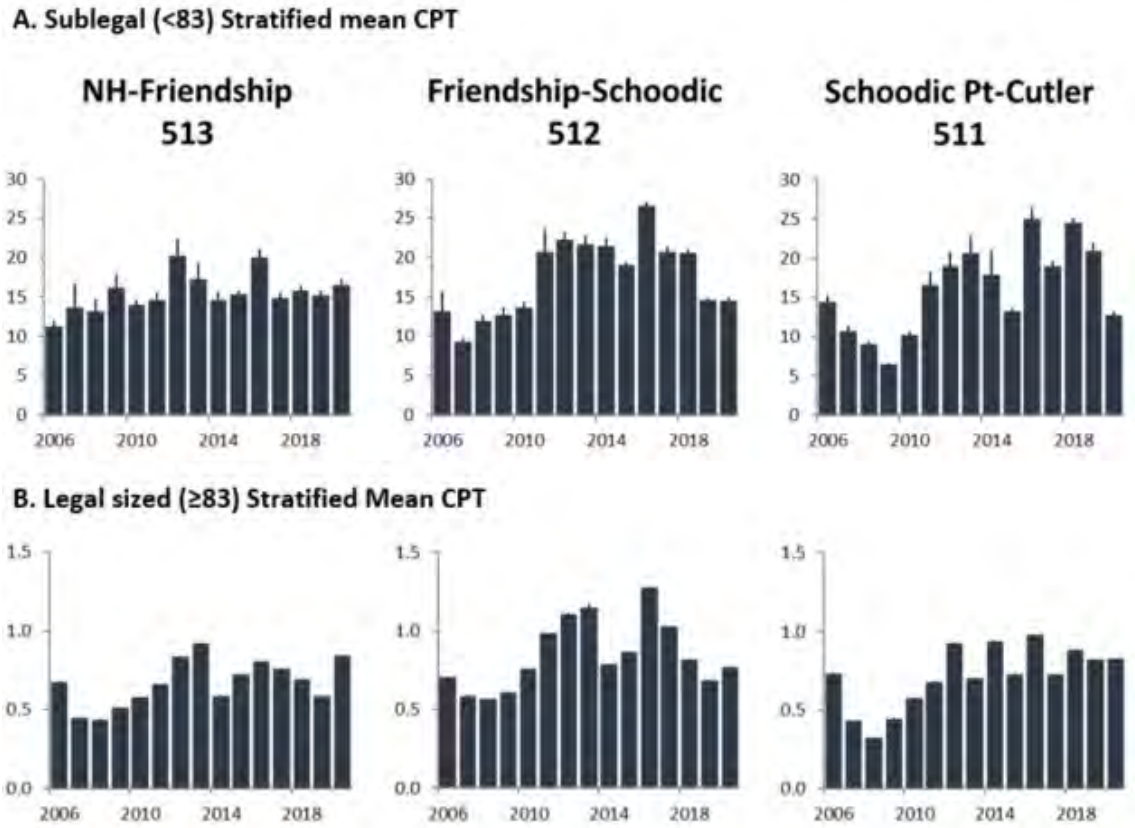

Figure 14. Stratified mean catch per trap for sublegal (A) and legal (B) sized lobsters from Maine's Ventless Trap Survey 2006-2020 by statistical area. Only ventless were traps included in the analysis.

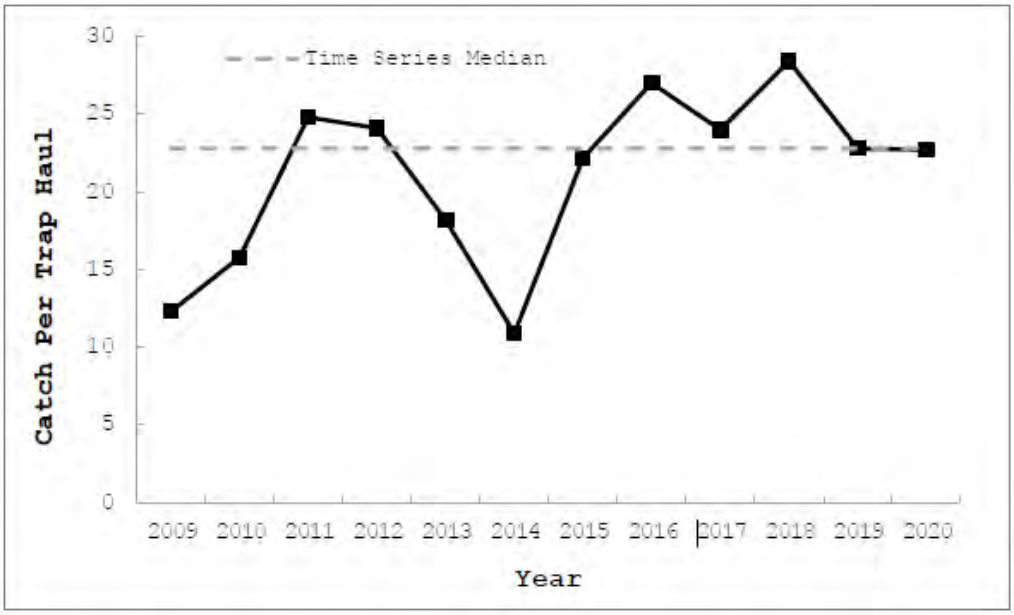

Figure 15. Stratified mean catch per trap haul (ventless traps only) for all lobsters captured during the coast-wide random stratified Ventless Trap Survey in New Hampshire state waters from 2009 through 2020.

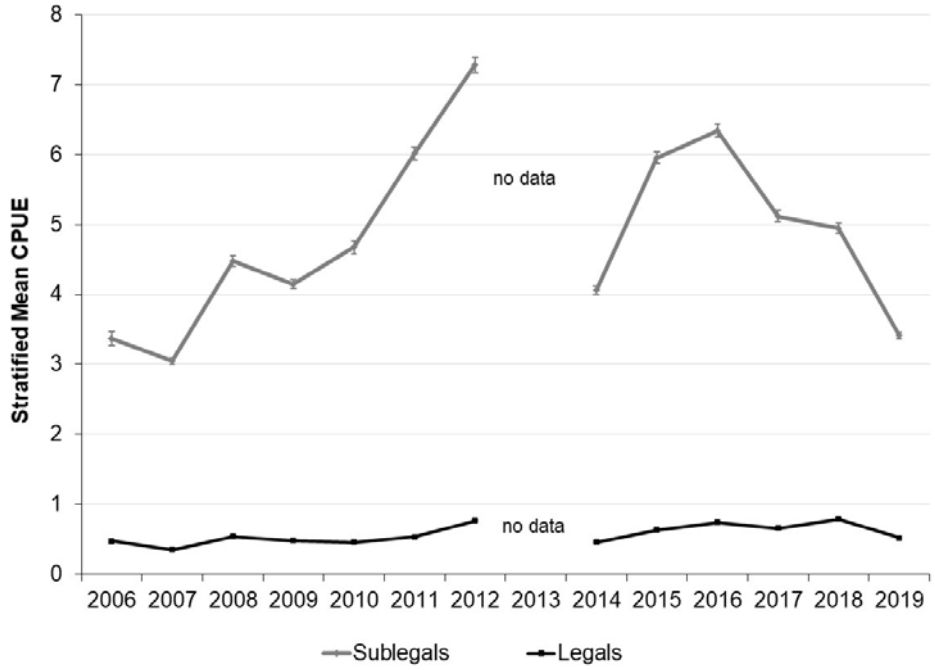

Figure 16. Stratified mean catch per trap haul (±S.E.) of sublegal (< 83 mm, grey line) and legal (≥ 83 mm, black line) lobsters in NMFS Area 514 from MADMF ventless trap survey from 2006-2019. Calculations include both vented and ventless traps.

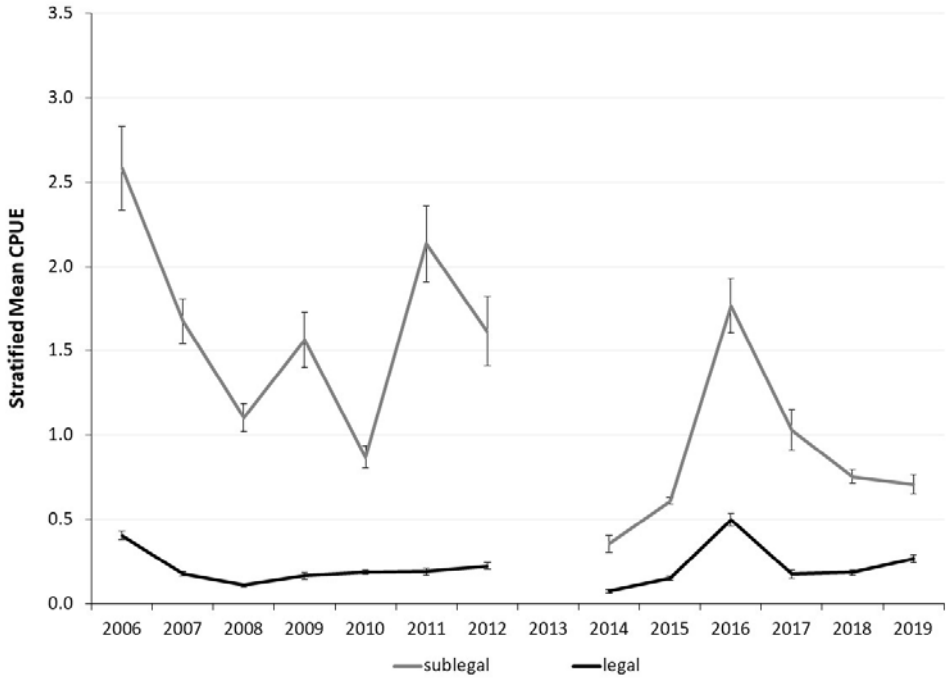

Figure 17. Stratified mean catch per trap haul (±S.E.) of sublegal (< 86 mm, grey line) and legal (≥ 86 mm, black line) lobsters in the original MA SNE survey area (within state waters), Area 538.

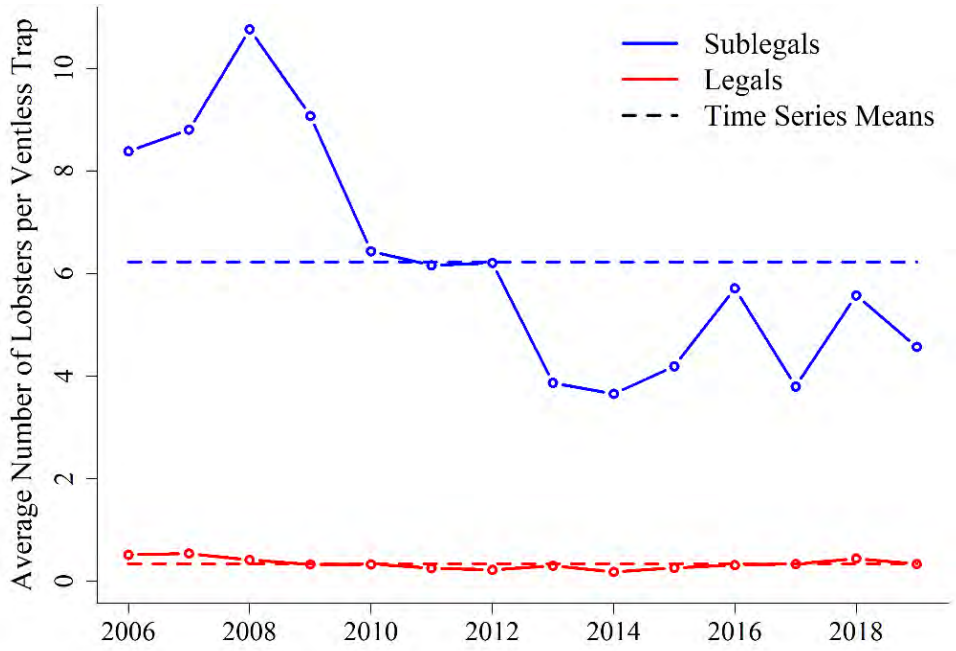

Figure 18. Stratified mean catch (#) per ventless trap for sublegal (<85.725 mm CL) and legal-sized (>=85.725mm CL) lobsters from RIDEM ventless trap survey. The dashed lines indicate time series means for the two indices.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

January 4, 2022

To: **American Lobster Management Board**

From: **Tina Berger, Director of Communications**

RE: **Advisory Panel Nominations**

Please find attached two new nominations to the American Lobster Advisory Panel – Eben Wilson and Jeff Putnam, both commercial trap fishermen from Maine. Please review these nominations for action at the next Board meeting.

If you have any questions, please feel free to contact me at (703) 842-0749 or tberger@asmfc.org.

Enc.

cc: Caitlin Starks

AMERICAN LOBSTER ADVISORY PANEL

Bolded names await approval by the American Lobster Management Board
Bolded and italicized name denotes Advisory Panel Chair January 4, 2022

Maine (4)

Jon Carter (comm/pot)
333 Main Street
Bar Harbor, ME 04609
Phone: (207)288-4528
CARTERLOB@GMAIL.COM
Appt. Confirmed: 5/30/96
Appt. Reconfirmed 7/26/00
Appt. Reconfirmed 1/2/06
Appt Reconfirmed 5/10
Confirmed Interest: 10/21

David Cousens (comm/pot)
Box 460
Waterman's Beach Road
South Thomaston, ME 04858
Phone: (207)594-7518
LPC6850@aol.com
Appt. Confirmed 8/28/03
Appt. Confirmed 8/07

Eben Wilson (commercial inshore/offshore trap)
5 Lincoln Street
PO Bix 87
East Boothbay, ME 04544
207.380.6897
ebensail@gmail.com

Jeff Putnam (commercial inshore - out to 20 miles - trap)
107 Littlefield Road
Chebeague Island, ME 04017
207.650.3327
Putnamjeff543@gmail.com

New Hampshire (2)

Robert Nudd (comm/inshore pot)
531 Exeter Road
P.O. Box 219
Hampton, NH 03842
Phone (eve): (603)926-7573
LOBSTAMAN@MYFAIRPOINT.NET
Appt. Confirmed: 10/30/95
Appt. Reconfirmed 9/15/99
Appt. Reconfirmed 1/2/06
Appt Reconfirmed 5/10
Confirmed Interest: 9/21

James A. Willwerth (comm./trap)
10 Mill
Hampton Falls, NH 03844
Phone (day): (603) 765-5008
Phone (eve): (603) 926-3139
JAW080257@comcast.net
Appt Confirmed 10/22/12

Massachusetts (4)

Arthur Sawyer Jr. (comm pots)
368 Concord Street
Gloucester, MA 01930
Phone: (978)281-4736
FAX: (978)281-4736
sooky55@aol.com
Appt. Confirmed: 1/29/01
Appt. Reconfirmed 1/2/06; 5/10; 9/15; 8/18
Confirmed Interest: 9/21

John Carver
PO Box 36
Green Harbor, MA 02041
Phone: 339.793.3785
FAX: (781)837-1707
fvnlights@gmail.com
Appt. Confirmed: 5/9/05
Appt. Reconfirmed 5/10; 9/15; 8/18
Confirmed Interest: 9/21

Grant Moore (comm/offshore pot)
4 Gooseberry Farms Lane
Westport, MA 02790
Phone (day): 508.971.2190
Phone (eve): 508.636.6248
FAX: 508.636.5789
grantmoore55@gmail.com
Appt. Confirmed 11/2/15
Appt. Reconfirmed 8/18
Confirmed Interest: 9/21

Vacancy – recreational diver

Rhode Island (2)
Lanny Dellinger (comm./pot)
160 Snuffmill Road
Saunderstown, RI 02874
Phone (day): (401)932-5826
Phone (eve): (401)294-7352
lad0626@aol.com
Appt Confirmed 2/21/06
Appt Reconfirmed 5/10

Vacancy (comm/offshore pot)

Connecticut (2)
John Whittaker (comm./pot)
37 Spring Street
Groton, CT 06340
Phone (day): (860)287-4384
Phone (eve): (860)536-7668
FAX: (860)536-7668
whittboat@comcast.net
Appt Confirmed 2/21/06
Appt Reconfirmed 5/10
Confirmed Interest: 9/21

Vacancy (comm pot)

New York (2)
George Doll (comm/inshore pot)
70 Seaview Avenue
Northport, New York 11768
Phone: (631)261-1407
FAX: (631)261-1407
Appt. Confirmed: 11/29/00
Appt. Reconfirmed 1/23/06
Appt Reconfirmed 5/10

James Fox (comm/pot)
152 Highland Drive
Kings Park, NY 11754
Phone: (631)361-7995
jcfox22@verizon.net
Appt. Confirmed: 10/16/01
Appt. Reconfirmed 1/23/06
Appt Reconfirmed 5/10

New Jersey (2)
Jack Fullmer (rec)
443 Chesterfield-Arneytown Road
Allentown, NJ 08501
Phone: (609) 298 – 3182
JF2983182@MSN.COM
Appt Confirmed 2/21/06
Appt Reconfirmed 5/17/10
Confirmed Interest: 9/21

John Godwin (processor)
1 Saint Louis Avenue
Point Pleasant Beach, NJ 08742
Phone: 732.245.0148
FAX: 732.892.3928
JOHN@POINTLOBSTER.COM
Appt Confirmed 11/2/15

Maryland
Earl Gwin
10448 Azalea Road
Berlin, MD 21811
Phone: (401) 251-3709
Email: sonnygwin@verizon.net
Appt confirmed 11/1/15
Confirmed Interest: 9/21

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Pat Keliher (your name) State: Maine

Name of Nominee: Eben Wilson

Address: 5 Lincoln St, PO Box 87

City, State, Zip: East Boothbay, ME 04544

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 207.380.6897 Phone (evening): _____

FAX: _____ Email: ebensail@gmail.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Lobster Advisory Panel
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes _____ no X

   If "yes," please list them below by name.

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Lobster

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 34 years
2. Is the nominee employed only in commercial fishing? yes _____ no X
3. What is the predominant gear type used by the nominee? Lobster pot
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? Both inshore and offshore to 35-40 miles

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 34 years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no X

   If "no," please list other type(s)of business(es) and/occupation(s):_____

3. How many years has the nominee lived in the home port community? 34 years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 34 years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no X

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? 34 years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no X If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? 34 years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? 34 years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

To the ASMFC commission, Thank you for considering me for this position. Lobstering has been my primary source of income since i was 8 years old. I don't come from a "traditional" fishing family, My mother is an archeologist and later a contractor, My father is a sailmaker. These varying experiences have been both helpful and challenging in the lobster industry. The Lobster industry has so much to be proud of in the face of many other fisheries around the world. I am excited to have the opportunity to be part of the regulatory process.

Nominee Signature: _____ Date: 12/3/21

Name: Eben Wilson
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____
State Director

_____
State Legislator

_____
Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Pat Keliher (your name) State: Maine

Name of Nominee: Jeff Putnam

Address: 107 Littlefield rd

City, State, Zip: Chebeague Island, ME, 04017

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 207-650-3327 Phone (evening): _____

FAX: _____ Email: putnamjeff543@gmail.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Lobster Advisory Panel
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

Maine Lobstermans Assn

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Lobster

scallop

menhaden

oyster aquaculture

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 25 years
2. Is the nominee employed only in commercial fishing? yes x no
3. What is the predominant gear type used by the nominee? lobster traps
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? inshore out to 20 miles

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no_____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management? yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

Nominee Signature: _____ Date: 12/13/21

Jeff Putnam

Name: _____
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____
State Director

_____
State Legislator

_____
Governor's Appointee

Atlantic States Marine Fisheries Commission

Tautog Management Board

January 25, 2022
1:00 – 2:30 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 (*M. Luisi*) 1:00 p.m.

2. Board Consent 1:00 p.m.
   - Approval of Agenda
   - Approval of Proceedings from October 2021

3. Public Comment 1:05 p.m.

4. Review and Discuss Hypothetical Scenarios from Risk and Uncertainty Decision Tool (*J. McNamee*) 1:15 p.m.

5. Review Feedback from Law Enforcement Committee on Commercial Tagging Program (*J. Snellbaker*) 2:00 p.m.

6. Elect Vice-Chair (*M. Luisi*) **Action** 2:25 p.m.

7. Other Business/Adjourn 2:30 p.m.

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

MEETING OVERVIEW

Tautog Management Board
January 25, 2022
1:00 - 2:30 p.m.
Webinar

Chair: Mike Luisi (MD) Assumed Chairmanship: 11/21	Technical Committee Chair: Craig Weedon (MD)	Law Enforcement Committee Representative: Jason Snellbaker (NJ)
Vice-Chair: Vacant	Advisory Panel Chair: Vacant	Previous Board Meeting: October 18, 2021
Voting Members: MA, RI, CT, NY, NJ, DE, MD, VA, NMFS (9 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 18, 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 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 and Discuss Hypothetical Scenarios from Risk and Uncertainty Decision Tool (1:15-2:00 p.m.)

Background

- In October, the Board reviewed a preliminary report of the Risk and Uncertainty Decision Tools for Tautog. The report summarized technical input from the Technical Committee, the Committee on Economics and Social Sciences (CESS) and preliminary weightings for the decision tools' components developed from Board input. The Risk and Uncertainty Decision Tools were developed in conjunction with the 2021 Stock Assessment Update in order to use the most current information to help inform management decisions.
- The 2021 Stock Assessment Update showed improvements in most regions from the last assessment in 2017. Since the Assessment Update indicated no regions are experiencing overfishing, the Board chose to not make any management changes.
- With no management action taken in response to the assessment, the Board requested staff develop hypothetical scenarios to further evaluate the Risk and Uncertainty Decision Tools. (**Briefing Materials**)

Presentations

- Hypothetical Scenarios from the Risk and Uncertainty Decision Tool by J. McNamee

5. Review Feedback from Law Enforcement Committee on Commercial Tagging Program (2:00-2:25 p.m.)

Background

- In October the Board approved questions for the Law Enforcement (LEC) to aid in assessing the impact of the commercial harvest tagging program on the illegal harvest and sale of tautog. The commercial harvest tagging program was fully implemented by all states in the management unit in 2021.
- The LEC met in December to respond to the questions of the Board and provided considerations in evaluating the effectiveness of the tagging program **(Briefing Materials)**

Presentations

- Feedback from LEC on Commercial Tagging Program by J. Snellbaker

6. Elect Vice-Chair

7. Other Business/Adjourn

Tautog 2022 Tasks

Activity Level: Low

Committee Overlap Score: High (Menhaden, BERP, Summer Flounder, Scup, and Black Sea Bass)

Current Committee Tasks:

- TC – May 1, 2022: compliance reports due

TC Members: Craig Weedon (Chair, MD), Alexa Kretsh (VA), Coly Ares (RI), Linda Barry (NJ), Sandra Dumais (NY), Scott Newlin (DE), David Ellis (CT), Sam Truesdell (MA), Kirby Rootes-Murdy (ASMFC Staff)

SAS Members: Coly Ares (RI), Linda Barry (NJ), Aexei Sharov (MD), Sam Truesdell (MA), Jacob Kasper (UCONN), Katie Drew (ASMFC Staff), Kirby Rootes-Murdy (ASMFC Staff)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

TAUTOG MANAGEMENT BOARD

Webinar
October 18, 2021

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

Draft Proceedings of the Tautog Management Board Webinar
October 2021

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Draft Proceedings of the Tautog Management Board Webinar
October 2021

ATTENDANCE

Board Members

Dan McKiernan, MA (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Jesse Hornstein, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
Pat Geer, VA, proxy for S. Bowman (AA)
Chris Wright, NOAA

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

Ex-Officio Members

Coly Ares, Technical Committee Chair
Jason Snellbaker, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Tina Berger
Pat Campfield
Lisa Carty
Maya Drzewicki
Emilie Franke
Lisa Havel
Chris Jacobs
Jeff Kipp
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Mike Rinaldi
Caitlin Starks
Deke Tompkins

Guests

Dennis Abbott, NH
Max Appelman, NMFS
Pat Augustine, Coram, NY
Richard Balouskus, RI DEM
Linda Barry, NJ DEP
Chris Batsavage, NC DENR
Sarah Bland, NOAA
Colleen Bouffard, CT DEEP
Delayne Brown, NH F&G
Jeff Brust, NJ DEP
Thomas Burrell, PA F&B
Peter Clarke, NJ DFW
Richard Cody, NOAA
Richard Cody, NOAA
Margaret Conroy, DE DFW
Heather Corbett, NJ DEP
Jessica Daher, NJ DEP
Lennie Day
Jeff Deem
Steve Doctor, MD DNR
Sandra Dumais, NY DEC
Lynn Fegley, MD DNR
James Fletcher
Alexa Galvan, VMRC
Jim Gilmore, NY (AA)
Angela Giuliano, MD DNR

Guests (continued)

Asm. Eric Houghtaling, NJ (LA)
Carl LoBue, TNC
Chip Lynch, NOAA
Eric Malone
Genine McClair, MD DNR
Conor McManus, RI DEM
Steve Meyers
Sen. Craig Miner, CT (LA)
Jerry Morgan
Brandon Muffley, MAFMC
Allison Murphy, NOAA
Lindsey Nelson, NOAA
Gerry O'Neill, Cape Seafoods
Rep. Sarah Peake, MA (LA)
Nick Popoff, FL FWS
Jill Ramsey, VMRC
Elizabeth Rasheed, SELCNC
Tara Scott, NOAA
Somers Smott, VMRC
Rachel Sysak, NYS DEC
Steve Train, ME (GA)
Marisa Trego, NOAA
Sam Truesdell, MA DMF
Scott Curatolo-Wagemann, Cornell
Mike Waine, ASA
Craig Weedon, MD DNR
Wes Wolfe, *The News-Leader*
Erik Zlokovitz, MD DNR
Chao Zou, NOAA

The Tautog Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Monday, October 18, 2021, and was called to order at 1:30 p.m. by Chair William Hyatt.

CALL TO ORDER

CHAIR WILLIAM HYATT: Good afternoon, everyone, this meeting of the Tautog Management Board is called to order. My name is Bill Hyatt; I'm the Governor's Appointee from Connecticut, and the current Chair of this Board. In fact, this is my last meeting as Chair, which is really strange, because we haven't done a single in-person meeting during my tenure as Chair, so very strange times, indeed.

APPROVAL OF AGENDA

CHAIR HYATT: First item on the agenda is Approval of the Agenda. Does anyone have any modifications? Toni, any hands?

MS. TONI KERNS: I see no hands, Bill.

CHAIR HYATT: Seeing none, the agenda is approved.

APPROVAL OF PROCEEDINGS

CHAIR HYATT: Next is approval of the proceedings from the August meeting. Does anyone have any edits? Any hands, Toni?

MS. KERNS: I see no hands, Bill.

PUBLIC COMMENT

CHAIR HYATT: Okay, so the proceedings are approved. Next on the list is Public Comment. Toni, is there anyone signed up or do we have any hands?

MS. KERNS: Technically we don't have a sign up, so I would just be looking for hands, and I do not see any hands at this time.

REVIEW OF THE 2021 STOCK ASSESSMENT UPDATE

CHAIR HYATT: Having none, we'll move right along to Item 4 on the agenda, and that's Review of the 2021 Stock Assessment Update. Coly, I think you have a presentation.

MS. NICHOLE ARES: I do, it looks like it's up on the screen now. Thank you all for giving me the opportunity to do this stock assessment update presentation for you. I'm Coly, I'm the Tautog Technical Committee Chair. To start, I just wanted to make sure we could recognize everyone who worked on the Tautog Stock Assessment Subcommittee for this update, myself, Linda Barry, Jacob Kasper, Alexi Sharov, Sam Truesdell, Katie Drew and Kirby Rootes-Murdy.

To start, I'm going to review the data that went into the updates this year including the new MRIP estimates. As you all know, there was a recalibration done recently to the MRIP program, which resulted in some pretty drastic changes across all species. Also, to the estimates has F and SSB and how those new MRIP numbers impacted both of those metrics, and do a review of the stock status and some short-term projections that were done as a result of that status. As a quick little reminder, Tautog is managed in four separate regions. Those regions are seen here. In blue you can see the MARI region, which is Massachusetts and Rhode Island. In green we have the Long Island Sound Region, which is Connecticut and most of New York, that is New York and the northern part of Long Island Sound.

In orange you can see the New Jersey/New York Bight Region, which is the southern portion of Long Island Sound and New Jersey. Then in red you can see the DelMarVa Region, which is Delaware, Maryland and Virginia. Because we have this in four separate regions, I have four little updates to show you for the entire coast on this species.

The previous assessment had data through the terminal year 2015, where this update for 2021 had

data through 2020. We are adding five years of data for this assessment. With adding all this data, we did see a few challenges. The first one I mentioned earlier was those new MRIP numbers for all the regions, which did include data for the entire time series, that is 1981 to 2020. That was the first big thing we had to look at.

The second thing, not unexpected, was the impact of COVID-19. Because of COVID-19 not all of the fisheries independent surveys were able to be completed in 2020, leaving some data gaps there. In addition to those fisheries independent surveys not being completed, MRIP did have some remote sampling in 2020.

As a result, some of the 2020 removals were estimated with imputed data from prior years, just to account for that inability of sampling during that time. To start here we have the new MRIP numbers. As you can see, we have these four separate regions here. In the top left you can see the MARI region, the top right you can see the New Jersey/New York Bight Region, on the bottom left you can see the Long Island Sound Region, and in the bottom right you have the DelMarVa Region.

In that gray line you can see the original estimate, and then in the black line you can see the calibrated new numbers from MRIP. As you can see across all four regions, we did have increases in the total removal estimates, and these removals are the landings plus 2.5 percent mortality rate on the Y releases in millions of fish. Again, you can see that we just see increases across all four regions, in terms of total removals.

Here you can see a similar spot, in terms of where the regions are situated. But instead of being the removals in millions of fish on the Y axis, you can actually, this shows you the percent difference, as in the increase in removals across those four regions during all of the time series. All the regions did have very, very large increases due to the new recalibration.

These increases averaged between 133 percent increase to 163 percent increase across those four regions. Here we have the total removals for the four regions. Again, MARI is in that upper left, New Jersey/New York Bight in the upper right, Long Island Sound is the bottom left and DelMarVa in the bottom right.

Here we have the total removals in metric tons. The light blue color is the recreational removals. The dark blue is the recreational release mortality, again that is that 2.5 percent mortality rate on those recreational harvests, and the white is the commercial harvest. Overall, the targets are highly recreational fishery, upwards of 90 percent recreational removals, as you can see in these figures here. Overall, you can see similar patterns for all four regions, and that is that we have high removal in the beginning of the time series, with a decline over time.

Again, the important thing to note here as well, is that those recreational removals do make a large part of the total harvest. Those new recalibrated MRIP numbers did have a large impact on the total removals for each region. I'm going to go through now the indices that were used within each region in this stock assessment update.

Here we have the MARI Region, and see there are four indices for this region. In the upper left you can see the Massachusetts Trawl Survey. This is an Age 1 plus survey. As you can see here, we have some high values up in the beginning of the time series, with a decline overall. In the upper right you can see the Rhode Island Trawl Survey.

This is a fall trawl survey targeting Age 1 plus individuals. You can see a similar trend here really had high values in the beginning of the time series, with a decline over the time. In the bottom left you can see the Rhode Island Seine Survey. This is a young of the year seine survey that targets

Narragansett Bay, and you can see a little bit more variability with an index over time here.

Then the bottom right you can see the MRIP CPUE index, which is an Age 1 stock survey. Again, you can see some of those higher values in the beginning of the time series with a little bit of a decline over time. Here we have the indices used for the Long Island Sound portion of the assessment. In the upper left you can see the Connecticut Long Island Sound Trawl Survey.

This is an Age 1 plus survey. Again, you can see some of those higher values in the beginning of the time series, with a little bit of a decline over time. It's also important to note that this is one of those surveys where we have a data gap in, as this survey was not able to be conducted in 2020, due to the COVID-19 pandemic.

In the upper right you can see the MRIP CPUE Survey, which is an Age 1 plus survey for the region. In the bottom left you can see the New York Peconic Bay Trawl Survey, this is an Age 1 survey. Then the bottom right you can see the New York Western Long Island Seine Survey, which is a young of year survey.

There were some modifications to the sampling of the New York Long Island Seine Survey, and that is just to account for the fact that New York does border those two different regions, the Long Island Sound Region and the New York/New Jersey Bight Region. Here we have the indices of abundance for the New Jersey/New York Bight Region.

In the upper left you can see the Western Long Island Seine Survey. Again, that's that Age 1 survey with some modifications to account for the differences between the two regions that New York does border the Long Island Sound, and the New Jersey/New York Bight Region. In the upper right you can see the New Jersey Ocean Trawl Survey. This is an Age 1 plus survey, and was not conducted in 2020 due to the COVID pandemic. Therefore, we do have a small data gap there. IN the bottom left you can see the MRIP CPUE Survey, which is an Age 1 plus survey. Here we have the index for the DelMarVa Region, which is just the MRIP CPUE Survey. In this region we do not have any fisheries independent surveys, so we just have the MRIP CPUE for this particular portion of the stock assessment.

The first step that the Stock Assessment Subcommittee took was to see what the impacts of the new MRIP numbers would be on the stock assessment, before we added more years of data. This gave us the ability to just see how the new MRIP numbers would impact the stock assessment looking at the additional years of data.

Because of this, we ran a Bridge model. We took the 2016 update, which was the most recent assessment before this one, that included data through the terminal year 2015. We then put in the new MRIP Numbers in place of the older uncalibrated numbers, and reran the model. This gave us the ability to see how those numbers impacted the previous assessment, before we added the five new years of data in the 2021 update, which is what we are looking at today.

Here we have the results of the three models, the 2016 update in the orange, the 2016 Bridge model that is the 2016 model with the new MRIP numbers, and in black we have the 2021 update. We have the four regions here, MARI the upper left, New Jersey/New York Bight in the upper right, Long Island Sound in the bottom left, and DelMarVa in the bottom right.

As you can see here, we have F on the Y axis, and the time series along the X axis. The new MRIP numbers had very little impact on the differences in F. There were some changes over time, but there wasn't any consistent overestimation or underestimation in any of the four regions. Here we have the same layout for the spawning stock biomass.

As you can see here, the 2016 update again in that orange is lower across all four regions than the Bridge model in blue or the 2021 update in black. We did see an increase in the estimation of the spawning stock biomass across all four regions. This is expected, as we did see an increase in harvest.

Therefore, we would anticipate seeing an increase in the fish available within each region. Generally, adding the additional years of data didn't have a very large impact on the results. Although you can see in the Long Island Sound Region you did see in the Bridge Model and estimated a little bit of a decline from 2010 to 2015.

However, when we added those additional five years of data, we do see that population starting to bounce back upwards. Here we have the results of the model for recruitment, with recruitment on the Y axis again. As you can see, across all the regions we did see a little bit of a scaling upwards in recruitment.

That is, you can see that 2016 update in orange, and then the 2016 Bridge model in the 2021 update in black. You can see that recruitment scaling upward in all four regions. Again, this is somewhat anticipated, given that we just see more removals, therefore there must have been more fish to support those additional removals for each region. Now for some changes from year to year in each region. Again, there was no consistent over or underestimation of recruitment in any individual region. Now I'll go into the stock status for each region, based on the assessment update. First up we have the MARI Region, where we are not overfished. The SSB was estimated to be 6,568 metric tons in 2020, with a threshold of 4,335 metric tons. This region is not overfished and is above the threshold and the target.

In the bottom frame you can see the F estimate. You can see that overfishing is not occurring in this region. The three-year average of F is estimated to be 0.23, which is below the threshold of 0.49. They are also below the target for this region. Here we can see we added a blue vertical line to indicate what the status was in 2015, which was the time of the last assessment.

For the MARI Region in the top image here, you can see that that blue line intersects the dark black line at the SSB. We're below the target, but we were above the threshold and below the target in 2015, indicating that we were not overfished. In 2020 we continued to be not overfished in this region, as we do have that SSB above the threshold, as well as the target indicating there has not been a change in status for this region.

In the lower image here, you can see that blue line intersecting the F estimate, below the threshold in 2015, indicating that overfishing was not occurring during that time period. In 2020 we continue to see that the F is below the target and the threshold, indicating that overfishing continues to no be occurring in 2020, indicating that there has been no change for the region as well. We continue to be, overfishing is not occurring.

Here we have the results of the Long Island Sound Region. Long Island Sound currently is not overfished, as indicated in the top figure. SSB was estimated to be 6,413 metric tons with a threshold of 5,044 metric tons. As you can see here, we are above the threshold and we're right on, pretty close to the SSB target. We are currently not overfished.

In the bottom figure you can see F. As per year average of F is estimated to be 0.3, which is below our threshold of 0.38, indicating that overfishing is currently not occurring in the Long Island Sound Region. Here once again we've added that vertical blue line to indicate where we stood in 2015 as a comparison.

In 2015 in the top figure, you can see that SSB was below the threshold in 2015, indicating that in 2015 the stock was overfished in the Long Island Sound Region. We have seen an increase in SSB, and actually got a change in status, where in 2020 we are no longer overfished in the Long Island Sound Region.

In the bottom figure you can see in 2015 where that blue line intercepts that we were overfishing. Since 2015, there has been a decline in F in the Long Island Sound Region, and currently overfishing is not occurring in the region, indicating an improved stock status for Long Island Sound. Here we have the stock status for the New Jersey/New York Bight Region.

The region is overfished, with an SSB estimated to be 4,782 metric tons, with our threshold of 4,890 metric tons. While we still are overfished, I would just like to draw attention to the fact that we do see that SSB improving over time, and we are seeing an uptick in that trend for SSB for the New Jersey/New York Bight Region. In the bottom figure you can see the F, and we can see that overfishing is currently not occurring in the New Jersey/New York Bight Region. The three-year average F is estimated to be 0.26 with our threshold of 0.3, so we are below that threshold, so overfishing is not occurring in this region. Here we have that comparison between the 2015 status and the status from 2020.

In the New Jersey/New York Bight Region, you can see that in 2015 where that vertical blue line intercepts the SSB estimate that we were overfished. Again, in 2020 we are still currently overfished, but we are seeing that upward trend in SSB. While there is no change in the stock status, we are seeing that trending upwards, closer to being a no longer overfished stock.

In the bottom figure you can see the change in status for F. In 2015 we were overfishing, indicated by that intersection between the vertical blue line, showing where 2015 exists, and the F status. We were above the threshold in that period, so we were overfishing. However, we have seen a decline in F since then, and now we can see that overfishing is not occurring in this region, and therefore we do see an improved stock status there.

For the last region we have the DelMarVa Region. We are currently not overfished in this region. SSB is estimated to be 4,396 metric tons, with the threshold of 3,355 metric tons. Additionally in the lower figure, you can see that overfishing is not occurring in this region. The three-year F average is 0.06, which is below the threshold of 0.27.

In comparison to 2015, in 2015 the DelMarVa Region was considered overfished, as you can see here where that blue line is intercepting with the annual SSB in the top figure. Since then, we've seen an increase in SSB, to the point where in 2020 you can see this region is not overfished, so there has been an improvement in the stock status there.

In the lower figure, you can see in 2015 overfishing was not occurring within this region. As you can see that blue line is intercepting with the three-year average F below the threshold. In 2020, we continue to see that overfishing is not occurring, so there has not been a change in stock status, in terms of F for this region.

Just as a little bit of a summary here, I do recognize that with four regions there was a whole lot going on. For the SSB status in the MARI Region, we are currently not overfished, and there has been no change in that status from 2015, where we were also additionally not overfished then. In the Long Island Sound Region, we are currently not overfished, which has been an improvement from the 2015 stock status, where we were overfished.

In the New Jersey/New York Bight Region we are currently overfished, which has not changed from

2015, although it is worthwhile to note that we have seen an improvement in the SSB since 2015. In the DelMarVa Region we are currently not overfished, and this has improved since the 2015 stock status, where we were overfished.

In terms of F, in the MARI Region there is no overfishing and that has not changed since 2015, where we were not overfishing as well. In the Long Island Sound Region, we are currently not overfishing, and that has improved since 2015. In the New Jersey/New York Bight Region there is no overfishing, and that again has improved since 2015. In the DelMarVa Region there is currently no overfishing, and again that has improved since 2015. In addition to the assessment update the Subcommittee also conducted some short-term projections for each region. For these projections we used the most recent three years of removals, which was 2018 to 2020. The projections, we did show the probability that the stock would be overfished, that is the SSB would be less than the threshold, and the probability that F would be above the target in 2025.

For the projections, so we have each region the probability of being at or below the F target in three years. The MARI Region with 100 percent probability of being at or below the F target. The Long Island Sound Region has a 3 percent probability of being at or below the F target. New Jersey/New York Bight had a 15 percent probability of being at or below the F target, and the DelMarVa Region had a 100 percent probability of being at or below the F target in three years.

We also did the projections for the probability of being at or above SSB threshold in three years for the MARI Region, had a 100 percent probability of being at or above the threshold in three years. The Long Island Sound Region had a 97 percent probability of being above the threshold. The New Jersey/New York Bight Region had a 53 percent probability of being at or above the threshold, and the DelMarVa Region had a 100 percent ability of being at or above the threshold in three years.

Generally, there was a low probability of being overfished under the current landings and management scenarios for each region. But some regions did have a higher probability of being above the F target in that three-year window. That is the quick overview of the stock assessment update. With that I am happy to take any questions.

CHAIR HYATT: Thank you, Coly, that was an excellent presentation, and it contained quite a bit of good news. At this point, are there any questions for Coly, and keep in mind that the next item on the agenda will include a discussion of management response. At this point jut please limit yourself to technical questions regarding the stock assessment. Any hands?

MS. KERNS: I have Jason McNamee, Adam Nowalsky, Justin Davis, and Jeff Brust.

CHAIR HYATT: Okay, go ahead, Jay.

DR. JASON McNAMEE: Coly, awesome job with the presentation. It's no small feat getting through not one stock assessment but four simultaneously. Nice job with that. There was one thing, so I'll just sort of echo what the Chair said. I wish all news on fisheries could be like this. This is pretty amazing.

I don't think I've ever seen anything quite like it during my time, so that's great. One thing that caught my eye was on the series of slides you had on the Bridge models. Specifically, I was wondering about the Long Island Sound SSB plot, where you've got the 2016, then you have the 2016 with the updated MRIP, and then the latest update.

In the Long Island Sound version of that, there was a lot of, across all of them a lot of them were pretty congruent, they sort of matched more or less, maybe scaling a little different, but ups and downs kind of look the same. But yes, thank you. If you

look at the bottom left on Long Island Sound, that is the one that kind of caught my eye, where it departs from the 2016 update with the new MRIP, where that one seemed to be indicating a downward trend, and then you know the latest update sort of reverses that, makes it go up by quite a lot. I'm just wondering if you guys, the Technical Team, discussed that, if you have any thoughts on what creates the difference between the models in that case?

MS. ARES: Thank you, Jay. We did look at that within the Subcommittee. There are quite a few factors playing in here. We didn't come up with a complete consensus as to how and why that that was so dramatically different. We did have regulation changes that went in due to the last assessment, so that could account for some of the changes that we see there, where we saw some decreases in harvest, allowing the SSB to increase.

We also did add a good chunk of data. If you actually look at the 2016 update, in orange you can kind of see it kind of leveling off, and then the new MRIP numbers you can kind of see that going down a little bit, and then with the new additional data it starts to pick that other feedback up. We also did look at the retrospective patterns, and we did run analyses to determine if we require an adjustment due to the changes that we did see.

We did see, when we did those analyses for the four regions, that the retrospective patterns fell within that 95 percent confidence interval, indicating that we didn't have to look, even though we did see that patterning throughout the period, it wasn't a significant change overall. Does that answer your question, or do you have anything else you would like me to kind of elaborate on?

DR. McNAMEE: No, I think that's good Coly. You know basically, there is no, I was kind of wondering, oh yes, you know what happened was we updated a survey and the numbers were higher. I was wondering if there was something like that. But it sounds like it's just an accumulation of factors.

I'm imagining too, you know with the statistical forward projection model, you know if you had some re-estimated recruitments that kind of change that trajectory a little bit moving forward in time, I guess. In any case, there was no like smoking gun, just to use that term, it was probably just an accumulation of a number of factors. In any case it's good news, so it's good to see.

CHAIR HYATT: Go ahead, Adam.

MR. ADAM NOWALSKY: I appreciate the presentation. With regards to stock status for the New Jersey/New York Bight Region. I just wanted to confirm that as I looked at Page 72 of the Assessment Update itself, that I believe was showing 95 percent confidence interval around the SSB estimates, that the SSB threshold is well within the confidence, that 95 percent confidence interval, if I'm interpreting that correctly, and in fact, the upper bound of that confidence interval is in fact very close to the SSB target.

MS. ARES: You are correct there. That region, let me just pull up my numbers for you. We were overfished in that region, but there certainly is very, very close to our threshold there, so there is a little bit of the confidence interval for that is slim, but we are very, very close to that threshold changing the stock status for that region.

CHAIR HYATT: All set, Adam?

MR. NOWALSKY: Yes, just wanted to make sure I was interpreting where that was correctly. Thank you, very much.

CHAIR HYATT: Very good. Justin Davis.

DR. JUSTIN DAVIS: Thank you, Coly for this presentation. I have a question relative to the short-term projections for the Long Island Sound Region, specifically with respect to the projections of F, as noted in the presentation. The short-term projections show that there is only a 3 percent chance of the LIS Region achieving the F target in three years.

When I first saw that, I guess I was a little surprised, given that if I have this right, the estimate of F for the terminal year in 2020 from the assessment is 0.3, which is certainly closer to F target, 0.26 than F threshold, 0.38. Then when I went and looked at the plots for the short-term projections for the Long Island Sound Region, this would be Figure 22 in the assessment.

I realize we're a bit handicapped here, because this wasn't a figure that was in the presentation. It showed the estimate of F for 2021 as being 0.38, essentially right at the threshold, which is substantially higher than the 2020 estimate of 0.3. I'm just wondering if you have any insight on why the short-term projection is showing such a higher F rate in 2021, relative to what the terminal year estimate was in 2020.

MS. ARES: We do see that for those projections I can get back to you with a little bit more detail later on, once I speak to the individuals who did these projections. I don't have the best answer for you, in terms of why we see that probability changing there. But I can certainly get back to our experts for that region, and come back with a better answer for you, unless Katie or Kirby might have some additional insight on that particular question.

DR. KATIE DREW: Yes, this is Katie. I think it is related to kind of Number 1, the figures we're showing that we're using for stock status is based on that three-year average of F. It's been declining for a bit, but we're then using sort of that three-year average of landings as well, which it is higher than kind of that terminal year of 2020.

The three-year average over that time period is going to be higher than what it was in 2020, I believe. That's kind of just bumping that up a bit, bumping the effect on the population up a little bit, compared to say just that three-year average and the terminal year value of F, when you're starting the projections going forward.

The projections going forward are handled a little bit differently than sort of that three-year smoothed average that we use to evaluate stock status. I think that is also due to some of the uncertainty around, and the shape of the distribution around that terminal year value of abundance going into the projections, and fishing mortality coming out of the projections, if that makes sense.

CHAIR HYATT: All set, Justin?

DR. DAVIS: Yes, thanks, that was really helpful, thank you.

CHAIR HYATT: Toni, I know we've got Jeff sitting there in the queue, is there any other Board members who have their hands up at this point in time?

MS. KERNS: That was the last of the Board members. Jeff was the first member of the public with a question.

CHAIR HYATT: Okay, I'm going to jump in, just with a quick question for you Coly. Just wondering if you could just comment in general on any of the constraints or limitations that might come forth with having only one index to work with for the DelMarVa Region, just if there is anything that we should know about the results that are presented here as a result of only having the one index, the catch-per-unit effort from MRIP.

MS. ARES: That is one thing that we did address in the risk and uncertainty tool that I believe might be two agenda items down. It is one thing that was considered. It did limit the number of sensitivity-runs that could be completed for that region, as we were unable to draft indices, to see their impact on the stock assessment.

However, based on the data we have available, what we have here with that one index is what we are able to complete at this time. It is something that would be interesting and beneficial in the future, to see if there were some more fisheries independent indices that could be created in that region.

But given what we have at the current time, this is the best data we have, and even then, when we did look at some of the retrospective patterning and did the analyses on that, there was not any significant patterning to cause us to do any sort of analysis to see if those retrospective patterns were a concern. It is unfortunate we couldn't do more with that region, but given what we have this is the best we can do, and we did not see anything overly concerning, based on the lack of indices for the region.

CHAIR HYATT: Very good, thank you, and like you said, that will be covered a little bit more under the agenda item dealing with the risk and uncertainty tool. Okay, Jeff. Jeff, go ahead.

MS. KERNS: He's not able to unmute himself, I don't think.

CONSIDER MANAGEMENT RESPONSE TO 2021 STOCK ASSESSMENT UPDATE

CHAIR HYATT: Very good, Toni, okay so we will move to the next agenda item, which is Item Number 5, Consider Management Response to 2021 Stock Assessment Update. But before we open this topic for discussion, Kirby is going to quickly review some items from Amendment 1, particularly 4.2.1. These provide the procedure for developing management measures. Kirby, I believe you've got some slides to go through.

MR. KIRBY ROOTES-MURDY: Yes, thank you, Mr. Chair. All right, first of all to the stock assessment update. I'll provide the Board with some management background to consider as they weigh a potential management response. To provide a quick overview, I'll highlight two relevant parts of Amendment 1. The first is fishing mortality target in Section 2.7.1 on Page 52.

The second is process for developing regional measures in Section 4.2.1 on Page 68. Based on the stock assessment update, I wanted to bring the Board to the following language under Section 2.7.1. It states, the management board will evaluate the current estimates of F, as determined by the most recent stock assessment, with respect to its regional reference points, before proposing any additional management measures.

If current F exceeds the regional target but is below the regional threshold, the Board should consider steps to reduce F to the regional target level, and if the current F is below the regional target F, then no action would be necessary to reduce F. For both the Long Island Sound and New Jersey/New York Bight Regions, the current estimate of F exceeds the target, but is below the threshold.

Comparing this information to the last assessment update, F has decreased, which is important, as an improvement from 2015 status. The other regions, Massachusetts and Rhode Island, as well as the DelMarVa, Delaware, Maryland, Virginia Regions. Their regional F estimate is below the regional target.

The other consideration of this section is the probability of achieving the F target. It states that the management measures will be developed based on at least a 50 percent probability of achieving the F target. As part of developing the risk and

uncertainty decision tool for tautog, the Board will be providing input in a later agenda item, in terms of the preliminary report that was developed and included in supplemental materials, and providing some further considerations on generating stock projections.

The other relevant section from the Amendment that I wanted to flag for the Board, was in considering changes to the regional measures. If a region is considering consistent measures across all states within a region, then a regional working group would be developed to discuss appropriate alternatives.

Really, this regional working group is important, whether it's trying to set up the same exact measures and changing, or if one state is interested in adjusting their measures. If a state wants to proceed that way, then under the general procedures within Section 4.11 of conservation equivalency, that would be followed.

It's recommended similarly that this regional working group is convened, in order to make sure that all the states within the region are on the same page in understanding what the proposed management measures are. Last, any modifications to these management measures, bag limit, minimum size, seasonal closures and quota, would be reviewed by the TC and approved by the Board. Once it's approved by the Board, measures can be implemented. With that I'll take any questions, and turn it back over to you, Chairman Hyatt if there aren't any.

CHAIR HYATT: Do we have any quick questions for Kirby? Toni, any hands?

MS. KERNS: Adam Nowalsky.

CHAIR HYATT: Go ahead, Adam.

MR. NOWALSKY: With regards to what the Amendment tells us to do, we're basically saying that the Long Island Sound and New Jersey/New York Bight Region, because they are currently above the target, we should consider measures. Whatever measures we consider need to have at least a 50 percent probability of achieving the target. Again, if I understand the presentation and what the Amendment called for.

The presentation we had prior showed that projections have already been done, that with current measures both the Long Island Sound and the New Jersey/New York Bight Region are projected to have greater than 50 percent probabilities of having F below the target. Where would that leave us? It seems that on the one hand we're being told to consider changes, but we've already run some projections that say we're on track to have F below the target.

CHAIR HYATT: Kirby, do you want to respond or do you want me to?

MR. ROOTES-MURDY: I'll go ahead. Thanks, Adam, for the question. Yes, in terms of what the current measures that were implemented as a part of Amendment 1. That has improved the stock status. Based on the language we have in the Amendment, if there is interest in adjusting those measures, then I think the Board would need to consider how to get them closer to the regional F target. But it's just a consideration, there isn't a timeframe in which they have to meet that F target.

In terms of the probability of achieving the F target. You know those were just included; you know as our status quo measures. As part of the risk and uncertainty decision tool agenda item, which will get into more detail. We're going to look to the Board for further guidance if there is interest in pursuing different probabilities than the default 50 percent from the Amendment. I'll leave it at that if that hopefully answers both of your questions.

CHAIR HYATT: Adam, are you good with that, or at least did it sufficiently answer your question?

MR. NOWALSKY: I'll just ask one follow up, and that is that should the risk and uncertainty tool ultimately, that we as a Board come up with a different number. If the Amendment is saying we need at least a 50 percent probability in our use of the risk and uncertainty tool, and maybe I'm jumping too far ahead here, tells us something different.

Are we going to need an addendum to the Amendment at that point, or if it's just anything more conservative than we would be okay? But if it came out with something more liberal, where is that going to play with this Amendment mandated 50 percent probability? I'm fine if the answer is just, sit on that for another half hour, and we'll get there.

MR. ROOTES-MURDY: Yes, that would be my suggestion.

CHAIR HYATT: Okay, are there any other discussion points regarding management response? Toni, any hands?

MS. KERNS: I see no other hands at this point, Bill.

CHAIR HYATT: Okay, I'm just going to interject something then, which may be my oversimplified view of where this leaves us at this point, recognizing that we still have ahead of us the discussion on the risk and uncertainty decision. But my thought, with regards to process here was that following this meeting if any region wants to consider a management change.

That they would subsequently get together following this meeting, put together what they think is a reasonable approach, bring it to the next Board meeting for discussions, at which time the Board would have the option of moving it along to the Technical Committee for analysis, both traditional analysis as well as analysis under the risk and uncertainty tool.

Then bringing it back to the following Board meeting for approval for consideration and discussion, then potentially approval by the larger board. At least from a process standpoint maybe a bit oversimplified. But I'm thinking that we're at the discussion point phase right now, and that any consideration or chance to implement changes would be two Board meetings down the road. I'll ask Kirby or Toni if they think that anything in which I just said was maybe off target.

MS. KERNS: I think that can work, Bill. Then it partially depends on the pleasure of the states, and how they want to move forward.

CHAIR HYATT: Okay, fair enough.

MS. KERNS: I do have an additional hand that has come up since you were chatting, Dan McKiernan.

CHAIR HYATT: Dan, go ahead.

MR. DANIEL McKIERNAN: Bill, I agree with you. I would just ask, as Toni mentioned, that this be a longer process. I would want to do some scoping, you know to our industry and also to our sister state that we share that stock with, and to try to move forward with something that both states are interested in, to try to keep things uniform.

I think that might take a little bit more time than just one meeting coming up with proposals. I would also have to deal with my Regulatory Commission, so I would want to get buy-in from them before I would come to the Commission with a proposal for changes.

CHAIR HYATT: Yes, the assumption in what I said was that following this meeting the Regional Workgroup, which in your case involved both Massachusetts and Rhode Island, would be working together to develop any type of proposal that would be subsequently brought to the next Board

meeting. Absolutely agree with you, and I think I was speaking in terms of what I would see as the fastest that the process could move forward. Any other hands, Toni?

MS. KERNS: That is all.

REVIEW AND PROVIDE FEEDBACK ON THE RISK AND UNCERTAINTY DECISION TOOL FOR TAUTOG

CHAIR HYATT: Okay, very good. Well, then we can move right into the next item on the agenda, which is Review and Provide Feedback on the Risk and Uncertainty Decision Tool for Tautog. Jay, I believe you've got a presentation to provide.

DR. McNAMEE: Yes, there it is, like magic. Hi everybody, I've got an update here for you on the Risk and Uncertainty Policy. We've done a number of things since we last spoke. This is an update for you on that. Thanks, as always to Sarah Murray, Kirby, and Katie Drew for putting the presentation together.

Just a quick overview of what the presentation covers, quick background, because I've said this to you about a thousand times, so I think everybody has got the background pretty well at this point. We'll talk a little bit about the process, mainly to kind of let you know where we're at in that process.

Then we'll talk about the report. We did a couple of things, including generating the weightings, and we've gotten some technical inputs for the decision tool, so have some cool stuff to report there, and then we'll wrap it up with some questions for the Board, seeking a little bit of input from the Board on a couple of the elements.

A background, as you recall the risk and uncertainty decision tool, what it is it's a method for arriving at a recommended risk level for a stock. What it does is it takes the Commission's priorities, the characteristics of the stock in the fishery, and in the end what you produce is the risk level that we want to use when we start to identify management options.

Our process to date has been more or less just sort of peppering the Technical Committee with giving us a number of different potential probabilities, and this adds a little more structure to the process. It really requires us to be a little bit more thoughtful about why we're picking these different probabilities.

Again, the decision tool itself, it's a structured method. Again, it arrives at the Commission's risk and tolerance for a species. It can be species specific or should be species specific. Then we take that information and we incorporate it into management. Just a really important nuance here is, the tool answers the question, how much risk is appropriate for the stock when making a management decision?

What it doesn't do is assess the level of risk associated with specific management actions. If we wanted to do that, we would have to do a management strategy evaluation. To sort of look at different management options, so if we want to do three fish in a season that had 100 days, and a 14-inch fish versus some different configuration of management options, and then compare those two things that's something different. What we're doing here is we're saying, we believe we need to be precautionary to some degree, based on these attributes that we built into the decision tool. Here is a graphic of the decision tool process. We developed the decision tool. It incorporates different information related to risk and uncertainty for a species, and these are the technical inputs that are within the decision tool. It takes those technical inputs and combines it with the relative importance of that information.

That is the weighting. That is that weighting exercise that we just went through a couple weeks

ago. In the end we take those two things, we put them together and we come up with a recommended probability of achieving our management objectives. Generally, the way this is broken up is the Board provides the input on the weighting.

We decide what is more important within our decision tool, whether it be the stock status information or the socioeconomic information. Then we get a little bit of help from our friends on the Technical Committee, and the Committee for Economic and Social Science. They provide the responses to the decision tool questions.

They get input from the Advisory Panel. But we also, as the Board, have the purview to make adjustments to their inputs if warranted, and that's another nice aspect of this is, the Board maintains control of the process in total. However, we have to be explicit about what we're doing, if we're making a change to any of the technical inputs that are provided to us by our experts.

It's an iterative process. That's that little loopy arrow on the left-hand side there. The Board can provide feedback on the weightings, and the decision tool to adjust things as needed, and that's exactly what we're going to be talking about today. The risk-and-uncertainty process is made up of two parts, basically.

We have the developing the species-specific decision tool, and then we have the second part, which is actually using that decision tool for helping us with the management decision. What we've done so far has been to develop the tool, or as is the case for tautaug, we developed four region specific decision tools.

We got the stock status inputs. Those came out of the 2021 assessment update that Coly so eloquently just told us all about. The Technical Committee scored and provided input on the sections on model uncertainty, management uncertainty, environmental uncertainty, and then the ecosystem and trophic importance components of the tool.

Then the Committee for Economic and Social Science scored the socioeconomic importance components, and those are the commercial economic value, commercial community dependence, recreational desirability and recreational community. The AP was also consulted on the technical inputs, but did not provide any feedback. Either they were satisfied with it, or didn't see a need to comment.

Then we, the Board, provided the weightings, and we did that via a full and, for those who couldn't make the webinar where we did the poll live. There was also a survey that was issued to the Board members. We did all this work. Now we're at the second part here, and that is if a management action is initiated, or is being considered, then implement the second part of the process. That would be to use this decision tool. What will happen is additional analyses will be conducted, and from those extra analyses we will produce the recommended probability of achieving the management targets, or the reference points that we're trying to achieve with our management changes.

Now I'll get into the report itself. I'll probably try and go through this relatively quickly, and then we can come back to any specific areas anybody wants to. Here is a table of the weightings themselves. These are basically all of the component within the decision tool. You've got your SSB information, the threshold and target, the F threshold and target, and then all of those other components there.

What you can see are there in the second column are the survey scores. You can see, remember the survey is on this scale from 0 to 5, and then we took all of those scores that all of the Board members gave, and then averaged them to come up with the

overall survey score. You can see the SSB threshold, that was an important one for us.

The F threshold, that was another important one for us. Then ecosystem importance was one of the lower ones. You know in the case of tautaug that probably makes some degree of sense. Those other survey scores, and then what happens is from those, those get kind of prorated and developed into our weightings.

You can see with the higher weightings, you see those at the SSB threshold, the F threshold, which correspond to the high survey scores, and then ecosystem importance you can see has the lowest weighting. You can see how this all kind of came out in the end. Remember, we went in with everything being weighted equally at 0.1. You can see how things have adjusted from that kind of equal weighting scenario.

This is just a graphical representation of how the information kind of sorted itself out. Just to orient you to these plots. We've got all of the different components, and then the X axis is your 1 to 5 scoring, and then you have the frequency is what the bars represent going up the Y axis there. The way you can kind of look at these is to determine if you've got any situation where the scores are really spread out across the whole range.

You can kind of see that for the long-term recreational one down at the bottom. Most of the scoring was at the score of 4, but you had responses across the whole range, as opposed to model uncertainty, which most of the scores were between 3 and 4. It just gives you a sense of how consistent we were as Board members with our weightings in these different areas.

From my eye, I think, with a couple of exceptions we were pretty good. The vast majority of folks were kind of scoring things within a point or two of that 1 to 5 scale. Now we're going to go region by region on the technical inputs. Here is the MARI Region, and you can see the stock status information. Those come directly out of the stock assessment.

This is exactly the information that Coly was just talking to us about. Those, the P with the little parenthetical after them, that is the probability of SSB being less than the SSB threshold. For the case of MARI there is a 0 percent probability of that, and so on and so forth. The only one there where there is any information is the probability that the SSB is less than the SSB target, and there is a small probability that that is the case, 6.9 percent probability. Everything else is 0. Those get plugged in directly to those first four questions, and then we've got the next component is the model uncertainty, that score right about the middle of the range there.

I won't read all of those out, but you can see some of the reasons why the Technical Committee scored this in the way that they did. But this is roughly in the center of the range there. Management uncertainty, a little bit less but still pretty close to the center of the range. Then environmental uncertainty towards the lower end of the range, so that had a lower score.

Then again, ecosystem trophic importance, that had the lower score at 0.8. It says no known key ecosystem trophic roles. I think that is accurate. I think tautaug does have importance, obviously in the ecosystem. I guess it's this notion of connections and impacts within the ecosystem, there is not a lot of information on that for tautaug.

Here is Long Island Sound, so in this case if you're looking at the table at the top, you've got information in all of the boxes there, with a probability of fishing mortality and SSB being within range of the thresholds and the targets there. You can see those. The model uncertainty pretty consistent with the MARI Region, right about the center of that 0 to 5 range.

Management uncertainty a little bit greater for this region for management uncertainty, and

environmental uncertainty and ecosystem trophic importance are at the lower end of that range. Here is the New Jersey and New York Bight again. There are probabilities of exceeding or being below the different thresholds and targets there.

You can see those in the table consistent with the other areas, with regard to model and management uncertainty being sort of central to the scoring range there, and again environmental and ecosystem importance lower end of the range. There is a lot of consistency in the reasoning, with these for the different areas or regions, rather.

Shift highlight, so one of the reasons the management uncertainty gets up-weighted for both Long Island Sound and New Jersey/New York Bight is the illegal harvest is believed to be a significant concern in these areas. Then beyond that everybody knows tautaug has a really high recreational component. Just because of that there is always going to be management uncertainty, based on the way we understand our recreational fisheries.

Last but not least, DelMarVa. You've got a little bit of information in the stock status boxes there for probabilities, generally in good shape in the DelMarVa Region with regards to that. Here the model uncertainty got a little bit of a higher score than the other areas. One of the main reasons for that is that there is no fishery independent index in this region, and the retrospective was kind of in that risky direction, where it's under predicting F, over predicting SSB, with regard to the retrospective patterns there.

Middle of the range there for management uncertainty, and then low end of the range for environmental uncertainty and ecosystem and trophic importance. A little bit about the socioeconomic criteria. This is just a reminder. We have the importance scores, that is what I'm going to be reviewing in the next slide coming up here, so that part is completed. Then there is a management effects scores, and those are only calculated if there will be a management action. Because the management effect is a multiplier, the total socioeconomic score can't be calculated unless there is a potential management action.

Basically, the total score bringing those two things together is essentially characterizing what the socioeconomic effects would be of implementing the level of precaution indicated by the rest of the decision tool. You can't get out in front on that one. You have to sort of have something in mind before you can do the second component of those socioeconomic criteria.

But we do have the importance scores. These were calculated based on coastwide socioeconomic indicators. In other words, I don't have four slides here, there is only one, and that is because this is done once and applied to all of the regions. For the commercial economic value, scored at the lower end of the range, and that's because in the grand scheme of things the commercial economic value, while important for those fishers who prosecute this fishery.

In the overall grand scheme of things, it's not a huge fishery in the area from Virginia to Mass in particular. Commercial community dependence is at the higher end, and that is a 4, and that is because the commercial community dependence for the top 10 communities is about 35.1 percent, so kind of the communities again, that do depend on tautog, they're kind of dependent on them. I think it's generally fisheries that are kind of cobbling together small-scale fisheries throughout the year, and tautaug is an important component of that.

That had kind of a higher score. Moving down to the recreational part of this. Recreational desirability is about the middle of the range there. It's pretty important. I think folks who fish for tautaug are passionate about it, there are just not as many of them as say there are for those that fish

for striped bass, for instance. Then the recreational community dependence is towards the lower end of the scale there. Yes, so that one scored about a 2. This is the end of it for the presentation here, and this is looking for a little bit of feedback.

You've got the report, are there any questions or feedback on the weightings or the technical inputs? That is something that we're looking to get feedback on. The next steps, so we would like to know if the Board would like to task the Technical Committee or the Committee for Economic and Social Science with any additional analyses.

If there will be a management action, would you like us to produce the recommended probability to help with that process, or if there won't be a management action, as we just saw earlier, a lot of really good news? Conceivably we might not be doing much here. But if we don't, what we could do is kind of produce some hypothetical scenarios to sort of illustrate how we would have used the decision tool to kind of go from the beginning to the end with tautaug here.

Another potential next step to consider, maybe beyond the scope of this Board. But we might want to think about beginning the development for some other species, you know weakfish or striped bass, or something like that. Then finally, we went through the process for tautaug. We would be interested in any feedback on the process itself, for instance the webinar that we have, the survey that was sent out, pretty much anything with that last one. We would be interested in getting some feedback. With that, Mr. Chair, happy to take any questions.

CHAIR HYATT: Great, Jay, thank you. I will say that with each and every presentation that I hear on the risk and uncertainty tool, I think I understand it a little bit better. The bad news is there is still a little way to go before I'm totally comfortable with it. Toni, have we got any hands up? Basically, we're looking for comments and questions for Jay, any type of feedback on what's been presented.

MS. KERNS: I have one hand, Tom Fote.

CHAIR HYATT: Tom, go ahead.

THOMAS P. FOTE: Yes, when I looked at the commercial side, we put an economic value on what would be a loss within the recreational community. We did not say the impact, you know nobody buys the green crabs that the tackle stores are selling. The charter boats can't sell if we don't have a season, or sometimes it is the only thing we can fish for during the gaps between sea bass and summer flounder. The economics might not seem as great, but it seems to be very important, because then you don't have trips going out. I'm just trying to understand why we didn't include that.

DR. McNAMEE: Yes, I think that's an awesome question, Tom. Why we didn't include it? I just don't think it, you know of course we all understand these things. I think in one regard we were trying to keep things sort of high level and tractable for our first run through here. But I think this is good feedback that we can sort of take back, and that is, because the dependent scores were high on the commercial side.

I think that was high without thinking about these indirect impacts to like, bait and tackle shops. In any case, I think I'll take your question as feedback that we can go back and think a little bit more about and try and incorporate it, because I agree with you. It's like super specialized, right. You have things that occur in the tautaug fishery that don't occur in any other fisheries, like green crab sales and things like that. We'll kind of take that one back and think about how to shoehorn that into the process here. I think it's a good comment.

MS. SARAH MURRAY: This is Sarah Murray. Is it all right if I chime in here for a moment?

CHAIR HYATT: Absolutely.

MS. MURRAY: Yes, I just wanted to piggyback off of what Jason was saying about the socioeconomic component. A piece of this that he alluded to is that we were trying to come up with a way to make this workable on a management timeline, so for the socioeconomic component we were looking for things that could be indicators of the general importance, for lack of a better word, of the commercial or recreational fisheries.

They are not necessarily capturing every dynamic of it, but they might be a way to get at the scale of the impact of the fishery. For commercial we have a little bit of an advantage that we at least have ex-vessel value data. That's what we ended up using for the commercial indicators. But I will note that is not an economic impact assessment. That is only price of landed tautaug, it doesn't include anything beyond that, the broader economic impacts. For recreational we don't really have something to parallel that on a coastwide basis that would be able to be used for an indicator.

What we did was look at directed trips instead, because that was the data that we had. That said, the socioeconomic indicators or the socioeconomic components are set up for the indicators to be a starting point, so a way to sort of sort the different species. But there is room for the SAS or the Board or AP providing input to say, we don't think that this indicator is actually capturing the reality of the fishery.

In the example of tautaug, if we think that the trip actually isn't really capturing either the sort of importance on a coastal scale, or the community dependence, if it's not capturing some of those dynamics there, and we want to sort of override the indicator. That is something that we've written in to how the economic components work.

We would just document that change in the report, include sort of justifications for why we're doing that, and change the score accordingly. Hopefully that helped clarify the socioeconomic component, and the recreational, and why there isn't necessarily dollar value associated there, although we know there is definitely economic impact.

MR. FOTE: Can I follow up?

CHAIR HYATT: Go ahead, Tom.

MR. FOTE: That is one of my major concerns. We're designing a tool because of lack of data. Over the years, you know we've been talking about management plans, and we always get to the point where we talk about the recreational socioeconomic impact. We always say, it's the best data we have available.

We're trying to basically do things that we never basically count the economic data that is in the recreational community, and fully in the commercial community. I see all these tools, but in the end it's because of lack of resources we have to get the data necessary to actually do things. We look for tools that will let us get around that, but we're still lacking the data we need to make decisions. This is not helping that, in my estimation.

MS. KERNS: Next Bill, you have Roy Miller.

CHAIR HYATT: Go ahead, Roy.

MR. ROY W. MILLER: This comment, or question actually, probably relates more to Kirby's presentation rather than Jay's, although perhaps the answer to Kirby's also applies to Jay's presentation as well. Specifically, I'm concerned about the relative lack of fishery independent surveys in the DelMarVa Region. There is a Delaware Bay Trawl Survey, but I presume that that data wasn't particularly useful for this purpose,

probably because of a relatively low catch rate of tautaug in that survey. It's somewhat of an unusual event to catch one. That is one presumption, which may or may not be correct. But I'm wondering, how about federal offshore trawl surveys? They had no utility in providing a fishery independent mechanism for estimating tautaug relative abundance? The question is, why weren't the federal surveys, offshore trawl surveys used?

CHAIR HYATT: Who wants to take a stab at answering that question?

DR. McNAMEE: Mr. Chair, this is Jay. Maybe I'll lead off just sort of topically on the decision tool, because I think there is a relevant response there. But then on the technical question that Roy has, hopefully someone else will jump in, maybe Katie or Kirby. I don't know if Coly is still on. She might be able to help too.

As far as the decision tool goes, just at the highest level, Roy, of your question. You know with the lack of a fishery independent index for that particular region, that is actually one of the real beauties of this tool, and that is you can, because of that fact, and why that is hopefully we'll hear about that in a minute.

But because of that fact, you can be more precautious in that area, and the tool is sort of built to do that, and in fact it did exactly that in the scoring by the Technical Committee. They ranked that uncertainty a little higher because of that in that component. That is exactly what the tool is built to do, is to accommodate and to prescribe a risk tolerance for exactly this type of a scenario.

I just wanted to sing the attributes of the decision tool with this particular topic, but if anybody has a direct response to the question about a trawl survey. I have like a sense, based on my history with tautaug, but I'll let the folks who are more involved more recently answer.

CHAIR HYATT: Thanks, Jay, so if Coly is still on or Kirby. If anybody can jump in and address Roy's question as to why federal data sources weren't used. Once Roy's question is answered I'm going to have a question, and then we can go back to Toni, whoever has their hand up. Coly, Kirby, does anybody have an answer to the question that Roy asked?

MR. ROOTES-MURDY: I'll jump in and just say that this assessment update, updates the last update from, it was 2016 and that data wasn't used then, so that's the simple answer. We're just updating the surveys that were used in the last assessment. But going back to that previous assessment, a decision why that wasn't looked at, I would have to go back and double check. Maybe Katie has more insight from the first benchmark back in 2014.

DR. DREW: Yes, basically the answer is, we looked at it for the last benchmark assessment, and those federal offshore trawl surveys just really don't catch tautaug. Trawl surveys in general are not great for tautaug, because they are so structure oriented, and the encounter rates in the NOAA surveys were very low. You just get one or two a year, or sometimes none, so we decided those surveys were not providing accurate indices of abundance, because they just couldn't catch them out there.

CHAIR HYATT: Very good. Jay, jump to the question that I have. I'm intrigued by your suggestion of hypothetical scenarios. I think as I mentioned earlier, I'm still struggling somewhat with getting comfortable with the level of understanding, as to what the risk and uncertainty tool would provide us, and how that would be applied. In your slide you ask, are there any questions regarding weightings, are there any questions regarding technical input.

I myself, I'm not really sure if I have any questions, given that I don't think I have a practical understanding of this tool yet. I was wondering if you could just talk for a minute about what you would envision in hypothetical scenarios, and well,

how you would envision doing it playing out. If you or others on the Board think that that is a useful way forward with it. I don't know how many people are struggling with this in the same manner that I am, but if you could talk about that for a minute it would be great, thanks.

DR. McNAMEE: Maybe Sarah could jump in as well. I don't know if the ASMFC team had talked more explicitly about this internally at ASMFC. But first I will sort of empathize with you a little bit. I struggle with these sorts of things in the abstract, and it's nice to see a good application.

That's exactly why we have that second sub-bullet there. It's sort of a good problem to have, and that is maybe we won't need to actually take any management action, because the news is good by and large. There may be an opportunity there, so it may be a moot point. Maybe we will do something here.

But you know the direct answer to your question is, that is the value of doing the hypotheticals is so that we can run this process from beginning to end, so everyone can see a full application of it. You know even in the case that we might not be making any management changes. I think that is the point where you would say oh, all right.

What the decision tool is going to tell us is, you know if we want to achieve some level of reduction in fishing mortality, it's going to give us the probability that we should set that at, and then the management measures will use that as the target. That's kind of the, there are like two more steps that this gets rolled into.

That is the point of doing the hypotheticals is for exactly the reason you highlight, and that is to run it from beginning to end, so that we can see the full application of the tool, rather than kind of ending here and having it remain sort of an abstract idea. Sarah, I don't know if you guys talked a little bit about what hypotheticals we might be thinking about, if we don't end up taking any management actions this time around.

MS. MURRAY: Yes, we did talk about it to a certain extent. We probably need to flesh these ideas out a little more if we go down that road. But I think the idea is essentially to give the Board a more fully fleshed out view of what this tool results in, and then also what sort of tinkering with the different pieces of the tool would do.

As we mentioned earlier in the presentation, this can be an iterative process, so when it comes to the weightings, for example, you all provided input on that. But there would be an opportunity that if you didn't quite agree with how that landed, that those could be changed, or an example of the socioeconomics component, where there might be concerns that one of the components isn't capturing things. There could be a chance of tweaking those. Some examples to just show what it would look like if you did change the weightings, for example, or if you did change the score on a socioeconomic component would be what we were thinking of, in terms of the hypothetical scenarios.

You know we haven't sorted out exactly what those would look like. We want o steer away from, I guess getting confusion around actual management of, versus what is happening. But the intent would be different scenarios that help the Board understand what the nobs they have to turn on in this decision tool would be.

CHAIR HYATT: Well, thank you, Jay and Sarah. From my perspective that would be extremely helpful, running some hypothetical scenarios to take this from the abstract to the practical. That includes some level of sensitivity analysis towards the variables. I'm talking for everybody here, and I hope there is agreement, and if not let me know.

But I'm thinking that that would take everybody a long way down the road towards understanding

this, and better understanding its practical application. I guess my question to you would be, do you need anything from the Board in order to proceed in that direction at this point in time, or is there agreement amongst the members of the Board that that is a good direction to move in?

MS. KERNS: Before Sarah answers that question, Bill, John Clark put his hand up during this discussion, so I don't know if he has a question related.

CHAIR HYATT: Go ahead, John.

MR. JOHN CLARK: Yes, I was just saying that I agree with Bill. I would really like to see these hypothetical scenarios. I'm just kind of curious also, if they did start being used more often, maybe Jay can answer this. Could you get to the point where the system could inadvertently be kind of game.

Let's say you had states that didn't want to see action taken. They both say put very low weights on certain of the items, other areas where they might be much more concerned about if they put very heavy weights on those, would it kind of cancel each other out, and then you end up with almost like a neutral weighting there?

DR. McNAMEE: Good question, John. I think there are two things to answer. I think that could happen mathematically. I think it would take a pretty concerted and coordinated cabal. You know one of the nice things about the survey is we all sort of took it independently, and then everything gets sort of averaged together. My hope is, you know any one individual who is trying to do something nefarious would get sort of, you know it would come out in the wash.

MR. CLARK: Jay, I think I worded it poorly. I didn't mean like an intentional system, but I just meant, you know let's say one region thinks the stock is doing well, and another region doesn't think it's doing well. There is some very much a subjective element to this whole thing. Could those type of things happens though, where it just kind of works out that you end up with a neutral recommendation based on the fact that everybody's kind of canceling each other out?

DR. McNAMEE: Yes, okay, I'm sorry. I was being a little cynical as well. I apologize. It probably wasn't the way you worded it.

MR. CLARK: Well, you are right to be cynical though, because those things could happen.

DR. McNAMEE: In answer to your question. In the case of tautaug, again maybe you didn't mean it this way, but the regions are independent from each other. They are succinct units. Within a region, if people felt differently about the stock status, yes that could happen, and in fact you sort of see that in the case of the socioeconomic factors, they sort of offset each other.

It can happen, but that is again, I think that's the opportunity we have here, is for you to look at the stuff and say hey, I don't think that looks quite right, I think maybe we all didn't understand this correctly, and we adjust the weight. But we have to do it transparently, and get the consensus of our fellow Board members to adjust that weighting post survey. I think yes, it can happen mathematically, absolutely. But there are ways to account for that, and the nice aspect of the process we've developed here is you have to be really transparent about it.

MR. CLARK: See, and that's real helpful, because I figured it would probably end up being an iterative process. But there is a lot of subjectivity involved in the process.

DR. McNAMEE: Yes, for sure.

CHAIR HYATT: Toni, do we have any hands up now?

MS. KERNS: We don't have any other hands up, so you can go back to Sarah, to answer your question about what we would need to do.
CHAIR HYATT: Go ahead, Sarah.

MS. MURRAY: The question really comes down to whether we want to look at hypothetical scenarios for the next Board meeting, or whether we want to kind of produce the real world recommended probability for each of these regions. The distinction there is, if we're going through the full real exercise of producing the recommended probability.

That involves working with the TC to produce harvest levels associated with the different probabilities, and looking at the potential change in harvest levels, and feeding that back through the management change effects, to then produce the recommended probability. In the hypothetical scenarios, at least how we had talked about it.

Rather than working with the actual projections, we would probably look at just different hypothetical percent changes, for example. That is kind of the nuance there of whether we want to continue forward with this, and work with the TC to do with the actual projections, or whether we just want to look at some hypothetical scenarios. A sort of middle option is to say, we want to look at hypothetical for now, and potentially do the real option later if we are actually looking at management possibilities, or both for the next scenario. Not to give ourselves too much work there, but I think that is kind of the real question we have for you. Do you just want hypothetical so that you can understand the tool, or are we wanting to take the next step to produce some potential probabilities to actually inform potential management actions?

CHAIR HYATT: It sounds to me like there is a little bit of a catch 22 there, in the sense that even if they are hypothetical, they have to be real enough to enable people to envision the use of the tool in a manner that leads to greater understanding, familiarity, and comfort. I don't know exactly, well off the top of my head, what type of guidance to give in response to the question you just asked. I think I will throw it out to the group for further consideration.

MS. KERNS: You have Adam Nowalsky, Mr. Chair.

CHAIR HYATT: Go ahead, Adam.

MR. NOWALSKY: If it is not the intention of this Board to change management measures, particularly I think in a more restrictive direction for Long Island Sound and New Jersey/New York Bight. Is there another species board that might get more out of doing the hypotheticals in the near term and/or possibly using this in the near term, if this Board doesn't intend to actually use it and it's just really hypothetical?

CHAIR HYATT: Jay, Sarah, I don't know if you have any thoughts on that. My immediate reaction, Adam, is that we've gone this far with developing it, and a lot of work has gone into developing it, with regard to tautaug. Jay and Sarah, correct me if I'm wrong, but this tool could be used not just in assessing more restrictive management measures, but also could be useful in addressing liberalization of future management. Am I correct?

MS. MURRAY: Yes, that is correct. It can be used in either direction. Perhaps as a note on workload. The hypothetical scenarios, at least as we envision them, shouldn't be terribly complicated to produce. Just as a way to visualize and maybe wrap it up, even if the Board is not looking to take a management action. At least to produce a few of those just so that for future reference you have a sense of how this would have turned out wouldn't be too much of a workload.

When it comes to whether or not, I can't speak to whether or not in regard to the Board action specifically, so that is up to the purview of the

Board. But producing the hypothetical wouldn't be particularly complicated. Producing the actual recommended probability is a bit more work, it's still feasible for the next board. It just depends on how the Board is seeing this, and whether it is useful for the Board.

CHAIR HYATT: Thank you, any other hands, Toni?

MS. KERNS: We have Justin Davis and then Adam Nowalsky.

CHAIR HYATT: Okay, go ahead, Justin.

DR. DAVIS: I guess I feel that seeing some hypotheticals might be helpful in sort of really bringing home to the Board whether or not this is a tool we want to adopt and use in an actual live fire management action in the future. I do think we need to be careful that moving forward with hypothetical runs of this tool is not sort of viewed as a pretext to management action, when the Board has not yet made a decision to take any management action at this point, relative to tautaug.

I'm not in favor of sort of just stopping at this point and not doing something further, until such time as a management action might be taken, because I think we need a more detailed look at how this might play out, to make the most informed decision about whether this is something we want to use in a future management action. I guess I would be in favor of some hypothetical applications of this, to give sort of a fuller look at what it might actually look like if used in a management action, if that's helpful.

CHAIR HYATT: Yes, it was helpful. Adam, go ahead.

MR. NOWALSKY: Like others who have spoken, I am completely interested in continuing to see this move forward. I'm not looking for a full stop on this. I think a lot of great work has been done. I think there are definite applications to this. I am thinking, however, that it was not this Board's request to have this tool brought to us first.

I believe it was ultimately a Policy Board decision when they looked at the tool, to say hey, this is a species that we think this would make sense to go to. That decision was made when we had information about stock status. This last assessment I think has significantly changed the Commission's perspective on where stock is, and I think again that's a great position to be in. I would rather be in that position than the other direction.

I'm leaning towards thinking, maybe the best approach here is not for this species board to be making this decision today, but for staff to spend some more time thinking about what is the best application for this at this point? Is there a better application than the Tautaug Board at this point, and ultimately have the Policy Board make the decision, whether they want an individual species board dealing with hypotheticals, or whether they think there is a better use of this moving forward in the near term?

CHAIR HYATT: Okay, so it is clear that some folks do believe that we should move forward with some hypothetical scenarios within this Board, take a further look at it. Adam has suggested that we move this over to the Policy Board, to see where would be the most appropriate place to do some additional and further development and analysis. What do other folks think?

MS. KERNS: Bill, I just want to step in really quick and in response to Adam. You know Adam, you are correct, the Policy Board thought that the Tautaug Board would be a great second run of the risk and uncertainty tool, or test run I should say, because of the previous stock status. We had an assessment coming up, where we thought, we might have to make a management response. If we go back to the Policy Board, we would have to start all over again, which would be potentially a considerable amount

of time before we even do another test run. It's been several years in the making, this tool. I think from the staff's perspective, we would like to try to be able to bring something back to the Policy Board, in terms of like how informative the tool was for the Board, so that they could make a decision on whether or not they want to approve the tool for use across the board for all of the species.

Doing a test run could achieve that for giving feedback to the Policy Board, I think. I'll just put that notion out there, if we could come back to the Board with like just make something up to say we needed to do reductions for tautaug in one of the regions. Here is a list of scenarios, based on some hypothetical to provide that information to you all, to see how it would work out. That said, I'll let the Board chew on that, and Tom Fote has raised his hand.

CHAIR HYATT: Go ahead, Tom.

MR. FOTE: I know it's supposed to be hypothetical, and we go through the exercise. But I have watched what happens in hypotheticals over the years, and the tendency of somebody jumping on it for their own, wherever their own philosophy is going, or what direction they want to go, and they start using your numbers on a hypothetical, which was never meant to be used.

It winds up in a lot of controversy going on. That is my concern here. Because fisheries management is no longer done in a bubble, but it's done on the internet a lot of times. I'm always concerned when you put out things to the public that are hypothetical, because some people just jump on and say that's the truth.

CHAIR HYATT: I will add that doing it clearly up front as a hypothetical does actually mitigate some of that risk that you had suggested, as opposed to jumping in and doing real life scenarios, maybe where you don't intend to take management action. I would argue that in order to protect against what you're concerned about, that it's actually better to work with hypothetical scenarios, at the stage in the process where you're still trying to understand the usefulness of a tool.

At this point, what I'm going to do is suggest that we do take one additional next step in this process. I'm going to suggest as a Board that we should go forward, and at least move one step forward and allow for the folks that have dedicated a lot of time and effort working on this, to prepare some hypothetical scenarios.

With the understanding that these will be presented to us at the next Board meeting, and if it's not practical by the next Board meeting, at least at a subsequent Board meeting. I don't think we need a motion here, unless there is a strong objection to this or any objection to this. I will throw that out for folks to see if members of the Board are comfortable moving forward at this time in that manner. Toni, have we got any hands?

MS. KERNS: We have two hands, Justin Davis and then Chris Wright.

CHAIR HYATT: Go ahead, Justin.

DR. DAVIS: I'll just offer one thought. I don't know if this is useful or not, but I wonder if in doing some hypothetical scenarios, if it might be useful and perhaps a little less, I don't know what the word is, but if we did something retrospective, where if for instance we looked at the management decisions that were made after the last assessment, which I think were all based on a 50 percent probability of reaching F target by some timeline. If there is a possibility of looking at the available information from the assessment at that time.

Coupled with this tool, and sort of determining whether we would have chosen a different probability for achieving F target at that time. In that case we sort of have a real-world comparison

of sort of what we did under the "old model" versus what we would have done under this model. That also avoids sort of the issue here of not wanting to create a pretext for management action at this point, that the Board hasn't shown any indication they want to take. That is just a thought thrown out there.

CHAIR HYATT: That's a very interesting suggestion, and Jay and Sarah, does that seem like something that could be within your wheelhouse to address in that manner?

MS. MURRAY: Yes, I think I'll provide a little more context on these hypotheticals that we are thinking of, and how those would work. In the real process we would take the probability that is produced from just the sort of scientific biology-based components of the stock status, model uncertainty, environmental uncertainty, ecosystem trophic importance, and then also the management uncertainty.

Those would produce a probability without the socioeconomic component, and we would look at the with projections what harvest level would achieve that probability, and see how that stacks up to the status quo, so in terms of whether that would be an increase or a decrease, or what percentage that would be. That would be what is used to produce that final socioeconomic score.

In the hypothetical scenarios that we're talking about here, we're essentially breaking this component of the decision tool. You can't take the hypothetical scenario and say, okay we want to apply it. Instead, what we're doing is we're taking out that component of looking at the harvest level from just those TC components. We're not doing that. Instead, we're saying, okay what if the scores that the TC produced suggested a 5 percent decrease. What would the management affect score for the SAS component be?

What if the TC component set a 10 percent increase? What would the management at that score be? There wouldn't be any justification for using that in a real-world scenario. When it comes to looking at a past, like the past management decisions, we could look at the percent decreases, for example, and use that for one of the hypothetical scenarios.

But actually, reproducing the full decision tool based on the reality of the time of the last management decision would be a lot of additional work, because we would need to produce all of those scores based on that time, and go back and do the socioeconomic scores based on that time period, and things like that. It sort of depends on exactly what you're thinking, in terms of using that past scenario. Hopefully that helps to explain things a little more, but if you have additional questions, please let me know.

CHAIR HYATT: Thank you, Sarah. It's clear that what you're suggesting is very sensitive to the concerns that Tom Fote brought up. It is consistent with some of the suggestions that have been made so far in the discussion. At this point, what I'm going to do is just ask the Board if there is any objection to having the folks move forward with the risk and uncertainty tool, to look at some hypothetical scenarios, as Sarah has described, and to report back to this Board at a subsequent meeting. Is there any objection to that?

MS. KERNS: I see no hands.

CHAIR HYATT: Okay, very good, thank you. Then we will move in that direction, and I will just ask, is there any further discussion that needs to be had, or that people are interested in having on this topic?

MS. KERNS: Chris Wright had his hand up.

CHAIR HYATT: Go ahead, Chris.

MR. CHRIS WRIGHT: I support the going forward, but what timeframe were you thinking, the next meeting, or which meeting are we going to hear back on this scenario analysis?

CHAIR HYATT: I'll jump in. I was thinking the next meeting. But I think, given the discussion that's been had, I think really depends upon Sarah and Jay and the folks who are going to be hands on, letting us know whether or not that is possible. Sarah, do you have an answer today, or is that something that you're going to need to think about a little bit?

MS. MURRAY: Yes, winter meeting should be feasible for coming up with some hypothetical scenarios to look at. As long as that makes sense with ISFMP and their agendas for that meeting, it shouldn't be an issue to have that analysis ready for them.

CHAIR HYATT: Very good, any other hands?

MS. KERNS: No hands.

MR. ROOTES-MURDY: I just wanted to jump in and say, in summary what I'm hearing is we don't have any feedback from the Board on the report, in terms of weightings or technical input at this stage. As you've suggested, we have a path forward, and coming up with some hypothetical scenarios that we will report back to the Board, in terms of the next steps, as there hasn't been any indicated management action at this point, the Board wants to take.

The last question we were hoping to get some feedback from the Board on, I think to help the risk and uncertainty process, you know moving forward, is on how the information has been presented, the previous webinars, survey, understanding the decision tool. You know I think that would be helpful for us as staff as well.

CHAIR HYATT: Thank you, Kirby. My feelings have been that the process moved rather smoothly, and it's been a learning experience. But I would love to hear from others. Anybody have any comments?

MS. KERNS: I have no hands, Mr. Chair.

CHAIR HYATT: Okay, Kirby. If anybody does want to provide any comment or any feedback to Kirby, relative to that question, I suggest you reach out directly to him or through me. That would be wonderful.

DEVELOP GUIDANCE FOR LAW ENFORCEMENT COMMITTEE REVIEW OF THE COMMERCIAL TAGGING PROGRAM

CHAIR HYATT: At this point then, we will move on to Item Number 7 on the agenda, it's Developing Guidance for Law Enforcement Committee Review of the Commercial Tagging Program. Kirby, I believe you've got a short presentation on this as well.

MR. ROOTES-MURDY: In August, the Board was presented an initial report from the TC, feedback from industry members and questions answered by the Law Enforcement Committee on the implementation of the tagging program. The focus of those questions going into the summer meeting was generally on how the tagging program was working.

Given the tagging program was implemented to address illegal harvest markets for tautaug, there has been noted interest by the Chair, Bill Hyatt, to put together a bit more information of how compliance and impact is having on the illegal harvest currently, in terms of tags being applied to fish across the management unit.

What was included in supplemental material for the Board to consider ahead of today's meeting were just four questions that we're trying to get at more specific feedback from the Law Enforcement Committee regarding compliance and impact on illegal harvest. The goal of today's presentation is

to highlight those questions to the Board, and try to get Board feedback on whether they will fully address the interest and further understanding the tagging program's impact.

If the Board is able to come to agreement on those questions today, and we are able to convene the Law Enforcement Committee in the coming months, we should be able to report back to the Board at the winter meeting, assuming that that all lines up. I'll next go through these four questions for the Board to consider, and then to wrap up have you all provide feedback.

The first is, are there any areas of concern, specific fisheries or markets where compliance of tautaug tagging requirements remain a significant issue? This would be helpful, obviously to better understand if there are other fisheries outside of the tautaug fisheries that it's having an impact on it. The second question is, is there a practical way for agencies to collect information on noncompliance with tagging requirements in the fishery or markets that could inform and improve the efficiency and effectiveness of law enforcement efforts?

Examples might include specific types of advanced information gathered by Agency biologists or by partner organizations. The third is, any additional thoughts or recommendations for improving the efficiency and effectiveness of enforcement at the tagging program, and the fourth and final question is, 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? Again, we're looking for feedback on these draft questions, and if there is agreement that these questions address what the Board is hoping to better understand on compliance with the tagging program and impact on illegal harvest, they could be forwarded on to the Law Enforcement Committee to get feedback. At this point I'll turn it back over to you, Bill.

CHAIR HYATT: In a nutshell, what this is, is basically the tagging program has been implemented, and compliance with it is important, in order for us to achieve the objectives of that program. The law enforcement officers in the various states that are working on the ground, they've got the most hands-on, most detailed, most up to date information on where issues are occurring and where concerns might be.

This is just an attempt to reach out to those law enforcement officers and try to solicit some feedback on both where efforts should be focused, and any suggestions as to how the efficiency of law enforcement efforts could potentially be improved. That is the whole purpose behind this short list of questions. Any feedback on what we're doing and thoughts on the specific questions would be welcome.

MS. KERNS: You have Dan McKiernan.

CHAIR HYATT: Go ahead, Dan.

MR. McKIERNAN: Thank you, Bill. I guess my concern is that some jurisdictions haven't even finished their first year with this program. But having said that, it's never too soon to get good feedback from the officers, as you've said. The officers who are on the front line are definitely going to have insights for us that will be very valuable.

I do have a question on the first of the four questions, if Kirby could bring up that slide. It was a little vague to me what was being asked, Question Number 1. Is this supposed to identify, say supply chain situations, where like a market might have some untagged tautaug? What is being asked of the officers to provide feedback on here?

CHAIR HYATT: This will, to get at the most specific information that the officers have. I think it should

be accompanied by the suggestion or a request that they talk directly with the field staff, as you say on the front lines, and whether it's specific geographic areas, whether it's specific type of markets, whether it's specific parts of the chain of custody, where the problems are occurring.
I think that's the intent here. If you or others think that this question needs to be fleshed out a little better to garner that information, then that is the feedback that we're looking for here. I think it would take us a long time to wordsmith everything and get it perfect here, but I think just following the meeting, working with Kirby to make some changes to these questions might be appropriate, if they come after further thought.

MR. McKIERNAN: Okay, well thanks for that, I'll yield.

MS. KERNS: Next you have Tom Fote.

CHAIR HYATT: Tom.

MR. FOTE: Yes, one of the questions, one of the concerns I've always had is when we put rules in place is that states that are not required, because they are basically markets. You know when I go to like say, Pennsylvania, I always check out the fish markets when I'm going there. I'm always concerned about, when I see striped bass in the market there, where they're coming from.

Because I know that is transportation of illegal fish over the state lines. If they're not required to use the tags in Pennsylvania is that a loophole? Is that a problem? I guess since Pennsylvania is not required to do tagging programs, how do we check on the import to their markets like that? I'm just curious on that.

MR. ROOTES-MURDY: This is Kirby, I can jump in.

CHAIR HYATT: Go ahead, Kirby.

MR. ROOTES-MURDY: Yes, this question came up before the tagging program went into effect, which was for Pennsylvania, because they don't have a fishery but they do have markets, how to ensure enforcement. Andy Shields, who as you know Pennsylvania doesn't sit on the Board, did indicate that they were going to have their officers check to ensure that they had tags on fish in the marketplace now.

I think to what Bill is trying to get at with these questions is, this could be a set of follow up questions to the LEC on these concerns that you're raising, Tom, of whether that is still the case that they are checking in that marketplace to ensure that the tags are being applied, even though the state is not on the management board and does not have a fishery.

MR. FOTE: Yes, because it's not only the market, there is also the restaurants, because that is where a lot of the tautaug wind up in.

CHAIR HYATT: Thanks, Tom, and yes, the hope is that law enforcement officers would be well positioned to have some of the type of information that you're talking about needing, absolutely. Any other hands?

MS. KERNS: I see no other hands raised.

CHAIR HYATT: I'm going to interpret this discussion that people are comfortable with going forward to the Law Enforcement Committee with a set of questions, that there might be some tweaks to those questions, and that people will get whatever suggestions they might have to Kirby. Providing they're not dramatically significant from what's been presented here, we'll move forward accordingly. Very good. Where were we on the agenda, that was the next to the last item. The last item is Other Business, so I will ask, is there any other business to come before the Board today?

MS. KERNS: You have Dan McKiernan.

CHAIR HYATT: Go ahead, Dan.

MR. McKIERNAN: Bill, earlier in the meeting you had mentioned this was your first and last Board meeting, and so it appears to me that you have some kind of Midas Touch, so I was wondering if in the Policy Board we could nominate you for Northern Shrimp, or maybe Striped Bass.

CHAIR HYATT: Thanks, Dan, I don't even know what to say to that except no. Thanks. I will add here is, before we go to adjourn, I'm going to say I want to thank Kirby for an absolutely excellent job he has done the last two years supporting this Board, and I particular keeping me on task.

Over those two years I got a lot of "Hey Bill, just a reminder" e-mails, and those e-mails and the discussions are greatly appreciated, so thanks, Kirby, and if we were meeting in person, I think the Board would be giving you a nice round of applause right now. With that, Toni, I'll just ask once more. Is there any other business to come before the Board, and are there any hands?

MS. KERNS: I don't see any other hands, and I am not aware of any other business.

ADJOURNMENT

CHAIR HYATT: Okay, very good, so with that we are ahead of schedule and we are adjourned. Thanks, folks!

(Whereupon the meeting adjourned at 3:47 p.m. on Monday, October 18, 2021)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Tautog Management Board

FROM: Sarah Murray, Fisheries Science Coordinator

DATE: January 10, 2022

SUBJECT: Risk and Uncertainty Decision Tool Hypothetical Scenarios

Background

In recent years, the Commission has been developing a policy to better account for the risk and uncertainty that is inherent to fisheries management. One of the key components of accounting for risk is determining risk tolerance – in the case of the Commission, how much risk is acceptable for a species or stock. The Commission's preliminary Risk and Uncertainty Policy provides a consistent yet flexible method for arriving at a recommended risk level that takes into account the Commission's priorities and characteristics of the stock and fishery.

In the typical management-decision process, projections of biomass are used to help determine the appropriate harvest level for a stock. Different harvest levels result in different probabilities of achieving the reference points; for example, higher harvest levels have a lower probability of being at or below the *F* target, while lower harvest levels have a higher probability of achieving the *F* target. Management priorities and risk tolerance determine the appropriate probability to use to set the harvest level for a stock. In the past, the Commission decisions regarding this probability have been made via *ad hoc* Board discussions.

The preliminary Risk and Uncertainty Decision Tool provides a structured method for arriving at the probability of achieving the reference points. The decision tool incorporates different information related to the risk and uncertainty for a species (technical inputs) and combines it with the relative importance of the information (weighting) to arrive at the recommended probability of achieving the reference points.

Tautog Pilot Case

At the 2021 Winter Meeting, the ISFMP Policy Board recommended using tautog as a pilot case for the Commission's draft Risk and Uncertainty Policy. Preliminary Risk and Uncertainty Decision Tools were developed for each of the four tautog management regions based on input from the Tautog Management Board, Tautog Technical Committee (TC), and Committee on Economic and Social Sciences (CESS). The Board reviewed the preliminary Tautog Risk and Uncertainty Report, which summarized the preliminary decision tools, at the 2021 Fall Meeting.

Normally, the risk and uncertainty process would only continue to the next stage if a management action was initiated. Otherwise, the species decision tool would be saved for future use. While the Tautog Board did not initiate a management action at the 2021 Fall Meeting, the Board tasked staff with developing hypothetical scenarios to illustrate how the tool would have worked and complete the tautog pilot case.

Decision Tool Process

If a management action had been initiated, the next step would be for the TC to produce a preliminary recommended probability (Table 1) of achieving the fishing mortality (*F)* target reference point for each of the management regions. The preliminary probabilities would include all of the components of the decision tool except for the socioeconomic component – in other words, this would be the recommended level of precaution if no socioeconomic considerations were taken into account. The TC would conduct projections to determine the harvest level that would result in *F* being at or below *F* target with the preliminary probabilities. Next, the CESS would compare the preliminary harvest levels to the status quo harvest levels and use the difference to score the management effect portion of the socioeconomic component. The socioeconomic scores would be added to the decision tool to produce a final recommended probability that includes socioeconomic considerations. The Board would review the final recommended probability and decide whether to accept it and use it to determine the future harvest level, or adjust the weightings to better reflect Board priorities.

Hypothetical Scenarios

In the case of tautog, a management action was not initiated and, as a result, the final stage using the probabilities with projections will not be completed. To complete the tautog pilot, hypothetical scenarios (Table 2) were developed to illustrate how the decision tools would have worked. These scenarios are not based on projections and therefore do not represent real scenarios or management options. While the real process would use the difference between the preliminary harvest level and the status quo to score management effect, these scenarios use hypothetical percent differences. For example, scenarios 2a-e (Table 2) demonstrate what the final recommended probabilities would be if the preliminary harvest level was a 5-10% change from status quo; this change could be an increase or a decrease in harvest.

The scenarios (Table 2, scenarios 2b - e) also include different potential weightings for the socioeconomic components. In the decision tool, the short-term socioeconomic component often decreases the probability (reducing precaution) and long-term socioeconomic component often increases the probability (increasing precaution). The socioeconomic component serves as a way to balance tradeoffs between short-term and long-term socioeconomic considerations, based on Board preferences. In the weightings produced from the Tautog Board's input, the short-term and long-term components were weighted roughly the same (Table 2, scenario 2a). This is a result of differing opinions on short-term and long-term

tradeoffs, which averaged out to similar scores. Because the short-term and long-term socioeconomic technical inputs were the same scores, the two components largely balance each other out. As a result, the different hypothetical management effect scores have little to no impact on the final probability.

To illustrate how the management effect score could impact the final probability, additional scenarios with alternate weightings for the socioeconomic components were added. The original decision tool weightings were based on Board input on the relative importance of each decision tool component compared to the others, scored from much less important (1) to much more important (5). Scenarios 2b and 2d demonstrate what the hypothetical scenarios would look like if short-term was scored as a 5 and long-term was scored as a 1, and vice-versa. While the original weightings were all based on the 1 – 5 scores, it is possible to weight a component even higher than this. Scenarios 2c and 2e demonstrate a more extreme weighting, which is the equivalent of having scored the short-term or long-term component as a 10. The tautog FMP mandates that the Board must use at least a 50% chance of achieving the *F* target when taking action to reduce *F*, so for the hypothetical scenarios, 50% was used as the lower limit and scenarios or weightings that would have resulted in a recommended probability of less than 50% were not included. A higher probability of achieving *F* target would result in a lower harvest limit.

For all regions, putting more weight on short-term socioeconomic considerations resulted in a lower recommended probability, while putting more weight on long-term socioeconomic considerations resulted in a higher recommended probability. The amount that the probability was changed depended on how much higher the weights for these components were. For the scenarios where the short-term socioeconomic considerations were weighted higher (2b-c), the standard most important score (5) resulted in a 2% decrease from the preliminary probability, while the more extreme weighting (10) resulted in a 4% decrease. For the scenarios where the long-term socioeconomic considerations were weighted higher (2d-e), the standard most important score (5) resulted in a 2% increase from the preliminary probability while the more extreme weighting (10) resulted in a 4% increase. In all cases, the adjustments do not result in radical departures from reasonable probability levels. At the same time, the process creates a more refined and transparent representation of the Commission's risk policy in the management decision-making process.

Next Steps

The next step for the tautog pilot case is to report back to the ISFMP Policy Board on lessons learned. For tautog, the regional decision tools will be saved for potential consideration with future management actions.

Table 1: Tautog Regional Decision Tool Preliminary Probabilities (Probabilities without Socioeconomic Considerations) for Achieving *F* Target

Tautog Regional Decision Tool Preliminary Probabilities				
Region	**MARI**	**LIS**	**NJ-NYB**	**DelMarVa**
Amendment 1 Status Quo	**50%**			
Preliminary probabilities by region (probabilities without socioeconomic component)	**54%**	**59%**	**61%**	**56%**

Higher probabilities of achieving the *F* target have a lower risk of overfishing but will result in lower harvest limits.

Table 2: Tautog Regional Decision Tool Hypothetical Scenarios

Tautog Regional Decision Tool Hypothetical Scenarios								
	Socioeconomic Component Weightings				**Regional Final Recommended Probabilities (All Components)**			
	Commercial		**Recreational**					
Scenario	**ST Weight**	**LT Weight**	**ST Weight**	**LT Weight**	**MARI**	**LIS**	**NJ-NYB**	**DelMarVa**
Scenario 1: No change to harvest level								
1: Any weightings	*	*	*	*	54%	59%	61%	56%
Scenario 2: 5-10% change to harvest level								
2a: No change to weightings	0.09	0.09	0.10	0.10	54%	59%	61%	56%
2b: Short-term socioeconomic considerations (ST) most important (5); long-term (LT) least important (1)	0.16	0.03	0.16	0.03	52%	56%	59%	54%
2c: ST most important, with extra high weighting (10); LT least (1)	0.25	0.03	0.25	0.03	50%	55%	57%	52%
2d: ST least important (1); LT most (5)	0.03	0.16	0.03	0.16	56%	61%	63%	58%
2e: ST least important (1), LT most, with extra high weighting (10)	0.03	0.25	0.03	0.25	58%	62%	65%	60%

*If the change to the harvest level is 0, the socioeconomic component will be 0 regardless of the weightings

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MEMORANDUM

TO: Tautog Management Board

FROM: Law Enforcement Committee

DATE: January 7, 2022

SUBJECT: Law Enforcement Committee Feedback on Tagging Program and Illegal harvest

The Law Enforcement Committee (LEC) met on December 2nd to review questions posed by the Tautog Management Board on the impact of the commercial harvest tagging program in reducing illegal harvest and sale. Below is the summary feedback provided by each state's LEC representative.

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.

<u>The LEC identified the following areas of concern:</u>

- Commercial harvesters returning to dock or penning up fish at sea with catches above the commercial limit or as part of efforts to avoid fishing during bad weather and then selling the fish at the trip limit quantity over multiple dealer reports. When there have been reports of this, Marine Patrol attempt to meet boats and intercept commercial harvesters when they possess catch over the limit. This has been challenging as some commercial harvesters have warned other harvesters in real time via cellphones.

- While there appears to be good compliance with the commercial fishery in all states- both among commercial harvesters, markets (fresh and live), and restaurants- the LEC noted concern that some recreational harvest is illegally being sold in secondary or underground markets. Suspicion that this illegal sale is occurring are instances of recreational trips arriving to docks with both legal and illegal (i.e. more than the legal trip limit or undersized fish) catches; in some of these instances the anglers are nonresidents making them hard to track; and instances in recent years of markets being shut down where there was illegal harvest (i.e. undersized fish or fish without tags) being sold. Finding and monitoring additional market places and proving that recreational harvest is ultimately being sold illegally is challenging.

- Individuals that are illegally harvesting tautog in the recreational fishery have been observed by Marine Patrol to work in groups across multiple boats, which can be challenging to catch in the act. These individuals can call or text others in their group to warn if they are intercepted by law enforcement, whether returning to shore or fishing in specific locations.

- A number of states are dealing with a shortage of Marine Patrol staff and competing priorities to monitor illegal harvest in the tautog fishery. If there has been generally good compliance with the tagging program, it becomes difficult for Law Enforcement to do extensive monitoring when there is no evidence that illegal activities (illegal harvest or sale) is happening.

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.

The LEC noted that trying to effectively use either other agencies or organizations would be very difficult in a number of states because in markets selling tautog, there is a strong distrust of anyone not from community coming in. In checking whether illegal undersized or untagged fish are being sold, a challenge is having those checks occur at the same time; checks have to be synchronized, otherwise vendors in one store or market will tip off vendors at other locations.

Regarding collecting information on non-compliance, it is unclear whether that would make efforts to combat illegal harvest more effective or efficient. Unless Law Enforcement Agents receive calls or information that indicates illegal harvest or sale is happening, it is very difficult to make regular surprise checks of markets when there isn't any evidence or information. Having the LEC meet on a regular basis to share notes and updates on activities in their state is very important in trying stay on top of illegal activity.

Based on the LEC's discussion, the group was in agreement that the recreational fishery is where much of the illegal harvest is likely occurring. But monitoring that fishery more than current efforts- which for some states often becomes the primary focus of law enforcement activity- is challenging given many of the states' limited law enforcement staff.

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

A few LEC members noted that commercial harvesters in their state have expressed frustration with the current tag type- that it causes sores on the fish and/or that it can increase mortality of fish intended for live markets. The injuries or mortality can affect the price the commercial harvesters can get for the catch. The LEC members indicated that the best way to maintain and strengthen compliance with the tagging program is to have full buy-in from the commercial sector. If there is the ability to evaluate a different tag type through more testing, that might satisfy those who have taken issue with the current strap and may further improvement compliance the ease of enforcement.

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?**

Overall, the LEC was in agreement that the tagging program has reduced the illegal harvest and sale of tautog, but to what extent is difficult to quantify. The tagging program has changed how the illegal harvest is happening- the LEC indicated the recreational fishery is where the majority of violations- specifically catches above the legal recreation trip limit- is occurring, but as mentioned earlier it is difficult prove the intended destination of fish caught on those recreational trips is for illegal sales.

Kirby Rootes-Murdy

From: Kirby Rootes-Murdy
Sent: Monday, December 6, 2021 9:02 AM
To: Kirby Rootes-Murdy
Subject: FW: [EXTERNAL] tautog tags

From: Tor Vincent <duckislandmarine@gmail.com>
Sent: Monday, November 29, 2021 11:01 AM
To: Snellbaker, Jason [DEP] <Jason.Snellbaker@dep.nj.gov>
Subject: Re: [EXTERNAL] tautog tags

Hello Jason,

I can be available late afternoon any day. 631 275 4248

I have attached the study from NYSDEC.
The tag in the study looks like the national 1005-4, the stainless stainless steel applicator is listed at .5 lbs. It is listed as designed for 4-10 lb fish,rabbits,racoons,

By contrast we were given the national 681. Instead of a dimple to hold the point for a smooth surface after application like the 1005-4 it has the folded point exposed to create an abrasive surface on the internal gills when applied "properly". This makes sense since it seems designed for swine and sheep ears or turkey wings and the point would be external away from the animal skin. The applicator weighs 1 full pound and is made from aluminum. Again this makes sense since it is designed for external ears and wing application. The choice to use the large tag and bulky tool where the inside of the gill is impacted during application by the tool then the weight of the tag on the gill causes the incision to remain open could contribute to the infections we are seeing on the gills. Chaffing on the gills was observed with the smaller dimpled tag.Without question the 681 is doing multiple rates of damage. The study was done in well water sourced tank water which flushed out. In the business we call this holy water because almost every tank problem goes away in these systems, the input water is sanitary and all the wastes leave quickly. But the proper location is required and usually cost prohibitive. Industry sources said over 99% of the tanks used are closed systems which have pathogen loads similar to back harbor water which uninjured fish with sealed skin have no problem with. Sadly we learned all this with the lobster claw pegs years ago. The infected lobster lost value because they had reduced tank life. With live fish, which are eaten whole ,the appearance through a glass walled tank is part of the buying experience. The scarred fish with infections have by now become noteworthy to the buying public. They are removed from the tank and filleted or returned to the seller and the bill gets cut. Tautogs are tough enough to survive with some fairly large gill infections but the value drops. To those of us that work hard to keep our fish in top quality and hold market relationships built up over time for delivering good quality products this situation is a terrible disgrace.

Regards,
Tor Vincent

On Wed, Nov 24, 2021 at 7:24 AM Tor Vincent <duckislandmarine@gmail.com> wrote:

> Good morning Jason,
>
> Happy Thanksgiving
>
> I have been trying to get a copy of the tank study done on the tautog tags. I read it years ago but I can't seem to find it. So far NY has not provided it. Do You have access to share it ?

Let's have the call next week

Regards,
Tor

On Fri, Nov 19, 2021 at 2:40 PM Snellbaker, Jason [DEP] <Jason.Snellbaker@dep.nj.gov> wrote:

> Tor-
>
> Please send me your telephone number and a good time next week we can have a discussion on this. Thanks for reaching out to me and I look forward to speaking with you.
>
> **Jason Snellbaker**
>
> Deputy Chief
>
> NJ Division of Fish and Wildlife
>
> Bureau of Law Enforcement
>
> 2434 Route 563
>
> Egg Harbor City, NJ 08215
>
> Phone: 609.748.2050
>
> **From:** Tor Vincent <duckislandmarine@gmail.com>
> **Sent:** Friday, November 19, 2021 9:34 AM
> **To:** Snellbaker, Jason [DEP] <Jason.Snellbaker@dep.nj.gov>
> **Subject:** [EXTERNAL] tautog tags
>
> Hello Jason,
>
> I just caught a tagged tautog which had a messy sore around the tag. some legwork and the owner was located. He explained some offloading mishap and spill where a few wiggled off the dock. Lost three weeks before capture, a month at the longest.
>
> The day before I was at an artificial reef meeting at NYSDEC. There I had a conversation with a participant in the tag study they did. When I showed him the attached photo of the bloody aftermath from tagging the limit his comment

was that they didn't see any blood. The picture is from a video i made for my state assemblyman when he couldn't come to the boat to witness my concerns. There have been many infections from the tag site on my tanked fish. Many coming as returns along with price negotiations not in my favor.

The comment from Rachel Sysak at DEC to the photo of the recovered fish was that the tag was not put on properly. Seriously, then a paragraph about proper tagging and videos coming. My response was that a close inspection of the photo shows a fully crimped tag with a hole starting in the proper place. My professional opinion is it was put on according to directions but fish movement caused the aftermath from the bulky metal tag and it rotated. I consider the wild the best tank conditions and have serious doubts that their study was valid.

She refered you as a source for data from other tags considered for the program. I hope you will take the time to consider my observations. If the study done to confirm the tag as safe is not valid then many decisions may need to be reconsidered. Is it possible for a file with data about the other tags considered to be sent to me ? At this point the next public meeting here could put Rachel in a position of stating she saw no blood to a crowd of fishermen who have been flushing bloody tanks in the aftermath of tagging. That comotion will not be productive.

Thank you,

Tor Vincent

Atlantic States Marine Fisheries Commission

Summer Flounder, Scup, and Black Sea Bass Management Board

January 25, 2022
2:45 – 4:15 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 (*J. Davis*)	2:45 p.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from August 2021	2:45 p.m.
3.	Public Comment	2:50 p.m.
4.	Review Technical Committee Recommendations on Methodology for Adjusting 2022 Summer Flounder and Black Sea Bass Recreational Measures **Possible Action**	3:00 p.m.
5.	Elect Vice-Chair (*J. Davis)* **Action**	4:10 p.m.
6.	Other Business/Adjourn	4:15 p.m.

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

MEETING OVERVIEW

ASMFC Summer Flounder, Scup, and Black Sea Bass Management Board Webinar
January 25, 2022
2:45 p.m. – 4:15 p.m.

Chair: Justin Davis (CT) Assumed Chairmanship: 12/21	Technical Committee Chair: Alexa Galvan (VA)	Law Enforcement Committee Representative: Snellbaker (MD)
Vice Chair: Vacant	Advisory Panel Chair: Vacant	Previous Board Meeting: December 14, 2021
Voting Members: NH, MA, RI, CT, NY, NJ, DE, MD, PRFC, VA, NC, NMFS, USFWS (13 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from August 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. Review Technical Committee Recommendations on Methodology for Adjusting 2022 Summer Flounder and Black Sea Bass Recreational Measures (3:00-4:10 p.m.) Possible Action

Background

- In December 2021, the Summer Flounder, Scup, and Black Sea Bass Management Board (Board) and the Mid-Atlantic Fishery Management Council (Council) jointly approved a 28% reduction in coastwide black sea bass harvest. At the same meeting, the Board and the Council jointly approved a 16.5% liberalization in coastwide harvest for summer flounder. The Board and Council opted to proceed with the regional conservation equivalency processes as outlined in Addendum XXXII for both species as opposed to implementing coastwide measures.
- The non-preferred coastwide measures for black sea bass include a 14-inch minimum size, 5 fish possession limit, and open season of May 15-September 21. The precautionary default measures for black sea bass include a 16-inch minimum size, 3 fish possession limit, and open season of June 24-December 31.
- The non-preferred coastwide measures for summer flounder include an 18.5-inch minimum size, 4 fish possession limit, and open season from May 15-September 15. In addition, the precautionary default measures include a 20-inch minimum size, 2 fish possession limit, and open season from July 1-August 31.
- The Technical Committee (TC) met twice in January 2022 to recommend a methodology to assist regions with developing recreational measure proposals (**Supplemental Materials**).

- Following Board review of the methodology, states will be required to work collaboratively to develop regional proposals in early February. The TC will then meet to review the regional proposals and provide recommendations to the Board for final approval at a Board meeting that will likely be scheduled during the first or second week of March.

Presentations

- Overview of the TC's Recommended Methodology presented by D. Colson Leaning

Board Actions for Consideration

- Approve Methodology for Adjusting 2022 Summer Flounder and Black Sea Bass Recreational Measures

5. Elect Vice Chair (4:10-4:15 p.m.) Action

Background

- The Vice Chair seat is currently empty and needs to be filled.

Board Actions for Consideration

- Elect Vice Chair

6. Other Business/Adjourn

Summer Flounder, Scup, & Black Sea Bass 2022 TC Tasks

Activity Level: High

Committee Overlap Score: High (Multi-species committees for this Board)

Committee Task List

- February 2022: Review 2022 summer flounder and black sea bass regional proposals for recreational measures.
- July 2022: Review and develop recommendations on 2023 specifications (coastwide quota and RHLs) for summer flounder, scup, and black sea bass.
- November 2022: Develop recommendations on 2023 recreational measures.

TC Members: Alexa Galvan (VA, Chair), Julia Beaty (MAFMC), Peter Clarke (NJ), Dustin Colson Leaning (ASMFC), Karson Coutre (MAFMC), Kiersten Curti (NOAA), Kiley Dancy (MAFMC), Lorena de la Garza (NC), Steve Doctor (MD), Emily Keiley (NOAA), Jeff Kipp (ASMFC), Rachel Sysak (NY), Corinne Truesdale (RI), Sam Truesdell (MA), Mark Terceiro (NOAA), Greg Wojcik (CT), Richard Wong (DE), Tony Wood (NOAA).

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SUMMER FLOUNDER, SCUP AND BLACK SEA BASS MANAGEMENT BOARD

AND

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Webinar
August 4, 2021

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ATTENDANCE

Board Members

Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Nichola Meserve, MA, proxy for D. McKiernan (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, Legislative proxy, Chair
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
David Sikorski, MD, proxy for Del. Stein (LA)
Shanna Madsen, VA, proxy for S. Bowman (AA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Marty Gary, PRFC
Mike Pentony, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Staff

Bob Beal
Toni Kerns
Laura Leach
Lisa Carty
Tina Berger
Pat Campfield
Kristen Anstead
Maya Drzewicki
Lisa Havel
Chris Jacobs
Jeff Kipp
Heather Konell
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murphy
Joe Myers
Caitlin Starks
Deke Tompkins
Geoff White

Guests

Karen Abrams, NOAA
Dustin Addis, FL FWC
Fred Akers
Katie Almeida
Max Appelman, NOAA
Pat Augustine, Coram, NY
Joe Ballenger, SC DNR
Richard Balouskus, RI DEM
Julia Beaty, MAFMC
David Behringer, NC DENR
Warren Elliott, PA (LA)
Dan Farnham, MAFMC
Sarah Bland, NOAA
Ellen Bolen, VMRC
Colleen Bouffard, CT DEP
K. Bradbury, Ofc. Sen. Whitehouse
Bonnie Brady
Jeff Brust, NJ DEP
Mike Celestino, NJ DEP
Peter Clark, NJ DEP
Richard Cody, NOAA
Heather Corbett, NJ DEP
Lynn Fegley, MD DNR
Marianne Ferguson, NOAA
Morgan Corey, NOAA
Jessica Daher, NJ DEP
Maureen Davidson, NYS DEC
Lorena de la Garza, NC DENR
Peter deFur
Greg DiDomenico
Anthony DiLernia
Russell Dize, MD (GA)
Steve Doctor, MD DNR
Michelle Duval, MAFMC
James Fletcher, Wanchese Fish
Tony Friedrich, SGA

Guests (continued)

Alexa Galvan, VMRC
Sonny Gwin
Jon Hare, NOAA
Hannah Hart, FL FWC
Dewey Hemilright
Helen Takade-Heumacher, EDF
Jesse Hornstein, NYS DEC
Peter Hughes
Cynthia Jones, ODU
Jeff Kaelin, Lund's Fisheries
Emily Keiley, NMFS
Pat Keliher, ME (AA)
Adam Kenyon, VMRC
Kris Kuhn, PA F&B
Rob LaFrance, Quinnipiac Univ
Scott Lenox
Carl LoBue, TNC
Chip Lynch, NOAA
John Maniscalco, NYS DEC
Dan McKiernan, MA (AA)
Conor McManus, RI DEM
Matt Gates, CT DEEP
Steve Meyers
Sen. David Miramant, ME (LA)
Chris Moore, MAFMC
Allison Murphy, NOAA
Brian Neilan, NJ DFW
Kennedy Neill
Gerry O'Neill, Cape Seafoods
Mike Plaia
Will Poston, SGA
Stephanie Rekemeyer, NYS DEC
Jill Ramsey, VMRC
Kathy Rawls, NC (AA)
Paul Risi, City Univ. of NY
Jason Rock, NC DENR
Mary Sabo, NOAA
Tom Schlichter
Tara Scott, NOAA
Olivia Siegal, VMRC
Jared Silva, MA DMF
Art Smith
Lewis Gillingham, VMRC
Somers Smott, VMRC
Shelly Spedden, MAFMC
Renee St. Amand, CT DEP
David Stormer, DE DFW
Kevin Sullivan, NH FGD
Cyrus Teng, UMD
Marek Topolski, MD DNR
Wes Townsend, Dogsboro, DE
Douglas Vaughan
S. Curatolo-Wagemann, Cornell
Mike Waine, ASA
Megan Ware, ME DMR
Craig Weedon, MD DNR
Sara Winslow
Rich Wong, DE DFW
Spud Woodward, GA (GA)
Chris Wright, NOAA
Erik Zlokovitz, MD DNR
Renee Zobel, NH FGD

The Summer Flounder, Scup, and Black Sea Bass Management Board of the Atlantic States Marine Fisheries Commission, concurrent with the Mid-Atlantic Fishery Management Council, convened via webinar; Wednesday, August 4, 2021, and was called to order at 10:15 a.m. by Chair Adam Nowalsky.

CALL TO ORDER

CHAIR ADAM NOWALSKY: I would like to welcome everyone this morning to the ASMFC Summer Meeting. This is the Summer Flounder, Scup, and Black Sea Bass Management Board. We are meeting concurrently today with the Mid-Atlantic Fishery Management Council. I will get into what concurrent means versus joint shortly.

Let me first go ahead and go through the Board business of agenda proceedings and public comment.

APPROVAL OF AGENDA

CHAIR NOWALSKY: First order of business here is to approve the agenda as it was presented. Is there anyone that would like to present any changes to the agenda? Seeing no hands raised, and hearing nothing, the agenda will stand approved by consent.

APPROVAL OF PROCEEDINGS

CHAIR NOWALSKY: The next order of business is to approve the proceedings from the February, 2021 meeting. Is there anyone that would like to offer any changes regarding those proceedings as they appear in the meeting materials? Seeing no hands raised and not hearing anything else, those proceedings will stand approved.

PUBLIC COMMENT

CHAIR NOWALSKY: Our next order of business is to allow for any public comment on items that are not on today's agenda. Is there anyone from the public that would like to speak on a topic that is not on today's agenda, but related to the species?

CHAIR NOWALSKY: I'm not seeing any hands raised, and I'm not hearing anything, so we will move on to our next agenda item.

CONSIDER THE ISFMP POLICY BOARD DIRECTIVE FOR CHANGES TO ADDENDUM XXXIII ON COMMERCIAL BLACK SEA BASS ALLOCATION

CHAIR NOWALSKY: Let me first go through the sense of concurrent versus joint. There was in the very last two pages of the supplemental meeting materials for this meeting a two-page memo from Toni Kerns that outlined some changes that would be needed to the voting process for this meeting, which is the reason why we're calling it concurrent versus joint.

The reason why we need to make some changes to the voting process is because of Commission direction, with regards to the species board needing to respond to the Policy Board's directive to take action on this matter. Typically, when we do the joint meetings, both the Council and the Board need to make like motions on a topic, in order for either sides motion to be valid. But today we're going to need to allow for a Board motion to stand on its own, which again is the reason for calling this concurrent versus joint. That process is outlined in greater detail, again in the memo. I'll try to just briefly summarize it. What we will be doing today is we will shortly turn to staff for a presentation about the background and the appeal. We will then take questions on the presentation as it was provided. I will then turn to a Board for a motion, and specifically I will be turning to the state of New York for the opportunity to make the first motion on this topic.

When motions are brought forward, the Board will have the opportunity to make the first motion on a particular area. We will then turn to the Council for the opportunity to make a like motion on that or not. Whether or not the Council chooses to make a like motion, we'll be able to follow a Board motion through to completion.

That would include the ability to follow Robert's Rules, and go three levels deep on a motion, up to

two amendment substitutes to a main motion, and again at each stop along the way giving the Council the ability to make a like motion. It is my sense right now that there are probably three possible outcomes from today.

I say that as a Chair that recognizes that they have a plan, until the motions start flying. We'll see how things go. I think the first outcome is that the Board takes corrective action within the bounds of the Policy Board's directive. The Council takes a like action. Another possible outcome is that the Board takes the required corrective action, but the Council does not take like action.

In the event that that occurs, that puts us in a situation. I think that the Service will likely have a difficult time. I don't intend to speak for them, but from past experience, given the fact that we would then have divergent state waters and federal waters commercial black sea bass allocations and quotas, that would probably put the Service in a very difficult position to approve the Council's amendment as it was previously decided on.

The other possible scenario today is that the Board does not take the required corrective action, in which case the Policy Board would likely need to step in, and then make a decision about how to proceed moving forward at that point. That kind of lays out what the plan is for today, what the possible outcomes would likely look like.

I will first turn to Mike Luisi to see if you would like to add anything, as Chair of the Council, with regards to the process and plan for today. Then before we get started with the staff presentation, I'll just entertain any questions from the Board and Council with regards to what our plans are. Mike, do you have anything you would like to add?

MID-ATLANTIC CHAIR MICHAEL LUISI: Yes, thanks, Adam. No, I appreciate your, as expected you were very thorough in your explanation about the process. There have been some discussions going back and forth over e-mail regarding the Council's. John Almeida, who is our Council attorney had some thoughts about process, and how we reconsider the motions that were made and passed. I wonder if John, if he's on the call, if he might want to speak to what may have to happen, as far as process goes. But Adam, no you did a great job outlining everything. You and I have spoken many times over the past week, and you know I'm looking forward to the discussion today. But I don't want to put John on the spot. I'm not even sure he's on the call. I'm looking for his name right now. But if John is there, maybe he can speak to what he thinks is the correct process for us regarding rescinding the previous motion made by the Council.

MR. JOHN ALMEIDA: Thank you, Mr. Chair. Yes, my thought was similar to at the June meeting when the Council voted to rescind the motion that sent the Amendment to NMFS, that there would be a similar motion to rescind prior to a vote on whether to take corrective action today, based on changes to the allocation formulas. Prior to a vote on, I guess prior to a motion on what a corrective action would be, that there would be a motion to rescind the main motion from the February meeting, because right now, as to this Amendment, that is still on the books.

We might want to vote to rescind that, in order to clear the decks for consideration of something different than was adopted at the February meeting. I understand that the Commission doesn't view that as necessary, given what the Policy Board did. Basically, the Policy Board rescinded the February vote of the Board, so the Commission doesn't view that is procedurally necessary at this point.

MID-ATLANTIC CHAIR LUISI: Today is going to be complicated enough. If the Council and the Board end up agreeing on terms, based on the remand by the Policy Board. Is that enough to make the corrective action? Do we need to go through the process of the rescind because the Council could rescind what happened during a previous meeting?

But the Council may also choose not to change what their decision was. Today is going to be complicated enough, I just don't know how

necessary it is to go through those hoops. But you are our attorney, so I'm looking for you for advice. Adam, I don't know how that would work within our scheduled plan on how this is all going to unfold.

I didn't mean to complicate things, but there have been some e-mails going around the last day, day and a half or so, I just read them this morning. Yes, John, I'm just looking for advice as to what we should do first, second, third, fourth and fifth, as we go through this process.

MR. ALMEIDA: Yes, and I appreciate that, Mike. This is kind of an unusual circumstance that we're in here. I think to the extent that the Council doesn't do anything, or the Council chooses not to change its earlier vote, then there wouldn't need to be a motion to rescind. I think it's only if the Council is entertaining the idea, the possibility of changing what it did earlier, that there ought to be a motion to rescind. Does that help?

CHAIR NOWALSKY: Yes, Mike, thanks for highlighting the fact that we've been working together on this. I didn't mean that initial part to sound like all this was Adam Nowalsky's idea. No, we've been working very closely with staff, with leadership, both the Council and the Commission, so this has been very much a collaborative effort.

I think the question that I have for you, John, is can the Council make motions without having a motion to rescind first? Then if we get to a point, you know could the Council motions look like, in the event that the Council rescinds, then we would propose this change. Could a motion look like that? Another possibility would be, could we start out with a motion to rescind, and then table that motion until all other actions were done, and then come back to that motion to rescind, as a way to wrap up, or from your perspective do we have to have a motion to rescind and passed, in order for the Council to make any motions on changes to the allocations this morning?

MR. ALMEIDA: I think your idea of tabling a motion to rescind until a time when it would be needed, might be the best approach.

CHAIR NOWALSKY: All right, so let's go ahead, and I think what we will do with that is again, we will do a staff presentation first, and then we'll entertain motions. Let me just turn to staff. We had sent out the voting policy detailing that the Board would make all first motions. Would staff prefer that the Board, should the Board, which I fully expect, make a motion to change New York's allocation.

Would we then need to look to the Council to first make that motion to rescind and table, or would you allow for the Council to make a motion to rescind first? I'm thinking we would want the Board motion on the table, and then the first thing that the Council would do after that would be a motion to rescind, followed by a tabling of that motion, followed by a like Council motion, is what I'm leaning towards, after hearing the guidance from General Counsel.

MID-ATLANTIC CHAIR LUISI: That sounds like a good plan to me, Adam. Thanks for outlining that. But I think that is the right steps, and I'm going to go back home to you and we'll get into the staff presentation. But yes, sorry for that hiccup on that one.

CHAIR NOWALSKY: Great, okay. Let me, before we turn to staff, are there any other questions from the Council or Board regarding the process of how we intend to proceed today? I'm not seeing any hands raised or hearing anything. We've got one, Joe Cimino. Go ahead, I had my hands order here reversed. Go ahead, Joe.

MR. JOE CIMINIO: This is, under my Council hat, and I apologize, but I'm sure I'm not the only one that is confused. How is this different than the June vote as a motion to rescind? Was that just because it was the submittal to NMFS, and so it's, as John said, still on the table? Is that correct? That is how this is different from what we did in June?

CHAIR NOWALSKY: I'll turn it to John Almeida to try to answer that, or Mike Pentony, I see you've got your hand up. I'll turn to somebody from the Service to go ahead and answer it.

MR. MICHEAL PENTONY: All right, I can. Hi everybody, I can try to take this, but John can correct me if I get something wrong. Yes, you know if everybody knows, through the Council process there is a series of motions that select the preferred alternatives, and then once we work through all of those, there is a motion to submit the Amendment, as adopted by the Council.

You know the way I look at this is the motion in June rescinded that final motion, the motion to adopt the Amendment and submit it to us for review. That allowed us to pause the review process on the Amendment, and provided the opportunity for the Council to engage with the Board today. But yes, to John Almeida's point, all the motions that the Council adopted, in terms of the preferred alternatives within the Amendment, are still on the books. That is why I think, you know John is looking, or John was suggesting and I agree, that a motion to rescind the Council's preferred alternative would then clear the decks to entertain a new motion to select a different preferred alternative.

CHAIR NOWALSKY: Great, thanks for that, Mike. John, do you have anything to add to that, or did Mike get us in the right direction?

MR. ALMEIDA: No, Mike summed it up pretty well, thank you.

CHAIR NOWALSKY: All right, great. Joe, the June motion rescinded the final action, and then what we would need to do today is to actually rescind the preferred alternatives. Does that clear it up for you, Joe?

MR. CIMINO: Crystal, thank you.

CHAIR NOWALSKY: Okay, any other questions? Any other questions from the Board or Council before we go ahead and turn to staff? Seeing none, I will also just add that it is my intention to entertain public comment on what we do today. It will be my intention to entertain public comment when we get to a main motion. Before we take a final vote on a main motion we would go ahead and take public comment. Let me go ahead and turn to staff, thanks for that clarification and clearing some stuff up in how we're going to proceed. Go ahead and get going with the staff presentation.

MS. TONI KERNS: Thank you, Adam. Today I'm going to go over what has led us to the directive from the ISFMP Policy Board to the Summer Flounder, Scup, and Black Sea Bass Board for changes to Section 3.1.1 of Addendum XXXIII**.** Addendum XXXIII was approved in February of 2021 by both the Board and the Council.

Under this Addendum, the allocations that were changed included Connecticut's baseline allocation increasing from 1 to 3 percent of the coastwide quota, to address its disproportionately low allocation, compared to the increased availability of black sea bass in Long Island Sound. The allocation for all states would then be calculated by using 75 percent of the coastwide quota, according to these new baselines, and 25 percent to the regions, based on the most recent regional biomass distribution information from the stock assessment.

The three regions that are involved in the allocation distribution are Maine to New York, New Jersey as a standalone, and Delaware to North Carolina. The regional allocations are distributed amongst the states within the regions, in proportion to their baseline allocations, except for Maine and New Hampshire, and this is because the allocations would be based in part on the regional biomass distribution from the stock assessment, and they would be adjusted if a new assessment indicates a change in the regional biomass distribution.

In March of 2021, the state of New York appealed the allocation changes approved by the Board. The appeal argued that New York's baseline quota should increase similarly to that of Connecticut, as it too had experienced a significant disparity between allocation and the abundance/availability of the black sea bass in Long Island Sound, which is a shared waterbody of state waters for both New York and Connecticut. The Policy Board considered

this appeal in May of '21, and found that it was justified. The next few slides cover the rationale of why the Board found the appeal justified.

Adult black sea bass were rare in Long Island Sound in the base years, when the original allocations were set by Amendment XIII. Long Island Sound did not support fisheries in either state when the original commercial allocations were made. New York's 7 percent allocation was based upon black sea bass landings in its traditional ocean-based fisheries that operated in other state waters, as well as in federal waters.

Long Island Sound is a shared waterbody of both Connecticut and New York. We saw a large increase of black sea bass in Long Island Sound, starting in late 2010 and onward, as you can see from the Trawl Survey Index on the screen. There is a dramatic expansion into Long Island Sound during these years.

The commercial black sea bass landings in Long Island Sound have increased substantially, and now make up 50 percent of both Connecticut and New York's total annual commercial black sea bass harvest. You can see here, New York's harvest is the blue line, and Connecticut's harvest is the red line. You can see that increase since the mid-2000s.

New York's landings from Long Island Sound are much larger in magnitude than the landings from Connecticut, they are about four times greater. These substantial new landings from Long Island Sound strain the quota availability to New York's traditional ocean fisheries. This information that was provided to the Policy Board compelled the Policy Board to agree that New York's appeal was justified.

The Policy Board then provided a directive back to the Summer Flounder, Scup, and Black Sea Bass Board. The Policy Board Remanded Section 3.1.1. This is the section of the document that only addresses the baseline allocation back to the management board for corrective action, to address the impacts to New York's baseline allocation in a manner that is comparable to the consideration that was given to Connecticut.

The Policy Board also specified that the management board's corrective action would not result in a decrease in Connecticut's baseline allocation to less than 3 percent, or decrease the percentage of quota allocated to the regional biomass distribution. The Board's charge today is to determine how much of New York's baseline quota should be increased, up to 2 percent.

This table here, which was included in materials that we distributed at the end of last week to both the Board and Council, no at the beginning of this week, I apologize, shows the current allocations under Addendum XXXIII. These allocations have been updated with the operational stock assessment from this year, so they are going to look a little bit different than what you saw in the Addendum XXXIII, as it was approved in February. This table is the maximum amount that could go to New York in its baseline, so 2 percent, as well this table is updated with the most recent stock assessment. Mr. Chairman, that is the end of my presentation, I can take questions. I do have other slides that show different percentages, if you would like to see them. I just figured for time I would just start with these two.

CHAIR NOWALSKY: Thank you very much for that presentation, Toni. Let me get a show of hands right now, of people that would like to ask questions about what Toni presented, with regards to the Policy Board decision and what we then have to do here today. I've only got one hand up, Dewey Hemilright, go ahead.

MR. DEWEY HEMILRIGHT: Thank you, Mr. Chairman. I was curious if there is any data that shows the gear type that is harvesting the quota, or harvesting in the Long Island Sound, like a breakdown from hook and line, trap, trawl, or whatever that may be, about how the harvest has changed or taken place over the last few years, given that the landings have changed in Long Island Sound. Thank you.

MS. KERNS: Adam, I would like to phone a friend, and ask John Maniscalco to answer that question, if it's okay with you.

CHAIR NOWALSKY: No, if staff has a way to get an answer, I will certainly endorse that. Go right ahead.

MR. JOHN MANISCALCO: Dewey, I wish I had an exact answer for you. Certainly, potting, trawl, and hook and line are all major players in Long Island Sound's black sea bass fishery, but I don't have a breakdown for you at the time.

CHAIR NOWALSKY: All right, sorry Dewey, we weren't able to get you the answer there with that one.

MR. HEMILRIGHT: Well, no problem. If you're looking at the changes that have taken place, I think it would also be a good idea just to show what gears are catching the fish. Thank you.

CHAIR NOWALSKY: Next up I've got Eric Reid.

MR. ERIC REID: This is most likely a question for the state of New York, if you don't mind. The basis for the appeal, the successful appeal, was based on the biomass in Long Island Sound, exclusively Long Island Sound. I would like to note that Senator Schumer, from New York, in his correspondence to the Board, also mentioned Long Island Sound exclusively. My question is, is it the intent of New York to use any additional allocation to support a fishery exclusively in Long Island Sound?

CHAIR NOWALSKY: I'll turn to see if there is anyone from New York that would like to try to answer that question.

MR. JAMES J. GILMORE: It's Jim Gilmore. Eric, I think that the simplest answer to that is that again, based upon the graph, and we essentially rely on Sound fishery overwhelmed the ocean fishery, and we really wouldn't have a way to segregate the two water bodies, based upon the way the fishery is managed. This would just be an increase for the overall quota for New York, not segregated by water bodies, just simply because we can't manage it that way.

MR. REID: I appreciate your answer, Mr. Gilmore, but it is interesting to me that we have tautog that is managed in Long Island Sound between New York and Connecticut as well. Thank you for your answer.

CHAIR NOWALSKY: Thanks for your question, Eric. Do I have any other Board or Council questions, any questions here? If the public has a question on this, if they can try to work with a state Board or Council member, I would really like to try to keep questions here at the Board and Council level, if possible. All right, I'm not seeing any other hands, so with that and having had the presentation, I think we're ready to turn to look for getting a motion on the board here to start the debate and conversation here today. Emerson, you've got your hand up.

MR. EMERSON C. HASBROUCK: Yes, thank you, Mr. Chairman, I have a motion, and I think staff has a copy of that motion**. I move to increase New York's baseline allocation in a manner comparable to the consideration given Connecticut for the expansion of black sea bass into Long Island Sound. New York's baseline allocation for black sea bass will be increased by 2 percent**.

This action maintains Connecticut's baseline allocation of 3 percent, and maintains the percentage of quota redistributed according to regional biomass. The remaining states' baseline quotas will be adjusted consistent with the allocation tables provided during this meeting.

CHAIR NOWALSKY: Thank you, Emerson, and to clarify, that motion is on behalf of the Board. Do we have a second for the motion? I've got a hand first came up from Jay McNamee. Jay, you are seconding the motion?

DR. JASON McNAMEE: Yes, Mr. Chair.

CHAIR NOWALSKY: All right, so at this point we have a motion made by Mr. Hasbrouck and seconded by Dr. McNamee. At this point what I'm

going to do is, I'm going to turn to New York for the opportunity to provide some rationale for their motion, beyond what we saw. Then after that rationale is presented, we will turn to the Council, to see if anyone from the Council would like to make a motion to rescind the preferred alternative from the previous motion, and go down the road that we talked about earlier, to see if we get to a like motion. I'll turn to New York here at this point. Emerson, would you like to go ahead and provide additional rationale?

MR. HASBROUCK: Yes, thank you, Mr. Chairman. I think Toni covered the background and justification pretty well in her presentation. However, I do have some additional comments and information. We developed Addendum XXXIII to address the issue of the increase in black sea bass biomass in the northern region.

The problem statement of Addendum XXXIII addresses this issue, and specifically highlights the fact that expansion of the black sea bass stock into areas with historically minimal fishing effort, and it's created significant disparity between state allocations and the current abundance in resource availability. The increase that New York received, due to the regional reallocation of Addendum XXXIII, is based on the fishery that existed during the baseline period, and accounts for increased biomass in the ocean fishery. It does not address a significant increase in biomass in Long Island Sound, an area with historically minimal fishing effort. The Board addressed this issue for Connecticut, by increasing its baseline allocation by 2 percent.

However, no such consideration was afforded to New York for the significant biomass and the related fishery in Long Island Sound. Then Mr. Chair, with your permission, I would like to hand it over to John Maniscalco of New York DEC, to provide some additional technical information.

CHAIR NOWALSKY: Yes, we'll look to John to try to keep it as concise as he can. Go ahead, John.

MR. MANISCALCO: Thank you for the opportunity to speak. I'll provide a little bit more information, including some that addresses Eric Reid's question. But I will also remind the Board that tautog is not a quota managed species in New York State so those dynamics are a little different. I was wondering if Maya had any slides that New York had submitted earlier, that she could put on the presentation.

MS. KERNS: Maya, those are those backup slides I sent yesterday.

MR. MANISCALCO: As Toni noted, commercial black sea bass harvest from Long Island Sound has increased substantially, in both Connecticut and New York, and now makes up approximately 50 percent of each of those states' total annual commercial black sea bass harvest. As you can see here, New York state landings from Long Island Sound are actually much larger in magnitude than the landings from Connecticut, approximately four times that in recent years.

Given this level of New York state landings that are now coming from Long Island Sound, a 2 percent baseline allocation increase, matching what was received by Connecticut, is certainly justified. A New York state licensed, commercial, food fishermen can take and land black sea bass from any of our state waters.

These substantial new landings that are coming from Long Island Sound strain the quota available to all of New York states' fishermen, including the traditional ocean-based fishery, and those now fishing in Long Island Sound. In fact, under a 50-pound daily limit, New York was closed for four to six weeks straight in mid to late spring to early summer, of pre-COVID years like 2018 and 2019.

While all New York state fishermen are impacted by these low limits and closures, closures in late spring especially impact Long Island Sound fishermen, because the fish arrive later in the season there. New York is seeking an increase to its baseline allocation, to account for the expansion of black sea bass into Long Island Sound.

Our initial commercial fishery management goals are to maintain our limited winter fishery. In 2021

that's 500 pounds weekly, and that enable fishermen to fish during the warmer months, when inshore access is high, without closures at something approximating 70 pounds a day. A baseline quota increase sets the stage for relief for all fishery participants that have been impacted by the new Long Island Sound fishery, and also helps to ensure that Long Island Sound fishermen can fish when the resource is available to them. While 60 to 70 pounds is a modest amount, it represents a single full carton, commonly used in New York states consignment-based fishery.

That amount will maximize a fisherman's profit per pound, after accounting for packing and shipping cost. The nearshore nature of the black sea bass resource and fishery around New York, requires quota management that allows for daily limits by a large number of participants, and by necessity those daily limits have to be modest.

Regardless of our quota, black sea bass will be encountered by a variety of fixed and mobile gear fishing in Long Island Sound, other waters of the state and in federal waters. Sufficient quota, which includes a baseline increase, will allow the states fishermen to take advantage of a resource they now encounter almost everywhere, in new and old areas, and land those fish instead of discarding them.

I will leave you all with this last slide to view, showing the differences between current Addendum XXXIII allocation and potential allocations that do include an increase to New York's baseline after current biomass distributions have occurred. While I'm not minimizing the impacts to other states from these changes, the majority of these changes are less than 0.5 percent, which in recent proposed quotas equates to approximately 32,000 pounds. I just want to thank you all for the opportunity to speak this morning. Thank you.

CHAIR NOWALSKY: All right, thank you very much, John. I'm sure there is a number of people that want to speak, and move us in directions. Before we get to a traditional pro and con debate on motions, now that we have a valid Board motion, the Board has had the opportunity to make that first motion, it's been made and seconded.

I would like to take a few minutes and turn to the Council, to see if the Council is prepared to make a like motion. That like motion, as we discussed earlier, would need to be preceded by a motion to rescind the preferred alternative from the last Council Amendment action, and it would likely, rather than having a lengthy debate, because whether or not that is rescinded is going to essentially be the same debate as to the magnitude of the change.

It would be my preference to have that debate during the motions that we would have regarding the percent change to New York potentially. Let me turn to the Council at this point, and see if a Council member would like to make a motion to rescind, and we might need to turn to staff to see what the scope of that is. If it's sufficient to say, the preferred alternative, and then staff could wordsmith that a bit, to make sure we're addressed accordingly. Maybe we've got a Council member that's going to hit this one out the park on the first pitch. Tony DiLernia.

MR. ANTHONY DiLERNIA: On behalf of the Council, I would move that we rescind what was originally our preferred alternative, and the suggestion as to how the staff could wordsmith the rest of it, I'm very agreeable to. But my intent is to move to rescind, so that we can engage in another discussion regarding how New York's allocation may change. Thank you, Sir.

CHAIR NOWALSKY: All right, thank you very much, Tony. With regards to the draft motion that is on the board. I think what we have here was according to the earlier discussion, our June motion had done the rescission of the submittal, and now we're looking to rescind the selection of the preferred alternative. I'll turn to John or Mike Pentony again to provide some guidance before we get a second, as to whether what's up is appropriate, or whether they have some advice on how this should be

wordsmithed before we get a second. John, go ahead, please.

MR. ALMEIDA: I might suggest a motion to rescind the main motion as adopted at the February 1st meeting.

CHAIR NOWALSKY: All right, so Tony, John is suggesting a change to this. Move to rescind the main motion.

MR. DiLERNIA: I'll accept that, I'm favorable to that. It captures the intent of what we're trying to do here, so I'm amenable to any editing that may achieve what we're trying to accomplish. Thank you.

CHAIR NOWALSKY: John, would you suggest this as it's written is okay, or do you think we need to change this further?

MR. ALMEIDA: I would suggest removing the, from to submit to the end of the sentence.

CHAIR NOWALSKY: All right, so we'll just put a period after meeting, and remove the rest. Thanks for your help and guidance with this. All right, so we'll turn back to Tony. Based on the guidance we received here at this point, if you would go ahead and reread this motion, and then I'll look for a second.

MR. DiLERNIA: Okay, just as long as we understand it. This motion is intended to address the black sea bass allocation**. Move to rescind the main motion as adopted at the February 1, 2021 meeting.**

CHAIR NOWALSKY: Thank you, Tony, do I have a second from the Council for this motion? I have a second, I have Dan Farnham's hand up. Are you raising your hand to second the motion, Dan?

MR. DAN FARNHAM: Yes, I am, Mr. Chairman, thank you.

CHAIR NOWALSKY: All right, thank you very much. Again, keeping in line with our earlier conversation that this is for the intent of just getting us to the point that the Council would have the ability to like motions, before we get into protracted debate here. Is there any interest in tabling this motion? Tony, you've still got your hand up. Tony's hand is down. We have this motion up. At this point, again, the Council can choose to debate it or table it here, as we discussed earlier. Chairman Luisi.

MID-ATLANTIC CHAIR LUISI: Can you explain to me the reason for the consideration for tabling? I mean maybe tabling isn't the right word, maybe postponing until another decision is made would be easier, so we don't have to have a motion to take it off the table. What is sort of the purpose then is to have a debate on the Board's motion, and then if the Council decides to move. Can you explain to me the purpose of the postponement or the tabling? I'm not quite clear on that.

CHAIR NOWALSKY: I think you were going down the right road, Mr. Chairman, in that right now we have a motion from the Board. We don't know if the Council wants to make a like motion. In order to make a like motion, the Council needs to basically back up. However, the Council doesn't know if they are ultimately going to want to rescind things or not, is my expectation, until they know what that change is going to be.

If we end up an hour from now, and decide that there is no change to New York, then the Council probably has no need to rescind things, depending on what the magnitude of that change may or may not be, then the Council would make that decision somewhere later this morning. That is the purpose to give time to go ahead and have the Council make a like motion for the Board.

Have that debate about how to change New York's base allocation, and then based on the outcome of those conversations and motions, the Council would then make a final determination, if they did want to ultimately rescind previous action, and go ahead and change that. Does that help you?

MID-ATLANTIC CHAIR LUISI: Yes, it does. I know it's just an added complication to the process.

CHAIR NOWALSKY: The alternative, I think at this point, is to have protracted debate about this, which I think is going to be difficult to do, not knowing what the magnitude of change is going to be. Again, I've got to go ahead and defer to the Council for what they ultimately want to proceed. I'm here to facilitate that discussion, but based on our earlier conversation this morning without forcing the Council to do something prematurely, we got the sense that that was the purpose of tabling this at this point. Mike Pentony.

MR. PENTONY: Maybe another way to look at this, and the way I guess I'm looking at it, is that voting down this motion by the Council would establish that the Council has no intention to change the main motion that was adopted in February, which was the allocations. Voting up this motion, then allows the Council to engage as I see it, with the Board on potential motions to change the allocations.

But it doesn't obligate the Council to adopt the same allocation that is currently on the table of the Board. But it basically frees the Council members up to engage in that discussion, and consider different allocations, and vote on those different allocations, should a Council motion be made. But it seems like until we vote this motion up, there really can't be any other Council motions that would follow the Board discussion. I guess I'm seeing this as the first step for the Council to engage with the Board on what the potential new allocations might be.

CHAIR NOWALSKY: All right, so thanks, Mike. That's a little bit different than what I heard from John Almeida earlier, that he was comfortable with tabling this until later. But again, I'll defer to your thoughts on what to do with this. Based on that, is the legal interpretation, again I'll have to turn to John Almeida.

You know earlier I thought I had heard that a tabling of this would allow the Council to make other motions. The Regional Administrator seems to have a slightly different take right now on it, so I think I need some definitive direction from the Council, as to whether or not the Council can make other motions to work with the Board, whether or not we take action on this or tabling it. What does the Council need to do with this motion? John, you've got your hand up, help us out.

MR. ALMEIDA: My understanding from the earlier discussion was we were going to get up to the point of a motion, but not necessarily have a motion be voted on, and then this would be tabled until such a motion was ready to be voted on. I think that was my understanding, is that we would keep this ahead of a vote on a motion, so we could have discussion, questions, get up to the point of someone putting a motion on the board, and then this would take priority over such a motion.

CHAIR NOWALSKY: Okay, so what would you advocate for procedurally right now? Would you advocate for tabling or postponing this, until another motion is made, or do you feel the Council needs to vote this up or down now, with the expectation that should the Council vote this up, that doesn't tie the Council's hands to having to have to make a change to the main motion, that they could always fall back on the main motion from the February meeting.

MR. ALMEIDA: I mean I think it's cleaner if we vote the motion now. But I don't think you are precluded, as long as this motion gets voted on before the later motion. Does that make sense?

CHIAR NOWALSKY: All right. Let's go ahead and do this. Based on that guidance, let me see first a show of hands of people that would like to speak in favor of this motion. It would include both Board and Council while this is a Council only motion. We are meeting concurrently. If we got to a place that we had a Board only motion, without a like Council motion, I would invite Council members to speak.

I would give Board members the same opportunity at this point. I will ask for a show of hands of people that want to speak in opposition to this motion, and let's work through this issue here then first. First up, a show of hands of people that want to speak in favor of this motion. Chairman Luisi,

you still have your hand up. Were you on that list, or was that still up from before?

MID-ATLANTIC CHAIR LUISI: I'm sorry, Adam, I had my hand up from before. I would speak in favor of this. While I have the microphone, I might as well, we'll say that since the Board has to take action, I think that Council members need to be thinking about whether or not they want the allocations that we decided on back in February, to be included in the federal FMP. The Board is going to take action. There is going to be a change. If the Council wants to keep those allocations in the Federal FMP, we're going to have to have that discussion with the Board, if we could come to some compromise, as to the changes that we make, because as Mike Pentony mentioned, I think it was Mike that mentioned it earlier, or maybe it was you, Adam. It's going to be very difficult for the Service if we have different allocations in both federal and state waters.

By voting this down, we're essentially saying that the Council is not interested in considering new allocations, which means that they will likely not be part of the Federal FMP. By voting this up, it puts us in that partnership with the Commission, to try to find some solution. I'll stop there, but thanks for recognizing me, Adam. It was a mistake, but I wanted to get that on the record anyway, so thanks.

CHAIR NOWALSKY: With the concurrency of this, we need everyone's leadership and input here. I've got one hand up for speaking in favor, Tony DiLernia, and again to be clear, this motion will not require that the Council change things later on, but it gives them the opportunity to do so.

Let me see any hands that intend to speak in opposition to this motion before I go to Tony DiLernia in favor. Okay, I'm not seeing any hands of anyone to speak in opposition, so Tony, before I even go to you, let me do the following. **Let me ask the question to the Council, is there any opposition to this motion? Seeing no hands and hearing anything, this motion will pass by consent.**

If we can put this off to the side, let's bring back up the Board motion, and the next place where we are is to make a determination if the Council would like to make a like motion for what the Board motion was. I will again turn to the Council. Is there anyone from the Council that would like to make this motion for the Council? Tony DiLernia, I have your hand raised.

MR. DiLERNIA: So, moved, Mr. Chairman. Do you want me to read it in?

CHAIR NOWALSKY: No, I think it's already been read into the record, so we're good with that, thank you. We'll just have it recorded that you have made the motion. Do we have a second by the Council? Dan Farnham, your hand is up. Are you seconding the motion?

MR. FARNHAM: That's correct, Mr. Chairman, thank you.

CHAIR NOWALSKY: Okay, thank you very much, Dan. Okay, so at this point we have a valid motion from the Board, we now have a valid motion from the Council. What I am going to do is, I'm going to turn and ask for a show of hands that would like to speak in favor of these motions, from both the Board and the Council.

I would also then, after I do that, I will ask for a show of hands of people that want to speak against, and keep in mind that somewhere along that way a Board member would have the opportunity to make a substitute or amended motion, if they want to do something with this. Let me first start with a show of hands of Board and Council members that want to speak in favor of the motion. I've got John McMurray, I've got Nichola Meserve. Roy Miller, I have your hand up. Was your hand up to speak in favor of this motion, or was it for another matter?

MR. ROY W. MILLER: It was to ask a question about the meaning of the motion itself.

CHAIR NOWALSKY: Okay, let me go ahead and finish getting a show of hands here of people to speak in favor, and then I'll come back to you. John

McMurray, Nichola Meserve, Dan Farnham, Emerson Hasbrouck. Okay, you can put your hands down. Let me get a show of hands of people that intend to speak in opposition to the motion, and then I'll go to Roy for his question. Chairman Luisi, your hand was up to speak in opposition, or did you have a point you wanted to raise?

MID-ATLANTIC CHAIR LUISI: No, I wanted to address, I'll put my Board hat on and my Maryland hat on. I wanted to address this in opposition, thanks.

CHAIR NOWALSKY: In opposition, I've got Mike Luisi, Joe Cimino, and Shanna Madsen. All right, so we'll start with those lists. Roy, let me turn back to you for your question here about the motion, and then we'll get going with the pros and the cons here.

MR. MILLER: Thank you, Mr. Chair. Perhaps I'm the only one that needs this clarification, but I'll take a chance, expose my ignorance, in any event. Is it the requirement, because of the action taken by the Board, that the resulting allocation must be 2 percent, or if because of the reallocation due to biomass?

If New York gets to 9 percent that way, do we have to approve a 2 percent increase? It's unclear to me, whether we have to go with a full 2 percent, or do we just get New York a total of 9 percent one way or the other, either through allocation or a new baseline. Can somebody answer that for me so I understand it?

CHAIR NOWALSKY: Yes, Roy, I'll take a shot at it, and staff can correct me if I'm misinterpreting the Policy Board directive. The Policy Board directive is to increase New York's baseline allocation by up to 2 percent. That is the directive from the Policy Board by up to. This motion as it exists right now would increase New York's baseline allocation by the full 2 percent.

MR. MILLER: Okay, I think what I'm hearing, if I may, Mr. Chair.

CHAIR NOWALSKY: Go right ahead.

MR. MILLER: Up to 2 percent. In other words, we could make a selection for one of the lower percentages, as long as the net result is New York getting 9 percent or more, with both the allocation and the new baseline. Am I correct in that?

CHAIR NOWALSKY: No, I don't believe the New York getting 9 percent is entering into this equation. All that is needed to meet the Policy Board remand to the species board, is to increase New York's baseline allocation to something above 7 percent, but not to exceed 9 percent. My interpretation of the Policy Board directive is that we need to be somewhere in the above 7 percent, and not to exceed 9 percent for their baseline allocation, when we end today. Whatever anything else, in terms of regional biomass shifts, et cetera, wherever any of those other things ultimately leave New York, is a separate issue that I'm sure we'll discuss today, but doesn't specifically need to be part of this motion process.

MR. MILLER: I think I understand now. What you're saying is, we make the baseline decision first, and then worry about the reallocation.

CHAIR NOWALSKY: The reallocation will then occur, and we don't actually have to. Again, I'm sure we'll discuss it, but as a Board, we don't have to worry about it in order to meet the charge from the Policy Board.

MR. MILLER: All right, thank you, Mr. Chair.

CHAIR NOWALSKY: All right, I'm not seeing staff raise any hands, not hearing anybody tell me that I'm way off base here. With that we're going to start with our list. I will turn to John McMurray first for a pro, I'll then turn to Mike Luisi for a con. Go ahead, John McMurray.

MR. JOHN G. McMURRAY: I don't think I need to talk about what's become a well-documented influx of black sea bass in Long Island Sound. I think we all understand that at this point. One of the stated intents of Addendum XXIII was to address changes

in the distribution of the stock, specifically in Long Island Sound.

Of course, it did that, but only for Connecticut, and clearly Long Island Sound is a shared waterway, and clearly New York received no such allocation. Now, I get that some of you see this from a coastal perspective, and that we already have quota. We could just shift effort from our ocean fisheries to Long Island Sound. But it doesn't really work that way.

Commercial black sea bass harvest from Long Island Sound has increased exponentially in the last several years. If I understand correctly, now makes up around 50 percent of the state's total annual commercial black sea bass harvest. If I'm not mistaken, Long Island Sound landings are much larger than Connecticut's.

These substantial new landings strain the quotas available to the state's traditional ocean fisheries, and it has forced low trip limits and frequent closures across the board. I would ask the Board and the Council to look at this issue objectively and fairly, not in a sense that we've got ours, and who cares about New York.

But think about what a mostly small-scale commercial fisherman in Long Island Sound, those same people who lost lobster because of climate change are now seeing an influx of black sea bass, likely for the same reason, can and should be allowed to access them in the same way Connecticut fishermen are.

Think about the ocean fisheries that are also feeling some pain. Lastly, understand some of you are prone to simply look at this as another allocation dispute, but it isn't. These fish moved into the Sound, debatably because of changing ocean conditions caused by climate change. In my view it's 100 percent a climate change management issue. If we can't deal with this sort of thing, which is relatively simple, will likely have minimal impact, well I think we failed, and we will likely continue to fail at truly addressing climate change, as it relates to stock redistribution. We have the opportunity to show the world here that we can effectively address such shifts in stocks without being forced to do so with legislation. Let's take advantage of that. That is all.

CHAIR NOWALSKY: Next up on my speaking list I had Mike Luisi.

MID-ATLANTIC CHAIR LUISI: I'm going to speak against the 2 percent increase. This isn't the first time that I've gone on the record to discuss this issue. It happened when we made the final decisions back in February. But I feel as if, you know to protect the resource that we have in our southern region, specifically in Maryland.

You know we found a really good compromise that I wasn't completely comfortable with, but we had our fishermen onboard to be able to, you know come to the agreement that we did, as we concluded this amendment, you know back earlier this year. The whole reason why Connecticut was considered for an increase to their baseline, was because they were such an extreme. Their quota was so extremely low at 1 percent, that they weren't even able to have a viable fishery.

All the graphs that we're looking at today, you know indicate that New York's Long Island Sound fishery is much larger than Connecticut's. Well, of course it is. New York has a 7 or 8 percent allocation to the fishery, while Connecticut had a 1 percent allocation, in which is why I think it was a no brainer to add to Connecticut's baseline allocation.

We also, in the southern region, and I'm sure that others on the call today will speak to this. You know we did address the problem statement in the Addendum, and we have shifted an enormous amount of fish from a region where we've seen no difference in our abundance. We shifted an enormous amount of fish to the Southern New England, New England area.

New York has already received the additional fish that is going to help them solidify their Long Island Sound and their ocean fishery. This to me is a request for, it's a fish grab, honestly, and they're in

a totally different situation with the allocation that their baseline starts at, as compared to Connecticut, and I just don't see the comparison.

I understand the Policy Board ultimately decided to remand this back to the Board, and I can probably agree to some additional baseline allocation, but 2 percent is far beyond what I can support. Thank you for the time, Mr. Chairman, and I find it complicated sometimes as I speak as Chair of the Council, but I'm speaking now as a seat on the Atlantic States Commission's Board as a Maryland stakeholder. That's where I am right now, so thanks, Mr. Chairman, I appreciate the time.

CHAIR NOWALSKY: Thanks, Mike, I can empathize. Every time I open my closet, I would like to get rid of some hats here, but like you they're all still hanging there, so thank you. Next up I have Nichola Meserve.

MS. NICHOLA MESERVE: I think most people around our virtual table may remember that I initially offered this proposed configuration of the options in the draft addendum that included the 2 percent increase for New York, and I continue to support that to address the expansion of the stock into Long Island Sound.

I say that as a state that stands to lose, you know a larger percentage of our quota than what has been decided already. I think that the 2 percent increase here is the most direct interpretation of the Policy Board's intent to take a corrective action here that is comparable to that given to Connecticut.

In addition, I think the arguments that have been made by New York, and in speaking with their staff about the percent of increase that is necessary to keep the fishery open at a low trip limit throughout the season, and avoid unnecessary discards of a healthy species, are very similar to the arguments that Connecticut made, in order to get its 2 percent increase.

I think Emerson Hasbrouck made some really good points that the 25 percent of the quota is being redistributed, really addresses the increase and the change in the ocean fishery, and that 2 percent or something very close to it for New York, is the appropriate response for the expansion into Long Island Sound. Thank you.

CHAIR NOWALSKY: Thank you, Nichola. Joe Cimino.

MR. CIMINO: You know I think as Mike Luisi mentioned, I think this Board got this right on the first go round. I want to correct the record. The Addendum does not ask about addressing the distribution in Long Island Sound. The Addendum talks about possibly reallocating based on the output from the stock assessment, which doesn't have that kind of resolution.

The document mentions the word distribution 20 times. It mentions Long Island Sound once, and as Mike Luisi pointed out, it's to point out that Connecticut was the most extreme example of a state that had trouble with the expansion of this stock. You know a lot is going on. To hear some northern state's talk about this as a global warming issue, that might be true for range expansion.

Although looking at the most recent stock assessment, although the percentages of the southern distribution did increase a little bit, there has been a downward trend in the SSB in the northern region since 2014. You know this isn't a species where the southern end of its range is North Carolina.

This is a species that has a southern stock component south of Hatteras in the southern portion of this stock from the assessment remains steady, and is even increasing a little bit. I think we addressed the current distribution with a 75/25 percent split. We addressed the extreme example of Connecticut by adding some additional percentages to that baseline.

We were handed a very tight decision that really binds what we can do here by the Policy Board. Quite frankly in a fashion that reminds me of a movie called The Jerk, where Steve Martin is telling folks they won a prize, and they can get anything between the ash trays and the thimbles, anything in

a 3-iinch area that includes the chiclets but not the erasers. We're in a chiclet but not the eraser situation, and when the time is appropriate, Mr. Chair, I would like to make a substitute motion on behalf of both the Board and the Council.

CHAIR NOWALSKY: Now Joe, if you have a substitute motion on behalf of the Board, I would entertain that at whatever time you're prepared to make that motion. Did you want to go ahead and do that now?

MR. CIMINO: Yes, Mr. Chair, and I think the current motion reads quite well, and gets to what the Policy Board has asked from us, and therefore I would simply change the increase from 2 percent to 1 percent.

CHAIR NOWALSKY: You're going to amend the motion by changing by 2 percent to by 1 percent.

MR. CIMINO: Good catch, yes, thank you.

CHAIR NOWALSKY: All right to staff, that will be a motion to amend. That motion will be on behalf of the Board, and again as per our procedures. We first need to get something up for the Board, so based on that, let me go ahead and look to the Board. Is there a Board member that would like to second this motion? Okay, I have a hand raised by Chris Batsavage. Chris, are you seconding this motion?

MR. CHRIS BATSAVAGE: Yes, Mr. Chair.

CHAIR NOWALSKY: Okay, thank you, Chris. All right, so we now have a motion. Again, this motion stands by the Board, but what I will do next is I will turn to the Council, to see if the Council would like to offer a like motion. To the Council, would someone like to make this motion on behalf of the Council? Please raise your hand. Joe, your hand it up, you're making the motion, correct?

MR. CIMINO: Correct.

CHAIR NOWALSLKY: Okay, Joe Cimino for the Council. Is there a second from the Council? Chris Batsavage has his hand up. Chris, are you seconding the motion for the Council?

MR. BATSAVAGE: Yes, Mr. Chair. Thanks.

CHAIR NOWALSKY: Okay, so we now have a motion to amend to change the 2 percent to 1 percent. I am going to continue with the list that I had. My assumption is that people that were speaking in favor of the original motion are probably now speaking in opposition to the amendment. I would entertain discussion on both of these motions as they are on the table.

When I get through Dan Farnham, when I get through Shanna Madsen, and Emerson Hasbrouck, I will then go ahead and look for additional people to speak or amend or substitute along the way, as I mentioned earlier. We'll go ahead and allow this to go three levels deep. Jim Gilmore, did you have your hand up as a point of order, or do you want to get on a list when I go ahead and ask for additional speakers?

MR. GILMORE: I wanted to be added to the list, Mr. Chair, thank you.

CHAIR NOWALSKY: Okay. All right, stand by, we'll go ahead and get those hands up. I'll be sure to add you here. All right, so next up I have Dan Farnham to speak. Go ahead, Dan.

MR. FARNHAM: Thank you, Mr. Chairman. I'll make it short here. I think that Mr. McMurray and Emerson have covered it rather well from the New York's point of view here. But I would like to touch upon one fact here. New York's allocation of 7 percent was based entirely upon its ocean-based fishery. Now, you know through the last few years here, 50 percent of the landings in New York are coming from a distinctly different fishery that has emerged in Long Island Sound, and there is nothing that we can do about that.

It's not like New York can just take that 50 percent in Long Island Sound and shut it down, and give it to the ocean-based fishermen that the allocation was based upon. The dilemma we have here is, so half

the landings now are coming from Long Island Sound. In essence, the ocean fishermen who qualified New York for the 7 percent of quota, are not getting an increase in black sea bass landings, they just do not.

What we're doing, we're seeing an increase in black sea bass interactions, but we're having an increase in discarding, like everybody is. But New York is seeing definitely a distinct increase over, I think I would say most other fisheries. I just would like to point that out, that the traditional fishermen are not seeing an increase in landings in black sea bass. Thank you.

CHAIR NOWALSKY: Next up I have Shanna Madsen.

MS. SHANNA MADSEN: I'm kind of coming at this from a different procedural perspective. In thinking through this issue, it was my understanding that all of the proposals to increase New York's baseline allocation needed to be within the range of options in the Draft Amendment. I've been spending a little bit more time in the Draft Amendment, thinking through ways to accomplish this.

To start in the Draft Amendment, it was proposed that New York receive an increase to their baseline allocation, only if the trigger approach was selected. Specifically, this option was Option E, and it stated that annually the coastwide quota, up to and including 3 million pounds would be distributed based on the initial allocations, and then surplus quota above the 3 million pounds would be used to increase Connecticut's allocation to 5 percent of the overall quota, and then to increase New York's allocation up to 9 percent of the overall quota.

Therefore, New York would only get a baseline increase from that surplus quota. None of the other states baseline quotas were to be decreased as a result of New York's increase. If the quota didn't reach the trigger, New York would not get a baseline increase, it would remain at 7 percent. My interpretation of that, the proposal before us today is something that was not distributed to the public, that New York would be specifically getting an increase in baseline quota, coming from other state baseline quotas. That was never in the document. Now, I do recognize that at the February Policy Board meeting or the February Board meeting where we discussed the allocations. Several states did modify Option B during motions. However, I will also say that that was never thoroughly discussed at the meeting. I went back and looked through the minutes.

Accordingly, it was never thoroughly discussed what type of proposals would actually fall within the boundaries of the Draft Amendment to increase New York's baseline allocations during the Policy Board Remand. Now, while I acknowledge that Option B seems to be the basis of the proposal to modify the baseline allocations here today.

I would also like to point out that Option B in the draft acknowledged the unique position of Connecticut sitting at 1 percent, and actually states that New York's baseline allocation was not to change as a result. Looking at Page 10 of the Draft Amendment, we said specifically we were to hold New York and Delaware allocations constant.

New York has experienced a similar substantial increase in black sea bass abundance in state waters, therefore a reduction to the New York allocation is not proposed. When we gave our percentage allocation to Connecticut's baseline from our baseline, New York did not contribute there. At first because of the discrepancies that I read in the draft, I was going to make a motion to table these motions, to allow for further consideration by the PDT. Essentially, just to ensure that we're operating within the constraints of the Draft Amendment options.

But however, I was made aware that this could prolong the process in a way that this might go back to the Policy Board, thereby allowing them to make this decision for us. Since I don't want to move us in that direction, I will simply leave these thoughts as a support of reducing New York's baseline increase, as throughout the Draft Amendment we already acknowledged that New York's Long Island Sound increase, and already addressed it by not reducing their baseline to increase Connecticut's.

CHAIR NOWALSKY: Thank you very much for that Shanna, so let me just add a bit of additional context to Shanna's comments that Commission Policy is essentially silent on what comes next in an appeal process, if a species board does not comply with a Remand from the Policy Board.

Given, and again I'll turn to staff if there is something that I'm not conveying properly here. If we don't take corrective action here today, the Policy Board would likely get the next crack at telling us what to do, whether that would be going back out to the species board again, whether we have the opportunity to send it to somebody else for other ideas, like the PDT that Shanna touched on, or whether they might just make a decision themselves.

Do you have anything in your comments, Shanna, that you feel you need staff to respond to, with regards to the validity of what we're doing here today in being in bounds, or are you comfortable with the information you have in front of you at this point, and just wanted to get your thoughts on the record?

MS. MADSEN: I think from my perspective, Adam, I already understand what ASMFCs interpretation of what we're doing here today is. I guess I would want to clarify, are we specifically using Option B as the basis of the proposals to change baseline allocation today. I think some clarification there would be useful.

CHAIR NOWALSKY: All right, I'll turn to staff for their thoughts, with regards to the basis with the appeal and what the Policy Board did, if they can respond to that concern.

MS. KERNS: I'll start and then see if Bob has anything additional to add. When the PDT worked on this document, they looked at it as two parts. First is looking at the baseline allocations, and then making a change to the either regional adjustments or maybe it was triggers. You know, it depended on the option that was in the document.

But for today's purpose, we're just looking at the baseline allocations, we're not thinking about the options for how the quota was distributed after the baseline allocations were adjusted. I'll say that just for everybody's information. It would have been staff's advice that this change to New York's allocation would have been in bounds from what was considered for what went out for public comment.

That is because the concept of changing New York's baseline allocation was in the Addendum itself. Then the impacts to the other states, in terms of quota coming off the baseline was considered, because in the option, where Connecticut received additional quota, they could have received up to 4 percent.

The impacts to the other states were given in the Addendum document. This splits the 4 percent, 2 to Connecticut, and 2 to New York, so that would be in bounds. As I said before, we're just looking at the baseline adjustments here, we're not thinking about any of the rest of the option of the regions. The PDT had intentionally split that into two parts.

CHAIR NOWALSKY: All right, so thanks for that Toni, I appreciate you putting that on the record, and I think at this point I'll just leave it with that. While there may be people around the table who may not completely agree with that interpretation, that is the interpretation we have before us at this point to work with and really, the only other option at this point would be to not take action at the species board, which would put it back in the Policy Board's hands. Next up I have Emerson Hasbrouck, then I'll look for additional speakers. Emerson, you're up next.

MR. HASBROUCK: I had an opportunity earlier, and I provided my comments when I made the motion. What I would like to do, Mr. Chairman, with your permission, is yield my opportunity right now to Jim Gilmore. I know he's on the list, but he hasn't had an opportunity to speak in favor of the motion yet, so I would like to yield to him.

CHAIR NOWALSKY: Given that Mr. Gilmore is also from the state of New York, I'll go ahead and allow that. Jim, you're up.

MR. GILMORE: I've heard some of the conversation and I understand some of the things from the southern states and their arguments, but I would characterize it a little different than a fish grab. We're really trying to get into managing this fishery, and I won't go into anything, it was said very well by John McMurray and Nichola Meserve. There are a lot of changes that have occurred in Long Island Sound, including our very viable lobster fishery many years ago that is completely gone.

But now that has been replaced by other species, and this is getting to that point about climate change. We're going to be dealing with this on a regular basis. I understand that some prospectus might be that we're trying to grab more fish. We're just trying to manage a viable fishery in the Sound, and a very limited fishery.

Again, this has been an increase in a specific water body. We're having trouble and difficulty with the ocean fishery because of that increase. We really have two very large bodies of water where we have a significant amount of black sea bass. Understanding at least some of the opinions I've heard from the southern states, at this point at least to maybe move this along. I would like to offer another amendment to the motion, at your discretion, Mr. Chairman.

CHAIR NOWALSKY: My sense is that Robert's Rules would allow that. I think that if you're looking to change the 2 percent to 1 percent amendment, you would take something in the form of a substitute. I would just caution you that if you're looking to do something between 1 and 2 percent, that it might be better to allow this amendment to become the main motion.

Then once you know whether or not this amendment has passed, to make another motion, if you don't agree with the outcome of that, as opposed to going ahead and trying to change it at this point to something between 1 and 2 percent.

MR. GILMORE: Then I can defer to after the vote on this, and then I'll reserve the right to make an amendment at that point. Thank you, Mr. Chairman.

CHAIR NOWALSKY: Okay, if you're comfortable with that, I think that is probably the best way forward right now. I've got the original list of speakers have all had the opportunity to speak. I will go ahead and ask again for people that want to speak. At this point I'll be asking, do you want to speak in favor of the motion to amend, or in opposition to it.

I would ask that people that do want to put their hands up to speak in favor of against at this point do so if you have some new information that we haven't talked about so far, or something you feel is critically important to get on the record or not. Let me look for a show of hands that want to speak in favor of the motion to amend. Tom Fote, I've seen your hand up for a bit, did you want to speak in favor of the motion to amend?

MR. THOMAS P. FOTE: Yes, I do.

CHAIR NOWALSKY: Okay, Chris Batsavage, I have your hand up. Do you want to speak in favor of the motion to amend?

MR. BATSAVAGE: Yes, please.

CHAIR NOWALSKY: Okay, let me see a list of hands of people who would like to speak in opposition to the motion to amend. Okay Jim, I've got your hand up. I know we just heard from you, but I'll get you on the record here to further speak on that motion to amend, and I've got Tony DiLernia. We've got two in favor, two opposed. Let's go ahead and get through these comments, and then we'll see if we need to take further comment or not. Tom Fote.

MR. FOTE: I understand New York's problem, but I really understand that we all have the same problem. You know New York keeps saying that the range is changing. Well, they've said that on summer flounder, they've said that at a bunch of

other species. But New Jersey, I wanted to basically explain what is going on.

We have the same problem. We basically have more fish coming up. We have the same amount of pressure on those species. We basically force our people, we shorten the season so they don't have bycatches as great as they could have, because we're in the same situation. We also have Raritan Bay, we also have Delaware Bay, which is another situation going on.

We understand the problems going on. But to always come in and say, well we're being treated unfairly because of global warming. They're using global warming as an excuse for reallocation. That is why some of us have been really very cautious about using global warming as an excuse for basically reallocation, because it does turn into a fish grab.

New Jersey has been at the foot of New York doing this, whether with summer flounder, whether with striped bass, or whether there were a bunch of other things they have basically done over the years. They wonder why we feel the tension. We don't have the same tension with Delaware. But it seems like New York always is crying foul on us, and basically trying to grab quota.

CHAIR NOWALSKY: Jim Gilmore.

MR. GILMORE: Just a couple of additional brief comments, and again, our intent on this is really managing the fishery as it exists today, and move it forward. I think that is something that we all have to start doing more of. This is really not an intent to try to, again grab fish or do anything that we're trying to feather our nest.

We're trying to manage the fishery the best we can, based upon what is going on in 2021. The only two other points I will add is that again, as seen in the other graphs is that New York's landings are four times higher. Even with that 2 percent increase we're going to have a difficulty in managing this, because we have a much larger fishery. That 2 percent increase helps us out tremendously, but doesn't get us to a whirlwind fishery that some people think we're going to have. One percent very clearly does not give us a viable fishery. We are going to continue to have closures, we will continue to have low trip limits, and essentially the fishing community in New York are going to have a very difficult time making a living. One percent just doesn't get us there.

CHAIR NOWALSKY: Chris Batsavage.

MR. BATSAVAGE: Yes, I support the 1 percent increase instead of 2 percent. I'm looking at it by how much states, especially in the southern region that fully utilize, or mostly fully utilize their black sea bass quota, are losing by going to 2 percent to New York versus 1 percent. I know it's still not a lot, but compared to like whole numbers, but still on a percentage basis it adds up when you look at a 600,000 pounds quota or whatever.

The 2 percent increase does, it's kind of a disproportionate reduction for states like Virginia, for instance, that largely utilize their quota. North Carolina hasn't utilized their quota in the last few years, just due to the nature of our fishery. But I think the 1 percent helps New York's cause, mitigates some of the additional loss of quota by states in the southern region, where black sea bass are still quite abundant, and they utilize most of their quota.

I kind of see this as a middle ground. With other allocation decisions that we've made for species, where the allocations have been in place for a long time. It's an iterative approach. We don't get to the full level of work that some people would like to see the first time around. That is how I envision this state commercial allocation action for black sea bass.

We're moving things forward from where they were 20 years ago, and we're committed to reviewing this allocation decision in five years. We'll see what the stock looks like, as far as distribution goes, and how the fisheries are operating in all the states, and make changes from

there. But I think this is a reasonable path forward, based on my comments and other comments made today.

CHAIR NOWALSKY: Tony DiLernia.

MR. DiLERNIA: Someone just spoke about how things were 20 years or so ago. Yes, 20 years or so ago, sitting at the Council, if someone needed some help folks were able to help someone out. They were able to negotiate. They were imagining themselves in the position the other person was in and saying, well how can I help them, how can I try to do this? That thinking seems to have disappeared. Well, let's face it, the folks that don't want to give up quota are the states that have more quota than New York.

I even heard that some states, whatever, are not even reaching their quota, yet they don't want to give them up, or they want to give up such a small percent that it really amounts to nothing. This has become a hooray for me, too bad for you type of situation, and I'm very disappointed with some of the folks sitting here. That's all I have to say, really. I'm disappointed. Is there a way? Can we return back to the way things were? Perhaps not, I don't know.

CHAIR NOWALSKY: At this point we've had quite a few speakers. We've covered a lot of different ground here. Are there any other Board or Council members that feel they need to raise a point to speak on something that hasn't been touched on during this debate between these two motions? Okay I've got Dan Farnham's hand up, is there anyone else that feels they need to raise an issue that we haven't touched on? All right, so I've got three hands. Dan, are you intending to speak in favor or in opposition to the motion to amend?

MR. FARNHAM: That would be in opposition, Mr. Chairman.

CHAIR NOWALSKY: Sonny Gwin, in favor or in opposition of the motion to amend? Sonny, it looks like you're unmuted in the Ap; I don't know if you're unmuted on your device.

MR. SONNY GWIN: Can you hear me now?

CHAIR NOWALSKY: Yes, there you go, you're good. Were you in favor or in opposition of the motion to amend?

MR. GWIN: I was in favor.

CHAIR NOWALSKY: Okay, and Joe Cimino, were you in favor or opposed to the motion to amend? You made the motion, I assume you're in favor still, to speak in favor of it.

MR. CIMINO: Yes, Mr. Chair, I never quite got a chance to give my rationale, but I obviously did speak to my thinking of this originally. But there is one other point that I would like to make.

CHAIR NOWALSKY: All right, so I'm going to go to Sonny, I'm going to go to Dan, I'm going to go to Joe. At that point I'm going to go out to the public, to talk about both of these motions. At that point we are then going to come back to the Board or Council, to see if there are any other topics that need to be discussed that weren't brought up.

We will then caucus, and we will then vote on the motion to amend. Based on that outcome, we'll decide whether to vote on the main motion, or whether we need to pursue other motions at that point. I've got Sonny Gwin, Dan Farnham, Joe Cimino, and then the public. Go ahead, Sonny.

MR. GWIN: Yes, I've been sitting here listening, and I keep hearing climate change, climate change, climate change. I just wish that we could go out there and let the fish know that there is climate change, and they are all shifting to the north, because it is so hard to sit here. I know the southern states are losing fish with these reallocation issues because of climate change.

But somebody needs to tell the fish, because we're seeing more black sea bass than we've ever seen down here. We will be catching our quotas up, and I feel for New York, I feel for them. But I think what we're doing is fair. The 1 percent is fair, with the

reallocation that we just did. It's going to put us in the same spot.

We're taking fish from down here on the southern end, where there is plenty of fish, and what we've historically caught until now, we're not going to be able to catch them, and we're going to be in the same boat. But like I said, I just wish somebody would let the fish know that there is climate change, and they are supposed to be all up north, and they're not. We're seeing a lot of sea bass. Thank you for the comment, Mr. Chair.

CHAIR NOWALSKY: Thank you very much, Sonny, and for the record, I'll be happy to join you in the same boat with you any day of the week, just go ahead and invite me. Thank you. Dan Farnham, you're up next.

MR. FARNHAM: In the beginning of our process earlier today, I think Eric Reid had a question for the New York contingency here. If New York did get an increase in quota, would they guarantee that the Long Island Sound fishermen would be able to catch it? The fact of the matter is that New York's Long Island Sound fishermen are catching that quota already.

No matter what we vote on here today, no matter what we debate today, the fact is that New York's Long Island Sound fishermen are catching 3.5 percent of the quota, like it or not. I understand everybody's point. Nobody wants to give up quota, I get that completely. I'm a commercial fisherman, I've been doing it for 40 something years. Nobody wants to give anything up. But what we really don't want to do is throw dead fish over the side either. Very good, thank you.

CHAIR NOWALSKY: Dan, I'll be happy to join you in your boat as well. I'll join anybody in anybody's boat, just go ahead and let me know when we're going. Joe Cimino, you're next.

MR. CIMINO: I kind of want to speak to the concept that 1 percent of the commercial quota would make a viable fishery for New York, knowing that we have a recreational/commercial reallocation hanging over our heads, and every commercial fisherman paying attention knows that in the black sea bass world they stand to lose the most.

We're looking at a 10 percent, potential as much as greater than 10 percent shift away from the overall coastwise commercial quota to the recreational fishery, which would more than wipe out anything we're fighting over right this minute. Unless all of those that are opposed to this amendment are planning on voting for status quo there, I'm kind of not even sure what we're fighting over at this point.

CHAIR NOWALSKY: As I indicated, I will next go out to the public, and then I will come back to the Board. Let me see a show of hands from the public that would like to speak. To try to keep this balanced, let me first ask for hands that want to speak in favor of the motion to amend. Okay, I've got one hand up, Greg DiDomenico. Let me see a show of hands that want to speak in opposition to the motion to amend. I've got Bonnie Brady.

All right, Greg, we'll go ahead, and James you've got your hand up. Are you going to speak in opposition to the motion to amend, James Fletcher? Well, we'll come back to James, don't hear what he is. We had Bonnie, I saw your hand up before Greg, so I am going to go ahead and go to you first here. Go ahead, and please speak to both of these motions, or quite frankly anywhere within this range. Now would be the appropriate time for public comment on it.

MS. BONNIE BRADY: This is Bonnie Brady, Long Island Commercial Fishing Association. We're opposed to the motion to amend. I know that's not shocking. Obviously, you all have heard New York's points. I think Dewey asked a question about who was catching what fish in the Sound, and basically Dewey it's an explosion.

The black sea bass are everywhere, and they are in such numbers now that last year obviously was a wash because of COVID, but we were closed for six solid weeks the year before. You can't get away from them, frankly. This opposition to changing the motion is because basically, we want to be able to

keep and have a fishery, and not just instead contribute to discards, which obviously all of you from various states know. Commercially if we go exponentially over them, that may affect us, and not just perhaps New York in a pound for pound Bay pack. We would appreciate any consideration that you all have regarding this issue, and allow not just those that fish in the Sound, but those that fish in ocean waters not be negatively impacted as a result of this. Thank you.

CHAIR NOWALSKY: Thank you, Bonnie, Greg DiDomenico, and you can assume we can hear you, unless in ten seconds I tell you we can't hear you.

MR. GREG DiDOMENICO: Good morning, thank you for the opportunity to comment. I'll be as brief as possible. Greg DiDomenico, Lund's Fisheries, Cape May, New Jersey. Obviously, everybody realizes this is controversial, and I don't want to take a position today that creates an adversarial position with anybody, to be perfectly honest with you, on this topic.

I do want to go over a few things first, get it out of the way and say that we do support the amended motion to change the 2 percent to 1 percent. But I say that in the hopes of, or at least the anticipation of that this issue is not going to go away. My concern is that this will continue to be a topic at the Commission and the Council.

There has to be some meaningful long-term solutions. This is not the one. But allocation is not the only solution. Right now, it is the only topic for every problem that we have, and it's not. Until we do something else, or look outside of allocation issues to solve these problems, this is going to continue to be adversarial. My experience with this is a very simple one that some people will remember.

I believe it was Addendum V, it was about 10 to 12 years ago. The state of New Jersey gave up 55,000 pounds of fluke over a two-year period voluntarily, to states that didn't have fish. Now the bargain for those 55,000 pounds was that those who received additional fish through this voluntary transfer of fluke, would take care of the issues in their own states that were contributing to these problems, such as discards and associated problems with low quotas.

That never happened. I don't know at this point whether or not there is a lasting solution, or a meaningful solution. But I do have to wonder about what are the management climate within these particular states. Have they controlled entrance? Have they controlled here? Have they controlled the people that continue to get these permits? I don't know.

I think that has to be made perfectly clear, and then lastly, I do want to remind everybody that we are at our all-time high for black sea bass, and all time high for fluke. I don't recall if black sea bass is 190 percent rebuilt or 200 percent rebuilt, or 150 percent rebuilt. But perhaps the issue with these allocations and low quotas in certain states lie in our continued, in some cases, perhaps in black sea bass, our continued conservative ABCs and OFLs, and all the rest that goes into the specifications process.

If there are so many fish, if there are so many black sea bass. Why are we just not adding to the quota to solve these problems? I know that's again, a larger question and a larger problem, and I don't want to have quotas that exceed the scientific advice. But if we don't start talking about the other issues associated with black sea bass and fluke, and only focus on allocation. This is exactly where we will wind up. We'll wind up arguing over small percentages, and not dealing with the main topics. Thank you.

CHAIR NOWALSKY: Thank you, Greg. Back to the Board and the Council. Is there anyone else that needs to speak on something that we haven't heard about, or need to get something on the record before we break to caucus? Shanna Madsen, go ahead.

MS. MADSEN: This is something kind of outside of this vote, but it's something that I believe that this Board should maybe consider taking to the Policy

Board. You know I've spent a lot of time in documents over these past few weeks, and I remember going back to reading our discussions during the Policy Board, where several states had large issue with the fact that the Policy Board continuously said that the discussion that was coming before them was not about allocation.

Then a couple of votes later, the Policy Board voted to tell this Board how to reallocate. I looked through the ASMFC Appeals Process Document, and I do know that the Policy Board is able to give guidance on how a management program should be modified. But respectfully, I believe that the Policy Board is not the proper body to give guidance on how to address allocation issues. This allows states that have not been part of this several-year process stand at a disadvantage to understanding the intricacies of the Draft Amendment.

They were asked to weigh in on how the Board should be reallocating, and in my mind that sets a pretty dangerous precedent for upcoming allocation decisions, and I do believe that this issue should be studied potentially by the Allocation Work Group that the Commission has brought together. I would kind of like to see maybe this Board push that forward to the Policy Board, and onto the Allocation Work Group. Thank you, Mr. Chair.

CHAIR NOWALSKY: Appreciate those comments, let's work through these motions here first, and then we can see if the species board wants to do anything here specific today. If not, I certainly think you can bring your comments to the Policy Board, either yourself, and if you're not actually a member of the Policy Board for your state, have your state Administrative Commissioner directly bring that.

But let's get back to these motions. Thank you for this comment. With that we're going to take, we'll try for three minutes here for a caucus. What I would ask states to do while they are caucusing, is to consider this Amendment. Consider the main motion, and also consider the possibility of anything that might occur for something in between these, depending on whether or not this becomes the main motion, and if there are any other subsequent motions. Go to caucus for three minutes, and then we'll come back. Thank you.

Okay, thanks to staff provided timer here. We are returning from caucus, and we are going to turn to the Board for the vote. The vote will be conducted in a role call manner. I will defer to staff to decide what order to conduct that vote. But we are looking for 12 votes on the motion to amend. Staff, I'll go ahead and turn to you to conduct the role call vote for the Board.

MS. KERNS: Mr. Chair, if we could just use the hands in favor, and I'll call off the states.

CHAIR NOWALSKY: That will be fine if that meets the needs of the outlined voting procedures. Let's go ahead and have hands raised for those states that are in support of the motion to amend. One hand per jurisdiction, please.

MS. KERNS: Just letting the hands settle. I have Delaware, Maryland, New Jersey, Virginia, North Carolina, and Potomac River Fisheries Commission.

CHAIR NOWALSKY: Okay, so we have six votes in favor, if we could put those hands down and clear them. Very good, all those opposed to the motion for the Board, please.

MS. KERNS: Letting the hands settle. I have Massachusetts, New York, Connecticut, New Hampshire, and Rhode Island. Mr. Chair, we're not looking for 12 votes. U.S. Fish and Wildlife Service does not sit on black sea bass. They only sit on summer flounder.

CHAIR NOWALSKY: Right, but I believe we've got 11 so far, and I believe we still have the Service here to consider as the 12th vote.

MS. KERNS: Oh yes, sorry.

CHAIR NOWALSKY: Looking for abstentions.

MS. KERNS: Abstention, NOAA Fisheries.

CHAIR NOWALSKY: Okay, so that gives us our 12 votes, so I don't have to call for null votes. This motion passes the Board by a vote of 6 in favor, 5 opposed, with 1 abstention. Chairman Luisi, I will turn to you to conduct the vote for the Council.

MID-ATLANTIC CHAIR LUISI: Yes, thank you, Mr. Chairman. The Council will now vote on the motion to amend, to change the original motion from 2 percent to 1 percent, as an increase to the baseline for New York, based on its appeal to the Policy Board at ASMFC. I will say that because we made like motions here.

While the Board has to make a change, the Council does not. However, there is a consequence to the Council not moving along in lockstep, or locking arms with our partners at the Commission on this, because of the issue with the allocations being put into the federal FMP. If the Council decides to not support this motion at all, there will be a challenge with the Service, because we'll have two different allocation scenarios, one at the Board level, one at the State level, and one at the Federal level.

It has been stated during the meeting, but I just wanted everybody to be aware. I think I've clarified what it is we're voting on as a Council, and so again, this motion is to amend from 2 percent to 1 percent, and I will go ahead. I can't see hands, so Toni, you're going to have to help me out on this one. Why don't I go ahead and call for all of those in favor of the motion to amend from 2 percent to 1 percent. Can you please raise your hand at this time? I'm going to have Toni either read the names or count, whatever you prefer, Toni.

MS. KERNS: I can read the names, since the public can't see them either. I have David Stormer, Kate Wilke, Sonny Gwin, Peter Hughes, Sara Winslow, Kris Kuhn, Joe Cimino, Wes Townsend, Michelle Duval, Scott Lenox, Chris Batsavage, Dewey Hemilright, Ellen Bolen, and Adam Nowalsky.

MID-ATLANTIC CHAIR LUISI: Okay, thank you for that, Toni. I counted 14 as you were reading those names off. Well, you can confirm that that is the same count that you got.

MS. KERNS: I'll ask Julia to do that.

MS. JULIA BEATY: Yes, that is correct.

MID-ATLANTIC CHAIR LUISI: Okay, so if everyone could put their hands down, or Toni if you can lower the hands. Let's go ahead, and I'm going to ask for those in opposition of the motion to amend, can you please raise your hand at this time?

MS. KERNS: Letting the hands settle. I have Maureen Davidson, Paul Risi, Tony DiLernia, and Dan Farnham.

MID-ATLANTIC CHAIR LUISI: Okay that' four on my count.

MS. KERNS: I agree.

MID-ATLANTIC CHAIR LUISI: Lower those hands, and I'm going to ask for any abstentions to the motion to amend.

MS. KERNS: I have one abstention, Mike Pentony.

MID-ATLANTIC CHAIR LUISI: Okay, so the Service is abstaining. Motion passes 14 to 4 to 1. Chairman Nowalsky, I'm going to go back to you. There should not be a 0 at the end, we do not have null votes at the Council, since everyone has a vote. 14 to 4 to 1 the motion passes. **Therefore, the motion to amend, based on the Board and the Council's vote has passed.** Chairman, I'm going to bring it back to you to conduct the remainder of the main motion.

CHAIR NOWALSKY: Very good, thank you very much, and again just for clarification. We did not require that the motion pass both bodies for it to be valid by the Board, but it is certainly helpful I think, in terms of what we're trying to accomplish today.

MID-ATLANTIC CHAIR LUISI: We do need to make it clear. I know you did it earlier, but before we vote on the main motion. If the Board passes the motion, even if the Council does not, it will still pass the Board, so that is a good clarification. I appreciate that. I'm going to go back on mute.

CHAIR NOWALSKY: Yes, fair enough. We're certainly so used to doing this jointly that that is what we're used to doing, so appreciate everybody's patience as we work through this modified process today. All right, so this brings us back to the main motion. If staff could now put this up as the modified motion with the 2 percent changing to 1 percent.

Since it has been amended by both the Council and the Board, it is now the property of both bodies. Thank you very much**. The amended main motion now reads, move to increase New York's baseline allocation in a manner comparable to the consideration given Connecticut for the expansion of black sea bass into Long Island Sound.**

New York's baseline allocation for black sea bass will be increased by 1 percent. This action maintains Connecticut's baseline allocation of 3 percent, and maintains the percentage of quota redistributed according to the regional biomass. The remaining states' baseline quotas will be adjusted consistent with the allocation tables provided during this meeting. I will now ask for anybody who wants to speak to do something to this motion, with regards to a need for an amendment or a substitute to it. Jim Gilmore, I will turn to you first.

MR. GILMORE: I would like to move to amend the New York baseline allocation for black sea bass will be increased by 1.75 percent.

CHAIR NOWALSKY: I have a motion by the Board for 1.75 percent. Let me go ahead and see if there is a second by another state. I will ask one more time, is there a second to this motion from the Board from another state? I just got Jay McNamee's hand went up. Are you seconding this motion, Jay?

DR. McNAMEE: Yes, Mr. Chair.

CHAIR NOWALSKY: Okay, so we now have a motion on behalf of the Board to increase the allocation by 1.75 percent. Let me make it clear that it is not my intention today to debate these numbers to tenths or hundredths of a percent ad nauseum. It was my hope that we would perhaps stick to half percent's.

I understand the desire on New York's part to do what they feel is in the best interest of their fishermen. I think that quarter percent are in line with things that staff has looked at, along the way. I do not believe we saw 1.75 percent earlier. I know that staff has the ability to put up those allocations if anybody needs to see them.

I think most people have a pretty good idea what this does, but staff does have the ability to put something up. I will just say that I will entertain the ability to look at stuff at halves and quarter percent, but that's it. We're not going to parse this anymore than that. We have a motion by the Board. Do we have a like motion by the Council? **Paul Risi, are you making this motion for the Council?**

MR. RISI: Yes, I am, Mr. Chairman, thank you. Do I have a second on behalf of the Council? Dan Farnham, are you seconding this motion on behalf of the Council?

MR. FARNHAM: Yes, I am, Mr. Chairman, thank you.

CHAIR NOWALSKY: We now have a valid motion here by both the Board, we also have a valid motion by the Council. Again, the Board motion would stand on its own. I am going to allow up to two speakers to do pro and con. I don't really think the nature of the debate is going to be any different than what we've heard so far.

I will turn to Mr. Gilmore to go ahead and provide input with things that he would like to. I will then also turn to Mr. Risi, if he would like to provide comments in favor. Are there two people who would like to speak in opposition to this motion? Okay, I've got Tom Fote and Mike Luisi. We're going to limit debate to that, so we're going to go Jim Gilmore, Tom Fote, Paul Risi, Mike Luisi, and then we're going to go ahead and take a vote on this question. Go ahead, Jim.

MR. GILMORE: I agree, we don't need to debate this more. I'll just make the simple comment that we are now arguing over mostly hundredths of percentage points, maybe a tenth of a percent or whatever. That is all I have to say, thank you.

CHAIR NOWALSKY: Tom Fote.

MR. FOTE: Yes, Greg brought up the arguments I was going to make in the beginning, I kind of forgot when I was speaking. We're fighting over scraps. These quotas make no sense whatsoever, whether it's summer flounder and black sea bass. That's why we're basically trying to mess with each other over what the quota. The quota should be bigger. There is no sense of what we're doing.

I mean I've been yelling that for 15 years now, and it basically causes these problems. Again, New Jersey gave up 20 percent of the quota, and Bruce Freeman, I remember when he did it, got a lot of flak over it, and basically took it. But we tried to make the plan work. I think we're the only state that gave up that much quota on any species, to try to make a plan work. We're working basically at not doing it again with these small quotas.

CHAIR NOWALSKY: Paul Risi.

MR. RISI: I was really feeling 2 percent was appropriate, so 1.75 is closer. In New York scraps are really important for us, they'll help a lot. Thank you.

CHAIR NOWALSKY: Chairman Luisi.

MID-ATLANTIC CHAIR LUISI: I'll be really quick. I think we could do this all day. We could go back and forth, and I know that's not what your intention is, to be debating over fractions of a percent. But I feel like for the states that are going to be giving up the most in this, we reached a compromise in that last vote on the amended motion to 1 percent.

You know it was clear that the southern states supported it, the northern states didn't. But it is a compromise, it is a partnership, and we're doing what we can to try to maintain the fisheries that we have, although they haven't changed, and they are not diminished at all, based on what Sonny was talking about. You know they're seeing more sea bass down here than they have in years past. I think that was a good compromise at 1 percent, and therefore, speaking for the state of Maryland, we cannot support the 1.75 at this time. Hopefully, you know I think Greg DiDomenico mentioned during public comment that with the new assessment that's going to be available soon, perhaps the quotas will increase, and everybody can get a little bigger piece of the pie.

You know that's my hope. I think debating over fractions of a percent, we can do this all day. I don't think it's worth the time of the Board. We found a compromise that was voted up by the Board and the Council, and I think we should move forward in that direction, so I'll be opposing this motion. Thanks.

CHAIR NOWALSKY: Okay, thank you. Before we vote on this, Robert's Rules would allow somebody to further amend or substitute or take some action on this motion to amend. I would advise that we just try to get to main motions and work off of that. But again, if there is somebody who feels that something is in order from Robert's Rules perspective, I'll entertain that and decide. Otherwise, we're going to go ahead and take a vote on this question. Do we need to go ahead, staff, and just show what the table of 1.75 percent would look like, and include anything here at this point?

MS. KERNS: Adam, that would be good for the record, just to note it for the voting. Maya, if you could give control to Savannah while the states caucus, and just note for the record that on the screen we will be looking at the allocations, if New York's baseline were to increase by 1.75 percent.

CHAIR NOWALSKY: Okay, I wasn't intending on caucusing for an extended period of time, but go ahead, and while Savannah is getting that up then we'll give everybody one more minute after Savannah gets that's table up. None of this would need to be read at this point, with the nature of these webinars being recorded. We have this as

video part of the record, Toni, would that be correct?

MS. KERNS: That is correct, Adam.

CHAIR NOWALSKY: While people are also caucusing, let me also add that should this motion not pass the Board, we will then need to do something with the Council motion. Options would be once it does not pass the Board, I would go back to the original maker of the motion, and give them the opportunity to withdraw the motion if they so desire, with the consent of the Council, or we'll have to go ahead and just take the vote on the Council motion, so that we can dispense with it.

Due to the nature of what we're doing, this isn't technically a joint vote, so we do have to treat these separately. All right, let's go ahead and get to a vote on this. For the Board on the motion to amend, and let's go ahead and get the motion page back up from staff. Okay, on the motion to amend the New York baseline black sea bass allocation to be increased by 1.75 percent. Motion by Mr. Gilmore, seconded by Dr. McNamee, for the Board. All those states and jurisdictions in favor, please raise their hand of the motion to amend.

MS. KERNS: I have Massachusetts, New York, New Hampshire, Rhode Island.

CHAIR NOWALSKY: Okay, we've got four in favor. Clear those hands please. All those opposed, please raise a hand.

MS. KERNS: Letting them settle here. I have Delaware, Maryland, New Jersey, Virginia, North Carolina, and Potomac River Fisheries Commission.

CHAIR NOWALSKY: I have six opposed, abstentions.

MS. KERNS: NOAA Fisheries.

CHAIR NOWALSKY: One abstention, do we have a null vote?

MS. KERNS: One null vote with Connecticut.

CHAIR NOWALSKY: Okay, the Board motion fails, 4 in favor, 6 opposed, 1 abstention, 1 null vote. Mr. Chairman, I will turn to you to dispense with the motion. Again, you might request that the original maker with a consent may choose to withdraw the motion. If they choose not to, then I believe you're going to have to go ahead and conduct a vote on this. I see John Almeida's hand up, does he have something else to add, before we do that procedurally?

MR. ALMEIDA: Yes, Mr. Chair. I'm not sure it would be appropriate. The motion is perfected and before the Council. I don't know that we can withdraw it at this point.

CHAIR NOWALSKY: My sense was that if the maker requested it and had consent of the Council, yes, but if you feel we just need to go ahead and vote on it, and that is your direction, then I'll defer to the Chair to how he wants to proceed.

MID-ATLANTIC CHAIR LUISI: Thanks, Adam. John, you think we need to call the vote here on this one?

MR. ALMEIDA: I think with the motion perfected before the Council, yes, we probably should vote on it.

MID-ATLANTIC CHAIR LUISI: Okay, yes, let's go ahead and do that then, we'll just make it clear as to the intent of the Council. To the Council, we have a motion to amend the New York baseline black sea bass allocation to be increased by 1.75 percent. If the Council is ready for the question, I'm going to go ahead and call for those in support of the motion to amend, if you can raise your hand, and then Toni can call out the names, and take a count.

MS. KERNS: Okay, I have in favor, Paul Risi, Tony DiLernia and Dan Farnham.

MID-ATLANTIC CHAIR LUISI: Okay, thanks, Toni.

MS. KERNS: I have one more, Maureen Davidson, apologize.

MID-ATLANTIC CHAIR LUISI: All right, so that was four in favor. Let's go ahead and all those opposed to the motion to amend, please raise your hand.

MS. KERNS: Letting the hands settle for a second. All right, I have David Stormer, Kate Wilke, Sonny Gwin, Peter Hughes, Sara Winslow, Kris Kuhn, Joe Cimino, Wes Townsend, Michelle Duval, Scott Lenox, Chris Batsavage, Dewey Hemilright, and Ellen Bolen.

MID-ATLANTIC CHAIR LUISI: Did you get a count on that, Toni, or was Julia taking a count? I wasn't able to count that one, I was trying to get the dog settled down.

MS. BEATY: I got 13.

MS. KERNS: Yes, 13.

MID-ATLANTIC CHAIR LUISI: Let's go ahead and clear hands, and are there any abstentions?

MS. KERNS: I'm sorry, there should have been 14, I forgot to say Adam's name, he can't raise his hand. That's my bad, I'm really failing you, Mike.

MID-ATLANTIC CHAIR LUISI: No, no, you're doing great, Toni, there are challenges throughout the day, all day long. You're doing a great job.

MS. KERNS: For your abstentions I have one from NOAA Fisheries, Mike Pentony.

MID-ATLANTIC CHAIR LUISI: From the Service, okay. **We had a vote of 4 to 14 to 1, is what the Council vote was on this motion to amend, so the motion also fails the Council, which brings it back to the main motion,** and I'm going to turn it back to Chairman Nowalsky to conduct the vote by the Board on this one.

CHAIR NOWALSKY: All right, very good. We're back to the main motion again. I will ask one more time, is there anything else to come before, before we vote on the main motion? Emerson Hasbrouck.

MR. HASBROUCK: I would like to amend the main motion to change 1 percent to 1.5 percent.

CHAIR NOWALSKY: Based on what I've heard so far, I will say this. I think I'm providing an extreme amount of latitude in providing a third bite at the apple here, so let me just make clear that I will allow this. We will immediately look for a second, same on the Council, immediately go to a vote.

But I am not going to go beyond this motion, given what I've heard so far, and where I believe these bodies intend to go at this point. With that being said, again, I think a third opportunity to make a motion is a lot of latitude here. Is this the motion you would like to make in light of that?

MR. HASBROUCK: Yes, Mr. Chair.

CHAIR NOWALSKY: Okay, so again, I think I'm extending an extreme degree of latitude here, let's try to move through this. Move to amend to change 1 percent to 1.5 percent. Motion made by Mr. Hasbrouck, I saw Dan Farnham's hand was up, are you seconding this, Dan?

MR. FARNHAM: Actually, Mr. Chairman, thank you. I was going to ask if we could caucus for 20 seconds before Emerson did that, but it might be too late, it's your decision. Thank you.

CHAIR NOWALSKY: I need to have a motion to caucus on, so what I would allow is that if there is a second, I will pause for a moment to allow, it sounds like principally your state to decide if you want to go forward with this or withdraw it before we have any debate. Let me first ask, if you do want to go ahead and make a second or not, Dan.

MR. DiLERNIA: You need a second from the Board, not from Dan. Dan is on the Council.

CHAIR NOWALSKY: You're right, my apologies. Thank you, Tony. Do I have a second from the Board? Thank you very much, I appreciate that. Jay McNamee, are you seconding this from the Board?

DR. McNAMEE: Yes, Mr. Chair.

CHAIR NOWALSKY: Okay, thank you very much. For the Council, let me just give New York 30 seconds here to decide if their Council representation is going to go ahead with a motion, before I ask for that. Okay, for the Council. Is there a like motion to move to amend to change 1 percent to 1.5 percent?

Dan, I still see your hand up. I'm not sure if it was up for that purpose. I don't see it up any more. Emerson, your hand is up, but you're a Board member, and Jim Gilmore I see your hand up, but I believe Maureen is the Council member here. Okay, so I see Maureen's hand up, you are making this motion on behalf of the Council?

MS. DAVIDSON: Yes, I would like to make a motion for the Council, and however, my motions might be different than the one that was made by Mr. Hasbrouck.

CHAIR NOWALSKY: I am going to only allow at this point a like motion, so would you like to make a like motion on behalf of the Council, or not?

MS. DAVIDSON: Yes.

CHAIR NOWALSKY: Okay, I have Dan Farnham's hand up. Dan, are you making a second to the Council motion?

MR. FARNHAM: Yes, I would like to do that, Mr. Chairman, thank you.

CHAIR NOWALSKY: Again, given the extensive debate we have had on these at this point, we are going to go right to the question at this point.

MR. GILMORE: Mr. Chairman.

CHAIR NOWALSKY: Do you have a point of order you would like to raise, Mr. Gilmore? Again, I believe I've extended an extreme amount of latitude at this point. If you have a point of order you would like to raise, I'll be happy to entertain that. Beyond that we're going to go ahead and vote on the motion.

MR. GILMORE: Yes, Mr. Chairman, thank you for the indulgence. **That one minute during that caucus, we agreed that we would change the 1.5 to 1.25, and I believe both for the Board and the Council motions. Since this is going to be the last opportunity, and understanding what the southern states have brought up or whatever, we would like to change that percentage from 1 to 1.25.** Again, it's Mr. Hasbrouck's motion, so he would have to change it, and Ms. Davidson, but that is what we would like to pursue.

CHAIR NOWALSKY: John Almeida, do you have any objection to both of them making that change as a friendly at this point, or do you feel we need to formally have the motions withdrawn and remade for the Council side.

MR. ALMEIDA: Where we haven't discussed the motion yet, I don't really have a problem with that as a friendly.

CHAIR NOWALSKY: Staff, do you have any concerns about doing that on the Board side?

MS. KERNS: No, Adam.

CHAIR NOWALSKY: We now have a Board motion made by Mr. Hasbrouck, seconded by Dr. McNamee; Move to amend to change 1 percent to 1.25 percent. For the Council, motion by Ms. Davidson, second by Mr. Farnham to do the same. Okay, we're going to go right to the question here at this point, unless there are any points of order that need to be raised. Otherwise, I'm going to request that hands be cleared at this point. Tom Fote, your hand is up. Do you have a point of order you wish to raise about the proceedings?

MR. FOTE: Yes, I didn't hear the maker of the motion or the second of the motion at the Board change their motion. We changed the numbers to what Jim Gilmore said, but he was not the maker of the motion.

CHAIR NOWALSKY: Thank you very much. Mr. Hasbrouck and Dr. McNamee, can you verbally

confirm for us that you are changing the motion to 1.25 percent from 1.5 percent?

MR. HASBROUCK: I'm fine with that friendly to change it from 1.5 to 1.25.

CHAIR NOWALSKY: Mr. Hasbrouck has confirmed, Dr. McNamee.

DR. McNAMEE: I agree as well, Mr. Chair, thank you.

CHAIR NOWALSKY: All right, thank you. Chairman Luisi, do you have something you would like to add at this point?

MID-ATLANTIC CHAIR LUISI: Yes, just something really quickly, Adam. You have been very gracious to allow for these motions to amend. I've been receiving a lot of feedback on my phone and via text message and e-mail. Would you allow for the consideration of a motion, based on what we've gone through over the last 45 minutes, for something less than 1 percent made by the Board?

You said this is the last change. We came up with a compromise of 1 percent, but I think there is some frustration growing, and I wonder if you would consider another amended motion for something less than 1 percent. I'm not advocating for it, I'm just asking you as a point of order, whether or not this is the last amended motion that you are going to consider.

CHAIR NOWALSKY: I'm going to offer that if it is the intention of people to go ahead and advocate for something less than 1 percent at this point, I would encourage a voting down of the main motion. We then clear the table, and we can start over at that point, would be my preferred way forward, Mr. Chairman.

MID-ATLANTIC CHAIR LUISI: Okay, that sounds great. That sounds good, Adam, I appreciate that.

CHAIR NOWALSKY: I think it's a great point to bring forward. Again, when we made these changes to these motions, as New York has brought them forward, if somebody else had raised their hand and made a motion for something lower than 1 percent, to be clear I certainly would have recognized people at that time.

If somebody had wanted to amend one of these amendments to change 1 percent to something lower as a third level of Robert's Rules, I would have entertained those. Quite frankly, I haven't heard anybody bring that forward so far, but it's a valid point, and at this point the way I would like to pursue that is, if that is the intent of someone from the Council or the Board when we get back to the main motion, to vote it down, clear the deck and we'll go from there.

MS. KERNS: Mr. Chairman, can I just ask for Maya to put, it's in the back of my presentation, the slide up with the 1.25 allocation, since we haven't seen that?

CHAIR NOWALSKY: That would be consistent with what we did for 1.75, so let's go ahead and do that.

MS. KERNS: Just for the verbal record, the presentation shows an increase in New York's baseline for 1.25 percent.

CHAIR NOWALSKY: All right, very good. Tom Fote and Mike Luisi, if you can both clear your hands as we prepare for the Board vote. All right, let's go ahead and put the motions back up, please. **We are voting on the motion to amend to change 1 percent to 1.25 percent. For the Board, all those in favor, please raise a hand.**

MS. KERNS: I have Massachusetts, New York, Connecticut, New Hampshire, and Rhode Island.

CHAIR NOWALSKY: I count 5 in favor, let's go ahead and clear those hands. All those opposed.

MS. KERNS: I have Delaware, Maryland, New Jersey, Virginia, North Carolina, and Potomac River Fisheries Commission.

CHAIR NOWALSKY: Thank you, Toni, I have 6 in opposition, abstentions.

MS. KERNS: I have NOAA Fisheries.

CHAIR NOWALSKY: One abstention. The motion fails the Board 5 in favor, 6 opposed, 1 abstention. Chairman Luisi.

MID-ATLANTIC CHAIR LUISI: Let's go ahead and call the question to the Council. The motion is to amend to change the 1 percent to 1.25 percent. All those in favor of the motion to amend, please raise your hand, and I'll have Toni call off the names.

MS. KERNS: I have Paul Risi, Tony DiLernia, and Dan Farnham.

MID-ATLANTIC CHAIR LUISI: Okay, that count is 3. If you can lower the hands, Toni. We'll go ahead and call for those in opposition to the motion to amend, if you can raise your hand, Toni can call out your names.

MS. KERNS: I have David Stormer, Sonny Gwin, Peter Hughes, Sara Winslow, Kris Kuhn, Joe Cimino, Wes Townsend, Michelle Duval, Scott Lenox, Chris Batsavage, Dewey Hemilright, and Ellen Bolen, and Adam Nowalsky.

MS. KATE WILKE: This is Kate Wilke; my hand should have been up in opposition.

MID-ATLANTIC CHAIR LUISI: Thanks, Kate. Yes, we'll make note of that. Toni, if you could make a note of that as well and then give me a count. I wasn't counting with you as you mentioned the names. We have 3 opposed.

MS. KERNS: I'll ask Julia.

MIS-ATLANTIC CHAIR LUISI: Twelve or 13 in opposition?

MS. BEATTY: I think it should be 14, I think there were 12 hands raised and then there was a verbal addition of Adam Nowalsky and Kate Wilke. I don't know if Maureen's vote got counted.

MS. DAVIDSON: I was going to say, my vote is for yes, I'm sorry, I'm having some technical difficulty.

MID-ATLANTIC CHAIR LUISI: All right, so that would be 4 in favor, and did you say it was 14 opposed, Julia?

MS. BEATY: Yes, so it would make it 4, 14, and 1, which would make sense, because that is how all the other numbers have lined up so far for all the other motions.

MID-ATLANTIC CHAIR LUISI: Yes, and I never asked for abstentions, but I assume that the Service is going to abstain. Maybe just on the record we can get that clarification that the Service will abstain.

MS. KERNS: Yes, the Service, Mike's hand is raised.

MID-ATLANTIC CHAIR LUISI: Okay, perfect, so the motion to amend from 1 to 1.25 has failed both the Board and the Council, and so we're back to the main motion again, Adam. Chairman Nowalsky, I want to turn it back to you, and I don't know if you want to call the question at this point, or consider other alternatives. But it's up to you.

CHAIR NOWALSKY: Again, to be consistent, if there is something that somebody, my preference at this point is that if you are intending to do something less than 1 percent, my request would be that we do so by voting this down, and then starting with a fresh slate. If there is somebody. Again, to be fair we were on the plus side of 1 percent.

If somebody feels the need to go ahead and move in another direction, I will entertain that. I will say that if we're going to go down that road, we will take a short break for a couple minutes beforehand. We will need to wrap up a couple of other Council motions to tidy this up before we are done. Either we go down the road of voting this up or down, assuming this were to get voted up, we would tidy things up with a couple of other Council motions.

It is our intention to conduct the FMP Review at another time, so we're not going to have that on our plate. But again, if there is the desire by somebody from the Board to move in another direction, we will fully consider that. Again, this has

been a Commission driven issue at this point. The Policy Board has provided direction.

I appreciate everyone's indulgence here today, but I want to make sure that we have fully considered this, in hopes that we don't find ourselves back here with another appeal on this issue. That is my goal here. Let me turn to Bill Hyatt, you've got your hand raised.

MR. WILLIAM HYATT: I just feel the need to say something here. I would like to point out that during some of the discussion that pertained to percentage switches higher than 1 percent. Some of the people, or at least one of the people speaking in opposition, referred to the 1 percent as an acceptable compromise. At this point this discussion has gone along for some time, and I would hope that that feeling that 1 percent was an acceptable compromise holds forth herein, and we can take some action on this main motion. Thank you.

CHAIR NOWALSKY: Thank you very much, Bill. Is there anyone else who feels the need to speak on behalf of this, before we go ahead and vote on this? Again, at this point this is a motion, because it was amended. It is owned by both the Board and the Council jointly at this point, which is why you don't see makers or seconders on the screen. Not seeing any hands or hearing anything else, we are going to go ahead and conduct a vote on this motion. It has been read previously. It has been up on the board for some quite time, so I will not be reading it again. I will turn to the Board to go ahead and conduct a vote on this motion. All those in favor of the motion.

MR. HASBROUCK: Excuse me, Mr. Chairman, can we caucus before the vote, please?

CHAIR NOWALSKY: I'll provide one more minute. I believe we've caucused multiple times, including the times when other baselines were up. We're going to go ahead and put up a one-minute timer, and then we're going to go ahead and vote. Thank you very much.

MS. KERNS: Maya, would you put the 1 percent up for me, please, and note for the record the screen shows 1 percent? Thank you, Maya.

CHAIR NOWALSKY: Okay, the question to the Board. All those in favor, please go ahead and raise a hand, and if staff would put the motions back up, please, just so it's clear what everyone is voting on. Before they get read, Toni, please make sure that the motion itself is on the board before you start reading them off, just so that we're crystal clear on what people are voting on.

MS. KERNS: I have Delaware, Maryland, Massachusetts, New York, New Jersey, Connecticut, Virginia, New Hampshire, Rhode Island, North Carolina, and Potomac River Fisheries Commission.

CHAIR NOWALSKY: Very good, that looks like 11 in favor. Opposition. No opposition, abstentions. One abstention from National Marine Fisheries Service. Sorry for doing your job there, Toni. We've got 11 in favor, 0 opposed, 1 abstention. Chairman Luisi.

MID-ATLANTIC CHAIR LUISI: Let's go ahead and bring this question to the Council. All those Council members in favor of the main motion, which is an increase to New York's baseline allocation for black sea bass by 1 percent. If you are in favor of that motion, please raise your hand, and I'll have Toni call out the names.

MS. KERNS: I have Adam Nowalsky, Maureen Davidson, David Stormer, Kate Wilke, Sonny Gwin, Peter Hughes, Sara Winslow, Kris Kuhn, Joe Cimino, Wes Townsend, Michelle Duval, Scott Lenox, Paul Risi, Tony DiLernia, Chris Batsavage, Dan Farnham, Dewey Hemilright, and Ellen Bolen.

MID-ATLANTIC CHAIR LUISI: Okay, thanks, Toni. Do we have a count on that? I was trying to keep track, and I think I caught 15 of 16.

MS. BEATY: I got 18.

MID-ATLANTIC CHAIR LUISI: Did you get 18, okay, is that Julia?

MS. KERNS: Yes.

MID-ATLANTIC CHAIR: Okay, 18 in favor, we can put hands down. I'll go ahead and call for those in opposition to the main motion, you can raise your hand.

MS. KERNS: I see no hands.

MID-ATLANTIC CHAIR: Okay, any abstentions?

MS. KERNS: Waiting, to see if I get a hand.

CHAIR NOWALSKY: I see one hand, Toni, I believe it's the hand you are looking for.

MS. KERNS: Mike Pentony has his hand up, NOAA Fisheries, thanks, Adam.

MID-ATLANTIC CHAIR: Okay, so we have a motion to the Council at 18 to 0 to 1, so the motion passes the Council, and I think we've accomplished what it is you were set out to do Mr. Chairman today, which is to get both the Council and the Board in lock step with one another on allocation changes. I'm going to turn it back to you to see where we want to go from here.

CHAIR NOWALSKY: Again, my extreme appreciation to everyone on the Board and Council. I do believe I took some liberty in providing some latitude, but I think it was for the better in creating the record here, to support what we've done together today. Let me first turn to Commission staff. Are there any additional motions that are needed on behalf of the Board, in advance of completing this Addendum process?

EXECUTIVE DIRECTOR ROBERT E. BEAL: Adam, this is Bob.

CHAIR NOWALSKY: Bob, go ahead.

EXECUTIVE DIRECTOR BEAL: The short answer is no additional actions are needed. The motion that was just passed by the Board will modify the contents of Addendum XXXIII, so I think as far as the Commission side of this goes, the Board is all set.

CHAIR NOWALSKY: Okay, thank you very much for that, Bob. Let me turn to staff, either from the Board or the Council, who I believe have been working together diligently this morning, while we've all been working. What is required on the Council at this point? Earlier we had rescinded the main motion. At the last meeting the Council had put a hold on the submission of the package, so what else is needed for Council business, and then I'll turn to Chairman Luisi to administer what needs to be done.

MS. BEATY: This is Julia, I guess I'll chime in. I don't recall if the Council actually voted on that recent motion, but in addition to that we have a draft motion ready to go for basically resubmitting the amendment with the changes made today to the Agency.

CHAIR NOWALSKY: Chairman Luisi, I'll let you take over from here. My thinking is put that motion up, and get any feedback from the Service or General Counsel about if they feel anything else is needed. But again, I think if they've got that Draft Motion put it up, and I'll defer to you to figure out how to tidy this up for the Council.

MID-ATLANTIC CHAIR LUISI: Yes, I appreciate that, Mr. Chairman, so let's go ahead and put that up. The motion is to submit the Black Sea Bass Commercial State Allocation Amendment to the National Marine Fisheries Service with the preferred alternatives as amended by the action today. Is there anyone from the Council that wants to make that motion at this time?

MS. KERNS: Mike, I think there might be some perfection to that motion, if you wouldn't mind.

MR. CHRIS MOORE: Mr. Chairman, I think we had another version of this motion, Julia, that was ready to go based on the e-mail exchange we had with John.

MID-ATLANTIC CHAIR LUISI: Yes, thanks, Chris. Why don't you guys take a minute to get up there what it was that was perfected.

MS. KERNS: John, if you could just perfect that for Maya, at that point Maya was in the thick of moving things, so I didn't send her any changes.

MR. MOORE: Julia has it. I don't know if Julia can have control of the screen, or just send it to Maya, that would be the easiest, unless John, you just want to read it.

MS. KERNS: John can just read it; I think that will be our fastest way.

MR. ALMEIDA: Okay, what I had sent to Julia read; I move to submit the Black Sea Bass Commercial State Allocation Amendment to NMFS with the preferred alternatives approved at the December 16, 2020, and February 1, 2021 meetings as amended by the action today.

MS. BEATY: Can you just read the last part of that again, please?

MR. ALMEIDA: With the preferred alternatives approved at the December 16, 2020 and February 1, 2021 meetings, as amended by the action today.

MID-ATLANTIC CHAIR LUISI: Okay, John, can you see the screen?

MR. ALMEIDA: Yes, I can see it.

MID-ATLANTIC CHAIR LUISI: Does that read as you intend it to read?

MR. ALMEIDA: Yes, the intention here is to just wrap things up in a bow here that we voted on undoing earlier, we're now wrapping up and making clear that the alternatives are only amended as to the extent that we amended them with the vote that just finished.

MID-ATLANTIC CHARI LUISI: That just happened, okay. Yes, and I think it's important for the Council to understand, that by supporting the work of the Board. Well supporting the motion by the Board and the Council, those allocations in the Federal FMP will stay the same, based on state and federal FMPs. We're not going to be in a situation based on the vote that just happened, we're not going to be in a situation where we have different state and federal allocations to the states. I think that's an important thing to just recognize, as far as the action that just happened. I'm comfortable with this, do you want me to read it into the record and then call for a person to second on this? Is that the best thing, John?

MR. ALMEIDA: I think we need someone to make the motion.

MID-ATLANTIC CHAIR LUISI: Does anyone want to make this motion, and if so, can you please read it into the record? I can't see hands go up, so I'll ask Toni to call on members of the Council that want to make this motion.

MS. KERNS: Joe Cimino.

MID-ATLANTIC CHAIR LUISI: Go ahead, Joe.

MR. CIMINO: Move to submit the Black Sea Bass Commercial State Allocation Amendment to NMFS with the preferred alternatives approved at the December 16, 2020, and February 1, 2021 meetings as amended by the action today.

MID-ATLANTIC CHAIR LUISI: Okay, so we have a motion made by Joe Cimino, and I'm going to look for a second on behalf of the Council. Does anyone want to second that on behalf of the Council?

MS. KERNS: You have Maureen Davidson.
MID-ATLANTIC CHAIR LUISI: Okay, so we have Ms. Davidson. Thank you, Maureen. Any discussion on the motion? Is there any opposition to the motion? If anyone is opposed to the motion, can you please raise your hand?

MS. KERNS: I have Kate Wilke with her hand up.

MID-ATLANTIC CHAIR LUISI: Kate, go ahead.

MS. WILKE: Yes, Mike, thanks Mr. Chair. This isn't opposition, I wanted to just make a comment before we vote on this, and just say that I want to

support Shanna Madsen's earlier suggestion that the allocation issue be looked at by the Allocation Working Group, because there were some questions about the Policy Board kind of weighing in on allocation on this issue. You know I felt a little hamstrung as a Council member today, because I think it's really important that the state allocations be a part of the federal FMP. You know it was just difficult voting today. I just wanted to say that on the record, before we submit this to the Service, but I am not opposing this motion.

MID-ATLANTIC CHAIR LUISI. Thanks, I appreciate that, Kate. You know based on the discussion that Shanna brought up, you know that is something certainly that the Board can take up, to work with the Executive. Bob, is that Executive Committee, or is that Policy Board that is spearheading that Allocation Work Group? Bob Beal.

EXECUTIVE DIRECTOR BEAL: Yes, thanks, Mike. That would be the Policy Board.

MID-ATLANTIC CHAIR LUISI: Maybe that's something that can come up at a future meeting, maybe as an agenda item, to talk about how the allocation issues are being dealt with, I don't know. Just something to follow up with. Does anyone else have any other comments on the motion before us as a Council member? Toni, do you see any hands?

MS. KERNS: No additional hands.

MID-ATLANTIC CHAIR LUISI: Okay, let me ask again, is there any opposition to the motion to submit the revised changes from today, the amended changes to the Black Sea Bass Commercial State Allocation. Is there any opposition to resubmitting that as we discussed today?

MS. KERNS: I see no hands in opposition.

MID-ATLANTIC CHAIR LUISI: Okay, so motion carries based on unanimous consent. Let me ask staff, is there anything else that we need to take up as a Council at this point?

MS. KERNS: Mike Pentony has his hand up, Mr. Chair.

MID-ATLANTIC CHAIR LUISI: Yes, go ahead, Mike.

MR. PENTONY: Just flagging an abstention.

MID-ATLANTIC CHAIR LUISI: Oh, okay, so motion carries unanimous consent with abstentions by GARFO.

MR. MOORE: Mr. Chair, we have nothing else.

MID-ATLATNIC CHAIR LUISI: That's it, Chris?

MR. MOORE: We have nothing else, yes, that is it.

MID-ATLANTIC CHAIR LUISI: All right, back to you, Chairman Nowalsky. We're good on our end on the Council side, I'll let you go ahead and call the meeting adjourned. Thanks for your efforts today too, you did a great job.

CHAIR NOWALSKY: Well again, I appreciate everyone's indulgence and patience today. To wrap up the Board agenda at this point, the next agenda item that we had was FMP Review and Compliance Reports. Staff has been working behind the scenes with the Council this morning to have that added as a Board only agenda item for next week's meetings, when we will be meeting jointly, as opposed to concurrently.

But that would be a Board only action, as well as seeing if there is anything else that can be taken up. That is going to address that issue. Under Other Business, again we've heard the concerns raised by both a Board and a Council member here today about the process here. I'll offer that the Policy Board is meeting tomorrow.

Again, I would offer anyone to bring that up under Other Business there, as well as this species board can continue to go ahead with that, that what we've done here and make any recommendations to the Policy Board moving forward at some point moving forward.

ADJOURNMENT

CHAIR NOWALSKY: Is there any other business that has to come before the Board today? Okay, seeing no hands and hearing nothing else, and having completed the business before the Board, the meeting stands adjourned. Thank you again to everybody; staff and all Board and Council members and the public today. Thank you so much.

(Whereupon the meeting adjourned at 1:15 p.m. on Wednesday, August 4, 2021)

Atlantic States Marine Fisheries Commission

Spiny Dogfish Management Board

January 25, 2022
4:30 – 5:00 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 (*N. Meserve*) 4:30 p.m.

2. Board Consent 4:30 p.m.
   - Approval of Agenda
   - Approval of Proceedings from October 2021

3. Public Comment 4:35 p.m.

4. Consider Postponed Motions from October 2021 (*N. Meserve*) **Final Action** 4:45 p.m.

   Main Motion
   Move to set at least a 7500-pound trip limit in the Northern Region (ME through CT) for FY2022 contingent upon NOAA Fisheries adopting at least a 7500-pound trip limit for federal waters. If at least a 7500-pound trip limit is not approved in federal waters, then the 6,000-pound trip limit will remain in the Northern Region.

   Motion to Substitute
   Move to substitute to set the Northern Region (ME through CT) state waters trip limit for FY 2022 equal to the trip limit in federal waters approved by NOAA fisheries.

   Motion to Postpone
   Motion to postpone action around the state waters trip limits for FY2022 until the ASMFC Winter Meeting.

5. Review and Populate Advisory Panel Membership 4:50 p.m.
   (*T. Berger*) **Action**

6. Elect Vice-Chair (*N. Meserve*) **Action** 4:55 p.m.

7. Other Business/Adjourn 5:00 p.m.

The meeting will be held via webinar, click here for details.
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEETING OVERVIEW

Spiny Dogfish Management Board
January 25, 2022
4:30 - 5:00 p.m.
Webinar

Chair: Nichola Meserve (MA) Assumed Chairmanship: 10/21	Technical Committee Chair: Scott Newlin (DE)	Law Enforcement Committee Representative: Pat Moran (NJ)
Vice-Chair: Vacant	Advisory Panel Chair: Vacant	Previous Board Meeting: October 21, 2021
Voting Members: ME,NH, MA, RI, CT, NY, NJ, DE, MD, VA, NC, NMFS (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 21, 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 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. Consider Postponed Motions (4:45 - 4:50 p.m.) Final Action

Background

- In October, the Mid-Atlantic Fishery Management Council (MAFMC) recommended to NOAA Fisheries to increase the federal commercial trip limit to 7,500 pounds. The decision was made based on analysis from MAFMC staff that indicated increasing the trip limit to that level would not have negative impact on the resource or markets.
- Later in October the Board considered the motion by the MAFMC but postponed action on the commercial trip limit in state waters until after the New England Fishery Management Council (NEFMC) met in December. The Board postponed the following motions from the October 2021 meeting:

Main Motion
Move to set at least a 7500-pound trip limit in the Northern Region (ME through CT) for FY2022 contingent upon NOAA Fisheries adopting at least a 7500-pound trip limit for federal waters. If at least a 7500-pound trip limit is not approved in federal waters, then the 6,000-pound trip limit will remain in the Northern Region.

Motion to Substitute
Move to substitute to set the Northern Region (ME through CT) state waters trip limit for FY 2022 equal to the trip limit in federal waters approved by NOAA fisheries.

Motion to Postpone
Motion to postpone action around the state waters trip limits for FY2022 until the ASMFC Winter Meeting.

- In December, the NEFMC voted to recommend increasing the federal commercial trip limit to 7,500 pounds.
- The postponed motions from the Board's October meeting are back on the table.

Board Actions for Consideration

- Consider action on postponed motion

5. Review and Populate Advisory Panel Membership (4:50 - 4:55 a.m.) Action

Background

- There is one new nomination to the Spiny Dogfish Advisory Panel- Captain Rick Bellavance, a commercial rod and reel fisherman and charter/party boat captain from Rhode Island **(Briefing Materials)**

Presentations

- Nominations by T. Berger

Board Actions for Consideration

- Approve Spiny Dogfish Advisory Panel nominations

6. Elect Vice-Chair Action

7. Other Business/Adjourn

Spiny Dogfish

Activity level: Low

Committee Overlap Score: low (some overlaps with Coastal Sharks)

Committee Task List
• TC – July 1st: Annual compliance reports due

TC Members: Scott Newlin (DE, TC Chair), Tobey Curtis (NOAA), Jason Didden (MAFMC),Lewis Gillingham (VA), Greg Skomal (MA), Mike Frisk (NY), David Behrigner (NC), Conor McManus (RI), Matt Heyl (NJ), Angel Willey (MD), Matt Gates (CT), Kathy Sosobee (NOAA), Michael Frisk (NY), Kirby Rootes-Murdy (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SPINY DOGFISH MANAGEMENT BOARD

Webinar
October 21, 2021

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

Draft Proceedings of the Spiny Dogfish Management Board Webinar
October 2021

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)
Cheri Patterson, NH (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Nicola Meserve, MA, proxy for D. McKiernan (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Conor McManus, RI, proxy for J. McNamee (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Matt Gates, CT, proxy for J. Davis (AA)
Bill Hyatt, CT (GA)
Sen. Craig Miner, CT (LA)
John Maniscalco, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
Joe Cimino, NJ (AA)
Peter Clarke, NJ, proxy for T. Fote (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
Shanna Madsen, VA proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Cynthia Ferrio, NMFS

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

Staff

Robert Beal
Toni Kerns
Laura Leach
Lisa Carty
Tina Berger
Pat Campfield
Maya Drzewicki
Emilie Franke
Jeff Kipp
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Caitlin Starks
Deke Tompkins

Guests

Karen Abrams, NOAA
Pat Augustine, Coram, NY
Alan Bianchi, NC DENR
Jeff Brust, NJ DEP
Thomas Burrell, PA F&B
Heather Corbett, NJ DEP
Nick Couch, DE DFW
Justin Davis, CT (AA)
Lennie Day
Andrea Didden
Jason Didden, MAFMC
Lynn Fegley, MD DNR
Marty Gary, PRFC
Pat Geer, VMRC
Lewis Gillingham. VMRC
Michael Ginex
Sonny Gwinn
Hannah Hart, FL FWC
Doug Haymans, GA (AA)
Jay Hermsen, NOAA
Helen T. Heumacher, US FWS
Matthew Heyl, NJ DEP
Carol Hoffman, NYS DEC
Jesse Hornstein, NYS DEC
Asm. Eric Houghtaling, NJ (LA)
Jacob Jaskiel
Chris Kellogg, NEFMC
Adam Kenyon, VMRC
Rob LaFrance, Quinnipiac Univ
Wilson Laney
Chip Lynch, NOAA
Dan McKiernan, MA (AA)
Kim McKown, NYS DEC
Steve Meyers
Mike Millard, US FWS
Brandon Muffley, MAMFC
Allison Murphy, NOAA
Lindsey Nelson, NOAA
Tamara O'Connell, MD DNR
Michelle Passerotti, NOAA
Willow Patten, NC DENR
Bill Post, SC DNR
Jill Ramsey, VMRC
Kathy Rawls, NC (AA)
Tara Scott, NOAA
Somers Smott, VMRC
David Stormer, DE DFW
Marek Topolski, MD DNR
Scott Curatolo-Wagemann
Mike Waine, ASA
John Whiteside
Angel Wiley, MD DNR
Chris Wright, NOAA
Jordan Zimmerman, DE DFW
Renee Zobel, SC DNR

The Spiny Dogfish Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Thursday, October 21, 2021, and was called to order at 10:15 a.m. by Chair Chris Batsavage.

CALL TO ORDER

CHAIR CHRIS BATSAVAGE: Good morning, everyone, I would like to call the Spiny Dogfish Management Board meeting to order. My name is Chris Batsavage, I'm the Administrative Proxy from North Carolina, and I'll be serving as Chair this morning.

APPROVAL OF AGENDA

CHAIR BATSAVAGE: I'll start off by Approval of the Agenda. Does anyone have any modifications to the agenda that was presented in the briefing materials?

MS. TONI KERNS: I have no hands raised.

CHAIR BATSAVAGE: Okay, then we will consider the agenda approved.

APPROVAL OF PROCEEDINGS

CHAIR BATSAVAGE: Next is Approval of the Proceedings from the October, 2020 Board meeting. Do any Board members have any modifications to the minutes from that meeting?

MS. KERNS: I have no hands raised.

CHAIR BATSAVAGE: Okay, then we will also consider those approved.

PUBLIC COMMENT

CHAIR BATSAVAGE: Next up is Public Comment. This is an opportunity for the public to comment on any issues related to Spiny Dogfish that are not on the agenda today. Toni, are there any hands up from the public to provide comment?

MS. KERNS: I do not have any hands raised.

REVIEW OF AN ANALYSIS ON SPINY DOGFISH TRIP LIMIT AND MARKET PRICE

CHAIR BATSAVAGE: Okay, moving right along, next item is a Review of an Analysis on Spiny Dogfish Trip Limit and Market Price. Today we have Jason Didden from the Mid-Atlantic Fishery Management Council to present some information on that. Good morning, Jason, and please begin whenever you're ready.

MR. JASON DIDDEN: This is Jason Didden, I'm a member of the Council staff for Spiny Dogfish. As a bit of a read up for some of the trip limit analysis, I'm going to roll through a little bit of background, because it helps set the scene for why the Council is looking at this. We're currently at an acceptable biological catch, just shy of 39 million pounds.

After discards mostly are accounted for, a little bit of median catch, just under 30-million-pound quota. That is the current fishing year, starts May 1, 2021, and also planned for 2022. The Council had set multi-year specs. For 2021, that ABC was associated with basically a one-third chance of overfishing. The lower more conservative, precautionary than the maximum risk of overfishing allowed by the Council, because the stock size as estimated was a bit below the target. With the Council's risk policy stock size slips below the target, the Council tolerates less and less chance of overfishing.

That was the estimated risk of overfishing for 2021, and then the SSC and Council extended that through the 2022 fishing year, since we have a research track assessment underway, and we're not getting another assessment for 2022, in particular. In terms of just broad management, its open access, requires a federal permit at the federal level, and the current federal trip limit is 6,000 pounds.

We didn't get like an assessment update. The Science Center did provide us with an update on the survey, no survey in 2020, but you can see that in

2021 data point, more or less in between the '18 and '19 data points. Same thing with the Pup index that comes out of the same survey, our spring trawl Science Center Survey Pup Index, now also in between the two previous data points.

Landings since management. The landings kind of increase and catch up with the increase in the quota as the stock is rebuilt initially, but then notice in 2010 it just kind of lags out of the quota, and we have a stock assessment update that caused the lowering of the quota for the 2019 fishing year. Then the projections coming out of that the stock is floating back up. Those last two data points in orange are the 2021, 2022 quotas.

Landings for the 2020 fishing year were down a good bit from 2019. This is current fishing year, so the current fishing year has been lagging, even 2020 fishing year, which again that was down itself. Just dogfish prices, inflation adjusted to 2020 dollars. If there is a trend it depends on exactly where you start.

The last several years there has been a general uptrend, but one of the tasks that I have engaged in for the research track assessment ongoing, has been just doing some data cleaning. We had some issues with kind of misreported landings, like whole dogfish or gutted dogfish reported as fins, and then that gets expanded.

I saw a couple things that sort of caught my attention in some of the last couple years, which may affect that price information a bit, hopefully not a ton. But am doing some data, kind of sifting and cleaning as part of some kind of activities with the research track assessment. Our Advisory Panel creates our fishery performance report, FPR, each year.

Pretty much similar sentiments as previous years, flagging that markets and trip limits really serve to restrict landings in this fishery. They've noted the continued erosion of participants. When you look at numbers of participants landing different amounts of fish each year, we've had a number of years of decline.

We've gotten input from some of the AP members that an increase in the trip limit to 10,000 pounds would help increase landings. Folks flag that if we go back quickly you can see that orange line, the end of the last fishing year, kind of flat line. It's normally when Virginia would be fishing, so that's an input that in the last fishing year Virginia had some diversion of participants to the shrimp fisheries, some oystering. Then we also got input from, not an AP member, but member of the public in Massachusetts that for this year the blueline, Massachusetts landings were lagging a bit.

Again, some people are shifting into other fisheries. It seemed like there were some availability issues with warm water, not finding dogfish in the normal spots, and some processors who wanted skates brought in along with dogfish, and if they couldn't provide the skates than the processors weren't interested in their dogfish.

We've kind of got a number of reasons for both the Virginia held off in the 2020 fishing year and the slow start in Massachusetts for the 2021 fishing year. The Advisory Panel continues to flag some science concerns, chief among them the Bigelow operations performance issues. The assessment to date has really been heavily dependent on this spring survey, and whether it's missed stations, (didn't catch), shifts in timing, my concern that that influences our ability to get a sense of where the dogfish population is headed.

Also, we've had recent research that looks at dogfish distribution beyond the survey area, also vertical distribution, and that kind of adds some uncertainty about what the trawl survey really means, in terms of dogfish. Then kind of continuing to flag that some kind of recent research on fecundity, in terms of how they're pupping just kind of raises concern among the AP of our ability to kind of know what is going on with dogfish.

The SSC takes all that and they kind of just basically endorse staying in our status quo specifications. They noted that a data gap with the 2020 Spring Survey certainly increases uncertainty. But the way those indices and the biomass data points we looked at earlier are calculated, some of the 2021 missed stations would cause that data point to be an underestimate, because of how the expansion works. No changes from the SSC.

On the trip limit analysis itself, given that erosion of participation and requests by at least some parts of the AP over time, if you look at the trip limit issue. The Council had kind of flagged this as a task related to an executive order, to try to take a bit of a deeper dive in consultation with some staff at the Science Center that said one way to look at this is just look at how prices move during the last trip limit adjustments.

They looked at both the 2014 and 2016 trip limit changes, and there really didn't seem to be a whole lot of impact on prices, at least at the coastwide level. We have gotten some input at some meetings over the last couple of months that there may have been some kind of more regional, local reactions, in terms of prices, with some of the trip limit changes. But at least looking coastwide didn't see any drastic changes.

At the Committee level, National Marine Fishery Service flagged that it would be useful, at least for decision making, and certainly for NEPA analysis to have a bit of additional descriptive information on some recent trips. Between the Committee meeting and the Council meeting, we had a couple of analyses just to help folks get a sense of how the fishery is operating. These are the 2019 and 2020 fishing years, and there are 8,215 dots on this figure. A lot of them are together, so you just kind of get a blur. But you can see that that 6,000-pound trip limit, there aren't a lot of trips above that, and you can see how dark it gets near that line. There are a lot of trips at or very close to that 6,000-pound trip limit.

These kinds of dots I just sorted them by date in the start of the 2019 fishing year on the left, and just moving through these two fishing years through time from left to right. Again, just to get a sense of how much of an impact, and what do trips look like. Again, there are over 8,000 dots on this map, to try to get a little more sense of the types of trips and what percent of landings those same 8,200 plus dots are now distorted from largest trip to smallest trip.

Like some of the higher dots here, the highest ones there are now over on the left here. Kind of get a sense of these size trips. How much of total landings are represented by these different trip types? There are relatively few trips that are above 6,000 pounds and the states have higher trip limits, and vessels without a federal dogfish permit can fish in state waters. It's an open-access permit, so to some degree it can be picked up and dropped.

Larger trips are 4 percent of landings. Then trips between 5,800 pounds and 6,000 pounds, all these dots in here, probably about 3,000, there is a couple thousand dots in there. Close to the trip limit is over a third of landings. You think 5,800 pounds to 6,000 pounds, real close to trip limit. That's over a third of landings between 5,000 pounds and 5,800 pounds that's another 25 percent of landings.

Again, just a sense of, you have a large chunk of the landings fairly close to the trip limit. Again, exact same data, same 8,000 trips, kind of binning them, and you can see not so many trips on the right here, about 6,000 pounds, that's 4 percent of landings. Between 5,000 and 6,000 pounds, that's really the plurality of trips in the single biggest bin here.

We've got over 3,000 trips between 5 and 6,000 pounds, and they make over about two-thirds of the landings in that group. Again, just a sense of what types of trips are responsible for landings. I think it says provide a sense that trip limit is

restricting, and you would expect some usage of an increased trip limit.

For the Monitoring Committee, we have two Ex-Officio industry members on the Monitoring Committee that recommended doubling of the trip limit to 12,000 pounds, to try to kind of get back to that somewhat higher participation level that we've seen in relatively recent history. Unless the Monitoring Committee has always kind of been more focused on, as long as we're sharing of the overall quota, the trip limits shouldn't be having a huge impact on stock size.

But the size of the change, if the Council wants to make a change, kind of dictates the process and the impacts associated with those, whether it's through a specifications or framework or an amendment, and what kind of NEPA analysis is necessary. But there was some input from the Ex-Officio industry members.

They requested that that 12,000-pound change be made rapidly, through an emergency rule, and kind of given the requirements for emergency rules, that seems like a not super feasible path. At the Council level, the Council didn't recommend any changes to specifications or quotas, but did recommend 25 percent increase to the federal trip limit, that would bring it up to 7,500 pounds. It's generally in line with the percentage changes for some of those other recent ones, and it becomes through specifications the target date of May 1 is kind of a target date when things occur through specifications.

Then the Council also voted to consider, when it meets again in December, whether or not to prioritize a framework for 2022 for additional modifications of the trip limit. Some of that discussion was also kind of noting that how the Council proceeds, it certainly takes action with a framework like that would likely depend on the results of the pending research track assessment.

Then the New England Council will take up dogfish in December. Jointly managed with New England, if the Councils don't agree, NMFS has considerable flexibility to resolve that difference. That's it for me, thank you.

CHAIR BATSAVAGE: Thank you for the presentation, Jason. Does anyone have any questions on the presentation?

MS. KERNS: We have a hand from David Borden.

CHAIR BATSAVAGE: Go ahead, David.

MR. DAVID V. BORDEN: Jason, if industry members want to craft and submit alternatives for a different arrangement on trip limits, when would they have to submit it for the framework?

CHAIR BATSAVAGE: Jason.

MR. DIDDEN: The tentative goal for frameworks is that the Council comes out of the first framework meeting with the range of alternatives. It sounded like most likely the Council might pick something up and have a first framework meeting after at least a good sense of the results of the research tracks are known.

That's probably going to be, I think that's over the summer. It will just be really that first framework meeting, and folks can talk to their council members, certainly make comments at that meeting. On the Council's website we have like the dates for public comments, leading up to each council meeting, so folks would make comments leading up to that first council meeting when Framework Meeting 1 is on the agenda.

MR. BORDEN: If I might, Mr. Chairman. That's December '22 or are we talking '21?

MR. DIDDEN: I anticipate currently if the Council prioritizes such a framework, that it would take it up in late summer or fall of 2022 for 2021.

CHAIR BATSAVAGE: Any other questions?

MS. KERNS: You have no other hands.

REVIEW AND POSSIBLY REVISE THE 2022 AND 2023 SPECIFICATIONS

CHAIR BATSAVAGE: We'll move on to the next item, which is to Review and Possibly Revise the '22, '23 Specifications. It is kind of based on the information that Jason just provided, as far as the trip analysis and what the Mid-Atlantic Council chose when they met a couple weeks ago. Kirby has a presentation, I think, to go over, or at least information to go over this with us. Kirby.

MR. KIRBY ROOTES-MURDY: I do have a brief presentation. As Jason noted, the Mid-Atlantic Council recommended an increase in federal trip limit up to 7,500 pounds for the 2022 fishing season. They also, as he mentioned, are considering adding a framework adjustment to consider changes to the trip limit and the implementation plan, which they'll take up in December.

For the Board's consideration today, the Board can modify the northern region trip limit, and that's for the states of Maine through Connecticut for the 2022 fishing season. Previously the Board had set the trip limit at 6,000 pounds, and that's what the trip limit is currently for the region in this fishing season, 2021, the current. In terms of Board actions for consideration today, the Board could, as noted increase the northern region trip limit to be consistent with the Council's recommendation to NOAA.

The other consideration is whether if they pursue that, recommend other states to help the northern regions, New York through North Carolina implement trip limits that don't limit potential 7,500 pounds federal trip limit. That concludes my presentation, and I think the only other thing I would note is that if the Board wants to make changes to that northern region trip limit, they previously approve that by taking a final action. We would either need a role call vote or agreement on the motion.

CHAIR BATSAVAGE: Any questions for Kirby?

MS. KERNS: I don't have any hands, Chris.

CHAIR BATSAVAGE: Kirby kind of laid out the options and considerations for the Board today, based on what the Mid-Atlantic Council did, as far as trip limits a couple weeks ago. But also keeping in mind that this is a jointly managed plan in federal waters with the Mid-Atlantic Council and New England Council, and New England will be meeting in December to set specifications.

Then from there NOAA Fisheries would ultimately then set the specifications based on input from both Councils in federal waters for next May. Just looking for some input, direction from the Board, as far as what they want to do in state waters, particularly for the New England states that currently are under a 6,000-pound trip limit.

MS. KERNS: I have Ray Kane.

CHAIR BATSAVAGE: Okay, Ray.

MR. RAYMOND W. KANE: I would like to put a motion forward. If you would like me to read it, I'll read it.

CHAIR BATSAVAGE: Yes, please.

MR. KANE: Move to set a 7500-pound trip limit in the Northern Region (Me through CT) for FY 2022 contingent upon NOAA Fisheries adopting a 7500-pound trip limit for federal waters. If a 7500-pound trip limit is not approved in federal waters, then the 6,000-pound trip limit will remain in the Northern Region. Thank you.

CHAIR BATSAVAGE: Thanks, Ray, do we have a second?

MS. KERNS: Cheri Patterson.

CHAIR BATSAVAGE: It is seconded by Cheri Patterson. Any discussion on the motion?

MS. KERNS: I have Pat Geer.

CHAIR BATSAVAGE: Okay, Pat.

MR. PAT GEER: I just want to clarify. The states of New York through North Carolina are still allowed to increase their trip limit to 7,500 pounds?

CHAIR BATSAVAGE: Yes, they can, since the states can set their own trip limits. They do have the option of also increasing to 7,500 pounds, and I think it is also contingent upon what NOAA Fisheries adopts.
MR. GEER: Okay, thank you.

CHAIR BATSAVAGE: Any further questions?

MR. DIDDEN: This is Jason, I can't figure out the hand raise feature, but can I ask a question?

CHAIR BATSAVAGE: Oh yes, definitely.

MR. DIDDEN: If by some chance NOAA was able to implement a trip limit change a little bit early, would this motion not allow those states to follow suit?

CHAIR BATSAVAGE: Early meaning before the 2022 season?

MR. DIDDEN: Going through the specifications process, the target is May 1. If it happened to get done like two weeks early, and was effective two weeks early, would these states not be able to follow suit, if it happened to be effective a little bit early?

CHAIR BATSAVAGE: I think based on the motion maybe not. I'll look to Toni on that, and it also may depend on the state's ability to go through their administrative processes to change trip limits in state waters, whether they would be able to do that before May 1st. But I'll just see if Toni has any thoughts on that. Maybe if any of the northern states have thoughts as far as what they could do if this was an option to make the trip limit change before May 1st.

MS. KERNS: As the motion reads it's for Fishing Year 2022. We could revise the motion to change it, but as you said, I don't know the ability for all of the states to make a change fast enough that would make a difference if it was only two weeks early. But I guess it would depend on what NOAA was thinking. But while I'm speaking, I just want to let you know that I have Eric Reid, Mike Luisi and Ray Kane.

CHAIR BATSAVAGE: All right thanks, Eric.

MR. ERIC REID: If for some unknown reason New England were to approve a trip limit of let's say 8,000 or 9,000 pounds. This motion should probably read adopt a trip limit of at least 7,500 pounds, just in case. Because if its strictly 7,500 pounds and it goes to 7,600 pounds, the motion would not make the 6,000 pounds go away.

CHAIR BATSAVAGE: Thanks for bringing that up, Eric. I had kind of similar questions about that. You know if New England picked a trip limit that was different than 7,500, and then GARFO ultimately selected a trip limit kind of splitting the difference, whether it was higher or lower how this would work. I guess with that, if Cynthia could possibly provide some insight on that scenario Eric just gave, to see if this motion might need some modifying. Cynthia, if you don't mind.

MS. CYNTHIA McMANUS: Sure, yes. I think that might be a good modification, because yes, in the eventuality because we know that New England Council hasn't met yet. In the possibility that they do propose a different limit of potential federal trip limits. It comes back to the Agency as having the option to select any alternative that has not been rejected by either council.

Essentially that would give us the option to go with either. The potential does sit there, that we could

go with a different one. We have been kind of talking internally about whether the fact that like the Mid didn't select a different number, does that count as an outright rejection, or how that works.

But essentially where we are right now, we're thinking that say, so the Mid proposed 7,500, if New England says like 9,000 for some reason, we would have the option to pick either. If that eventuality happened, I think it would probably be good to have some language that kind of better reflects essentially similar to what you have right now, with contingent on NOAA Fisheries adoption of a higher trip limit, maybe a little bit more flexible, just in case something different comes out of New England.

CHAIR BATSAVAGE: Thanks, Cynthia, I appreciate that explanation. Eric, I think you had, I guess a suggested modification to the motion, if you want to provide that now, then we see if Ray and Cheri are okay with maybe doing a friendly amendment.

MR. REID: Well, Mr. Chairman, you just have to put in either no less than or at least 7,500 pounds, however the maker and the seconder want to handle it. But that's a pretty simple adjustment.

CHAIR BATSAVAGE: Okay, we'll try adopting at least a 7,500-pound trip limit for federal waters. I don't know if we need to make a modification in the next sentence or not, or just there. Eric, is that getting to what you're suggesting, and I think is also in line with the information Cynthia just gave us, right?

MR. REID: Well, it's got to be in both sentences, Mr. Chairman, that would be my opinion.

CHAIR BATSAVAGE: Okay, that makes sense. Ray and Cheri, are you okay with this modification to the motion?

MR. KANE: Yes, Chris, I'm good with it.

MS. PATTERSON: Yes, I'm fine, thank you.

MS. KERNS: Chris, should it say at least a 7,500-pound trip limit for the first sentence as well, that first 7,500 pounds?

CHAIR BATSAVAGE: I think so, yes.

MS. KERNS: Then I have a follow up question, in terms of process. Then if NOAA does adopt a different trip limit, then would it be the intention of the Board for staff to come back and provide that trip limit, and do an e-mail vote to set a final trip limit if it is something higher than 7,500 pounds?

CHAIR BATSAVAGE: I think that would make the most sense. It's real hard to predict exactly what will ultimately happen. I mean yes, from staff's perspective, Toni, is that probably the easiest way to handle that, or would this really be up to the Board to decide how to proceed under that scenario?

MS. KERNS: I think that would be the easiest. Bob has his hand up, so he might have a different idea of direction, so I'm going to let him speak.

CHAIR BATSAVAGE: Yes, Bob, I appreciate any input.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Yes, just a thought. I think really what the states are trying to do here, and the northern states in particular, is just mirror the federal trip limit. With the numbers in here it kind of pins us in. You know maybe it's just simply a move to establish a northern region trip limit consistent with what NOAA establishes for FY22, and keep it at that. Who knows?

Maybe NOAA decides on 7,000 pounds, or NOAA decides on 9,000 pounds after they get New England input. I think all these multiple votes may be tricky. I think it's just, establish a northern region trip limit consistent with what NOAA establishes for FY22 if NOAA maintains a 6,000-pound trip limit, the northern region will maintain the 6,000-pound trip limit as well, something along

those lines, or just say we're going to ride along with what NOAA does, and if NOAA doesn't change, we're not going to change either, so we can work on the wording if you want.

CHAIR BATSAVAGE: That makes a lot of sense, because again, say it's from a process standpoint and kind of allows for a lot of flexibility. I guess we could try modifying the motion that way. It changed it pretty substantively. I think we're trying to get to get to the same place either way. Would it be okay to just modify to that level, just kind of trying to follow parliamentary procedures as best as I can? I guess look for some guidance from staff on that, and then also see if Ray and Cheri are okay with what Bob is suggesting.

EXECUTIVE DIRECTOR BEAL: Chris, this is Bob again if I might. You know I think you're right, it is a pretty significant change to this motion, and there are a lot of details in this motion that would be modified. You know there are two ways out of this. One is a substitute motion, or the other is just to have the Board agree to withdraw this motion, because it is property of the Board now.

Then start all over. The third option is, you know Roberts Rules of Order really being stretched, which is modifying this one with the approval of Ray and Cheri. It's up to the group, but any of those are viable. I mean the idea is just to make sure we get the will of the Board captured in the motion.

CHAIR BATSAVAGE: Thanks, I guess we'll try this, hopefully this might be quick. Is there any objection by the Board to withdraw this motion and then start with a new motion as Bob suggested?

MS. KERNS: I have some hands up by Eric, Mike Luisi, and David Borden, and I don't know. They've been up, some of them have been up, so I don't know if that's what they are objecting to or not. One went down. Eric and David, are you objecting?

MR. REID: If I might, Mr. Chair.

CHAIR BATSAVAGE: Yes.

MR. REID: My suggested language for of at least is in case New England should set a higher trip limit. If it is the will of the Board to set a trip limit at 7,500 pounds, that is what they should say. If you set a trip limit of at least 7,500 pounds it's pretty ambiguous. To me, I think that move to set a trip limit at 7,500 pounds is what the Board seems like it wants, and just let it go.

CHAIR BATSAVAGE: Okay. Anyone else with thoughts on how to proceed with this motion or possibly an alternative motion?

MS. KERNS: I have Matt Gates.

CHAIR BATSAVAGE: Hey, Matt.

MR. MATTHEW GATES: Hi, Chris, thank you for the opportunity to comment on this. I think what I was thinking of doing is making a substitute motion to do what Bob indicated, if that's helpful to you to move this along, in case that was the will of what the Board wanted was to set the limit the same as what the Feds will eventually approve, or if the will is to stick with the 7,500 pounds regardless then I won't bother.

CHAIR BATSAVAGE: I think at this point it would be appropriate to put up a substitute motion, then we can kind of debate both at one time, so Matt yes, if you're ready to offer one that would be great.

MR. GATES: Okay, I'll try, I'm doing it on the fly, so bear with me a little bit. I would move to set the Northern Region, Maine through Connecticut trip limit for FY2022 equal to the limit approved by NOAA Fisheries.

CHAIR BATSAVAGE: Matt, is that reading the way you would like to see it, I guess we're still crafting it

here a bit. I'll let Maya finish up before letting you determine if this is what you would like. Do we have a second?

MS. KERNS: Megan Ware.

CHAIR BATSAVAGE: Okay, seconded by Megan Ware, and I guess for efficiencies sake, go ahead and take comments on the substitute motion and the first motion too, just to move things along. Toni, I know we had some other folks in the queue. Who do we have, I guess in order right now, to make sure I don't miss anybody?

MS. KERNS: Mike Luisi, David Borden and Adam Nowalsky, I think that is everybody that was in the queue.

CHAIR BATSAVAGE: Okay, Mike Luisi.

MR. MICHAEL LUISI: I don't really have a dog in the fight here with the Northern Region, but I understand where they are coming from. I think a motion to substitute would read a little more clearly if it would state that the Northern Region state waters trip limit for FY22 equaled to the federal waters trip limit approved by NOAA Fisheries.

I think it just clarifies what the states are doing, as compared with what NOAA Fisheries would approve in federal waters. It just may be more clear there. I also do have one other comment if you want to take that one first, I have another comment, based on what Pat Geer said earlier.

CHAIR BATSAVAGE: Matt and Megan, are you okay with that suggested modification by Mike?

MR. GATES: Yes, I appreciate that refinement to it, thank you.

MS. MEGAN WARE: Yes, fine here.

CHAIR BATSAVAGE: Yes, Mike, please continue with your comments.

MR. LUISI: My other comment is related to what Pat Geer brought up about the states of New York through North Carolina. I just want to make sure that we're still in the position where those states can set trip limits exceeding those of federal waters, and the fishermen who have federal permits would need to relinquish their permit in federal waters, in order to fish in state waters at a higher trip limit.

The reason I ask is that we currently in Maryland have a 10,000-pound trip limit in state waters. I just want to make sure that that is still a viable path forward, and that nothing has changed over the last couple years to limit state waters to that of federal waters.

CHAIR BATSAVAGE: I'm not aware of any changes, and this motion and the specifications in federal waters shouldn't impact that at all. Kirby, if I'm wrong please let me know. But again, I think what's set in state waters from New York to North Carolina still stands.

MR. LUISI: Okay, thanks, Chris.

CHAIR BATSAVAGE: Next up is David Borden.

MR. BORDEN: This will be quick. I support the substitute; I think it's simpler. I think it accomplishes what Ray and Cheri originally wanted to accomplish, and it avoids some of the difficulty that we might encounter, depending upon what NOAA does in federal waters. I support the substitute.

CHAIR BATSAVAGE: Next up is Adam Nowalsky.

MR. ADAM NOWALSKY: Where does this leave a possible disconnect between what we set at this Board, what New England does, and where the Mid-Atlantic was? I guess at the end of the day it's all going to come down to what NOAA approves, regardless. But are we in a position here that we potentially set ourselves up for a disconnect, where some other group has to reconsider something as well?

CHAIR BATSAVAGE: That's a good question, Adam. I guess I'll go to Kirby to see if there is any disconnect with what we're doing today, compared to the specifications that will be set in federal waters. Kirby, do you have any thoughts on that?

MR. ROOTES-MURDY: Sorry, I was trying to help Maya with wordsmithing this a little bit, to be more clear. Adam, can you repeat the question one more time?

MR. NOWALSKY: I was just trying to get clarity on where this would potentially put us for a disconnect. What we've had at the recent Council meeting was a firm 7,500 number that was not an up to, it was not an at least, it was a preferred number that came out of the Council. We don't know what New England is going to do yet, we don't know what the Service is going to do yet. The original motion we had here today started with that matching firm 7,500 number. We've got the main motion now set to at least a number, and now we've got a potential substitute that says we're just going to match whatever NOAA Fisheries does. The specific question is, where does this leave us with the potential disconnect between management bodies, and would there need to be further action for that to get addressed by one of those management bodies moving forward?

MR. ROOTES-MURDY: Yes, thanks, Adam. My read of the substitute motion is it actually helps cover what this range of potentially different trip limits that the New England Council might offer, and what the Service ultimately implements, and allows for this Board not to have to come back and revisit what the trip limit is that's approved by the Service.

You know for example, at the winter meeting or having to do so just before the start of the 2022 fishing season. To me, the substitute motion aligns well with that, if that is the will of the Board. But to maybe your concern, if there is interest in having a set 7,500-pound trip limit for just the northern region, then that's what you guys should discuss. I'll just note that Jason Didden is trying to raise his hand. But we have him listed as an organizer right now, so he is not able to do so. Mr. Chair, if you want to call on him, hopefully that might be helpful.

CHAIR BATSAVAGE: Yes, Jason, do you have anything to add on this point?

MR. DIDDEN: I was just going to add, it seems like this would allow the flexibility to resolve any disconnect that occurs between the two Councils.

CHAIR BATSAVAGE: Thanks, Jason, any other hands up from Board members?

MS. KERNS: I have Cynthia, well David Borden was first, then Cynthia and Nichola.

CHAIR BATSAVAGE: We'll go with Cynthia first. Cynthia.

MS. McMANUS: Yes, this is just quick clarification, just in case it wasn't clear. But maybe to just assuage any potential apprehension or fear that folks might have. But the Service is not, like say there is disconnect in what the Mid-Atlantic or New England do set for their recommendations.

The Service would not set like a third option or deviate from what has been recommended from either Council. We would just select from the alternative options that are set before us. It's not like there would be like a third thing that comes out, and then we kind of make a different decision, like between them or something.

Say it was like 7,500 and 9,000. We wouldn't pick 8,000, we would pick from one of the two options. It does kind of limit the potential other options that come out. It's really just, the uncertainty we have here is that New England hasn't met yet. We don't know what New England's recommendations are. That's really why we're not considering just the

7,500 right now, because there is the potential that New England would do something else.

But the Service itself isn't going to propose something completely different. We're going to pick from what comes out of the Councils.

CHAIR BATSAVAGE: Thanks, Cynthia, that is very helpful to know how, just the decision process by GARFO on this. David, I'll come to you in a second. But first I'll go to Nichola.

MS. NICHOLA MESERVE: I do have a little bit of apprehension about the open-endedness of the substitute motion. I think the Mid-Atlantic Council selected 7,500 in a balance between desires for a much larger trip limit to fulfill the quota, and other concerns about decreased quality and the effect on price, and small boat competition that would come along with that much larger trip limit.

Not knowing what the New England Council might prefer, it just gives me a bit of pause where this could go. Knowing that the New England Council has in the past recommended a complete removal of the federal trip limit. You know I think I'm a bit more comfortable with the initial motion that would have mirrored the 7,500-pound trip limit recommended by the Council.

CHAIR BATSAVAGE: David.

MR. BORDEN: I'll pass, Mr. Chairman, the point has already been made.

CHAIR BATSAVAGE: Toni, any other hands up?

MS. KERNS: Two last hands, Joe Cimino and then Shanna Madsen.

CHAIR BATSAVAGE: Joe.

MR. JOE CIMINO: I just really appreciate Nichola's comments. A lot of folks from New Jersey were amongst those making those comments, and I really do think that the Mid-Atlantic got to a very well-reasoned compromise at 7,500. That's why I still support the original motion.

CHAIR BATSAVAGE: Thanks, Joe, Shanna.

MS. SHANNA MADSEN: Pardon me if I missed this in the beginning of the presentation, but I guess I'm sort of confused procedurally why we wouldn't hold this meeting after the New England Council get a chance to meet, like why we wouldn't have this in February, and then we would have a clearer idea of what the path forward would be? I also wanted to say, I did appreciate Nichola's comments as well.

CHAIR BATSAVAGE: I know October is typically the time of the year that ASMFC sets specifications for spiny dogfish in state waters. I guess it's always a timing and order issue, where you have really three different management bodies setting specifications. I'll look to Kirby if he has anything in addition to add, to why now as opposed to January or February. I'll just see if Kirby has any additional thoughts.

MR. ROOTES-MURDY: I think you captured it well, Mr. Chair, that that is just how we would handle specifications in past years. But if there is concern or apprehension about moving forward with this at this point, this Board could delay taking action on this motion until after the New England Council meets. It's another option if that is what the Board desired.

CHAIR BATSAVAGE: That's true, we could always just defer this to the winter if that is the will of the Board. Toni, are there any other hands up before we call the question?

MS. KERNS: We just have Ray Kane, and I just want to make sure. If we do defer, we need to make sure that all the states would have time to implement a trip limit that late in the year.

CHAIR BATSAVAGE: Thanks, Toni, yes. That's a good point. The later we wait the less time it is for

states to go through their administrative processes. Ray.

MR. KANE: I cannot support the substitute motion. In Jason's presentation earlier today, you know being part of the Commission, we've gone up incrementally in thousand-pound trip limits. Now I'm hearing talk about a 3,000-pound trip limit. We've been able to keep the price paid to harvesters in check by going up in small incremental increases, and I like what Joe Cimino had to say.
I was waiting for Jersey to come in, because I know they've got a small boat fleet down there also. I don't want to leave this open ended, so I would rather, if we could, address this in February, after we get a decision from the New England Council, personally. I went with the 7,500-pound trip limit that came out of the Mid. They deciphered; they've looked at this.

Now it's coming before New England in December. Can we not address this at the February meeting? That's my question. But I cannot support the substitute motion, because it's open ended, and as I said, we have kept the price in check by going up, increases have been incremental, thousand-pound trip limit increases. That's what I have to say, thank you.

CHAIR BATSAVAGE: I guess in terms of addressing this at the winter meeting, I think we would need a motion to postpone until then, or where we would take action now and then see what happens with New England, and then ultimately with GARFO. I mean if there is an interest to postpone this until the winter, I think now would be the time. If not, I think I'll just do one last check for comments, and then I'll allow time to caucus before we call the question.

MS. KERNS: Megan Ware had her hand up, and then Nichola Meserve and then Adam Nowalsky.

CHAIR BATSAVAGE: Okay, Megan.

MS. WARE: I'm going to move to postpone this discussion until the ASMFC winter meeting. I think we need a bit more information, and right now if either of these motions pass, as a state I wouldn't actually know what trip limits to be putting through our regulatory process, until we know what NOAA is going to implement. I don't think this should impact the state's regulatory processes.

CHAIR BATSAVAGE: Okay, we'll let Maya get that up on the board, motion to postpone.

MS. MAYA DRZEWICKI: Can you just repeat the rest of the motion, please?

MS. WARE: Yes, no worries, Maya. Move to postpone this discussion around the state waters trip limit for Fishing Year 2022 until the ASMFC winter meeting.

MS. KERNS: Matt Gates, are you seconding?

MR. GATES: I just had a point of order on this, if it's okay. I was kind of looking it up, and it says generally a motion to postpone is applied to a main motion. I'm not sure now you would handle that in this case. I'm not really against putting it off too much, but I'm not sure if postponing is the appropriate way to do it.

CHAIR BATSAVAGE: Thanks, I'll look to staff, as far as the appropriateness of a motion to postpone at this point.

MS. KERNS: I'm not aware of a rule that you're not allowed to postpone or table. I can't remember if table is the more appropriate word, but it's okay. I'm not aware of it being a problem for a substitute motion.

CHAIR BATSAVAGE: Thanks, Toni, next up I had on my list is Nichola.

MS. MESERVE: I would prefer that we act on this today, actually. I think that it sends a better signal to the New England Council our position on this, rather than just reacting to what they determine for

the federal limit. I would rather reconsider our decision, if need be, but pick our stance on it now. I also did have a question about kind of timeline, based on some prior discussions with National Marine Fishery Service staff.

I was under the impression that a trip-limit increase much greater than 7,500 may delay the process, due to NEPA requirements and analysis. I think that was also a consideration in the Mid-Atlantic Council selection of 7,500 pounds, in order to do this by FY2022 or potentially a little bit sooner. You know something much larger than that would delay it. I think there is a lot of rationale, again, for 7,500 pounds. I think we're in a good position today to approve that motion to set that.

CHAIR BATSAVAGE: Yes, thanks, Nichola. Yes, it was stated during the Council meeting and the Dogfish Committee meeting by the Council that the higher trip limits would take more time, just through the process that NOAA Fisheries has to go through. Next up I have is Adam Nowalsky.

MS. KERNS: Chris, before you start with Adam, is it possible to get a second to this motion?

CHAIR BATSAVAGE: Oh yes, it would be good to get a second, wouldn't it? Kind of slipped my mind, sorry about that. Yes, is there a second on this motion, because we're debating something that hasn't been seconded yet.
MS. KERNS: Dennis, do you have your hand up as a second?

MR. DENNIS ABBOTT: I have a procedural question about that motion that you're looking for a second. My question would be, the motion says to postpone this discussion, it doesn't say anything about postponing the motions. If you're going to postpone the discussion, that means everybody is done talking and we go on to something else. I would go along with the previous speaker that says we should vote up and down on the substitute motion, and have a main motion.

At that point someone can make a motion to table or postpone or whatever. But you've got three motions and generally speaking, we were taught many times that you're only supposed to have two motions up on the table. That third motion isn't correct, and I think that you should handle this a little closer to normal parliamentary procedure, Mr. Chair.

CHAIR BATSAVAGE: I guess, well yes, should just see if there is a second to this motion before proceeding any further. Is there a second?

MS. KERNS: I have no hands in a second. Sorry, David Borden, are you raising your hand up as a second?

MR. BORDEN: Yes, and if I could comment, Mr. Chairman.

CHAIR BATSAVAGE: Yes.

MR. BORDEN: I'll second it. I think Dennis is making a correct point here that it should be a motion to postpone action not a discussion.

CHAIR BATSAVAGE: Yes, it's a good point. Megan, are you okay with that change?

MS. WARE: Yes, I think that is a good suggestion.

MS. KERNS: Now you have Adam Nowalsky.

CHAIR BATSAVAGE: Adam.

MR. NOWALSKY: I think I'm leaning towards Nichola's most recent comments, with regards to preferring to pick a number today that sends a message, and my support would be behind the fixed 7,500-pound number. However, if this motion to postpone were to go forward, would there be any merits for consideration to changing this to just say after the NEFMC meeting?

As opposed to waiting to the winter meeting, given our ability to conduct business virtually, and that the December New England Council meeting is

relatively early in the month. Just wondering if there might be any benefit to conducting this Board meeting virtually to make a decision sooner versus later.

CHAIR BATSAVAGE: Thanks, Adam, I'll turn to staff to see if that's helpful or what we have is okay.

MS. KERNS: That's up to the Board. If the states need additional time to implement trip limits, then we could do that. But if meeting in January meets your state timeline, then I'm not sure it's necessary, unless there is another rationale for having it early.

CHAIR BATSAVAGE: Are there any hands up on that? If not, we are actually getting past our time. If there are no other hands, I think we'll maybe give two minutes to caucus on the motion to postpone, and then see where that leaves us. No other hands, Toni, then I guess we'll set the timer for two minutes.

MS. KERNS: I have one hand, Shanna Madsen.

CHAIR BATSAVAGE: Okay, Shanna.

MS. MADSEN: I have no dog in this fight, but I just wanted to point out that the main motion doesn't get to what Nichola is asking for either. To say that you're setting at least a 7,500-pound trip limit means that again, if the Northeast Council comes back with 9,000 pounds. I guess I'm confused as to how the main motion gets to what Nichola is now recommending as well. I just wanted to put that out there.

CHAIR BATSAVAGE: I guess we'll see, I guess if we get to that point, I guess we'll discuss that further if need be. Knowing that we're kind of in overtime right now, let's go ahead and just take two minutes to caucus, and we'll come back and vote on the motion to postpone action. Okay, two minutes is up, does anyone need any additional time, if so, please raise your hand. Otherwise, I'll go ahead and call the question?

MS. KERNS: I don't have any hands for time.

CHAIR BATSAVAGE: Okay, so it's a motion to postpone action around the state waters trip limits for FY2022 until the ASMFC winter meeting. Motion by Ms. Ware, second by Mr. Borden. All those in favor, please raise your hand.

MS. KERNS: I believe the hands have settled. I have Maine, Connecticut, NOAA Fisheries, New York, Virginia, Maryland, New Hampshire, and Virginia.

MR. ROOTES-MURDY: Toni, I think you said Virginia twice.

MS. KERNS: I did, because two Virginia folks have their hands up, sorry about that.

MS. MADSEN: We're sorry about that, Toni.

MS. KERNS: I will put the hands down.

CHAIR BATSAVAGE: Is that 7 in favor?

MS. KERNS: Is that what I had, Kirby?

MR. ROOTES-MURDY: Yes.

CHAIR BATSAVAGE: all those opposed, please raised your hand.

MS. KERNS: I Have Mass, North Carolina and New Jersey.

CHAIR BATSAVAGE: Okay, that's 3 opposed, any null votes?

MS. KERNS: I Have 1 null vote, Rhode Island.

CHAIR BATSAVAGE: Okay, and any abstentions?

MS. KERNS: I have 1 abstention, Delaware.

CHAIR BATSAVAGE: Okay, then the motion passes 7 to 3 to 1 to 1, if I'm correct on the vote count.

MS. KERNS: That's what we had.

MR. ROOTES-MURDY: Yes.

CHAIR BATSAVAGE: Yes, we'll then address this again in the winter, after we know what the New England Council decides on trip limits. I think that covers that agenda item.

CONSIDER FISHERY MANAGEMENT PLAN REVIEW AND STATE COMPLIANCE FOR THE 2020 FISHING YEAR

CHAIR BATSAVAGE: Next up is to consider the Fishery Management Plan Review and State Compliance for the 2020 Fishing Year. Kirby is up for that. Kirby, or staff, do we have time to do that, or would it be better to handle that via an e-mail vote later? I'll leave that up to staff to determine, since we're running late.

MR. ROOTES-MURDY: I think we have a little flexibility as far as the next meeting and getting through this. I can quickly go through the presentation, and we just need a motion.

CHAIR BATSAVAGE: All right great, thanks. Please proceed.

MR. ROOTES-MURDY: I'll just give a brief overview of stock status, commercial landings and quota, state compliance, de minimis requests and PRT recommendations. This was already covered by Jason, but we don't have any update on the stock status from what was presented back in 2018.

As noted, we have a research track assessment scheduled for 2022, so that should meet early next year. Just a reminder of what the commercial season is. As we were just discussing, May 1 through April 30th, the quota for Fishing Year 2020 was 26.19 million pounds. The trip limit for the northern region was 6,000 pounds, and the commercial landings were approximately 12.75 million pounds, which is a 30 percent decrease from Fishing Year 2019.

Recreational harvest and discards, the recreational harvest was about 236,000 pounds, which is an increase. But keep in mind that harvest estimate tends to be very low, this increase percentage is a little misleading. The discards also decreased from 2019 up to 1.7 million pounds. In terms of state compliance, the PRT reviewed all the state compliance reports in all regions and states harvested within their quota and states implemented regulations consistent with the FMP. New York and Delaware requested de minimis status and it was authorized based on the PRTs review. (Broken up).

Just in terms of the PRT recommendations requesting that the states be more clear in indicating where their landings are reported to, NOAA or SAFIS. The other note was exempted fishing permits. Currently the language in the FMP centers around biomedical research. There had not been really any exempted fishing permits issued in recent years for biomedical research. When there is a future management document, if the Board wants to consider revisiting what the exempted fishing permits are for, then it might be most helpful.

Then last, the PRT just noted that de minimis right now for this FMP is not necessarily providing those de minimis states with a tremendous amount of benefit, because they still have to report their landings out annually, and at least weekly reporting that is being done by those states to NOAA Fisheries. Those are the main points from the PRT for the Board's consideration today is to accept the FMP Review and state compliance reports for spiny dogfish Fishing Year 2020 through 2021, and de minimis requests from New York and Delaware. I'll take any questions.

CHAIR BATSAVAGE: Thanks, Kirby, any questions for Kirby?

MS. KERNS: I have no hands.

CHAIR BATSAVAGE: Quick question, Kirby. Regarding the biomedical permits and then states reporting dogfish collected through scientific permits, which is totally different. Aside from any future Board action to expand what's required for reporting. Would it be better for those states just not to report those in the compliance reports if those permits are not specific to the biomedical industry?

MR. ROOTES-MURDY: No, we definitely still want (can't hear) permits before, for example educational purposes or other research, and yes that's helpful, because this is in addition many times to what the state is already harvesting for the commercial quota. We want that information; it's just really noting that this path of the FMP isn't really operating the way it has in the past, so things for the Board's consideration.

CHAIR BATSAVAGE: Great, I appreciate that. If there are no further questions, I'll look for a motion to approve the FMP Review, state compliance reports and de minimis requests.

MS. KERNS: I have Shanna.

CHAIR BATSAVAGE: Okay, Shanna.

MS. MADSEN: Thank you, Mr. Chair, I would like to move to accept the FMP Review and state compliance reports for the spiny dogfish 2020/2021 fishing year and *de minimis* requests from New York and Delaware.

CHAIR BATSAVAGE: Thanks Shanna, is there a second?

MS. KERNS: Nichola Meserve.

CHAIR BATSAVAGE: Seconded by Nichola. Any discussion on the motion?

MS. KERNS: No hands.

CHAIR BATSAVAGE: Okay, is there any objection to the motion?

MS. KERNS: I see no hands.

CHAIR BATSAVAGE: Then we'll consider this approved by consent.

UPDATE ON THE RESEARCH TRACK ASSESSMENT

CHAIR BATSAVAGE: Thank you, next up is an Update on the Research Track Assessment, and Conor McManus will be giving us an update on that. Conor, if you're ready, please go ahead.

MR. CONOR McMANUS: I'll be really quick here. I'm just going to give a quick update to where we are with the Spiny Dogfish Research Track Assessment. Just as a background, we initiated the group this past summer for spiny dogfish. Just for a bit of background, the Research Track Assessment and this relatively new framework for assessments is designed to evaluate new datasets that can be either used to inform the models or be used in the stock assessment models, of which then would be ultimately used in future management track assessments.

Our goal here is to improve the stock assessments for spiny dogfish, again evaluating new analytical techniques and such for the species, again with this then new model being available as needed in future management track assessments. The work group has been officially formed now, with members of the various entities listed here.

Again, we started this past summer and we are planned to go for peer review with the assessment in July of 2022. Thus far the working group has met three times. Mainly working through some of the initial data availability questions, reviewing the previous assessments, as well as the various recommendations in the past for research elements by both the Council and the SSC.

With the Research Track Assessment itself there are several new advancements that we're looking to take with it, with just some of them described here below. I think perhaps the biggest advancement would be trying to move from a more index-based approach that relies heavily on one survey index, which Jason spoke to earlier, being the spring Science Center trawl, and moving towards a more sophisticated framework or a model that incorporates the life history of the species, as well as perhaps other surveys and information.

The platform we're looking to use here is stock synthesis. Another major element that we're looking to update here is growth for the species. We have an effort to look at some of the spines, for spinys from some of the federal trawl surveys in the recent years, not just for comparison to go from older growth models, which are believed to be by many outdated, but get an update on the growth rates for the species for use in the model. But then also just to understand how growth may be changing with the environment over multiple decades. There has also been a lot of discussion over the distribution of spiny dogfish, both on and off the shelf, as well as the differences in movement seasonally over time by sex. We'll look at that in two different ways, one is looking at tagging data that has been collected by the Science Center through some of their cooperative research efforts, and to get a sense of changes in migration and distribution, also gives us a little bit of sense to as perhaps some of the stock structure for the species.

Then also, looking at more, again spatial distribution, abundance in distribution for both males and females, to get us an understanding of environmental drivers, and whether we may or may not see them in certain regions, such as state waters. One thing I wanted to address for the Board today is that we will also plan to engage stakeholders directly.

We have working group meetings that folks are allowed to attend, not just the working group members, but we also will have directed meetings with stakeholders to let them know on the process of the assessment, updates that we're making to provide clarity or background from the data that we're using in the assessment.

Also selected feedback on some research elements that they would like to see addressed in the assessment, if possible, as well as feedback on some different elements on the science that we would like to get some level of feedback on, or perspective on as we see it from the data. Stay tuned for that. I will be certainly reaching out to members of the AP for those notifications, but also the Board as interested. I think that's all I had for you, but I'm happy to take any questions.

CHAIR BATSAVAGE: Yes, interesting advances in this assessment compared to what's been done in the past, so I look forward to hearing more about the progress, and eventually seeing the results. Any questions for Conor?

MS. KERNS: One hand from David Borden.

CHAIR BATSAVAGE: David.

MR. BORDEN: Conor, there was a suggestion about trying to involve Canadian scientists in the discussion in another portion of the document. Will the Canadians be involved in this? I mean it is a transboundary stock, and it might make some sense to at least get one Canadian scientist involved in this. Thank you.

CHAIR BATSAVAGE: Conor.

MR. McMANUS: Thanks for your question, David. There are no Canadian scientists on the working group, but we are working with Canadian scientists in a couple of different facets. One is mainly trying to get survey information from those waters, to understand changes over time, and understanding how those compare to what we see in U.S. waters.

Particularly in the fall, where we see some of the spiny dogfish in the survey perhaps aggregated more in the Gulf of Maine on slopes and shelves, and as well as looking at the other data streams that may help inform some of the analyses on sensitivity dependence, and again, understanding overall trends in the stock. While there is no membership on the working group from the Canadians, we are in correspondence with them. I will also note that we've also, in terms of the new model development we're also in conversations with the Northwest Fisheries Science Center on the model as it relates to Pacific spiny dogfish, which they've used this template in the past, but we're hopeful that we can help improve the assessment here using some more framework.

CHAIR BATSAVAGE: Any further questions for Conor?

MS. KERNS: No hands.

CHAIR BATSAVAGE: All right, great, thanks for the update, Conor, and look forward to hearing more about the assessment. That takes us to Other Business. Is there any other business to bring forward before we adjourn?

MS. KERNS: No hands.

ADJOURNMENT

CHAIR BATSAVAGE: Anyways, thanks for everyone's patience on getting through this information. We'll discuss this again in February, and I just want to say, I appreciated the opportunity to Chair this Board for the last two years, and special thanks to Kirby for helping me prepare for the meetings and keep me on track during the meetings. Nichola Meserve will serve as Chair for the next two years, and I look forward to her leadership. With that we're adjourned, thanks everyone.

(Whereupon the meeting adjourned at 11:35 a.m. on October 21, 2021.)

Atlantic States Marine Fisheries Commission

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

MEMORANDUM

December 1, 2021

To: **Spiny Dogfish Management Board**

From: **Tina Berger, Director of Communications**

RE: **Advisory Panel Nomination**

Please find attached a new nomination to the Spiny Dogfish Advisory Panel – Captain Rick Bellavance, a commercial rod and reel fisherman and charter/partyboat captain from Rhode Island. Please review this nomination for action at the next Board meeting.

If you have any questions, please feel free to contact me at (703) 842-0749 or tberger@asmfc.org.

Enc.

cc: Kirby Rootes-Murdy

SPINY DOGFISH ADVISORY PANEL

Bolded names await approval by the Spiny Dogfish Management Board

December 1, 2021

New Hampshire
Thomas Lyons (comm. gillnet)
653 Exeter Road
Hampton, NH 03842
Phone: 603.427.3428
tomrlyons@hotmail.com
Appt. Confirmed 10/22/18

Massachusetts
Doug Feeney (comm. hook & line/gillnet)
47 Barn Hill Road
Chatham, MA 02633
Phone: 774.994.0593
dougfeeney@comcast.net
Appt. Confirmed 10/22/18

John F. Whiteside Jr. (attorney who represents 4 seafood associations, seafood processors, and ancillary businesses to the fishing and seafood industries from Maine to Virginia)
678 State Road
Dartmouth, MA 02747
Phone (day): 508.991.333
Phone (eve): 508.246.2828
John@JWhiteside.com
Appt. Confirmed 10/22/18

Rhode Island
James B. Webber (rec)
5 St. Andrews Way
Barrington, RI 02806
Phone: (401)524-7652
Email: jerry02806@yahoo.com
Appt. Confirmed 2/20/06
Appt Reconfirmed 5/10
Appt. Reconfirmed 9/4/2020

Captain Rick Bellavance (commercial rod and reel/for-hire)
140 Jerry Lane
North Kingstown, RI 02852
Phone: 401.741.5648
rickbellavance@gmail.com

New York
Merry Camhi (conservation)
National Audubon Society
100 W. Main St.
West Islip, NY 11730-2323
Appt. Confirmed 1/31/01
Appt. Confirmed 1/2/06
Appt Reconfirmed 5/10
Incorrect phone number

New Jersey
Marty Buzas (comm./longline & gillnet)
558 Shunpike Road
Cape May Courthouse, NJ 08210
Phone (day): (609)827-2626
Phone (eve): (609)465-5776
Email: MBEileenB@yahoo.com
Appt Confirmed 8/3/10
Confirmed participation 4/2014

Virginia
William Reid (comm gillnet)
4950 Cypress Point Cir Apt. 203
Virginia Beach, VA 23455-6868
Appt. Confirmed 1/31/01
Appt. Confirmed 1/2/06
Appt Reconfirmed 5/10
Incorrect phone number

Scott MacDonald (processor)
4401 Monmouth Castle Road
Virginia Beach, VA 23455
Phone: 757.287.3534
smacdonald7@cox.net
Appt. Confirmed 10/22/18

North Carolina
Chris Hickman (comm gillnet)
PO Box 476
Hatteras, NC 27943
Phone: 919/986-2217
bouttimefishing@yahoo.com
Appt. Confirmed 8/21/00
Appt. Confirmed 1/2/06
Appt Reconfirmed 5/10; 4/14; 8; 18

Vacancy – commercial

Nontraditional Stakeholder

Sonja Fordham
Shark Advocates International
c/o The Ocean Foundation
1990 M Street, NW
Suite 250
Washington, DC 20036 Phone: 202-436-1468
Email: sonja@sharkadvocates.org
Appt. Confirmed 5/19/06
Confirmed participation 4/2014

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Rick Bellavance (your name) State: RI

Name of Nominee: Capt. Rick Bellavance

Address: 140 Jerry Lane

City, State, Zip: North Kingstown, RI 02852

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 401-741-5648 Phone (evening): _____

FAX: _____ Email: rickbellavance@gmail.com

. . . . . .

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Spiny Dogfish
   2. Coastal Sharks
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes_____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no_____

   If "yes," please list them below by name.

RI Party and Charter Boat Association

Commercial Fishing Center of RI

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

STB, BLU, BSB, SCUP, SF

Spiny Dogfish, HMS, Tautog

Cod, Pollack, Hake, WF

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

STB, BLU, BSB, SCUP, SF

Spiny Dogfish, HMS, Tautog

Cod, Pollack, Hake, WF

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 30 years
2. Is the nominee employed only in commercial fishing? yes _____ no X
3. What is the predominant gear type used by the nominee? Rod and Reel
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? Inshore and offshore from Montauk NY to Marthas Vineyard MA out to 50 miles

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 30 years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no X

If "no," please list other type(s)of business(es) and/occupation(s):

Fishing Consultant - Member New England Fishery Management Council

3. How many years has the nominee lived in the home port community? 53 years

If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no x

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing?
   _____ years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

Spiny Dogfish and Coastal Sharks are important to RI's charter/party and commercial fishing industry. As someone who participates in these fisheries and As someone who is familiar with the commission's management process I feel I can be helpful to the AP. I understand the commitment necessary to be an AP member and I can meet that commitment.

Nominee Signature: _____ Date: 1/6/2021

Name: Rick Bellavance
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____
State Director

_____
State Legislator

_____
Governor's Appointee

Atlantic States Marine Fisheries Commission

Executive Committee

January 26, 2022
8:00 – 9:30 a.m.
Webinar

Draft Agenda

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*)

2. Committee Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021

3. Public Comment

4. Discuss the Commission's Role in Coordinating the Member States' Efforts in Offshore Wind Energy Development

5. Discuss Appeals Process *(R. Beal)*

6. Other Business/Adjourn

The meeting will be held via webinar, click here for details.
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEETING SUMMARY OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

EXECUTIVE COMMITTEE

Virtual via GoToMeeting
Arlington, VA
October 20, 2021

For Review & Action by the Executive Committee January 26, 2022

INDEX OF MOTIONS

1. **Approval of Agenda** by Consent. (Page 1)

2. **Approval of Meeting Summary from August 4, 2021** by Consent. (Page 1)

3. **On behalf of the Administrative Oversight Committee, move acceptance of the FY21 Audit** (Page 1). Motion by Spud Woodward on behalf of the AOC. Motion passed unanimously (Page 1).

4. **Adjourn** by Consent (Page 1).

ATTENDANCE

Committee Members

Pat Keliher, ME
Cheri Patterson, NH
Dennis Abbott, NH (LA Chair)
Dan McKiernan, MA
Jason McNamee, RI
Justin Davis, CT
Jim Gilmore, NY
Joe Cimino, NJ
Kris Kuhn, PA
Roy Miller, DE (GA Chair)
John Clark, DE
Bill Anderson, MD
Steve Bowman, VA
Chris Batsavage, NC
Mel Bell, SC
Spud Woodward, GA
Erika Burgess, FL

Other Commissioners/Proxies

Lynn Fegley MD DNR
Tom Fote, NJ (GA)
Pat Geer, VA (AA Proxy)
Bill Hyatt, CT (GA)
Raymond Kane, MA (GA)
Rob LaFrance, CT (LA Proxy)
Mike Luisi, MD DNR
Nichola Meserve, MA DMF
Adam Nowalsky, NJ (LA Proxy)
Craig Pugh, DE (LA Proxy)
Eric Reid, RI (LA Proxy)
Malcolm Rhodes, SC (GA)
Megan Ware, ME (AA Proxy)
Ritchie White, NH (GA)

Staff

Bob Beal
Laura Leach
Toni Kerns
Tina Berger
Lisa Carty
Pat Campfield
Geoff White
Kristen Anstead
Lindsey Aubart
Lisa Havel
Chris Jacobs
Jeff Kipp
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Julie Simpson
Caitlin Starks
Deke Tompkins

Others

Karen Abrams, NOAA
Max Appelman, NOAA
Pat Augustine, Coram, NY
Frederick Bogue
Jeff Brust, NJ DEP
Derek Cox, FL FWC
Lennie Day
James Fletcher
Marty Gary, PRFC
Lewis Gillingham, VMRC
Greg Hinks, NJ DEP
Dionne Joshua
Josh Kiggans
Wilson Laney
Dee Lupton, NC DENR
Shanna Madsen, VMRC
Chris McDonough, SC DNR
Chip Lynch, NOAA
Steve Meyers
Mike Millard, US FWS
Jerry Morgan
Brandon Muffley, MAFMC
Allison Murphy, NOAA
Lindsey Nelson, NOAA
Derek Orner, NOAA
Willow Patten, NC DENR
Rachael Peabody, VMRC
Jill Ramsey, VMRC
Somers Smott, VMRC
Mike Waine, ASA
Meredith Whitten, NC DENR
Chris Wright, NOAA
Horace Wynn
Renee Zobel, NH FGD

CALL TO ORDER

The Executive Committee (EC) of the Atlantic States Marine Fisheries Commission convened October 20, 2021 virtually via a GoToMeeting webinar. The meeting was called to order at 8:04 a.m. by Chair Pat Keliher.

APPROVAL OF AGENDA

The agenda was approved as presented.

APPROVAL OF PROCEEDINGS

The summary minutes from the August 4, 2021 meeting were approved as presented.

PUBLIC COMMENT

There was no public comment.

CONSIDERATION OF FY21 AUDIT

The FY21 Audit was reviewed by the Administrative Oversight Committee and forwarded to the Executive Committee with a recommendation for approval. On behalf of the Administrative Oversight Committee, move acceptance of the FY21 Audit. Motion by Spud Woodward. Motion passed unanimously.

PUBLIC INFOMATION REQUESTS POLICY

Mr. Beal presented the draft Policy on Responding to Public Information requests, which was drafted in consultation with the Commission's attorney. After a thorough discussion, Mr. Beal was directed to incorporate aspects of the discussion and bring it back to the EC for action at the January meeting.

OFFSHORE WIND ENERGY

Mr. Cimino requested discussion on the Commission's role in coordinating the member states' efforts regarding offshore wind energy development. While the Bureau of Ocean Energy Management (BOEM) has the lead in wind energy development, Mr. Cimino believes there needs to be coordination among the Atlantic coast states so they speak with a unified voice. A robust discussion ensued, and Chair Keliher noted further discussion needs to take place at the January meeting to determine the appropriate role for the Commission.

SEAFOOD PROCESSORS PANDEMIC RESPONSE AND SAFETY BLOCK GRANT

The EC discussed the Seafood Processors Pandemic Response and Safety Block Grant Program under the Department of Agriculture. Several states felt the amount of funding available to them was not enough relative to the amount of work administering it would take; other states indicated they were interested but had questions. Mr. Beal will reach out to the Department of Agriculture to request a meeting to discuss this program with the states who are interested. State applications are due November 22, 2021.

APPEALS PROCESS

The EC discussed the revised Appeals Process and agreed with the changes to the process; however several Committee members said the allocation issue must remain as an issue that can be the subject of an appeal. Mr. Beal agreed there is a bit more work to do on the Appeals Process and will bring a revised document to the EC meeting in January.

FUTURE ANNUAL MEETINGS

The future annual meeting schedule is:

New Jersey in 2022; North Carolina in 2023 and Maryland in 2024.

ADJOURN

The Executive Committee adjourned at 9:41a.m.

Atlantic States Marine Fisheries Commission

Horseshoe Crab Management Board

January 26, 2022
9:45 - 11:45 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. Cimino)* — 9:45 a.m.

2. Board Consent
   - Approval of Agenda
   - Approval of Proceedings from October 2021 — 9:45 a.m.

3. Public Comment — 9:50 a.m.

4. Consider Adaptive Resource Management (ARM) Revision and Peer Review Report — 10:00 a.m.
   - Presentation of ARM Revision Report *(J. Sweka)*
   - Presentation of Peer Review Panel Report *(Y. Chen)*
   - Consider Management Response to ARM Revision and Peer Review Report *(J. Cimino)* **Possible Action**

5. Other Business/Adjourn — 11:45 a.m.

The meeting will be held via webinar, click here for details.
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEETING OVERVIEW

Horseshoe Crab Management Board Meeting
Wednesday, January 26, 2022
9:45 - 11:45 a.m.
Webinar

Chair: Joe Cimino (NJ) Assumed Chairmanship: 10/19	Horseshoe Crab Technical Committee Chair: Jeff Brunson (SC)	
Vice Chair: John Clark (DE)	Horseshoe Crab Advisory Panel Chair: Brett Hoffmeister (MA)	Law Enforcement Committee Representative: Doug Messeck (DE)
Delaware Bay Ecosystem Technical Committee Chair: Wendy Walsh (FWS)	Adaptive Resource Management Subcommittee Chair: Dr. John Sweka (FWS)	Previous Board Meeting: October 21, 2021
Voting Members: MA, RI, CT, NY, NJ, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (16 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 21, 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 Adaptive Resource Management (ARM) Revision and Peer Review Report (10:00-11:45 a.m.) Possible Action

Background

- In October 2019, the Board directed the Adaptive Resource Management (ARM) Subcommittee to begin working on updates to the ARM Framework to revisit several aspects of the ARM model to incorporate horseshoe crab population estimates from the Catch Multiple Survey Analysis (CMSA) model used in the 2019 Benchmark Stock Assessment and the most current scientific information available for horseshoe crabs and red knots.
- In the last two years, the ARM Subcommittee has been working on incorporating the CMSA model into the ARM, moving the model to a new software platform, improving model structure, and updating the red knot population model. The ARM Revision report details the recommended updates to the ARM Framework (**Briefing Materials**).
- A peer review workshop for the ARM Revision was conducted from November 16-18, 2021. The Peer Review Panel summarized their findings with respect to the TORs for the review

and made recommendations for further improvement of the ARM and its parameterization for management advice (**Briefing Materials**).
Presentations • ARM Revision Report by J. Sweka • Peer Review Panel Report by Y. Chen
Board actions for consideration at this meeting • Consider Adaptive Resource Management (ARM) Revision and Peer Review Report for Management Use • Consider Management Response to ARM Revision and Peer Review Report

5. Other Business/Adjourn

Horseshoe Crab

Activity level: Medium

Committee Overlap Score: Low (SAS overlaps with BERP)

Committee Task List

- PDT – review the threshold for biomedical use to develop biological based options for the threshold and to develop options for action when the threshold is exceeded; review best management practices for handling biomedical catch and suggest options for updating and implementing best management practices (BMPs).
- TC – July 1st: Annual compliance reports due
- ARM & DBETC – Fall: Annual ARM model to set Delaware Bay specifications, review red knot and VT trawl survey results

TC Members: Jeff Brunson (SC, TC Chair), Derek Perry (MA), Natalie Ameral (RI, Vice Chair), Deb Pacileo (CT), Catherine Ziegler (NY), Samantha Macquesten (NJ), Jordan Zimmerman (DE), Steve Doctor (MD), Ellen Cosby (PRFC), Adam Kenyon (VA), Jeffrey Dobbs (NC), Eddie Leonard (GA), Claire Crowley (FL), Chris Wright (NMFS), Joanna Burger (Rutgers), Mike Millard (USFWS), Kristen Anstead (ASMFC), Caitlin Starks (ASMFC)

Delaware Bay Ecosystem TC Members: Wendy Walsh (USFWS, Chair), Amanda Dey (NJ), Samantha Macquesten (NJ), Henrietta Bellman (DE, Vice Chair), Jordan Zimmerman (DE), Steve Doctor (MD), Adam Kenyon (VA), Jim Fraser (VA Tech), Eric Hallerman (VA Tech), Mike Millard (USFWS), Kristen Anstead (ASMFC), Caitlin Starks (ASMFC)

ARM Subcommittee Members: John Sweka (USFWS, Chair), Larry Niles (NJ), Linda Barry (NJ), Henrietta Bellman (DE), Jason Boucher (DE), Steve Doctor (MD), Wendy Walsh (USFWS), Conor McGowan (USGS/Auburn), David Smith (USGS), Jim Lyons (USGS, ARM Vice Chair), Jim Nichols (USGS), Kristen Anstead (ASMFC), Caitlin Starks (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

HORSESHOE CRAB MANAGEMENT BOARD

Webinar
October 21, 2021

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

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ATTENDANCE

Board Members

Dan McKiernan, MA (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Conor McManus, RI, proxy for J. McNamee (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Rob LaFrance, CT, proxy for B. Hyatt (GA)
Sen. Craig Miner, CT (LA)
John Maniscalco, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
Joe Cimino, NJ (AA)
Peter Clarke, NJ, proxy for T. Fote (GA)
Adam Nowalsky, NJ, proxy for Sen. Houghtaling (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for Bill Anderson (AA)
Russell Dize, MD (GA)
Pat Geer, VA, proxy for S. Bowman (AA)
Shanna Madsen, VA, proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Mel Bell, SC, proxy for P. Maier (AA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Erika Burgess, FL, proxy for J. McCawley (AA)
Marty Gary, PRFC
Chris Wright, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

John Sweka, ARM Subcommittee Chair

Staff

Robert Beal
Toni Kerns
Laura Leach
Lisa Carty
Maya Drzewicki
Kristen Anstead
Tina Berger
Pat Campfield
Emilie Franke
Lisa Havel
Chris Jacobs
Jeff Kipp
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Caitlin Starks
Deke Tompkins

Guests

Dennis Abbott, NH, LA proxy
Karen Abrams, NOAA
Max Appelman, NOAA
Pat Augustine, Coram, NY
Linda Barry, NJ DEP
Alan Bianchi, NC DENR
Nora Blair, Charleston, SC
Jason Boucher, DE DFW
Rob Bourdon, US FWS
Jeff Brust, NJ DEP
Thomas Burrell, PA F&B
Margaret Conroy, DE DFW
James Cooper
Heather Corbett, NJ DEP
Claire Crowley, FL FWC
Jessica Daher, NJ DEP
Andrea Didden
Sheila Eyler, US FWS

Guests (continued)

Lynn Fegley, MD DNR
Cynthia Ferrio, NOAA
Lewis Gillingham, VMRC
Michael Ginex
Hannah Hart, FL FWC
Helen Takade-Heumacher, US FWS
Jaclyn Higgins, TRCP
Jessie Hornstein, NYS DEC
Bill Hyatt, CT (GA)
Ryan Jiorle
Adam Kenyon, VMRC
Wilson Laney
Christina Lecker, Fuji Film
Chip Lynch, NOAA
Shanna Madsen, VMRC
Jason McNamee, RI (AA)
Nichola Meserve, MA DMF
Steve Meyers
Matt Mobley
Jerry Morgan
Allison Murphy, NOAA
Eileen Murphy, NJ Audubon Soc.
Josh Newhard, US FWS
Tamara O'Connell, MD DNR
Nick Popoff, US FWS
Jill Ramsey, VMRC
Daniel Sasson, SC DNR
Sommers Smott, VMRC
David Stormer, DE DFW
Benjie Swan, Limuli Labs
Marek Topolski, MD DNR
Scott Curatolo-Wagemann, Cornell Univ
Kristoffer Whitney, RIT
Beth Versak, MD DNR
Angel Willey, MD DNR
Sarah York, NOAA
Jordan Zimmerman, DE DNR
Renee Zobel, NH FGD

The Horseshoe Crab Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Thursday, October 21, 2021, and was called to order at 8:30 a.m. by Chair Joe Cimino.

CALL TO ORDER

CHAIR JOE CIMINO: Good morning, everyone, I'm Joe Cimino, coming to you live from the sad to not be hosting state of New Jersey, where it's another lovely day. I'm the Administrative Commissioner for New Jersey, and the Chair of the Horseshoe Crab Management Board.

APPROVAL OF AGENDA

We've got 90 minutes and a couple important action items to get through, so we'll get started with approval of the agenda. Are there any additions or corrections that anyone has that they want to add to the agenda?

MS. TONI KERNS: I have no hands.

CHAIR CIMINO: Approved by consent then.

APPROVAL OF PROCEEDINGS

CHAIR CIMINO: We'll move on to the proceedings from October of 2020. Hopefully, you all had a chance to look through those. Any concerns or additions there, please raise your hand.

MS. KERNS: I have no hands.

CHAIR CIMINO: Excellent, again that is approved by consent.

PUBLIC COMMENT

CHAIR CIMINO: Moving on to Public Comment and for members of the public interested in making public comment today, this is for items that are not on the agenda. We do have a couple action items. If you wish to speak to those items, I will take hands during the harvest specification process. But if you have any concerns that are not on the agenda, please raise your hand now.

MS. KERNS: I have no hands.

SET 2022 HARVEST SPECIFICATIONS

CHAIR CIMINO: Okay, we shall get started. We have Dr. John Sweka of the U.S. Fish and Wildlife Service with us today, and John will be walking us through a couple items here. But that will begin with the Review of the ARM Model, so John.

REVIEW OF HORSESHOE CRAB AND RED KNOT ABUNDANCE ESTIMATES AND 2021 ADAPTIVE RESOURCE MANAGEMENT MODEL (ARM) RESULTS

MR. JOHN SWEKA: Okay, thank you, Mr. Chair. Yes, our typical harvest specifications, based off the adaptive resource management framework for 2022. Our objective statement for this process is to manage the harvest of horseshoe crabs in the Delaware Bay to maximize harvest, but also maintain ecosystem integrity and provide adequate stopover habitat for migrating shorebirds.

Within the ARM framework we have red knot and horseshoe crab population thresholds in the utility functions which dictate when female and male horseshoe crabs would have value to harvest. The model takes red knot and horseshoe crab abundance indices and looks at these relative to those thresholds within the optimization procedure, and select from one of five harvest packages, and eventually we make our annual harvest recommendations like we've been doing for several years now.

The five harvest packages range from a full moratorium to a maximum harvest of 420,000 males and 210,000 females. These also include 2 male-only harvest options. Since the inception of the ARM was approved for management use, we've been recommending harvest package 3 every year. The threshold in the ARM utility function.

For horseshoe crab we have a female utility threshold of 11.2 million females, and that equates

to a negotiated 80 percent of carrying capacity. For red knots the harvest of female crabs starts to have value once red knots hit 81,900 birds. This is based off of a mark/recapture estimate and peak aerial counts, you know going back in time is how we came up with this threshold.

Ultimately, there is value to female horseshoe crab harvest if the threshold is met. Moving on to our abundance estimates of red knots. You can see in the graph here that the blue line represents our stopover population estimate, which is based upon mark/recapture estimation procedures within Delaware Bay.

It's fluctuated, you know some variation through time, and some uncertainty on those estimates. The green line on this graph represents peak aerial survey counts that are observed each year from a plane flying over the beaches of Delaware Bay, and an observer looking out and counting the number of birds seen on the shoreline.

You can see there is more variability in the peak counts than there is in the mark/re-site population estimates. The 2021 estimates were slightly higher than the 2020 estimates, and the stopover duration for birds, so this is how long they would spend in Delaware Bay, was 10.3 days in 2021, which was slightly less than 10.7 days in 2020.

The total population estimate for 2021 was 42,271 birds, and this is below the threshold of 81,900 birds. Moving on to the horseshoe crab abundance. Horseshoe crab abundance, as it's set by the Virginia Tech Trawl Survey, and the trawl survey wasn't funded every year, so there is some incomplete data from the Virginia Tech Trawl Survey.

What we did during those years of missing data, they span from 2012 to 2015, was we used the Delaware 30 Foot Trawl and a New Jersey Ocean Trawl to come up with composite index and estimate, based on the overlapping years, what that ratio between these non-Virginia Tech Trawls were to the Virginia Tech Trawl, to fill in that time series gap. The survey is conducted in the fall of 2020, so 2020 had an estimate, when we decrement that by a half year's natural mortality to put it onto the same timeline as when the bird population estimates are conducted.

In the end we end up with an estimate of 9.5 million females, which is under the 11.2 million female utility thresholds. Total population, we have 9.5 million females and 29.7 million males. When we put these values of abundance for male and female horseshoe crabs and red knots into our decision maker, it comes from the optimized ARM model. We recommend for 2022 harvest package number 3 again, and this will be 500,000 male harvest and 0 female harvest. Again, both red knots and horseshoe crabs were below their utility threshold, and therefore no female harvest is recommended at this time. When we take those harvest recommendations and put it into our allocation algorithm, this is the breakdown by state of how many males each state could harvest of Delaware Bay origin.

For Delaware and New Jersey, roughly 152,000, Maryland 141,000, and Virginia 34,000. Also, within this we recognize that not all crabs in Maryland and Virginia waters are of Delaware Bay origin, so we account for that, which allows a total quota for Maryland and Virginia to be a bit higher, so for Maryland almost 256,000 and for Virginia 81,000 male only. With that I'll take any questions on this year's allocation and recommendations.

CHAIR CIMINO: Thanks, John, let's open it up to the Board, Toni, please, if you have any hands.

MS. KERNS: There are no hands currently. I have now, David Borden.

CHAIR CIMINO: David, go ahead.

MR. DAVID V. BORDEN: A question, I don't know a lot about red knots, but the decline in red knots, are there other indices from other areas that comport with the same rate of decline that we've seen in the U.S.?

MR. SWEKA: There are other indices, or there are counts down in South America. I don't know the specifics of those off the top of my head. You know they have shown a decline. Over the course of, you know since we've been monitoring and the ARM has been in use for management, from 2011 through current times, our mark/re-site estimate of birds has remained very stable. Prior to that, Delaware Bay observed declines in those peak aerial counts. There are some counts in other places like South America that did show a decline.

MR. BORDEN: Thank you. I guess the only observation would be, Mr. Chairman, it might be useful at some point, and I may have suggested this in the past, to get a little bit of the data from the other survey indices from other areas, to get a broader picture on what's happening with the population, to see whether or not this is indicative of overall population decline or not.

CHAIR CIMINO: Yes, that is something, you know we certainly have folks involved in this process that could help us put that together, so that is something to take into consideration, to present to the Board at another time. Any other hands, Toni?

MS. KERNS: Conor McManus.

CHAIR CIMINO: Go ahead, Conor.

MR. CONOR McMANUS: I had just a quick question on the missing data-points. It sounds like to estimate those it was kind of a cross walk comparing other surveys from the region to data fill, and I guess I was curious if there was discussion of other tools, like a moving average or some type of random walk to estimate those from the actual trawl survey, as opposed to estimating them from others, which can obviously have issues, in terms of comparability, catchability, spatial temporal overlap, so I just was curious if you could speak to that a bit.

MR. SWEKA: I guess we didn't really consider other methods. You know we looked at the correlation between the New Jersey and Delaware trawls with the Virginia Tech Trawl, and used a linear mix to sex model to combine the surveys overall. You know we did see that that combined composite index did show a good correlation to the Virginia Tech Trawl over for when we had overlapping years of both time series.

Then we just used the straight up regression equation to fill in those data gaps. We didn't explore other models; you know such as you say like a random walk model. Hopefully, the Virginia Tech Survey continues to receive funding every year. Our hope is this won't ever be an issue again.

But if it is, at the same time, the Delaware Trawl and the New Jersey Ocean Trawl are also starting to collect additional information similar to the Virginia Tech Trawl, so sexing crabs and staging crabs, in terms of primiparous and multiparous. If, in the rare chance that the Virginia Tech Trawl Survey isn't funded again, I think we will have the necessary data from the other trawls to inform annual population estimates.

MR. McMANUS: Great, thank you.

MS. KERNS: You have no additional hands, Joe.

SET 2022 HARVEST SPECIFICATIONS

CHAIR CIMINO: John said something, we've been really for a few years now. Caitlin, do you want to go into the specifications?

MS. CAITLIN STARKS: Yes. The specifications can be set by the Board based on a recommendation from the Committee.

CHAIR CIMINO: Great, thanks. We've seen kind of a status quo suggestion here, so I'll open it up to the Board for a motion on this.

MS. KERNS: You have Mike Luisi.

MR. MICHAEL LUISI: Thanks, Mr. Chairman, I'm happy to make the motion. Do you have something already prepared that I can read? I'm trying to come up with it off the top of my head. There we go. **I move to select harvest package 3, 500,000 male crabs only for 2022 horseshoe crab bait harvest in Delaware Bay.**

CHAIR CIMINO: Thank you, Mike, and do we have a second to that?

MS. KERNS: We have Pat Geer.

CHAIR CIMINO: Very good, thanks, Pat. Is there any discussion amongst the Board on the motion?

MS. KERNS: No hands are raised.

CHAIR CIMINO: To be true to my word, I did say that I would open this up to the public if there were any questions or comments that they had.

MS. KERNS: Just a reminder to the public, your hand is raised when the hand icon button has the red arrow pointing down. I don't see any hands.

CHAIR CIMINO: Very good. Okay, so is there any objection to this motion by members of the Board?

MS. KERNS: I see no hands in objection.

CHAIR CIMINO: Okay, the motion passes by consent, one more year of harvest package 3.

PROGRESS UPDATE ON REVISION TO THE ARM FRAMEWORK

CHAIR CIMINO: Let me bring up my agenda here, and I believe that takes us back to John for the Progress Update on Revision to the ARM Framework

MR. GEER: Hey, Joe?

CHAIR CIMINO: Yes.

MR GEER: On the screen we don't have who the second was on the last motion. We need to get that in there for the record.

CHAIR CIMINO: Yes, okay, very good, thank you.

MS. KERNS: Maya, it was Pat Geer.

CHAIR CIMINO: John, before you start, I just wanted to give my thanks to the ARM Subcommittee who have been putting in a tremendous amount of work on this. I really appreciate it, and I think it's continuing to move us forward, as we did with the 2019 assessment. If you want to go through the Progress Update on the Revision, thank you.

MR. SWEKA: Yes, this has been a work in progress now for coming up on two years now. I just wanted to give you a progress update very quickly on where we're at in the process. Just to show a timeline. We've redone models, put a draft report together. On October 4, we had a webinar amongst the entire ARM Subcommittee to review the draft report and the results.

This draft report has now been sent to the Delaware Bay TC, that was on October 13. This coming Monday on October 25, we will have a webinar with the Delaware Bay Ecosystem TC and the Horseshoe Crab TC to review the report. Between October 25th and mid-November, we'll have an opportunity to make any tweaks or changes to the report. It's going to be sent to the peer review panel. The peer review workshop is scheduled for November 16th to 18th. After that we'll have some December, January we'll have some time to make any changes that the peer review might recommend. Then it's anticipated that we will present the reports and our findings to the management board in January, at the winter board meeting in January. We are going to have a couple minority opinions, so if there is not management board objection, we will add a term of reference to the peer review terms of references, to address any of these minority reports. That's where we stand with the revision to the ARM.

CHAIR CIMINO: Okay, thanks, John. I think we all look forward to seeing this through peer review. You did have something there for us, so I'll open it up to the Board for questions, and any comments on the TOR that John is suggesting, which is certainly not uncommon. But we thought it would be good to have it specifically spelled out as a TOR. Toni.

MS. KERNS: I have currently no hands. One hand, Mike Luisi.

CHAIR CIMINO: Go ahead.

MR. LUISI: John, regarding the minority report. My staff indicated to me that there might be some discussion about female harvest of horseshoe crabs. Is that what you're referring to, based on the minority report or can you get into any more detail about where that might go, as far as that term of reference?

MR. SWEKA: I hesitate to divulge too many details, because this hasn't gone through the Delaware Bay Ecosystem TC yet, and they haven't weighed in on the process. Also, it hasn't been peer reviewed. If you allow me to not specify any details that would be appreciated at this point in time.

MR. LUISI: That's totally fine, I just was wondering if there was any additional information you could provide. But I totally understand, that's fine, thanks.

MS. KERNS: There are no additional hands, Joe.

CHAIR CIMINO: Okay, well with that, and thank you once again, John. I appreciate that, and please pass on our thank you from the Board to the ARM group for all that hard work.

CONSIDER FISHERY MANAGEMENT PLAN REVIEW AND STATE COMPLIANCE FOR THE 2020 FISHING YEAR

CHAIR CIMINO: We'll go to Caitlin for the FMP Review and State Compliance for the 2020 Fishing Year.

MS. STARKS: I'll be going over the Horseshoe Crab FMP Review for the 2020 Fishing Year. Before I start, I do want to note that the draft FMP review document that went out in the supplemental materials to the Board has some numbers and information that need to be updated following this meeting, specifically the compliance report from Massachusetts was not available until earlier this week.

My presentation today will include those most up to date numbers, and I'll incorporate those into the document after that meeting. But just so folks are aware that there will be some discrepancies between the document and my presentation today. Okay, so I'll start off with a short and sweet review of the management history for horseshoe crab at the Commission. The FMP was originally approved in 1998, and then in 2000 Addendum I established the state quotas for bait harvest and de minimis criteria. In 2001 quota transfer provisions were established through Addendum II. Addendum III and Addendum IV established state quotas and seasons for the Delaware Bay Region, and then Addenda V and VI extended those provisions. Then in 2012, Addendum VII was approved, which established the current adaptive management resource framework for the Delaware Bay.

This figure is showing the annual values of reported horseshoe crab bait harvest, biomedical collections and estimated biomedical mortality in millions of crabs over the time series. As you can see, the bait harvest is lower in 2020 compared to 2019, while biomedical collections increased slightly compared to 2019.

For bait harvest in 2020, the total (breaking up) reported was 456,675 crabs, and that represents a 45 percent decrease from the 2019 landings, and approximately 20 percent of the Commission's coastwide quota for horseshoe crabs, which is 1.59 million pounds. The states of Massachusetts, Delaware, New York and Maryland made up for 90 percent of the total coastwide bait harvest when

combined, and each state harvested 36 percent, 27 percent, 14 percent and 13 percent of the total respectively.

It should be noted that the decline in landings observed in 2020 was likely a result of the COVID-19 pandemic, not necessarily due to declines in abundance. For biomedical in 2020, the number of crabs collected for the sole purpose of LAL production in the biomedical industry was just over 697,000 crabs.

This represents a 9 percent increase from the 2019 value, and the estimated mortality of biomedical only crabs was 106,339. As a reminder, this total is the sum of the number of observed mortalities plus 15 percent of the total crabs bled. The biomedical mortality represents about 19 percent of the total mortality in 2020, and that includes the bait harvest.

That total is about 563,000 crabs. Again, that total mortality number is a big decrease from 2019, considering the decrease to bait harvest. As you might expect, COVID-19 did have some impacts on state sampling in 2020. I just wanted to note that several state surveys were unable to be conducted, while others saw a significant reduction in sampling effort due to restrictions, as a result of the pandemic. Those are listed here and in the FMP review document.

For de minimis status, states can qualify if their combined average bait landings for the last two years are less than 1 percent of the coastwide bait landings for the same two-year period, and in 2020 South Carolina, Georgia and Florida requested and meet the criteria for de minimis status. New Jersey and Potomac River Fisheries Commission also meet the criteria, but did not request de minimis status.

These are some of the recommendations based on the PRTs review of the annual compliance reports. First, the PRT again is recommending the Commission continue to prioritize finding long-term funding for the Virginia Tec Trawl Survey. Again, this is a critical piece of information for our current management program. The PRT also recommends working towards getting annual estimates of horseshoe crab discard removals, and then lastly this is an item that has come up during the FMP review for a number of years, which is that the biomedical mortality threshold of 57,000 crabs has been exceeded. The FMP specifies that if this threshold is exceeded the Board is required to consider management action, and during the past few years when the Board has discussed this issue, the conversation has come back to the fact that we do not have scientific evidence that the biomedical mortality is affecting population status, and therefore action is not warranted.

In the 2019 assessment, a sensitivity analysis was run in which the total biomedical mortality for the coast was input into the catch multiple survey analysis models for the Delaware Bay stock, and the conclusion from that was that the biomedical mortality rate did not have an impact on stock status.

It's also worth reminding the Board that the threshold set in the FMP did not have a biological basis, but was based on biomedical mortality rates at the time. Given the biomedical mortality rate has continually exceeded this threshold in recent years, and that is likely to continue, and taking into account the advice from the assessment that says the recent levels have not likely had a negative impact on the stock.

I see the Board having two paths moving forward to address this. One is to do nothing, meaning the issue may present itself to the Board every year, and you'll have to keep discussing it annually as per the FMP. The other is to consider taking an action, and that action could be to consider modifying the threshold through an addendum, or otherwise change the FMP requirements to address this issue in some way.

Taking an action would also allow the Plan Development Team to put some work into analyzing options and coming up with recommendations for

how to address this issue, and on that note, I'll throw out just one thought, which is that if the ARM revision is peer reviewed and accepted by the Board early next year.

I do believe that would require an addendum to implement, so this could be another issue addressed in that same action. I know that was a chunk of information for the Board to digest, but I did want to give you all the opportunity to discuss this today. Then last slide here, with regard to state compliance.

The PRT found that with the exception of those surveys that were impacted by the COVID-19 pandemic, as well as a few late compliance reports, all states and jurisdictions appear to be in compliance with the requirements of the FMP, and they recommended approval of the state compliance reports, de minimis request, and the FMP review for the 2020 fishing year. That's all I have, Mr. Chair, I can take any questions.

CHAIR CIMINO: Great, Caitlin, thank you. That was very well laid out, very thorough report and recommendations from the Plan Review Team, as always. That was a lot, and like I said, I think Caitlin laid it out very well. Toni, do we have any hands, questions from the Board?

MS. KERNS: You have three hands, Roy Miller, John Clark and Mike Millard.

CHAIR CIMINO: Okay, in that order, go ahead, Roy.

MR. ROY W. MILLER: Caitlin, thank you for that report. Are you able to bring up a graph showing the biomedical harvest over the years? Thank you. Now we concluded that the biomedical mortality does not affect stock status, at least for the 2020 work. I assume there will be further analysis of that in the future, and the ARM group or the Delaware Bay Ecosystem Group.

MS. STARKS: If I could reply, Mr. Chair.

CHAIR CIMINO: Yes, please, Caitlin, for all of these questions, go ahead.

MS. STARKS: Correct. The 2019 assessment looked only at the Delaware Bay Region, because that's the only region we have a population model for. What it looked at was if you were to assume that all of the biomedical mortality comes from the Delaware Bay Region, if that is having an impact on the stock status.

The answer that they concluded was no, it doesn't appear to have an impact on the stock status. During the ARM revision there are considerations for biomedical mortality numbers to be included in the model, so that is work that is going into the revision and would be addressed, if that revision is approved on an annual basis. Does that answer your question, Roy?

MR. MILLER: Yes, thank you, Caitlin. Anyone can look at that graph and wonder if the biomedical collection is having a dampening effect, but it would only be speculation. I'll have to go with the conclusions of the PDT, concerning the annual report. Thank you.

CHAIR CIMINO: I believe John Clark was next.

MR. JOHN CLARK: My question kind of follows up on Roy's. If you could just refresh our memories as to why the threshold for biomedical mortality was set at 57,000, and you mentioned that it's been exceeded regularly for years. I know certain actions have been talked about, but nothing has been done. When was it set and why was it set at 57,000?

MS. STARKS: Thanks, John, I believe that it was set in the original FMP, if not a very early addendum. It's been exceeded for 13 of the past 14 years. It's not completely explicit in what I could find, but it seems that the number was based on what the biomedical mortality rates were at the time with the data they had available.

MR. CLARK: Thanks, Caitlin, I mean obviously it just seems like the Board will have to do something here, because it does seem very odd that we're

putting all these limits on commercial harvest, and yet biomedical is passing this threshold every 13 out of 14 years. Thank you.

CHAIR CIMINO: It's certainly been a concern of mine, and I think again, Caitlin kind of talked about a couple ways that we could deal with this. The fact that with a revised ARM model we might be starting an addendum process, once we get past peer review. I think that's something for the Board to consider. I know we have one more hand at least, and that's Mike Millard, so Mike.

MS. KERNS: I just wanted to let you know, Joe, you have two more hands, David Borden and Dan McKiernan. But I just want to make sure that everybody remembers when they read this graph that the biomedical collection is higher than this harvest, but biomedical mortality associated with those collections is significantly lower than mortality associated with bait harvest.

CHAIR CIMINO: Well said, Toni, thank you. Go ahead, Mike.

MR. MIKE MILLARD: Thank you Caitlin for that report. I especially appreciated your vision about how to possibly treat the biomedical issue. As people have already said, we've kind of looked the other way. We've exceeded it every year now for, I don't know 15 years or something and we've looked the other way.

But if the trend continues, not only are we exceeding it, we're essentially going to be doubling it. That has never set well with me that we just kind of look the other way, so I hope that we can address that one way or another in the near future. My question is, and perhaps either for you, Caitlin, or for John.

As we ponder that biomedical mortality, it makes sense to also think about the other non-directed mortality, the bycatch and incidental mortality in the other gear. I see a comment in this PRT plan review document that says that bycatch is significant. I believe in the 2019 stock assessment, bycatch was documented, but that was just for Delaware Bay, I think.

My question is, are we looking at or considering bycatch up and down the coast? I guess I would like to hear John's reaction maybe. How do we put this biomedical mortality in context with all these other non-directed mortalities, when we say that it doesn't affect the stock? I would like to hear more about that.

MR. SWEKA: This is John, if I may, Mr. Chair.

CHAIR CIMINO: Yes, please.

MR. SWEKA: Okay, Mike, I mean this is obviously a good question, and something that comes up every board meeting, you know putting these other sources of mortality in perspective. As far as the bycatch is dead discards from other fisheries. You are correct in that we've only, in the 2019 assessment and currently in the ARM revision that we're going through right now.

We've only assessed and quantified dead discards for Delaware Bay. It probably is possible to do this for other areas along the coast, it just hasn't been done yet, because we didn't have a stock assessment model in those other areas that required that information as input. But as Caitlin said, you know one of the best ways to put everything in perspective is through our catch multiple survey analysis model that we're running for Delaware Bay, because all sources of mortality are included in that, you know natural mortality, bait, biomedical, and dead discards.

We obviously can continue running that to put things in perspective and parse out what portion of total mortality, at least within the Delaware Bay area comes from each one of those sources. In terms of putting things into perspective. Well, I guess, back to just one more thing on the discards. Something to note is that the discards of horseshoe crab have probably gone up because of our management. That is because we have a prohibition on the harvest of females in the

Delaware Bay area. When a commercial vessel pulls up a female horseshoe crab, they have to put it back, so it is basically discards.

Granted, some of those may succumb to mortality based on the fishing gear that was used. But to also put the biomedical mortality into perspective. You know during my presentation I presented that for 2020 we had 9.5 million females and 29.7 million males, so that's a total of 39.2 million crabs within the Delaware Bay area.

If we assume a worst-case scenario that all coastwide biomedical mortality came from Delaware Bay, now obviously it doesn't, because we have bleeding facilities in the Northeast and then also in the Southeast. But if you just consider that, for example that all of those biomedically-bled crabs that die came from Delaware Bay. You know, that really represents only 0.3 percent of the Delaware Bay population.

When you put that into perspective with the natural mortality associated with crabs in Delaware Bay, which is 26 percent annually that die from natural causes. You know the biomedical mortality is a very, very small proportion, and it would be very difficult for us to even really quantify an impact that that might have on the population, just given the natural variation and natural mortality. Does that answer your question?

MR. MILLARD: Yes, thanks, John.

CHAIR CIMINO: Thanks, John, I think it answers another question and it's why have we not taken action through all these years. But it does speak to, then do we have an appropriate threshold, of course. That is a question that doesn't need to necessarily be answered today, but it certainly sounds like there is a will from many Board members to at least further that discussion at some point. I know we have a few more hands, so I think David Borden was next.

MR. BORDEN: Yes, thanks, Mr. Chairman. My comment kind of follows up on John Clark's comment. I recognize that the biomedical harvest is low, but it kind of begs the question, are their handlings techniques or other methodologies we could use with that mortality sector, to kind of lessen the impacts, and if there are or if there are not, that is one thing.

But, if the technical folks could give us some recommendations on that sector we could then explore with the biomedical people to try to lessen the impact, it helps. Everything helps. We're trying to lower mortality on crabs, and we can't turn a blind eye to just one section of the mortality.

CHAIR CIMINO: Thank you, David. Dan.

MR. DANIEL McKIERNAN: To just give a brief response to David Borden's comment. Massachusetts does have a biomedical firm in the state, and we do permit the company with a lot of permit conditions that have to do with maximum time that they can handle them, temperature that they're holding them, things like that to try to minimize the incidental mortality from the processing of the lysate. But the reason I raised my hand, and I know I brought this up last year. I'm going to make this a more urgent request. I would really like the Technical Committee or the Plan Review Team to stop presenting the years 1998, '99, and 2000, and maybe 2001 in the annual total harvest estimates. I believe that those years may not be accurate.

I know that data collection methods evolved, and they are much, much better today. In fact, our program really came into its own around, of course we all have to be counting crabs, but you know when the quotas were kicked in. But some of those numbers in '98, '99, or 2000, I know because I was around then.

Some of those were estimates that weren't reliable enough for us to even continue to manage our quota. We have a 330,000-crab quota under the interstate plan, but as a state we limit our harvest to 165,000, half of that, because we believe that

some of those early numbers were inaccurate. I just don't think that those numbers have the same quality, in terms of precision or accuracy.

I see this graph and it appears that there was an awful lot of bait harvest back in the late '90s and in 2000, and that you can see the management plan kick in. I agree the management plan has been effective at controlling harvest, but I don't think those early numbers are accurate. I would ask for next year's report.

If the PRT Or the Technical Committee could just weigh in on that, and maybe not show the trends during this time period, like cut those years off. I don't think they are meaningful. We obviously have no biomedical collection data in those years. Then we can move on to the years that we've been actively managing this fishery. Thanks.

CHAIR CIMINO: I guess Toni, you can correct me if I'm wrong, but I don't think we necessarily need a motion to task the PRT to consider that.

MS. KERNS: No, we don't need a motion, you can do it by consensus. But before we make the promise, if we could just say that we would let the PRT evaluate that, and see how it impacts the information we're giving you.

MR. McKIERNAN: Yes, that's all I'm asking for, an evaluation.

CHAIR CIMINO: Okay, I think that's fair. Of course, if anyone has any objections to that please raise your hand.

MS. KERNS: We have Chris Wright with his hand up, and David, I don't know if your hand is left over or not.

MR. BORDEN: It's up again, quick point.

CHAIR CIMINO: To that, David is it to Dan's suggestion?

MR. BORDEN: Mr. Chairman, you are a little broken up, are you calling on me?

CHAIR CIMINO: Oh, sorry. I was asking if your quick comment was to Dan's suggestion or it was another point entirely.

MR. BORDEN: Yes, I'm supportive of what Dan suggested, but I appreciate his response to my question, so once again it begs a question. Do all states require the additional restrictions and handling techniques that Mass does, and if they don't, then I think it would be useful to have a technical group review the Massachusetts requirements, and see whether or not we should make it a plan condition, or some variation of that plan condition. If we're going to get technical people together on one issue they could review that other issue, I think that would be informative.

CHAIR CIMINO: Sure, yes. I know there are best management practices throughout, but whether or not those are permit requirements I think is something, like you said. It would be useful to have a report in the near future on an important item. That's fair, thanks, Dave. Chris, go ahead.

MR. CHRIS WRIGHT: Yes, I just wanted to follow on of Mike's comments, in regards to the dead discards in the bycatch. At the last stock assessment that was the one thing that the Peer Review Folks noted, that that was the most important aspect, in regards to mortality that is not being necessarily addressed or accounted for.

If we're going to be looking at like threshold for the biomedical, which I think does need to be looked at. But it's not necessarily in my mind worrisome, it's more like it's an optics issue. Because the biomedical use is a valid use, it's just that we have to allocate those resources and account for them, and right now we're not really accounting for them correctly.

But I think the dead discards from the other fisheries need to be accounted for, and if I recall correctly, and John or any of the other tech folks from the TC can correct me. But I believe that it

was almost, it was estimated by the peer reviewers to be almost as high as the harvest, the direct harvest.

That is a little bit more concerning to me than the biomedical, which is much less significant. But I think we need to have the TC and the ARM address those things, so that we can just have proper accounting, because right now the optics look like biomedical is harming the stock and it's not. But we need to address that threshold, because it's not necessarily realistic with what's happening currently.

CHAIR CIMINO: All good points, yes thank you, and those were concerns of mine as well, as we went through the peer review presentation for management use. That went for all stocks, not just Delaware Bay. I know that the Stock Assessment Subcommittee did a tremendous amount of work trying to find all available data on the issue. I think it might lead more towards future research recommendations on being able to collect more information on this, so that they have something, new numbers to use in the future. Toni, any other hands?

DR. KRISTEN ANSTEAD: Mr. Chair, can I chime in on the dead discards?

CHAIR CIMINO: Yes, of course, go ahead.

DR. ANSTEAD: I figured the dead discard estimates for the benchmark and, at that time the Peer Review Panel made some great recommendations about how to improve those estimates because it was sort of our first shot at it. We have taken a lot of those recommendations for the ARM revision.

But as you all noted, that is just for the Delaware Bay. I just wanted to manage expectations, because these discard estimates are from the Northeast Fisheries Science Center's Observer Program, and that program does operate from Maine to North Carolina. It doesn't operate coastwide, as far as our horseshoe crab population is concerned.

While estimates could be made for sort of more of the coast, it will be potentially more challenging. That's not to say that we can't look into it on an annual basis, particularly if the ARM model passes Committee review and Peer Review. I'll be asking for that data every year, to support the ARM Framework, and I can get it from the entirety of the coast where that program operates.

But, we did look into that during the benchmark and it was challenging because it is a modeled approach, it's a ratio estimator. The Observer Program isn't necessarily designed for horseshoe crab, you know it's a federal program for federally permitted boats, and some of the states just didn't have the data to support those ratio estimators, and there were a lot of kind of modeling problem. It is certainly something we can look at in the future, but I think we should manage expectations about trying to do those coastwide on an annual basis, if that's possible.

CHAIR CIMINO: It's very helpful, Kristen, and I apologize. I forgot to mention to the Board that we had Dr. Anstead waiting in the virtual wings if we needed some assistance. With that, Toni, do we have any other hands?

MS. KERNS: We do. We have Rob LaFrance, Roy Miller, Craig Pugh, and then you have a member of the public.

CHAIR CIMINO: Okay that's fair. Let's start with Rob, go ahead.

MR. ROB LaFRANCE: I just wanted to be supportive of what David Borden was saying. I do think it's important that we look at what Massachusetts is doing, in terms of best practices, and take a look at how to improve the number of crabs that might die as a result of the activity that happens from that, and see what we can do to help reduce on the margin that mortality. I would also suggest that that analysis might be helpful in really making certain that we really, truly understand whether or not that 15 percent mortality rate is accurate. I just want to be supportive of David, and thank you for the time.

CHAIR CIMINO: Again, I think some of this has been covered in the past, including the fact that they do model other mortality estimates. But it is certainly something important to revisit. Sorry, Toni, I think Roy was next in line.

MS. KERNS: I can't remember if I said Roy or Craig first, but they are both in line.

CHAIR CIMINO: Okay, well how about this. We've heard from Roy, so why don't we let Craig go first and then we'll go to Roy, so go ahead, Craig.

MR. CRAIG D. PUGH: My comment or question is in the ever changing commercial fishery that I've been involved in with the state of Delaware. Our horseshoe crab fishery has changed extensively in the last 10 to 12 years. Almost all of our quota has been hand collected with little mortality whatsoever.

Years ago, 25 years ago, the dredge fishery, and there would have been a fair amount of mortality that went along with that. But in most recent years, almost all of our quota has been collected by hand, and then transported out either by truck or trailer to the markets, leaving very, very little mortality, so this is a pretty big change in the mortality statistics, I would expect.

CHAIR CIMINO: That's a great point, Craig, because you know we are talking about doing our best to make those estimates current, and future needs. But I guess in assessing stock dynamics it would be important to look back at the differences, or at least potential discard estimate differences, considering how fisheries have changed. Great point, thank you. Roy, go ahead.

MR. MILLER: I was just going to add. I think Dan's suggestion of the PDT taking another look at the early years of the bait estimates that you see on this graph that's before us. That is a good suggestion. But I would remind the Board that the reason we started this horseshoe crab management plan in 1998, there were some pretty alarming numbers, in terms of harvest, back in the 1990s. That's how we embarked on this FMP process to begin with.

I wouldn't be too quick to prejudge those early numbers that you see in this graph as inflated, until a more thorough examination of the records from back then is done, including whatever information was anecdotal at the time. Let's not jump to too many conclusions yet, pending the further analysis.

CHAIR CIMINO: Sure, fair point, thanks, Roy. Toni, you said a member of members of the public?

MS. KERNS: We have one more commissioner, Emerson Hasbrouck, and then you have Allen Burgenson and Brett Hoffmeister.

CHAIR CIMINO: Yes, okay, Emerson.

MR. EMERSON C. HASBROUCK: I do not have any questions, but when you're ready, Mr. Chairman, I've got two motions to make.

CHAIR CIMINO: Okay, that sounds fair. In that case then we'll take it out to the public. Toni, you said, I'm sorry, it was Allison?

MS. KERNS: First was Allen Burgenson.

CHAIR CIMINO: Sorry, go ahead, Allen.

MR. ALLEN BURGENSON: I would like to point out, to answer an earlier question regarding best management practices. The biomedical industry, the ASMFC, the state and a couple federal agencies all got together in October of 2011, and laid out the best management practices that we all adhere to. We've all incorporated them into our operating procedures, and we audit our fishermen, and it's followed up with the people who go out on the boats to watch.

We do adhere to the best management practices, and if I could address the 15 percent. That number has long been disputed, because it was set using methods that in no way represent the procedures

of the biomedical industry. It's set artificially high for planning purposes, but it's a worse case, but it's not the real case, and that's it.

CHAIR CIMINO: Thanks, Allen, we appreciate the perspective. I do think there was another element of that request that I still would like to have reported out to the Board, and that's just kind of where it falls from state to state on permit requirements regarding all this. But I appreciate that, and go ahead, Brett.

MR. BRETT HOFFMEISTER: For the record, my name is Brett Hoffmeister, LEL Production Manager and Associates, Cape Cod. I also serve on the Advisory Panel. Two quick comments, first regarding the 57,000-threshold for biomedical. You know when you look at the overall quotas, coastwide quota for horseshoe crab bait is about 1.5 million.

That is reduced down to about 1 million crabs coastwide by the states themselves, and that includes states that don't include any harvest whatsoever. You're looking at the total mortality of the biomedical and Bay combined, and that's well, well below these thresholds. When the question of whether or not the Board needs to take action on the biomedical threshold, I think that that is something that in the past has been taken into consideration.

I mean we're not even approaching the thresholds or quotas for bait, so when you roll in the biomedical, it's clearly not something to be overly concerned about. Second comment, very quickly would be regarding the biomedical mortality. Again, a lot of comments and questions surrounding that. The one thing I would point out was that the most recent published paper in 2020 by U.S. Geological Service and the Fish and Wildlife Service, I think Dr. Smith worked on that, did look at biomedically-bled crabs.

There was about 78,000, 75-78,000 crabs that were bled by biomedical companies in the Delaware Bay Region that were tagged and analyzed over years, and that mortality was better than the controls in some cases. You know to Allen's point, the mortality that we have estimated or you have estimated for the purposes of management at 15 percent is high, assuming some worse case scenarios. The actual mortality is demonstrated by at least one large scale study, significantly lower. Very low in contrast to some of these other studies, where you know they did not even remotely follow the practices of the biomedical companies. It's suggested for the future that that may be something that they included, or at least considered in future biomedical estimates. That's all, and I appreciate the time, thank you.

CHAIR CIMINO: Yes, and thank you. I am sure that the group working on it at every benchmark will continue to evaluate that. Toni, we know that Emerson is waiting with a couple of motions, and I appreciate hearing that, Emerson, because I think that this would require two potential motions if we're interested in taking action on the threshold. But are there any other hands, Toni?

MS. KERNS: No other hands, I think you're ready for Emerson.

CHAIR CIMINO: Sounds good, go ahead, Emerson.

MR. HASBROUCK: My first motion would be to accept the FMP Review, so does staff have a motion prepared for that? **Yes, move to approve the FMP Review for the 2020 fishing year, state compliance reports and de minimis status for South Carolina, Georgia and Florida.**

CHAIR CIMINO: That's great, thanks. If we could get a second to that, and Emerson, if you don't mind. I think this is going to be pretty easy, so I would like to dispatch this entirely before we move to your second. Do we have a second, Toni?

MS. KERNS: David Borden.

CHAIR CIMINO: Great, thanks, David. We have a motion and a second, is there any discussion on this?

MS. KERNS: No hands.

CHAIR CIMINO: Okay, I kind of had a feeling**. A show of hands if there are any objections to this, if not we can approve this by consent.**

MS. KERNS: I see no hands in objection.

CHAIR CIMINO: Sounds great, back to you, Emerson.

MR. HASBROUCK: I'm just doing this next motion on the fly here, so I'm open to edits and suggestions on it. **Move to initiate and addendum to review the threshold for biomedical use to develop biological based options for setting the threshold, and to develop options for action for when this threshold is exceeded. Also, in the addendum to review best management practices for handling biomedical catch, and suggest options for updating and/or implementing these best management practices.**

MS. MAYA DRZEWICKI: Can you just repeat that last section of the sentence?

MR. HASBROUCK: Yes, like I said, I was doing this on the fly. Best management practices for handling biomedical catch and suggest options for updating and implementing BMPs, and implementing BMPs, best management, yes.

CHAIR CIMINO: Take a look, Emerson, do you think the wording is what you were hoping for.

MS. STARKS: Maya, I believe the word settle should be develop, in the third line.

MS. KERNS: Hold on one second, Joe. Maya, instead of and to develop options for action, right, Caitlin?

MS. STARKS: It should be to develop biological based options for the threshold, and to develop options for actions when the threshold is exceeded.

MS. KERNS: Thanks, Maya.

MR. HASBROUCK: That looks okay, again I'm open for edits and suggestions here, because I did this on the fly.

MS. KERNS: Before I give you a hand that was maybe up for a second, Joe, can I just ask Emerson if his intention for something? Caitlin had mentioned that we'll get the ARM model review and peer review, hopefully at the winter meeting. There potentially could be some management action following that review.

Emerson, is your intention to wait until after we have that peer review? Could we have, instead of initiate an addendum, have the Plan Review Team or Plan Development Team, either one, review the information and bring it back to you all before you decide if you're going to start the addendum? I just was hoping we could have an addendum that was potentially on one track.

MR. HASBROUCK: That's fine with me, Toni, if you think that's a better process. I just don't want to in a way ignore the fact that we have a threshold that we continue to ignore when we exceed it. If you think it is better off to have this reviewed, and then circle back to it in our winter meeting, I'm fine with that. But I just wanted to initiate an action right now, whatever is most appropriate to start to move this forward.

CHAIR CIMINO: I appreciate that, Emerson, and to Toni's point. I was kind of hoping that we could do this all-in-one time. Again, we let this roll along for quite some time, and we should have the peer reviewed revised ARM at our next meeting, and that will begin an addendum process. It would be great if we could roll this in. I don't see this going away, since I think the threshold needs to be revisited. With that in mind, and the wording to that timing is a little complex. I guess, Toni, do we need to correct or should I look for a second with an understanding on the record of the intent?

MS. KERNS: I think it would be great to correct, and instead of saying initiate an addendum, we would

just in the two places where it says addendum, just say move to have the Plan Development Team review, also have the PDT review.

MR. HASBROUCK: Yes, I'm fine with that. For the justification, I'll give it now. You know we shouldn't have a threshold that we continue to ignore. It seems that the threshold has no biological basis, and then we also have no basis to ignore it. I think we need to have a more solid development of this threshold, and then have a better reason for us to either ignore it or initiate some action. I don't think we should just keep going along from year to year saying, okay it's been exceeded but it doesn't mean anything, so we'll ignore it.

CHAIR CIMINO: Sure, understood. Do we have a second to Emerson's motion?

MS. KERNS: David Borden has his hand up. I just want to make sure that he is seconding. David, are you seconding?

MR. BORDEN: Yes, but I would like to comment on this.

CHAIR CIMINO: Yes, go ahead, David.

MR. BORDEN: My suggestion is I'm totally supportive of what Emerson is attempting to accomplish. I think he's 100 percent right. I don't think we need a motion. I think if we just took out move to have the PDT, or change that to task the PDT, so it would be a directive. As Toni suggested it would go to the groups.

It would be reviewed, and then it would come back to us, and I think we would be in a better position to actually decide on whether or not we want to initiate an addendum, or what path we want to follow at that point. We would be better informed. If Emerson were willing to make that editorial change, I think we can dispense with the motion.

MR. HASBROUCK: Yes, I'm fine with that, but I don't know, do we need a motion though to task the PDT to do something?

MS. KERNS: Mr. Chair, you have a motion on the table now, so I think if you just wanted to vote on it, it would be the cleanest, now that you have a motion on the table with a second.

CHAIR CIMINO: I appreciate the review, Toni, and also, I think it might be good to have a discussion on the motion. Yes, it sounded like there is a lot of support, but we do have a motion, as Toni mentioned. We have a second, so hands for any discussions or thoughts on the motion.

MS, KERNS: We have Roy Miller.

CHAIR CIMINO: Go ahead, Roy.

MR. MILLER: Thank you, Joe. I just wonder if the Plan Development Team is the best body to review best management practices for handling biomedical catch. I confess I don't recall who is on the PDT exactly, but they may need outside expertise from the biomedical industry, in order to review best management practices.

CHAIR CIMINO: As we had a couple industry members today mentioned that those BMPs are out there, they are updated, and being used currently. I think that information would be available to a Plan Development Team, and Toni, I don't know if we have a current Development Team sitting, or if this is something that needs to be created after we move forward.

MS. KERNS: Joe, you are correct. We would create a PDT and we'll get the (fade) best, we might even create two different ones. Caitlin and I will talk about it, and figure out if we need to have some people doing the BMPs, and other folks reviewing the threshold. We'll determine that after the meeting, and then send an e-mail out to the Board for nominations.

CHAIR CIMINO: Very good, thank you, any other hands?

MS. KERNS: We have Dan McKiernan, and Maya, can you just say move to task the PDT? Then Chris Wright, followed by Dan, I mean Dan followed by Chris.

CHAIR CIMINO: Now you're saying Chris had his hand up first, go ahead, Chris.

MR. WRIGHT: I just had a question. I'm in support of analyzing, then the motion of getting to what the threshold is. But I guess with the PDT, are they going to have enough information to come up with some kind of recommendations back to the Board? Because one of the things that has happened since the COVID pandemic is, I believe that the demand for the product from that biomedical harvesting has increased. I believe that's why we're seeing an increase in that threshold being exceeded the last couple years.

But if there is a demand there then it turns into an allocation type of situation, where if there is a use that is being used for biomedical and it's a valid use, we need to account for that in the Board, and balance that with the bait fishery and all the other things, bycatch and what have you. I'm just wondering, is the PDT going to have enough information on what's currently happening with that biomedical, I guess use, so that we can actually come up with some kind of recommendations for the Board.

CHAIR CIMINO: You know without having a team together or having started the process, I'm not sure anyone wants to be put on the spot to attempt to have (faded).

MS. KERNS: I think, Joe, we'll just figure that out once we have the team together. We'll compile the information that we have available to us, and then they will be able to look at what they have and provide information back to the Board.

CHAIR CIMINO: I think that's fair, Toni. As Board Chair, I do know the industry has put out some statements regarding the need for the product during the pandemic. I think information is out there. Let's go to Dan.

MR. McKIERNAN: I'm going to vote against this motion. I agree with the previous speaker that ultimately it becomes an allocation challenge. We've seen in the graphs that the bait harvest appears to have dropped off in the last few years. It's been mentioned that the demand for crabs to be used for biomedical uses has increased. I don't think it's possible for the PDT to establish a biologically based threshold. This was discretionary when the Board enacted it two decades ago, trying to, I think, capture things as they were. Clearly, we've exceeded that, but I don't think, at many local levels there hasn't been impacts on stocks, especially up our way in the Mass/Rhode Island area. I wasn't expecting this to be dealt with at today's meeting. I think it's a little rushed. I would recommend the Board take this up in a more substantive way, maybe in February. I think it's premature.

CHAIR CIMINO: I think that although one thing that would be initiated from this motion today would probably be getting together one or two plan development teams. But other than that, I think a lot of this will be following our peer review. But those are all good points, and I don't know that everyone was thinking along the lines of there is potential discussion that needs to happen on allocation for the competing uses here. Any other hands, Toni?

MS. KERNS: I have no additional hands.

CHAIR CIMINO: With that, we have ten minutes left. Dan and others might have not been expecting this, so I'm going to give two minutes for caucus. I in fact have to get together with my delegation on this as well. Let's get that started and then I'll call the question. Okay, hopefully that was enough time for everyone. I'll give a second or two. Throw up your hand if you do need another minute, if not I would like to call the question.

MS. KERNS: Joe, I don't see anyone with their hands raised. Do you mind reading the motion, since we altered it?

CHAIR CIMINO: Not at all, I would be happy to do that. We know there are some objections, so I will be looking for a true vote on this. The motion is: Move to task the PDT to review the threshold for biomedical use to develop biological based options for the threshold, and to develop options for action when the threshold is exceeded.

Also task the PDT to review best management practices for handling biomedical catch, and suggest options for updating and implementing BMPs. That motion was made by Mr. Hasbrouck and seconded by Mr. Borden. We have a motion in front of us, can I see a show of hands of all those in favor.

MS. KERNS: I'm just going to let the hands settle for one second. I have NOAA Fisheries, Florida, Rhode Island, New York, Connecticut, Georgia, New Jersey, South Carolina, Delaware, North Carolina, PRFC, Fish and Wildlife Service. I think that's everyone.

MR. LUISI: Hey Toni, this is Mike Luisi. I had my hand up, but I didn't hear Maryland.

MS. KERNS: Put Maryland in there, sorry, thanks, Mike.

MR. LUISI: Okay, no problem.

MS. KERNS: When hands go up late, the order changes and sometimes I miss folks, it's why I call you all out. I put the hands down, Joe, I'm ready for the noes.

CHAIR CIMINO: Very good. All those opposed to this motion, please raise your hand.

MS. KERNS: I have Virginia, and that is all.

CHAIR CIMINO: Thank you, any null votes?

MS. KERNS: N-U-L-L, is that what you asked?

MR. McKIERNAN: Toni, how did you have Massachusetts?

MS. KERNS: I don't have a vote for you yet.

MR. McKIERNAN: We're voting against.

MS. KERNS: Against, okay, in the record, Massachusetts with a no, as well as Virginia, so that is two noes. I had no null, N-U-L-L.

CHAIR CIMINO: Thank you, Toni, and I don't think we have any, but any abstentions to the motion?

MS. KERNS: I have zero abstentions.

MS. STARKS: That's 13 in favor and 2 against, Mr. Chair.

CHAIR CIMINO: Very good, we'll put that up. Okay, so Toni, I guess we'll be expecting some e-mails from you on putting together a new or two new plan development teams.

MS. KERNS: Caitlin will be sending them out.

CHAIR CIMINO: Great, thank you both.

ELECTION OF VICE-CHAIR

CHAIR CIMINO: We have another agenda item that we need a motion on, and that is election of a Vice-Chair. Do we have any hands for a nomination?

MS. KERNS: I have Mike Luisi.

CHAIR CIMINO: Great, go ahead, Mike.

MR. LUISI: **I would like to take this opportunity to move to nominate my friend and colleague from the state of Delaware, Mr. John Clark as Vice-Chair to the Horseshoe Crab Management Board.**

CHAIR CIMINO: Very good, could I get a second?

MS. KERNS: Marty Gary.

CHAIR CIMINO: Excellent, thanks, Marty, and somewhere Stew is chuckling. Are there any objections to this motion?

MS. KERNS: No hands.

CHAIR CIMINO: Great, thanks, John, I appreciate you serving. This is an excellent crowd to work with, I promise you.

MR. CLARK: Thanks, Joe.

CHAIR CIMINO: Yes.

MS. KERNS: Just really quick, can you just say that both of the last two motions passed?

CHAIR CIMINO: Yes, of course, sorry, Toni.

MS. KERNS: Technicalities.

CHAIR CIMINO: Very good, so this motion passes by consent and our last motion passed. I believe it was a count of 13 to 2. We did not have any other additions to the agenda, but is there any other business?

MS. KERNS: I have no hands.

ADJOURNMENT

CHAIR CIMINO: Great. Well, Chris, I apologize. I thought I was going to give folks time to get some coffee before spiny dogfish started, but it looks like we came right up to it, so can I have a motion to adjourn, please?

MS. KERNS: Motion by Mel Bell.

CHAIR CIMINO: Thank you, Mel, and a second?

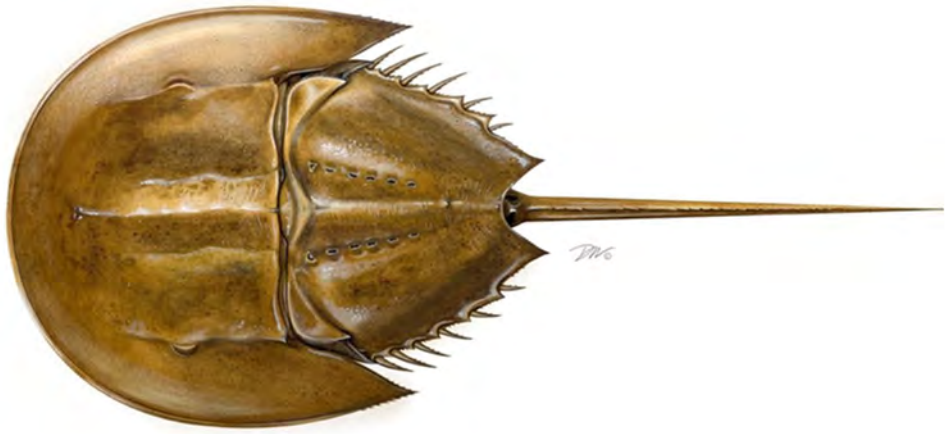
MS. KERNS: John Clark.

CHAIR CIMINO: Wonderful, I'm not allowing objections, we'll move to adjourn, thank you so much, everybody.

(Whereupon the meeting adjourned at 10:00 a.m. on October 21, 2020.)

Atlantic States Marine Fisheries Commission

Revision to the Framework for Adaptive Management of Horseshoe Crab Harvest in the Delaware Bay Inclusive of Red Knot Conservation



Draft for Board Review

Vision: Sustainably Managing Atlantic Coastal Fisheries

Prepared by the
Adaptive Resource Management Subcommittee
John Sweka (Chair), US Fish and Wildlife Service
James Lyons (Vice Chair), USGS Patuxent Wildlife Research Center
Kristen Anstead, Atlantic States Marine Fisheries Commission
Linda Barry, New Jersey Division of Fish and Wildlife
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And the Horseshoe Crab Delaware Bay Ecosystem Technical Committee
Wendy Walsh (Chair), US Fish and Wildlife Service
Henrietta Bellman (Vice Chair), Delaware Division of Fish and Wildlife
Kristen Anstead, Atlantic State Marine Fisheries Commission
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Adam Kenyon, Virginia Marine Resources Commission
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Mike Millard, US Fish and Wildlife Service
Caitlin Starks, Atlantic States Marine Fisheries Commission
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ACKNOWLEDGEMENTS

The Atlantic States Marine Fisheries Commission and The Adaptive Resource Management (ARM) Subcommittee thank all the individuals who contributed to the development of the ARM Revision. Thanks to Michael Schmidtke for his contributions to the report before leaving his position at the Commission. The ARM Subcommittee also thanks Rich Wong (DE DFW) who developed the catch multiple survey analysis for the horseshoe crab benchmark assessment and provided the code and support for this Revision. Thanks to Mandy Dey and the New Jersey Department of Environmental Protection for working with the ARM Subcommittee to incorporate New Jersey data into the Framework. The ARM also thanks James Hines (USGS) for his time and analytical support on the red knot multi-state framework. Thanks to Heather Konell (ACCSP) who validated bait landings data and contributed expertise to the commercial fisheries discard analysis.

Statement Regarding Confidential Data

Note: The Adaptive Resource Management Revision and peer review was conducted using **coastwide** biomedical data, which is not confidential. When the model is run for the purpose of determining harvest in the Delaware Bay, the confidential data from the Delaware Bay states will be used by a person with confidential data access. The annual harvest package will be determined using Delaware Bay state confidential biomedical data but the public and managers will be shown the resulting population estimates using the coastwide non-confidential data only.

Confidential data are data such as commercial landings, including biomedical harvest, which can be identified down to an individual or single entity. Federal and state laws prohibit the disclosure of confidential data, and the Atlantic States Marine Fisheries Commission abides by those laws. In determining what data are confidential, most agencies use the "rule of 3" for commercial catch and effort data. The "rule of 3" requires three separate contributors to fisheries data in order for the data to be considered non-confidential. This protects the identity of any single contributor. In some cases, annual summaries by state and species may still be confidential because only one or two dealers process the catch. Alternatively, if there is only one known harvester of a species in a state, the harvester's identity is implicit and the data for that species from that state is confidential.

EXECUTIVE SUMMARY

The purpose of this assessment was to revise the Adaptive Resource Management (ARM) Framework that was established through Addendum VII (2012) to the Horseshoe Crab fisheries management plan (FMP). The ARM Framework incorporates both shorebird and horseshoe crab abundance levels to set optimized harvest levels for Delaware Bay-origin horseshoe crabs. The objectives of the ARM Revision were to address previous peer review critiques, include many new sources of data and horseshoe crab mortality, and adopt advances in modeling and optimization approaches. This ARM Revision incorporates significant changes from the original version. However, the conceptual model of horseshoe crab abundance influencing red knot survival and reproduction remains intact with the intent of insuring that the abundance of horseshoe crabs does not become a factor limiting the population growth of red knots.

Red Knot Status

The red knot is one of the many shorebird species that feed on horseshoe crab eggs in the Delaware Bay Region during their migration. The red knot was listed as "threatened" under the United States Endangered Species Act in January, 2014, due to loss of habitat, climate change, timing mismatches between the birds' migration and food availability, and other threats. In May 2021, the USFWS released for public comment a draft recovery plan for red knots to ensure the species recovery and resiliency with a goal of delisting by 2080. In July 2021, the USFWS published a proposed rule to designate critical habitat for the red knot. Both the final recovery plan and final critical habitat rule are expected in 2022.

Horseshoe Crab Stock Identification and Management Unit

The Atlantic States Marine Fisheries Commission (ASMFC) manages horseshoe crabs from Maine to eastern Florida, although the ARM Revision focuses on the Delaware Bay Region (i.e., New Jersey-Virginia). The percentages of Delaware Bay-origin crabs in each of the Delaware Bay state's harvest was revised from the previous ARM Framework based on genetics data to be 100% Delaware Bay-origin for New Jersey and Delaware, 45% for Maryland, and 20% for Virginia. These Delaware Bay-origin values are lower than the previously used values of 51% for Maryland and 35% for Virginia.

Commercial Fisheries

Horseshoe crabs in the Delaware Bay Region are harvested commercially as bait for the commercial American eel and conch/whelk fisheries. Since 1998, states have been required to report annual landings to ASMFC through the compliance reporting process and bait landings were validated for 1998-2019 during this assessment. Bait harvest in the Delaware Bay has been limited to 500,000 male-only horseshoe crabs since the implementation of the ARM Framework in Addendum VII (2012).

Horseshoe crabs are also collected by the biomedical industry and a portion of their blood is extracted to support the production of Limulus amebocyte lysate (LAL), a clotting agent that aids in the detection of endotoxins in patients, drugs, and intravenous devices. Most crabs collected and bled by the biomedical industry are released alive to the water from where they were collected; however, a portion of these crabs die from the procedure. A 15% mortality rate is applied to the number of horseshoe crabs bled and released alive to estimate the number of

crabs that die each year. This source of removals was not accounted for in the previous ARM Framework but is now included in the ARM Revision. The biomedical harvest data is confidential, so coastwide biomedical data has been used for the revised ARM model development although annual harvest recommendations will be determined based on the region-specific confidential biomedical data.

Horseshoe crabs are also encountered in several other commercial fisheries. Commercial dead discards were estimated for the Delaware Bay Region as part of this ARM Revision with data from the Northeast Fisheries Science Center's Northeast Fisheries Observer Program. Commercial dead discards were not considered as a source of removals in the previous ARM Framework, but are now included in this ARM Revision.

Abundance Surveys

Three fishery-independent surveys were used for the ARM Revision to estimate horseshoe crab abundance: New Jersey Ocean Trawl, Delaware Fish and Wildlife Adult Trawl Survey, and Virginia Tech Horseshoe Crab Trawl Survey. All three surveys indicate stable abundance from 2003 through the early 2010s, then variable but increasing through 2019. Additionally, the Delaware Bay Horseshoe Crab Spawning Survey was used to estimate spawning beach sex ratios which has varied annually from three to five males for every female.

Mark-resight and count data from New Jersey and Delaware were used to estimate red knot passage population size. The passage population estimates were fairly stable between 2011 and 2020 at approximately 45,000 birds.

Population Models

The previous ARM used a horseshoe crab model based on life history parameters taken from the literature, most of which came from areas outside the Delaware Bay. In this ARM Revision, a catch multiple survey analysis (CMSA) was used to estimate male and female horseshoe crab population estimates for 2003-2019 using all quantifiable sources of mortality (i.e., natural mortality, bait harvest, coastwide biomedical mortality, and commercial dead discards). The CMSA indicated that adult abundance in the Delaware Bay was stable from 2003-2013 and then began increasing in the last few years for both sexes. This finding is consistent with stock rebuilding due to a period of significantly reduced commercial landings and tight management controls on the fishery beginning in the 2000s in this region. Estimated recruitment is less stable throughout the time series due to the missing years of data from the Virginia Tech Horseshoe Crab Trawl Survey. In 2019, the CMSA estimates that there were 23.9 million male and 7.3 million female horseshoe crabs*. Sensitivity runs were done to test various assumptions and inputs for the CMSA and the model was robust to the changes explored.

The previous models describing red knot population dynamics were also largely based on life history parameters taken from the literature and not specific to the Delaware Bay. For the ARM

*NOTE: The base run of the ARM model was amended during the Peer Review Workshop and a supplemental report will be provided to the Board in supplemental materials ahead of the January 26, 2022, Board meeting with the new base run. The changes effect the Delaware Adult Trawl Survey and thus the population estimates for horseshoe crabs from the CMSA, the results of the IPM, and the revised ARM Framework including the final recommended harvest. The values cited in this Executive Summary will change.

Revision, an integrated population model (IPM) was developed to quantify the effects of horseshoe crab abundance on red knot survival and recruitment based on data collected in the Delaware Bay. Estimates of adult red knot apparent survival probability were consistently high, with an average of 0.93. Estimates of recruitment rate were fairly low and showed little year-to-year variation. Estimates of population growth rate indicate that the red knot population was most likely stable to increasing from 2005-2018. Several iterations of the IPM were run to test the sensitivity of model outputs and fit. The IPM showed a positive effect of horseshoe crab abundance on red knot survival, but no effect of horseshoe crab abundance on red knot recruitment.

Projection models were developed to simulate the system state into the future. Because the state of the Delaware Bay system is represented in the ARM model via abundances of horseshoe crabs and red knots, population projection models are required for both species in the previous and revised ARM. The horseshoe crab projection model used in the ARM Revision derives directly from the CMSA population estimates and model structure. The predictions were not very sensitive to the harvest but were to recruitment. The revised red knot projection model mirrors the structure of the IPM.

Revised ARM Framework

The previous ARM Framework used Adaptive Stochastic Dynamic Programing (ASDP) software to determine an optimal harvest level of horseshoe crabs. This software is now antiquated, not supported, does not run on current computer operating systems, and was limited in its capacity to incorporate uncertainty when determining optimum harvest strategies. This ARM Revision uses an Approximate Dynamic Programing (ADP) approach implemented through the readily available R software. This new approach also incorporates uncertainty on all life history parameters for both horseshoe crabs and red knots.

The ADP optimization seeks to maximize the average total reward from the system. Reward is indexed as proportion of maximum allowable harvest value for horseshoe crabs plus the abundance of red knots relative to a target threshold of 81,900 birds. The previous ARM Framework only considered reward from the harvest of horseshoe crabs with red knot abundance as a constraint. Incorporation of both horseshoe crab harvest and red knot abundance in the reward function of the ARM Revision is more appropriate in that reward cannot be gained solely from one species (i.e., horseshoe crab harvest) which better reflects the values of all stakeholders. Maximum reward occurs when red knots are at high abundance and horseshoe crab harvest is high relative to the maximum allowable harvest. During the ADP optimization routine, many simulations of the linked population dynamics models for horseshoe crabs and red knots are ran, and parameters of harvest policy functions which maximize the average total reward over a 100 year time horizon are solved for. These harvest policy functions are logistic functions that determine the proportion of maximum male and female horseshoe crab harvest (500,000 and 210,000, respectively) that could be harvested given the current abundances of male and female horseshoe crabs as well as the current abundance of red knots.

The annual decision of allowable horseshoe crab harvest is based on current state of the system (abundances of both species) and the optimal harvest policy functions from ADP. Annual

estimates of horseshoe crab and red knot abundances are used as input to the harvest policy functions, which then output the optimal horseshoe crab harvest to be implemented. The previous ARM Framework used horseshoe crab abundance estimates derived from the Virginia Tech Trawl swept area population estimates, however CMSA estimates of abundance are used in the ARM Revision. Both the previous ARM Framework and this ARM Revision use the annual mark-resight population estimates of red knots as annual input.

Harvest recommendations under the ARM Revision are based on a continuous scale rather than discrete harvest packages as in the previous Framework. Also, the harvest of females is decoupled from the harvest of males in this revision. However, the maximum harvest possible was maintained for females at 210,000 and for males at 500,000. Although harvest is treated as continuous in the new ARM Framework, harvest could be rounded to some fixed values to more closely approximate previous harvest packages and minimize changes to allowable harvest between years. For example, an optimal continuous harvest of 135,400 females could be rounded down to 100,000 females.

Stock Status

There have been no overfishing or overfished definitions adopted by the Management Board for horseshoe crabs in the Delaware Bay. The 2019 benchmark stock assessment characterized the status of the Delaware Bay area as "neutral" based on trend analysis. The purpose of this ARM effort in the Delaware Bay was not to determine stock status in the traditional sense of commercial fishery management (e.g., overfished and/or overfishing). Rather, the purpose was to determine the optimal harvest strategy given the abundance of horseshoe crabs and red knots. Based on the base run of the revised ARM model, the recommended harvest in 2019 would have been 499,939 male and 138,243 female* horseshoe crabs. Conversely, the previous ARM model recommended 500,000 male-only harvest.

It should be noted that this ARM Revision was developed using coastwide biomedical data so as to avoid data confidentiality issues. The population estimates for horseshoe crabs from the CMSA therefore represent an overestimate. If this Revision is accepted for management use, the Delaware Bay-specific biomedical data will be used to determine the harvest package and the model will be run by someone (e.g., ASMFC staff) with confidential data access. Therefore, the final harvest recommendations are likely to be marginally lower than those reported here. No other model inputs were affected by data confidentiality.

This revision of the ARM Framework represents several advancements in not only the knowledge of the population dynamics of horseshoe crabs and red knots, but also how to efficiently model them. The population dynamics models for both species are now parameterized with empirical data from the Delaware Bay rather than based on literature values for life history parameters coming from elsewhere. Because they are based on empirical data from the Delaware Bay, model updating will be more efficient and transparent as new data for both species is collected through routine monitoring efforts.

*NOTE: The base run of the ARM model was amended during the Peer Review Workshop and a supplemental report will be provided to the Board in supplemental materials ahead of the January 26, 2022, Board meeting with the new base run. The changes effect the Delaware Adult Trawl Survey and thus the population estimates for horseshoe crabs from the CMSA, the results of the IPM, and the revised ARM Framework including the final recommended harvest. The values cited in this Executive Summary will change.

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TERMS OF REFERENCE

For the 2021 ASMFC Adaptive Resource Management Revision

Board Approved October 2020

Terms of Reference for the Adaptive Resource Management Revision

1. **Use and further develop, as needed, the peer reviewed and accepted 2019 benchmark stock assessment catch multiple survey analysis (CMSA) model as the underlying horseshoe crab population model in the Adaptive Resource Management (ARM) Framework. Include and account for commercial bycatch (dead discards) and biomedical mortality in the Delaware Bay Region as an input to the CMSA model.**

The CMSA model was used in this ARM Revision and further developed to address previous peer review comments (Section 6.1). The same model structure was used as the 2019 benchmark assessment but the time series was extended by two additional years of data. Survey weights for the three fishery-independent surveys were dropped as recommended by the peer review panel since the weights were calculated in a way that might have resulted in double-counting the abundance indices' errors. The value of natural mortality was also slightly increased based on an updated analysis of tagging data (Section 2.1.4). The commercial dead discard estimates were updated following the previous peer review panel's comments and the revised values were used in this CMSA (Section 3.3) in addition to coastwide biomedical data, not Delaware Bay-specific biomedical data (Section 3.2). For each change made from the 2019 benchmark, a sensitivity run was done to evaluate the effects of that change (Section 6.1.5). The model was developed with coastwide biomedical to avoid the use of confidential data, but if the Revised Framework is approved for management use, the Delaware Bay confidential biomedical data will be used for recommending harvest in the region.

During the 2019 benchmark assessment, the assessment team focused on the CMSA model development of female horseshoe crabs. While a male model was attempted at that time, there were initially some convergence issues and poor survey fits and further development was not attempted due to the timeline of the benchmark. For this ARM Revision, more time was dedicated to explore starting values and stability of the male model, and a male model was successfully developed using the same data sources as the female model.

2. **Reassess ARM utility of female horseshoe crab harvest as a function of female abundance.**

The horseshoe crab utility in this ARM Revision depends upon the number of female and male horseshoe crabs harvested relative to the maximum allowable harvest in the original ARM Framework. The horseshoe crab utility reflects a precedent established in the original ARM model, that the monetary value of harvested female horseshoe crabs is twice that of males (Section 8.5). Further, the reward function has been revised to promote a balance between horseshoe crab and red knot utilities, because although some reward can be obtained when the harvest of crabs and abundance of red knots is high, higher reward values are only possible when both are high.

3. Update red knot survival and mass gain model with most recent data.

The ARM Revision attempted to replicate the multi-state framework used in the previous ARM Framework (ASMFC 2009a) and McGowan et al. (2011a) using the most recent data available (Section 7.1). The multi-state model in the original ARM Framework estimated annual survival of red knots that stop at Delaware Bay based on their body mass at departure and estimated the probability of gaining weight during stopover. Because of the hypothesized relationship between female horseshoe crab abundance and mass gain of red knots, the survival modeling provided a direct link between red knot population dynamics and female horseshoe crab abundance. When the time series was extended and the inputs were revised to reflect the most recent data, the model produced counterintuitive results that were not consistent with the ARM workgroup's hypotheses and predictions about the effects of horseshoe crab abundance on refueling energy needs of red knots during stopover at Delaware Bay. Furthermore, the results were inconsistent with the results of ASMFC (2009a) and McGowan et al. (2011a). Therefore, this approach was abandoned and an integrated population model (IPM) was pursued (Section 7.2). The IPM produced estimates of adult apparent survival probabilities and estimates of recruitment rate for red knots. A mass gain model was no longer needed with the revised modeling approach.

4. Evaluate red knot model weights.

The previous ARM Framework made use of three competing models of red knot population dynamics, which differed mainly in the influence of horseshoe crabs they specified (ASMFC 2009a). The models were assigned weights, and all three were employed in simulating red knot populations with predicted abundances representing a weighted average of the three models' predictions. In a 'passive' approach to adaptive management, these model weights would be periodically updated using monitoring data. However, model weight updating was not pursued since the ARM Revision abandoned the multi-state framework and used the IPM (see TOR3). The IPM did not require the use of model weights (Section 7.2).

5. Request the disclosure of confidential biomedical data for use in the base run CMSA estimate. If the companies say no to the disclosure: Run the CMSA with the confidential biomedical data with 15% applied mortality, without biomedical data, and with non-confidential coastwide biomedical data with 15% applied mortality. The harvest package will be made based on the population estimates from the CMSA that includes confidential data, as it represents the best data set available. Publish 0% biomedical and coastwide biomedical population estimates as population bounds.

The ASMFC circulated a letter to each of the biomedical facilities requesting the disclosure of confidential biomedical data for use in the base run of the CMSA estimate. This request was denied and thus the ARM Revision proceeded with using coastwide biomedical data with a 15% mortality for the model development. A sensitivity run of the CMSA was done using 0% biomedical mortality (Section 6.1.5).

6. Reevaluate definition of Delaware Bay crabs and the implications towards the population estimates and harvest allocations.

The definition of Delaware Bay-origin horseshoe crabs was reevaluated based on the most recent genetics work (Section 2.1.1). The proportion of each states' bait landings that were of Delaware Bay origin were revised to reflect the new analyses done in the region.

Terms of Reference for the Adaptive Resource Management Revision Peer Review

1. Evaluate adequacy of the proposed models for estimating horseshoe crab population dynamics and projections for use in the ARM Framework, including the definition of Delaware Bay crabs.
2. Evaluate the proposed changes to the red knot population dynamics model and model weights.
3. Evaluate adequacy of the fishery-dependent, fishery-independent, and life history data used in the ARM Framework revisions for both horseshoe crabs and red knots, including the use of biomedical data.
4. Develop recommendations for improving assessment methodology and data collection.
5. If a minority report has been filed, review minority opinion(s) and associated analyses. If possible, make recommendation on current or future use of alternative approaches presented in minority report(s).
6. Prepare a peer review panel terms of reference report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within four weeks of workshop conclusion.

1 INTRODUCTION

1.1 Brief Overview

Since 1998, the horseshoe crab fishery has been managed cooperatively by Atlantic coast states through the Atlantic States Marine Fisheries Commission (ASMFC; ASMFC 1998). The Horseshoe Crab Management Board approved the Horseshoe Crab Fishery Management Plan (FMP) in October 1998. The goal of the FMP is "management of horseshoe crab populations for continued use by: current and future generations of the fishing and non-fishing public (including the biomedical industry, scientific and educational research); migratory shorebirds; and other dependent fish and wildlife (including federally listed sea turtles)." The FMP outlined a comprehensive monitoring program and maintained controls on the harvest of horseshoe crabs put in place by New Jersey, Delaware, and Maryland prior to the approval of the FMP. These measures were necessary to protect horseshoe crabs within and adjacent to the Delaware Bay, which is the epicenter of spawning activity along the Atlantic coast.

Because much of the concern about a reduced horseshoe crab population centered on the ecosystem services provided by high abundance of horseshoe crabs within Delaware Bay, an effort began in 2007 (Breese et al. 2007) to develop a multi-species approach to managing horseshoe crabs by employing the tools of structured decision making and adaptive management. In 2007, the Horseshoe Crab and Shorebird Technical Committees met and endorsed the development of a structured decision making (SDM) framework and adaptive management approach to harvest management. An adaptive resource management (ARM) subcommittee was formed with representatives from state and federal partners, as well as horseshoe crab and shorebird biologists. The subcommittee produced a framework for adaptive management of horseshoe crabs in the Delaware Bay that was constrained by red knots which was peer-reviewed with a coastwide benchmark stock assessment for horseshoe crab in 2009 (ASMFC 2009a, 2009b).

Addendum VII was approved in February 2012 (ASMFC 2012). The addendum implemented the Adaptive Resource Management (ARM) Framework for use during the 2013 fishing season and beyond. The Framework considered the abundance levels of horseshoe crabs and shorebirds in determining the optimal harvest level for the Delaware Bay states of New Jersey, Delaware, Maryland, and Virginia (east of the COLREGS). Since then, the Board annually reviews recommended harvest levels from the ARM Subcommittee, who run the ARM model, and specifies harvest levels for the following year in New Jersey, Delaware, Maryland, and Virginia.

This report revises the ARM model structure, as described in the Terms of Reference, in addition to migrating the model to a new software platform.

1.2 Structured Decision Making and Adaptive Management

Structured decision making (SDM) is a formal and transparent approach to decision making (Hammond et al. 2002; Gregory et al. 2012; Runge et al. 2020) that incorporates views of all stakeholders and uses predictive modeling to assess the potential consequences of alternative actions (Gregory and Keeney 2002; McGowan et al. 2011a; McGowan et al. 2015a). The key to successful decision making is to break a complex decision down into its component parts and

address each part sequentially (Hammond et al. 2002; Gregory and Keeney 2002). The decision analysis follows a sequence in which the problem is defined, the management objectives are identified, potential alternatives actions are determined, and models are developed for the purpose of projecting the consequences of the actions. For management of natural resource systems, estimates of system state (e.g., population size) are obtained and then used with the above components to make the decision, often with the help of an optimization algorithm.

Adaptive management, which can be viewed as structured decision making for sequential decision processes, is becoming increasingly important and has been endorsed by federal management agencies (Williams et al. 2007; Runge 2020). The approach entails making predictions about how a system will respond to management actions, followed by implementation and monitoring of the system to evaluate the accuracy of the a priori predictions. The ARM approach builds on existing approaches in several important ways. First, there is a great emphasis on complete elicitation of objectives and management actions from a full range of stakeholders. Second, this process facilitates learning while managing and uncertainty about system dynamics including competing models of how the system works (e.g., how species respond to management actions, how species interact with other species and their environment) can be incorporated into the decision process. Third, a variety of optimization tools are available to identify the optimal action under multiple, and sometimes conflicting, objectives. Fourth, monitoring data are used to update knowledge about system dynamics by either refining parameter estimates or updating weights assigned to competing system models. This last point illustrates that in an iterative setting where decisions are made repeatedly over time, the system models can be improved based on the accuracy of their predictions, and future decisions can be improved (Williams et al. 2007; Runge 2020). Four types of uncertainty characterize natural resources management (Regan et al. 2002): 1) ecological or structural uncertainty, 2) environmental uncertainty, 3) partial controllability, and 4) partial observability. In the face of uncertainty, dynamic programming is a powerful tool that can be used to find an optimal management policy given the objectives and available actions, the understanding of the system as reflected by the system models, and the estimated state of the system.

1.3 Original Adaptive Resource Management Framework for Horseshoe Crabs and Red Knots (2009)

Underlying the original (2009a) ARM model are population models for both red knots and horseshoe crabs (ASMFC 2009a; McGowan et al. 2011a, 2015b). The optimization routine in the ARM model determines the best choice among five potential harvest packages (numbers of male and females that can be harvested) given the current abundance of each species in order to maximize the long-term value of horseshoe crab harvest. The ARM model values female harvest only when the abundance of red knots reaches 81,900 birds (a value related to the historic abundance of red knots in the Delaware Bay) or when the abundance of female horseshoe crabs reaches 80% of their predicted carrying capacity (11.2 million assuming a carrying capacity of 14 million; ASMFC 2009a). On an annual basis, the ARM model is used to select the optimal harvest package to implement for the next year given the current year's estimate of horseshoe crab abundance from the swept area estimate from the VA Tech trawl survey and a mark-resight estimate of red knot abundance.

A stage-structured population model was used for horseshoe crabs based on an age-structured model by Sweka et al. (2007). Multiple juvenile years were condensed into a single stage with a constant probability of transition out of that stage and into either a pre-breeding stage or breeding adult stage. Horseshoe crabs are partitioned into different sexes as they enter the breeding stage and there are different survival rates applied to pre-breeders and breeding adults annually. A fertility factor (Caswell 2001) was used to reduce reproduction when the operational sex ratio (Section 2.1.5) of adult stages falls below a target and the number of eggs laid per female, egg survival, and age-zero survival were incorporated as a multiplier on fecundity in the state dynamics equations.

Construction of the red knot population model was more straightforward and a modified version of the Baker et al. (2004) three-stage population model was used. Within the adult stage, birds are in one of two weight states, above or below a threshold weight of 180g. The model tracked arrival time and weight, weight gain, and departure probabilities in the Delaware Bay. The weight gain probabilities were tied to horseshoe crab abundance and the proportion of the crab population that spawns during the stopover period. From this basic matrix model structure, there were three alternative ways that horseshoe crab abundance could affect red knot population dynamics: 1) a “no interaction” model, where red knot weight gain and horseshoe crab status were disconnected, allowing the two species to operate independently of each other, 2) a fecundity only effect model, where horseshoe crabs affect only the fecundity or productivity of the red knot population, and 3) a full effect model where horseshoe crab abundance affects both fecundity and annual survival of adult red knots. Each of the three models was assigned a weight based on committee consensus. At the end of the stopover season, the two weight states of adult red knots survive and reproduce at different rates, depending on the model.

On an annual basis, the ARM model is used to select the optimal harvest package to implement for the next year given the current year’s estimate of horseshoe crab abundance from the swept area estimate from the VA Tech trawl survey and a mark-resight estimate of red knot abundance. The harvest packages for horseshoe crab bait harvest that can be selected by the ARM model are:

- Package 1) Full harvest moratorium on both sexes
- Package 2) Harvest up to 250,000 males and 0 females
- Package 3) Harvest up to 500,000 males and 0 females
- Package 4) Harvest up to 280,000 males and 140,000 females
- Package 5) Harvest up to 420,000 males and 210,000 females

Since its implementation in 2013, neither the 81,900 red knot threshold nor the 11.2 million female horseshoe crab thresholds have been met and harvest package 3 has been selected every year by the Framework.

1.4 Status of Horseshoe Crabs

1.4.1 Horseshoe Crab Assessment History

1.4.1.1 Previous stock assessments

The initial stock assessment for horseshoe crab was completed and peer reviewed in 1999 (ASMFC 1999). A new assessment framework was proposed in 2000 (ASMFC 2000a), and an internally peer-reviewed assessment was produced in 2004 and another in 2009 (ASMFC 2009b) and updated in 2013 (ASMFC 2013). The most recent benchmark stock assessment for the coastwide horseshoe crab population was completed, peer-reviewed, and approved for management in 2019 (ASMFC 2019).

The ARM Framework, which went through peer review in 2009 and was established through Addendum VII (2012) to the FMP, has been used to manage horseshoe crabs in the Delaware Bay region since the 2013 fishing year.

1.4.1.2 Summary of Previous Assessment Models

1.4.1.2.1 ARM Model (2009)

See Section 1.3.

1.4.1.2.2 Benchmark Stock Assessment (2019)

The coastwide benchmark stock assessment (ASMFC 2019) for horseshoe crabs used several fishery-independent surveys to characterize trends in abundance in four regions. Two surveys were located in the Northeast region, four in the New York region, seven in the Delaware Bay region, and five in the Southeast region. Tagging data from the U.S. Fish and Wildlife Service horseshoe crab database were explored by region to estimate survival. The highest survival rates were in the Delaware Bay and coastal Delaware-Virginia regions. The lowest survival rates were in coastal New York-New Jersey and the Southeast. A trend analysis, Autoregressive Integrated Moving Average (ARIMA), was used to assess regional and coastwide stocks. For the trend analysis, 1998 was used as the benchmark year for comparison of survey trends since it was the first year of FMP implementation.

An additional stage-based model, a catch multiple survey analysis (CMSA), used pre-recruits and full recruits to assess the Delaware Bay region. This model included several sources of removals from the population: bait harvest, dead discards from commercial bycatch, mortality associated with biomedical bleeding, and natural mortality. The CMSA indicated adult abundance in the Delaware Bay was stable from 2003-2012 and then considerably increased through 2017, the terminal year of the model.

1.4.1.2.3 Previous Peer Review Comments

The Peer Review Panel for the original ARM report (ASMFC 2009a) supported the use of the Framework for managing horseshoe crabs in the Delaware Bay. The Panel provided positive feedback on the model development and data handling but also some criticisms and suggestions for future work. For example, they were concerned about the use of a knife-edge utility function to represent the value of harvest associated with differing levels of female crabs

and adult red knot abundance. The reviewers recommended a distribution of values for the parameter representing survival of lower weight red knot birds given its importance to the population trajectory and there were concerns that the three models used for the red knots may not be the most suitable candidates for the optimization analysis. They also criticized the report for not providing the results of any simulation work, sensitivity runs, assumptions for either model, or a summary table of parameter values.

The ARM model went through an internal committee review in 2016 to monitor and evaluate the model performance (summarized in McGowan et al. 2020). As part of the review, the ARM subcommittee evaluated the monitoring programs for horseshoe crabs and red knots and found that while the surveys used were appropriate and represented the best data available, future consideration should be given to incorporating mortality due to the biomedical industry in the region. The subcommittee also evaluated the harvest of the Delaware Bay states relative to the quotas and the harvest packages in the model and did not recommend any changes. Finally, the structure of the objective function was assessed, specifically to determine if the approach is still the most appropriate and if the thresholds are set at appropriate levels. No changes were made except for removing a sex ratio constraint from the utility function because it was deemed to be conceptually redundant within the model. Following the review, the committee recommended that a larger revision of the ARM model should be conducted that considered changing the model platform and updating the Framework with new models, if available, and updating and revising parameters to incorporate new analyses and data as needed. The recommendations from that review were the basis of the Terms of Reference (TORs; page 17) for this ARM Revision.

The Peer Review Panel for the 2019 benchmark stock assessment supported the CMSA as a stock assessment method for horseshoe crab in the Delaware Bay, but did not approve the reference point developed by the Stock Assessment Subcommittee for determining overfished and overfishing status to compare with the model output. Regardless, the Panel acknowledged that the CMSA abundance estimates represent the best available data and recommended using the CMSA estimates in the ARM Framework.

1.4.2 Stock Status

The 2019 Horseshoe Crab Benchmark Stock Assessment evaluated the stock status of the resource by region, finding populations within the Delaware Bay and Southeast regions remaining consistently stable and in good status, respectively, through time. The status of the Northeast region population has changed from poor to stable, while the status of the New York region population has trended downward from good, to stable, and now to poor. The Benchmark Assessment was endorsed by the Peer Review Panel and accepted by the Horseshoe Crab Management Board for management use.

To date, no overfishing or overfished definitions have been adopted for management use. For the assessment, biological reference points were developed for the Delaware Bay region horseshoe crab population although not endorsed by the Peer Review Panel for use in management. However, given the assessment results of low fishing mortality and relatively high

abundance, overfishing and an overfished status are unlikely for female horseshoe crabs in the Delaware Bay region.

1.5 Status of Red Knots

The *rufa* red knot (*Calidris canutus rufa*) was added to the United States List of Endangered and Threatened Wildlife as threatened in January 2014 (USFWS 2014), due to loss of habitat, climate change, and timing mismatches between the birds' migration and food availability, among other threats. Additionally, red knots have been listed as endangered under the Canadian Species at Risk Act since 2012. In May 2021, the USFWS released for public comment a draft recovery plan for red knots to ensure the species recovery and resiliency with a goal of delisting by 2080. In July 2021, the USFWS published a proposed rule to designate critical habitat for the red knot. Both the final recovery plan and final critical habitat rule are expected in 2022. The draft recovery plan, critical habitat maps, a 2020 Species Status Assessment, and additional information can be found on the USFWS website: https://fws.gov/northeast/red-knot/.

1.6 Changes to ARM Framework in this Revision

The purpose of revising the ARM Framework was to address previous critiques, include newly available data, and adopt advances in modeling and optimization approaches (Section 1.4.1.2.3). This revision of the ARM Framework incorporates significant changes from the original version that was peer reviewed in 2009 and adopted for management use in 2012. However, the conceptual model of horseshoe crab abundance influencing red knot survival and reproduction remains intact with the intent of insuring that the abundance of horseshoe crabs does not become a factor limiting the population growth of red knots. The original objective statement was:

Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also maintain ecosystem integrity and provide adequate stopover habitat for migrating shorebirds.

Over the years, this objective statement has been criticized because the conservation intent for commensal species such as red knots was not apparent to all stakeholders and seemed, to some, less explicit than the harvest intent. With the listing of the red knot as a threatened species under the endangered species act in 2015, and the need to be more explicit about the intent of the ARM Framework, the ARM workgroup rephrased the objective statement to:

Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity, provide adequate stopover habitat for migrating shorebirds, and ensure that the abundance of horseshoe crabs is not limiting the red knot stopover population or slowing recovery.

The changes to the original ARM Framework and modeling made during this revision represent an increase in not only the amount of data available for each species, but also an evolution of modeling techniques and experience. The major changes are described in detail throughout this report, but are summarized below.

- Abandonment of Adaptive Stochastic Dynamic Programing (ASDP) software – ASDP is an antiquated software that is no longer supported and is not compatible with contemporary computer operating systems. ASDP also suffered from capacity issues that constrained the degree of biological realism that could be incorporated in population projection models.
- Revised Horseshoe Crab Population Dynamics Model – The previous horseshoe crab model was based on life history parameters taken from the literature, most of which came from areas outside the Delaware Bay. The revised model has the same structure as the Catch Multiple Survey Analysis (CMSA) model which was approved for management use following the 2019 stock assessment. This new model is based on empirical data directly from the Delaware Bay and includes all quantifiable sources of removals from the population including bait harvest, biomedical mortality, discards from other fisheries, and natural mortality.
- Revised Red Knot Population Dynamics Models – The previous models describing red knot population dynamics were also largely based on life history parameters taken from the literature and not specific to the Delaware Bay. The three models represented uncertain alternative hypotheses about the influence of horseshoe crab on red knots. The revised red knot model is an integrated population model (IPM) developed specifically for red knots stopping in Delaware Bay and directly quantifies the effects of horseshoe crab abundance on red knot survival and recruitment based on empirical data collected from Delaware Bay.
- Revised Reward Function – The original reward function in the ASDP optimization only valued the harvest of horseshoe crabs. The revised reward function now values both horseshoe crab harvest and the abundance of red knots, and it does so in a way in which greatest value is recognized only when horseshoe crab harvest and red knots are both abundant, rather than one or the other.
- Adoption of Approximate Dynamic Programing (ADP) – Optimization in this revision was conducted using ADP coded in the program R. This has several advantages over the previously used ASDP program including: use of computer software that is readily available with code that is easily modified, greatly shortened run times, incorporation of more uncertainty and structural detail in life history parameters, and elimination of the capacity constraints in ASDP.
- Harvest Recommendations on a Continuous Scale – Output from the previous ARM Framework using ASDP gave one of five possible harvest packages as the optimal harvest to be instituted given the state (abundance) of horseshoe crabs and red knots. Except for the upper limit of possible horseshoe crab harvest, these packages were defined arbitrarily to accommodate the capacity constraints of the ASDP program. In addition, harvest levels of males and females were not independent within these packages. In this revision, the optimization conducted with ADP can recommend harvest levels on a continuous scale while still imposing an upper limit on sex-specific harvest.

These recommendations can then be discretized for implementation (e.g., managers may round down to the nearest fifty or hundred thousand horseshoe crabs of each sex).

- More Direct Process for Harvest Policy Adaptation – Adaptation in the harvest policy occurs through a more straightforward process than implemented before, where predictions generated by the three competing models of red knot population dynamics were assessed against highly uncertain red knot population data. In this revision, annual monitoring data on horseshoe crabs and red knots directly update the parameters within the predictive models and ultimately the optimal policy itself.

The large methodological changes represent an evolution of the ARM Framework that increases the transparency of the decision process. The most significant advance in these updates is in moving the population dynamics models for each species from a suite of theoretical models to models based on empirical data specific to the Delaware Bay ecosystem.

2 LIFE HISTORY

2.1 Horseshoe Crabs

Horseshoe crabs are characterized by high fecundity, high egg and larval mortality, and low adult mortality (Botton and Loveland 1989; Loveland and Botton 1992). They breed in late spring on Atlantic coast beaches, laying eggs in nests buried in the sand. Larvae typically hatch from the eggs within 2 to 5 weeks, then settle within a week of hatching and begin molting. Juvenile crabs initially remain in intertidal flats, near breeding beaches. Older juveniles move out of intertidal areas to deeper bay and shelf waters and then return as adults to spawn on beaches in the spring. Adults overwinter in the bays or shelf waters. Horseshoe crabs mature between 9 to 11 years of age depending on sex and live over 20 years. Horseshoe crabs undergo stepwise growth by periodically shedding their shells (molting) until a terminal molt at maturity, with females typically maturing later and attaining larger sizes than males.

2.1.1 Definition of Delaware Bay-Origin Crabs

Delaware Bay-origin horseshoe crabs have been defined as crabs that spawn at least once in the Delaware Bay for the purposes of the ARM Framework. In 2011, the Delaware Bay Ecosystem Technical Committee (DBETC) reviewed genetic data to develop lambda values, representing how much of a state's harvest is of Delaware Bay-origin, as analyzed and presented by Dr. Eric Hallerman (Virginia Polytechnic Institute and State University). The genetics data indicated that the horseshoe crabs from Cape Cod to Cape Hatteras comprise a genetically related stock, the Mid-Atlantic horseshoe crab stock, which in turn is comprised of smaller subunits. Within this geographic region, evidence indicated that the Delaware Bay subunit extends from Cape Cod, Massachusetts, to near Tom's Cove in Virginia, where it begins to mix with a separate and distinct Chesapeake Bay subunit. Dr. Hallerman noted that these results agreed well with tagging work reported by Shuster and Botton (1985) that also suggested genetic overlap of Delaware Bay and Chesapeake Bay stocks in the Tom's Cove region.

The lambda values for Maryland and Virginia were based on genetics results, as well as expert opinion from the DBETC based on their work and knowledge of the horseshoe crab populations and the genetic tests. As this analysis uses genetic data, the term "of Delaware Bay origin" implies that these crabs are of the same genetic subunit originating in the Delaware Bay area. This interpretation is more conservative than the ARM-defined criteria of a Delaware Bay origin crab, as the ARM defines such a crab as being one that would spawn at least once inside the geographic Delaware Bay. The DBETC felt that, since the Delaware Bay population has only begun to show a slightly increasing trend, the use of this more conservative definition should be considered. During the development of the previous Framework, the DBETC determined that the lambda values should be 1.0 for New Jersey and Delaware (or 100% Delaware Bay-origin), 0.51 for Maryland, and 0.35 for Virginia.

2.1.1.1 Updated Values

As part of the ARM Revision, the ARM Subcommittee requested a review of current genetic work on Delaware Bay-origin crabs from Dr. Eric Hallerman (Virginia Polytechnic Institute and State University).

Delaware Bay-origin horseshoe crabs encompass not only the crabs that spawn in the Delaware Bay itself, but also spawning assemblages that are demographically linked to Delaware Bay spawners by high rates of gene flow. These demographic/genetic linkages were established in a series of population genetic studies (King et al. 2005, 2015), including a study of the composition of seven fisheries (Hallerman et al., *in review*). Roughly 45% of individuals landed in commercial fisheries in Maryland were of Delaware Bay origin. In Virginia, Chincoteague Island had 34% Delaware Bay-origin horseshoe crabs and Assateague Island had 6%. The ARM Subcommittee agreed that the samples from Assateague and Chincoteague were not representative of the area in Virginia east of the COLREGS as a whole and perhaps an average would be appropriate. Since the composition of the population east of the COLREGS line is unknown, the ARM Subcommittee estimated the proportion for Virginia to be 20%. Therefore, the ARM Subcommittee recommended updating the lambda values to be 1.0 for New Jersey and Delaware, .45 for Maryland, and 0.20 for Virginia. These Delaware Bay-origin values are lower than the previously used values of 0.51 for Maryland and 0.35 for Virginia.

2.1.2 Growth

Horseshoe crabs undergo stepwise growth, with females typically attaining larger sizes than males. Growth is relatively rapid during the first several years with several molts within the first year and then a single molt per year until reaching maturity (Shuster 1982). Upon reaching maturity, horseshoe crabs are believed to stop molting, although there is evidence that in some regions, such as Pleasant Bay, horseshoe crabs continue to molt throughout their lives (Carmichael et al. 2003). However, an analysis of Delaware Bay crabs found that they do experience a terminal molt when the crabs reach maturity in that region (Smith et al. 2009). That analysis also demonstrated that Delaware Bay crabs exhibit sexual dimorphism and that males in Delaware Bay tended to mature at age 10 and 11, while females tended to mature at ages 10, 11, and 12.

2.1.3 Stage Classification

Horseshoe crabs can be sexed by visual examination and categorized into three maturity stages: immature, primiparous (newly mature), and multiparous (mature). Horseshoe crabs have six pairs of legs on the underside of their shells. The first pair, the chelicera, are used for eating. The second pair are the first pedipalps, or walking legs, and vary between the sexes. For male horseshoe crabs, these legs are grasping appendages in the shape of "boxing gloves" that allow them to hold onto a female horseshoe crab shell when mating. Juvenile male crabs do not have boxing gloves but can be sexed by the nozzles (gonopores) present under the operculum or first gill flap, primiparous male crabs have boxing gloves with thumbs present, and multiparous male crabs have boxing gloves and no thumbs (Figure 1). The nozzles (gonopores) in males are hard, round, and protruded whereas in females they appear oblong or oval and are flat (J. Zimmerman, *personal communication*).

Since mature horseshoe crabs in the Delaware Bay do not molt or do very rarely, spawning activity leaves marks on female horseshoe crab shells and can be used to categorize maturity stages (Walls et al. 2002). If there are no rubs present on the shell but there are eggs present, that crab is categorized as primiparous (Figure 2) – it is newly mature and will spawn for the first time that year. If there are rubs present on the shell and eggs present, the horseshoe crab is categorized as multiparous or mature.

These stages are recorded by the Virginia Tech Trawl Survey (Section 4.4) and used for modeling the population in the most recent stock assessment report (ASMFC 2019). Additionally, in recent years, several other surveys in the Delaware Bay have begun to collect sex-specific stage data for horseshoe crabs.

2.1.4 Natural Mortality

Sweka et al. (2007) developed an age-specific schedule of natural mortality, relying on reports by Botton et al. (2003) and Carmichael et al. (2003), for the life-history model that has been used in early stock assessments (e.g., ASMFC 2009b) and adaptive resource management models (McGowan et al. 2011a). The mortality schedule for horseshoe crabs is characterized by very high mortality during the first several instars, dramatically reduced mortality during juvenile ages, and increasing mortality on adult stages. This pattern reflects changing vulnerability to predation among sub-adults followed by stranding and harvest mortality emerging at sexual mortality. Only sexually mature individuals are subject to harvest. And stranding is thought to be the main source of natural mortality due to risk associated with spawning as excessive energy expenditure, stranding, desiccation, and predation are directly due to mating and egg-burying behaviors (Botton and Loveland 1989). The age-related condition of the individual is thought to be a factor in stranding-related mortality (Penn and Brockmann 1995). Smith et al. (2010) found that the probability of stranding increased strongly with age class in both males and females; they estimated stranding related mortality to be between 6% and 18%.

The most recent stock assessment investigated multiple lines of evidence from the US FWS tagging database and VA Tech Trawl Survey to update natural mortality estimates (ASMFC 2019). Animals tagged as adults have been observed to remain at large up to 17 years indicating

maximum age is at least 27 years based on a maturity schedule from 9 to 11 years of age. This updated estimate of longevity exceeds the previously assumed maximum age of 20 years. As reported in the most recent stock assessment (ASMFC 2019), indirect estimates of age-invariant natural mortality (*M*) based on a maximum age of 27 years would range between 0.11 and 0.17 (depending on selected mortality model), as opposed to a range of 0.15 to 0.22 given a maximum age of 20 years (Hoenig 1983; Hewitt and Hoenig 2005). Additional indirect estimates of natural mortality were reported in ASMFC (2019) based on von Bertalanffy growth, but those models are not consistent with horseshoe crab life history, do not result in maturity at age 9-11, and do not attain maximum age of 27 years.

As reported in the recent stock assessment (ASMFC 2019), a natural mortality between 0.2 and 0.3 is supported by the empirical ratio of multiparous to primiparous females (ratio=3.8) observed in the Virginia Tech Trawl Survey. Given its biology, newly mature primiparous females will spawn in the upcoming year, generally occurring between ages 9 and 10, and exhibit multiparous behavior thereafter. Given a longevity of 20 or 27 years, *M* would need to be 0.22 or 0.23 to produce a 3.8 multiparous (ages 10+) to primiparous (age 9) ratio.

Tag-based analysis estimates of annual survival rates (*S*) reflect avoidance of both natural (*M*) and fishing (*F*) mortality. Thus, mortality based on the finite survival rate (-ln[*S*]) is a conservative estimate, which is to say an overestimate, of natural mortality because it assumes *F*=0. Furthermore, recent survival estimates from Delaware Bay (ASMFC 2019; Smith et al. 2020) exceed the previously assumed rate of 0.62 from Cape Cod (Carmichael et al. 2003). The tagging analysis in ASMFC (2019) report embayment specific constant annual survival between 0.59 to 0.79 with the Delaware Bay estimate of 0.76 and associated *M* = 0.274.

Since the 2019 stock assessment, tagging data from Delaware Bay have been analyzed using multi-state models where the states were defined by geographic subregions: in-bay Delaware, in-bay New Jersey, and the ocean north and south of the midline at the mouth Delaware Bay. The time was partitioned into the periods before and after the New Jersey moratorium was enacted (2003-2005 and 2006-2016) because fishing mortality should be reduced significantly within the New Jersey subregions during the post-moratorium period. Thus, an estimate from the subregion during the post-moratorium period would provide a reasonable basis for natural mortality estimation. The annual survival for the post-moratorium New Jersey subregion was 0.74 (95% CI: 0.71, 0.77) based on the minimum AIC candidate model. Thus, instantaneous natural mortality, assuming negligible fishing mortality, was 0.30 (SD: 0.0183; 95% CI: 0.27, 0.34).

In summary, multiple lines of evidence indicate that natural mortality among adults in Delaware Bay is approximately 0.3 with some indications from life history traits and demographics that *M* is closer to 0.2 than 0.3. The most recent estimates of constant annual survival from Delaware Bay after 2005 during a period of constrained harvest indicate *M* between 0.27 and 0.34. Although the recent estimates for natural mortality are based on data from Delaware Bay, which is a significant advance, understanding natural mortality across all ages remains an important research need.

2.1.5 Sex Ratio

Two types of sex ratios are useful for understanding horseshoe crab ecology and informing management decisions. The population sex ratio is the ratio of males to females among individuals in the population. The operational sex ratio is the ratio of males to females among adults that are actively spawning, which is a function of population sex ratio and sex-specific spawning behavior. While juveniles show a balanced population sex ratio (Shuster and Sekiguchi 2003; Smith et al. 2009), the population sex ratio among adults has been observed to be skewed toward males in Delaware Bay (2.2:1 M:F; Smith et al. 2006). The operational sex ratio of horseshoe crabs on the spawning beaches is highly skewed toward males because males exhibit a higher frequency of spawning bouts than females (Brockmann and Smith 2009). While one male attaches to a female in amplexus prior to spawning, the amplexed pair is surrounded by unattached (i.e. satellite) males during fertilization (Brockmann and Penn 1992). Hence, the operational sex ratio on spawning beaches is expected to be more male biased than the population sex ratio among adults.

A population sex ratio over 1 is likely to be required among adults to ensure that reproduction is not limited by sex ratio. Brockmann (1990) found that female horseshoe crabs will tend not to nest unless they are in amplexus with a single male and that satellite males are not needed to fertilize eggs. Some males (approximately 30%) are not capable of amplexus because of their condition (Brockmann and Smith 2009). Thus, there needs to be an excess of males in the population to ensure enough capable males are available to pair with the females ready to spawn.

Since its adoption (ASMFC 2012), the ARM has given value to male harvest if an operational sex ratio of 2 males to 1 female is maintained in the Delaware Bay region. The ARM relies on the Delaware Bay Horseshoe Crab Survey for the annual sex ratio, which has never fallen below the 2:1 ratio since the ARM model has been in use (Section 4.3).

2.2 Red Knots

The red knot is a medium sized migratory shorebird with several subspecies distributed in distinct flyways throughout the world (Niles et al. 2008). The work here is focused on the Western Atlantic flyway subspecies *Calidris canutus rufa* (hereafter red knots), which overwinter in the southeastern United States, the Caribbean and Northern Brazil, and in Tierra del Fuego in southern South America (Niles et al. 2008). The birds migrate in the spring, northward to Arctic Canada, stopping at various locations along the route to rest and refuel, most notably, for this assessment, in the mid-Atlantic coast of the United States with especially large concentrations in Delaware Bay (Atkinson et al. 2005; Niles et al. 2008). The birds travel to the northern portions of Nunavut, Canada, where they breed, typically nesting in drier, upland habitats (Niles et al. 2008). Red knots are ground nesters, laying 4 eggs in a single nest per season. Like most shorebird species, the chicks are precocial and thus mobile and foraging for their own food soon after hatching.

After breeding the females depart the breeding range soon after nests hatch (or fail) and begin their southward migration. Males stay with the developing chicks for 3-4 weeks until fledging and then depart, leaving the chicks to continue foraging and building strength for their own

southward migration a few weeks thereafter (Niles et al. 2008). Though data are limited, the birds seem to exhibit moderate site fidelity in the wintering and breeding grounds, in that they generally return to same area each season, though not necessarily to the same breeding or wintering territory. Some evidence suggests that they may exhibit inter-annual plasticity in migration stopover site use (Tucker et al. 2021).

Red knots are thought to be long-lived birds, with many survival analyses showing annual survival over 90% annually (e.g., McGowan et al. 2011b, Schwarzer et al. 2012) and longevity records (i.e., life span of known individuals) greater than 20 years (Niles et al. 2008). Very little is known about red knot reproductive rates at the population scale, or about first year and juvenile survival rates (Niles et al. 2008; McGowan et al. 2011a). However, recent applications of integrated population models, statistical tools that integrate multiple sources of data within a life-cycle framework to improve inference, have enabled estimation of population level recruitment rates for the Western Atlantic flyway population (Tucker 2019).

For this adaptive management plan, the most relevant details about red knot life history and annual cycle are the spring migration period and their stopover ecology in Delaware Bay. Northward migrating birds begin arriving in Delaware Bay in early May and remain for two to four weeks resting, foraging, and gaining mass (Karpanty et al. 2006; Atkinson et al. 2007; McGowan et al. 2011b; Tucker et al. 2019a, 2019b). Red knots time their arrival to exploit horseshoe crab eggs deposited on the sandy beaches of Delaware Bay during annual spawning events that coincide with the new and full moon spring tides in May (Tanacredi et al. 2009; Tucker et al. 2021) but that also depend on suitable water temperature and weather conditions. Individual birds arrive in Delaware Bay throughout the stopover season and depart throughout the season as well, typically reaching peak abundances between May 20th and May 27th. The flow-through nature of the stopover population (i.e., constant arrivals and departures) makes monitoring the population difficult and makes analyzing data about this system difficult (Lyons et al. 2016; Tucker et al. 2021)

In the early 2000s, *rufa* red knot populations in Tierra del Fuego and in Delaware Bay exhibited precipitous year after year declines, and many conservation biologists hypothesized that the unregulated harvest of horseshoe crabs in Delaware Bay during the late 1990s prevented birds from gaining enough weight during stopover to avoid significant mortality risks. For birds with high adult survival and low productivity, even small changes in adult survival can have large consequences for population dynamics, and large declines in survival can lead to population collapse (Baker et al. 2004). Some analyses supported the hypothesis (e.g., Baker et al. 2004, Niles et al. 2009), while others found mixed results (e.g., Karpanty et al. 2011, McGowan et al. 2011b, Cohen et al. 2009), with some research suggesting that conditions in the Arctic during the breeding season may play an important role (McGowan et al. 2011b; Fraser et al. 2013; McGowan 2015). These alternative research results left uncertainty in the strength of the effect of horseshoe crab populations on red knot population dynamics, and previous efforts to manage this system acknowledge these uncertainties by using multiple system models in an adaptive management framework (McGowan et al. 2015).

3 HORSESHOE CRAB FISHERY DEPENDENT DATA SOURCES

3.1 Commercial Bait Fishery

The commercial bait fishery consists primarily of trawl, hand harvest, and dredge fisheries. Since 1998, ASMFC has compiled landings by state in the annual FMP review report. The horseshoe crab fishery supplies bait for the American eel (*Anguilla rostrata*), conch (*Buccinidae*) and, to a lesser degree, catfish (*Ictaluridae*) fisheries. The American eel pot fishery prefers female horseshoe crabs to males, while the conch pot fishery uses both male and female horseshoe crabs. The conch fishery uses horseshoe crabs more frequently than the American eel fishery, with eel baits using blue crabs (*Callenectes sapidus*) or fish more often than horseshoe crabs (ASMFC 2017). Most fishing effort for horseshoe crabs is concentrated within the mid-Atlantic coastal waters and adjacent federal waters. Since 1998, states have been required to report annual landings to ASMFC through the compliance reporting process. Landings used in this assessment for 1998 through 2019 were validated by state agencies through the Atlantic Coastal Cooperative Statistics Program (ACCSP). Harvest levels for the Delaware Bay region states have been set using the ARM Framework since Addendum VII (ASMFC 2012) and have constrained harvest in the region to 500,000 male-only crabs since its implementation.

3.1.1 State Management

3.1.1.1 New Jersey

The current ASMFC state quota for New Jersey is 162,136 male horseshoe crabs, but since 2006 a moratorium has been in place on the harvest of horseshoe crabs and horseshoe crab eggs in the state. The law prohibits the possession of horseshoe crabs and horseshoe crab eggs except for those individuals in possession of a scientific collecting permit, allowing them to possess horseshoe crabs or horseshoe crab eggs for research or educational purposes only. Those fishermen using horseshoe crabs as bait must provide adequate documentation that the horseshoe crabs in their possession were not harvested in New Jersey. For those commercial fishermen in possession of horseshoe crabs, documentation shall include a receipt or bill that provides the name, address, and phone number of the person or company that provided the horseshoe crabs, the permit or license number of the person or company named, and the state and, if possible, the location where the horseshoe crabs were harvested.

3.1.1.2 Delaware

Delaware's annual horseshoe crab harvest is determined in accordance with the annual sex-specific allocations identified in Addendum VII to the FMP. The current quota for the state of Delaware is 162,136 male horseshoe crabs. Harvest is required to be reported by phone to the Delaware Department of Natural Resources Division of Fish and Wildlife (DNREC DDFW) daily. Upon reaching 95% of the annual allocation, DNREC establishes a date and time to close the fishery, based on recent fishery performance and landings. Any overages incurred are subtracted from the following year's horseshoe crab quota allocation.

Two methods of harvest are permitted and employed in Delaware's horseshoe crab fishery. Hand harvest licenses were capped in 1998, although transfer of licenses between qualified individuals is lawful. Individuals that have a current commercial eel license are also allowed to harvest horseshoe crabs for personal bait use. Harvest by eel licensees may not be sold or combined with any other commercial harvest of horseshoe crabs. Annual hand harvest may not begin until June 8 and ends upon reaching the quota allocation. No more than 300 cubic feet of horseshoe crabs may be collected in a 24-hour period. If the quota has not been reached by June 30, five horseshoe crab dredge permits are issued via lottery, if more than five applications are received. Only current holders of oyster harvesting licenses are eligible for horseshoe crab dredge permits. Dredge harvest is limited to 1,500 horseshoe crabs per day. No harvest, by any method, is allowed to occur between sunset and sunrise.

Delaware has prohibited the use of more than one-half of a female horseshoe crab or one male horseshoe crab as bait in any type of pot on any one day. Bait saving devices are mandatory in all whelk pots employed in the state. Possession of Asian horseshoe crabs or parts thereof are prohibited without written authorization from the Director of the Division of Fish and Wildlife.

3.1.1.3 Maryland

The annual quota of horseshoe crabs for the commercial fishery in Maryland currently is 255,980 male crabs. There is no female harvest permitted. Harvest is subject to daily catch limits, determined by whether the harvester has a valid landing permit. Non-permitted harvesters may not land more than 25 horseshoe crabs per day. Permitted harvesters may not land more than 150 horseshoe crabs per day from May 1-July 9. From July 10-November 30, permitted harvesters are subject to daily limits as designated on their respective permits.

The bait fishery is subject to seasonal restrictions. From May 1-July 9, horseshoe crabs from outside one mile of the Atlantic coast or from Maryland's coastal bays and tidal tributaries may be caught and landed, but crabs may not be caught within one mile of the Atlantic Coast or the Chesapeake Bay and its tidal tributaries. From July 10-November 30, horseshoe crabs from the state tidal waters may be caught and landed. From December 1-April 30, horseshoe crabs may not be caught or landed in Maryland.

Horseshoe crabs used for scientific purposes (including biomedical use) must be collected by individuals with scientific collection permits. These permits are only granted with proof that collected crabs are being supplied to a facility approved by the US Food and Drug Administration (FDA). Only male crabs may be collected from January 1-June 6. Crabs must be transported in a refrigerated truck and returned within 48 hours. A chain of custody form must follow the crabs from collection to release, and an annual report detailing use of horseshoe crabs is due to the state by January 31 of the following year.

3.1.1.4 Virginia

The current quota for Virginia is 172,828 horseshoe crabs, although the harvest is male-only east of the COLREGS line and limited to 81,331 horseshoe crabs. Virginia allocates its quota annually among five different harvest gear types including trawl, dredge, pound nets, by-hand, and by other gear. Each one of these gear types is limited entry and requires a gear-specific

harvesting permit to participate in the fishery. The harvest of horseshoe crabs in Virginia requires a Commercial Fishing Registration License as well as a gear-specific horseshoe crab harvesting permit. The daily landing limits for each gear-specific license are 2,500 crabs by Trawl Permit, 2,500 crabs by Class A Dredge Permit, 1,000 crabs by Class B Dredge Permit, 500 crabs by Hand Harvest Permit, 500 crabs by Pound Net Permit, and 250 crabs by General Category Permit.

3.1.2 Commercial Bait Landings

Total bait landings in the Delaware Bay by state are shown in Figure 3 and Table 1. Landings were relatively high in the late-1990s, decreased through the early-2000s, and have remained relatively stable through 2019. Horseshoe crab harvest by sex has varied through time, reflecting the management shift to male-only harvest in the region with the implementation of the ARM model in 2013 (Figure 4).

Bait landings for the Delaware Bay states were developed to support the catch multiple survey analysis (CMSA) model for that region using only Delaware Bay-origin crabs. Horseshoe crab landings from New Jersey and Delaware are considered to be 100% Delaware Bay origin (i.e., spawned at least once in Delaware Bay) whereas 45% of Maryland's harvest and 20% of Virginia's are believed to be Delaware Bay origin based on genetic data and analysis (Section 2.1.1.1). These percentages were applied to the Delaware Bay states' bait harvest. Horseshoe crabs that were not sexed were portioned into males and females based on sex ratios. The CMSA model used data from 2003-2019 and while the female harvest decreased over this time, male horseshoe crab harvest has varied (Figure 5 and Table 2). Due to the implementation of the ARM Framework through Addendum VII (ASMFC 2012), harvest in the region has been restricted to male-only harvest and this can be seen in the sex ratio of the catch.

3.2 Biomedical Fishery

Research on horseshoe crabs for use in the biomedical industry began in the early 1900s (Shuster 1950). Scientists have used horseshoe crabs in eye research, surgical suture wound dressing development, and detection of bacterial endotoxins in pharmaceuticals (Hall 1992). The current major biomedical use of horseshoe crabs is in the production of limulus amebocyte lysate (LAL). LAL is a clotting agent in horseshoe crab blood that makes it possible to detect endotoxins in patients, drugs, and all intravenous devices. The LAL test was commercialized in the 1970s (J. Cooper, *personal communication*), and is currently the worldwide standard for screening medical equipment for bacterial contamination.

Blood from horseshoe crabs is obtained by collecting horseshoe crabs, extracting a portion of their blood, and releasing them alive. Crabs collected for LAL production are typically collected by hand or trawl. Crabs are inspected to cull out damaged or moribund animals, and transported to the bleeding facility. Following bleeding, most crabs are returned near the location of capture; however, some states allow facilities to bleed crabs caught by the bait industry prior to these crabs going to the market for sale (ASMFC 2004).

There are four companies in the Delaware Bay region that extracted horseshoe crab blood during the time period examined by this assessment, 1999-2019: Limuli Labs (New Jersey),

Lonza (Maryland, formerly Cambrex Bioscience), Wako Chemicals (Maryland, previously Virginia), and Heptest Labs (Virginia). 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. Coastwide there currently are six facilities, one in Massachusetts (Associates of Cape Cod) and one in South Carolina (Charles River Endosafe) in addition to the four in the Delaware Bay.

3.2.1 Biomedical Mortality Rate

As part of the peer-reviewed benchmark stock assessment (ASMFC 2019), a literature search of all studies regarding biomedical bleeding mortality was compiled and a meta-analysis of bleeding studies was conducted. In order to determine what mortality should be applied to crabs that were bled by the facility and released alive, the mortality rates and sample sizes were compiled from the studies. Some studies had multiple rates from multiple treatments and each were treated independently. The rates and samples sizes were analyzed to estimate an overall mortality rate distribution by simulating results from mortality rate study as a separate random variable with its own binomial distribution and sample size. Then the quantiles from the overall mortality rate distribution were used to calculate an expected biomedical mortality of 15% with a 95% confidence interval of 4-30%. Therefore, the mortality rate of 15% is applied to those crabs that were bled and released alive in order to estimate the number of horseshoe crabs that die from biomedical bleeding practices.

3.2.2 Biomedical Data Estimation

Since 2004, ASMFC has required states to monitor the biomedical use of horseshoe crabs to determine the source of crabs, track total harvest, and characterize pre- and post-bleeding mortality. These values are reported in annual compliance reports but the amount, quality, and completeness varied, particularly in the early part of the time series. Additionally, the time series needed to be extended back to 2003 for use in the CMSA. Biomedical company representatives and state permitting records were consulted to confirm whether and which facilities were operating during years without data. To extend the time series of all facilities and account for biomedical mortality in as many years as possible, missing years were estimated based on available data as part of the benchmark assessment (ASMFC 2019) and that time series is used in this report.

The bleeding mortality estimate from the meta-analysis of bleeding studies (15%) was applied to numbers of bled crabs to estimate bleeding mortality. This was added to the number of crabs observed dead during the biomedical process to estimate the total mortality attributable to biomedical use (Figure 6 and Table 3). These values represent the number of horseshoe crabs estimated to have died coastwide as a result of the biomedical industry.

3.2.3 Biomedical Mortality in the Delaware Bay

Only the Delaware Bay region is modeled in the ARM Framework, yet the biomedical data on a regional basis is confidential (see Statement Regarding Confidential Data). During the update of the ARM model, the coastwide values were used to develop the model, as outlined in the

Terms of Reference. These provide an upper bound on harvest. Conversely, the ARM model was also run assuming zero biomedical mortality to provide a lower bound on harvest.

Following peer review, if the revised ARM model is accepted for use, the real, confidential Delaware Bay biomedical harvest will be used to determine the amount of mortality to attribute to the region. These mortality estimates will include apportioning of Virginia and Maryland crabs, with 20% and 45% of crabs from each state, respectively, to represent Delaware Bay origin. Then, the ARM model will be run using the confidential data by ASMFC staff who has access to the data and a harvest package will be determined and shared with the public, without showing the regional biomedical data or CMSA population estimates, the latter of which could be used to back calculate confidential harvest.

3.3 Commercial Discards

3.3.1 Northeast Fisheries Observer Program

Discard information from observed commercial fishing trips was obtained from NMFS' Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Observer Program (NEFOP). The NEFOP program collects data on harvested and discarded catch, gear, effort, and species' lengths and weights using trained fishery observers from Maine to North Carolina. The total catch and a subsample of the total catch from each observation (e.g., towed trawl net) are weighed. The observer program is mandatory for federally-permitted vessels which are selected for observation during fishing trips based on number of sea days needed to achieve a 30% CV in the dataset. Fisheries that require observer coverage fall under the federally managed fishery plans, such as groundfish, herring, squid, surfclam, ocean quahog, and the lobster fisheries. Horseshoe crab does not have a federal fishery plan and is not one of the target species of the program, but data is still collected on the species when it is encountered by NEFOP observers.

The program began in 1989 but data on horseshoe crab was available beginning in 2004. Horseshoe crab landings and observed discards were used to develop discard estimates from gillnets, trawls, and dredges in the Delaware Bay states for use in the catch multiple survey analysis (CMSA). See the NEFOP website for additional details about the program (http://nefsc.noaa.gov/fsb/program.html).

3.3.2 Methods

The first commercial discard estimates for horseshoe crab were done as part of the 2019 benchmark stock assessment (ASMFC 2019). Simply, the method developed annual ratios of observed discarded horseshoe crabs to observed landings of all species by gear in the data that encountered horseshoe crabs: gill nets, trawls, and dredges. It was assumed that the discarding rates during observed trips are representative of overall discarding rates in these fisheries. Therefore, the ratios were then applied to reported gill net, trawl, and dredge landings of all species in the region to estimate total horseshoe crab discards in the Delaware Bay. The landings used to scale up the discard ratios were queried from the Atlantic Coastal Cooperative Statistics Program (ACCSP) warehouse. The 2019 peer review panel made several recommendations regarding the discard estimates, including to further examine the NEFOP

data for horseshoe crab by area, gear, and season. Additionally, the panel suggested that the federal Vessel Trip Reporting (VTR) data should be considered for scaling up the ratios to the landings and that more work should be done to match NEFOP data and the landings data, whatever the source (VTR or ACCSP).

3.3.2.1 Data Filtering and Addressing Peer Review Comments

3.3.2.1.1 Statistical Area

The NEFOP dataset included all landings from observed trips, including those where no horseshoe crabs were encountered, as well as horseshoe crabs discarded and horseshoe crabs kept, in pounds. To address the peer review comments that statistical area should be used to develop discard ratios, not state, statistical areas within the Delaware Bay region (Delaware, New Jersey, Maryland, and Virginia; Figure 7) were examined. Only statistical areas within the region where horseshoe crabs were encountered, either discarded or kept, were included in the analysis. Of the observed trips in NEFOP that kept horseshoe crabs coastwide, 99% of the trips occurred in area 621 (95% of all trips that kept horseshoe crabs) and 625 (4%). Of the observed trips in NEFOP that discarded horseshoe crabs, 96% of the trips occurred in areas 621 (72% of all trips that caught and discarded horseshoe crabs), 612 (10%), 626 (6%), 625 (5%), 614 (2%), and 615 (1%). Therefore, the NEFOP data was limited for the analysis to areas that encounter horseshoe crabs which were 612, 614, 615, 621, 625, and 626. Statistical areas 613, 631, and 635 also accounted for approximately 1% each of the discarded horseshoe crabs but were outside of the Delaware Bay region and were not used for this analysis. Discard estimates were attempted by statistical area, rather than by gear, which resulted in poor estimates and it was not pursued further.

3.3.2.1.2 Landings Data Source

Federal VTR data was considered for scaling up the discard ratios, as recommended by the peer review panel, but there were challenges using the reported quantity, or the amount of landed product, which was a non-standardized unit of measure in the dataset. Additionally, VTR data has a complicated species coding system which ACCSP formats to be in the same format as the state data it receives. Upon consulting with ACCSP, it was recommended that for the purposes of this analysis, the best data to use for scaling up discard ratios to the region's all-species landings was the fisherman trips in ACCSP, as opposed to the commercial landings in ACCSP which were used for the 2019 benchmark. While commercial landings represent the best compilation of state and federal landings submitted by both dealers and fishermen, fishermen reports have more reliable data for statistical area. A custom data request was made in ACCSP for the landings that most closely matched the NEFOP data fields of interest (e.g., statistical area, gear, species).

3.3.2.1.3 Gear

The gears that encountered horseshoe crabs in the NEFOP dataset were more closely examined and matched with the queried ACCSP data compared to the 2019 benchmark. In NEFOP, the gears that kept or discarded horseshoe crabs within the region were determined and grouped by more general type for the larger analysis (e.g., "TRAWL, OTTER, BOTTOM, SCALLOP" was

categorized as “trawl”). Most of the trips that discarded and kept horseshoe crabs occurred on bottom otter trawls, sea scallop dredges, fixed or anchored sink gill nets, or clam dredges, although other trawls, dredges, and gill net codes also encountered horseshoe crabs on observed trips. NEFOP gears excluded from the analysis because they did not encounter horseshoe crabs included, for example, longlines, pots and traps (e.g., pots and traps for lobster, blue crab, and conch), handlines, midwater trawls, drifting or floating gill nets, and purse seines. With the collaboration of ACCSP staff, these gears were matched with ACCSP gears, which are not coded in the same format, and grouped in a similar way. The gears used in the analysis are in Table 4. Some gears were general in ACCSP, such as “GILL NETS,” but were included in the initial data pull to be filtered later to exclude species caught in the gear that do not commonly encounter horseshoe crab.

In ACCSP, some landings were not available at the gear level and appear in the database as “NOT CODED.” These landings were partitioned into trawl, gillnet, and dredge landings by calculating the annual proportion of landings by these gear categories and then these proportions were applied to the “NOT CODED” landings. The proportioning of NOT CODED landings were done after all data filtering was complete so that it did not include general gears, such as “GILL NETS” that represented species trips that were unlikely to encounter horseshoe crabs.

3.3.2.1.4 Season

Discard ratios by season was also considered, as recommended by the 2019 peer review panel. While the percent of horseshoe crabs discarded by trip varied throughout the year, generally more horseshoe crab discards occurred in the second half of the year (Figure 8). Ratios of discarded horseshoe crabs to all species kept in NEFOP were examined by year, month, gear, and statistical area (Figure 9). Discard estimates using one variable over another often resulted in poor estimates (i.e., estimates went to infinity or had very large associated errors) since some combinations, for example gear and area or month and gear, were not represented in the data for horseshoe crabs. Because the NEFOP dataset is not designed to target horseshoe crab trips specifically, it was difficult to determine if, for example, there were more discards in January 2012 than other years or if it was an artifact of sampling that year. Limiting the data to month or season resulted in poor estimates and this approach was not pursued further.

3.3.2.1.5 Species

To further filter the data to better represent trips that would encounter horseshoe crabs, species in NEFOP and ACCSP were closer examined. In NEFOP, pounds of horseshoe crabs kept and discarded, as well as pounds of all species landed on observed trips, are reported but the landed pounds are not reported by species. In NEFOP, “trip target” is provided and only refers to what the captain indicated he or she was targeting at the trip level, not necessarily what was landed. Species landed is not keypunched in NEFOP (Gina Shields, NEFOP data contact, *personal communication*) and does not exist as a queried data field. So, for example, a trip in NEFOP may have targeted summer flounder, discarded 100 pounds of horseshoe crab, and landed 1700 pounds, but those 1700 pounds are not necessarily summer flounder. Therefore, trip target was used to further refine and limit the data to species thought to be captured with horseshoe

crabs, but a guild approach was not pursued. In observed trips in the Delaware Bay region, the trip target that resulted in the most horseshoe crab discards was summer flounder (38% of discarded horseshoe crabs occurred on trips where the captain indicated that the targeted species of the trip was summer flounder), horseshoe crabs (35%), sea scallops (18%), and monkfish (3%). Of the 33 species targeted in NEFOP that discarded horseshoe crabs, 10 species represented approximately 99% of the discards (Table 5). Having already limited the NEFOP and ACCSP datasets to the six statistical areas and three gear categories, data was further filtered to include only trips and landings that were likely to interact with horseshoe crabs. This included the 33 species targeted in NEFOP which were paired to species categories in ACCSP. For example, from ACCSP, all trawl trips that occurred in the Delaware Bay region that landed flounder were included, not just summer flounder. Trips that landed species such as sharks, tunas, sea turtles, catfish, pufferfish, tilefish, and shad, for example, were excluded because while they occurred within the region and gears that captured horseshoe crabs, they were unlikely to encounter them. To test the sensitivity of limiting the trips by species, discard estimates were done with all species landed within the area and gear categories and then again with the limited species categories. The results were not greatly influenced by this decision, with all species included resulting in only slightly higher discard estimates than the limited species data. The ARM subcommittee decided that the limited species represented the best data since it eliminated trips that were unlikely to encounter horseshoe crabs.

3.3.2.1.6 Horseshoe Crab Size and Maturity

During the 2019 benchmark, there was no consideration given to the size or maturity of horseshoe crabs discarded. For the ARM Revision, the biological sampling of kept and discarded horseshoe crabs in NEFOP was examined. Biological sampling of horseshoe crab length was limited to statistical area 621 (97%) and reported mostly without the sex of the crab. Despite these limitations, the prosomal width frequency was noticeably different between horseshoe crabs kept on observed trips and those discarded (Figure 10). Horseshoe crabs kept, on average, were larger than horseshoe crabs discarded. When a reason for discarding was provided, most fishermen indicated it was because the crabs were too small or regulations prohibit retention.

Discarded horseshoe crab lengths indicated that many of them were likely to be immature and therefore should not be included in the estimates used for the CMSA, which does not model immature crabs. To filter out immature crabs, length-weight relationships were used as developed during the 2019 assessment. Since many of the measured crabs were not sexed, a sex ratio was used (52% male and 48% female) based on commercial bait sampling data. For females the length-weight relationship used was:

$$\log_e(Wt) = \log_e(PW) * 2.8659 - 15.1802$$

and for male horseshoe crabs, the length-weight relationship used was:

$$\log_e(Wt) = \log_e(PW) * 2.4381 - 12.9439$$

where Wt=weight of the horseshoe crab in kg and PW=prosomal width in mm (ASMFC 2019). As determined by committee consensus, a length cutoff of 180 mm was used to differentiate mature from immature. The proportion at weight that corresponded to mature crabs in the

biological sampling was expanded to the discard estimates to eliminate immature crabs from the analysis for the CMSA. Again, while this analysis did estimate the number of immature horseshoe crabs captured and discarded, the immature stage was not modeled in the CMSA or revised ARM Framework. Only estimated mature horseshoe crabs were used in the analyses going forward. On average, 43% of the discarded horseshoe crabs were estimated to be mature for the years with biological sampling in the database, 2012-2019. For 2003-2011, the average proportion mature was used (Table 6).

3.3.2.2 Discard estimation methods

After examining the NEFOP and ACCSP data in finer detail as recommended by the 2019 peer review panel, the data used in the analysis were filtered to include six statistical areas, more specific gear categories which were then generalized into trawl, gill nets, and dredges, and limited species targeted and landed as described in above sections. Calculating discard ratios annually by gear, rather than by month or statistical area, resulted in the best discard estimates due to missing or limited data in the other configurations. Following data filtering, NEFOP observer data were used to develop annual ratios of observed discarded horseshoe crab to observed landings of all species by gill nets, bottom trawls, and dredges from the statistical areas within for 2004-2019. Ratios were then applied to reported gill net, bottom trawl, and dredge landings of all species from those areas for 2004-2019 as queried from the ACCSP warehouse to estimate total discards of horseshoe crab.

The annual ratios by major gear type were calculated as the ratio of the mean discards of horseshoe crab per observation (i.e., tow or net set), in pounds, to the mean landings of aggregated species per observation, also in pounds (Equation 1).

$$Equation\ 1: R = \frac{\overline{D}}{\overline{L}} = \frac{\sum_1^n D_i}{\sum_1^n L_i}$$

This ratio estimator includes all observations with observed landings of any species, including those where no horseshoe crab were discarded. The variance of the ratio estimator was calculated with Equation 2 (Pollock et al. 1994).

$$Equation\ 2: Var(R) = \frac{1}{n(n-1)\overline{L}^2}\left(\sum_1^n D_i^2 + R^2 \sum_1^n L_i^2 - 2R \sum_1^n D_i L_i\right)$$

It was assumed that discarding rates during observed trips were representative of overall discarding rates in these fisheries. Small sample sizes of positive observations precluded developing ratios at finer resolution (e.g., by state or season).

For trawls, annual mean weights were calculated as the total number counted from subsamples divided by the total subsample weight and were applied to the discard estimates in weight to derive discard estimates in numbers. In years with no observer data, averages of all the years combined were used. For gill nets and dredges, there was not sufficient biological sampling to calculate the mean weight of horseshoe crabs caught as bycatch in the gear. A conversion factor of 1.5 pounds per horseshoe crab caught as bycatch in the dredge and gill net gears was used to convert from pounds to numbers.

A discard mortality rate of 5% was assumed for both dredge and trawl discards of horseshoe crab and a 12% mortality rate was applied to gill nets. These mortality rates were developed from stock assessment subcommittee, technical committee, and ARM subcommittee discussions. There is a lack of information about discard mortality rates from various gears for horseshoe crabs. A sex ratio of 48% female to 52% male was applied to split the discards by sex for the CMSA based on commercial bait sampling data in the region.

3.3.3 Discard Estimates

The ratio estimators varied by gear and year with the highest ratios of discarded horseshoe crabs to kept species occurring in the trawl fisheries (Table 7-Table 9). While trawl fisheries had higher ratios for discarded horseshoe crabs, the most discarded horseshoe crabs by number occurred in the dredge fisheries. Discards from dredges increased remarkably in 2014-2019 due to several observed trips with high discarded horseshoe crabs in those years. Trawls also showed the highest rates of discards in similar years, 2015-2017. Conversely, estimated discards from gill nets were the highest in 2011 and 2013 and decreased from 2014-2019. Estimated discards for all three gears combined showed an increase of discards throughout the time series, although those estimates were highly influenced by the dredge discard estimates.

The sex ratio, mortality rates by gear, and proportion mature values were applied to the discard estimates to get the final number of dead mature horseshoe crabs by sex in the region to use in the CMSA. The number of dead horseshoe crabs was high in 2016, 2017, and 2019 for both sexes, driven mainly by high discard estimates from dredges those years (Table 10; Figure 11).

4 HORSESHOE CRAB FISHERY INDEPENDENT DATA SOURCES

During the 2019 benchmark stock assessment, several fishery independent surveys in the Delaware Bay region were explored and many were used to develop indices of relative abundance to support modeling in the region. The following indices were used in the peer reviewed CMSA and were updated for this report with additional years of data. All indices were developed using the delta distribution for the mean and variance for each year of a survey to specifically take into account the number of zero catches (Pennington 1983).

4.1 New Jersey Ocean Trawl Survey

4.1.1 Survey Design and Methods

New Jersey's Ocean Trawl Survey has been operating since August of 1988 and collects samples during five survey cruises per year (30 samples in January, 39 samples each in April, June, August and October) in the nearshore ocean waters of New Jersey. It uses a three-in-one design, two-seam trawl net with forward netting of 12 cm stretch mesh, rear netting of 8 cm, and a 6.4 mm bar mesh liner in the cod end. The survey incorporates a random stratified design with sampling sites selected within 15 strata (Figure 12) with longitudinal boundaries consisting of 5, 10 and 15 fathom isobaths. The latitudinal boundaries are identical with the NMFS groundfish survey except the extreme southern and northern ends of the sampling area. These strata are further divided into blocks which are 2.0 minutes longitude by 2.5 minutes latitude

for the mid-shore and offshore strata, and 1.0 minutes longitude by 1.0 minutes latitude for the inshore strata. The standard duration of each sample is a 20-minute tow.

4.1.2 Biological and Environmental Sampling

Catches are sorted to species level whenever possible, enumerated, weighed (gross weight per species), and measured for length/width (cm) data. Certain species are sexed and horseshoe crabs have consistently been sexed since 1999. Environmental data include depth (m), surface and bottom water temperature (degrees Celsius), salinity (0/00), dissolved oxygen (mg/L), air temperature, wind direction and speed, weather conditions, wave height, and swell direction and height.

4.1.3 Evaluation of Survey Data

A spring/summer (April and August) index was developed from this survey for female adult (>= 19 cm pw) and male adult (possessing male pedipalps) horseshoe crabs. The indices were developed for the years in which the crabs were consistently sexed (1999-2019), although only 2003-2018 are used in the CMSA. In 2019, the April cruise did not run and therefore the 2019 data point for the spring index only includes the August data and should not be used for modeling.

4.1.4 Abundance Index Trends

Both indices of female and male horseshoe crab abundance began as relatively high in 1999 and then declined over several years to the time series low in 2010 (Figure 13-Figure 14). The indices began to steadily increase until the time series high in 2013, after which horseshoe crabs declined in abundance again and then had variable abundance until a relatively high point in the terminal year, albeit a reduced survey that year due to the missing April cruise.

4.2 Delaware Fish and Wildlife Adult Trawl Survey

4.2.1 Survey Design and Methods

Delaware has conducted the Adult Trawl Survey in three discrete time spans: 1966 – 1971, 1979 – 1984, and continuously since 1990. This assessment used the data from the latest time period (1990 – 2017) and was updated through 2018 for the spring portion of the survey. The survey samples 9 fixed stations monthly from March through December for an annual total of 72 samples. This survey uses a 30 foot, 2-seam otter trawl with a 3 inch stretch mesh in the wings and body and a 2 inch stretch mesh in the cod end. The sampling area includes the Delaware waters of the Delaware Bay at depths ranging from 7 – 35 m (Figure 15). The standard duration for each sample is 20 minutes at a speed of 3 knots.

4.2.2 Biological and Environmental Sampling

Catch is sorted to species level, enumerated, and weighed (aggregate per species) and measured for length/width to the nearest 0.5 cm. Horseshoe crabs are sexed, enumerated, and measured (prosomal width). Environmental data include tide stage, water temperature (degrees Celsius), salinity (ppt), cloud cover, and depth (m).

4.2.3 Evaluation of Survey Data

This survey catches mainly adult horseshoe crabs and spring (April through July) indices were developed from this survey for male and female horseshoe crabs separately. Overall, the proportion positive tows varied little between the seasons with the spring showing slightly higher values than the fall (43.6% spring, 39.5% fall). The spring index was used in the peer-reviewed 2019 benchmark assessment in the modeling and therefore it was also used for this report.

4.2.4 Abundance Index Trends

For all adult female horseshoe crabs in the spring (Figure 16), abundance was highest in 1990 and 1991, and then a downward trend began from 1992 through 1995. It rebounded with an increase in 1996 before continuing the general trend downward through 2005. There was a moderate increase in 2006 and 2007 before dropping to low abundance levels from 2008 through 2013. Since 2014 there has been a generally upward trend. A similar pattern was seen for the spring indices of adult males (Figure 17).

4.3 Delaware Bay Horseshoe Crab Spawning Survey

4.3.1 Survey Design and Methods

The ASMFC's FMP for Horseshoe crab (ASMFC 1998) required that the states of Delaware, Maryland, and New Jersey implement pilot horseshoe crab spawning surveys based on "standardized and statistically robust methodologies." In January 1999, the ASMFC convened a workshop that established a framework for such surveys in the Mid-Atlantic region. The framework built upon existing horseshoe crab spawning survey efforts by Finn et al. (1991) and Maio (1998). The survey began in 1999 and has continued through the present. Approximately 25 beaches are sampled in the Delaware Estuary during nighttime high tides in May-June. The goals are to provide an index of spawning activity and distribution in the region, increase the understanding of environmental factors on spawning activity and distribution, and promote public awareness of the role crabs play in shorebird dynamics. The survey has been shown to provide levels of spatial and temporal coverage essential for understanding trends in spawning activity (Smith and Michels 2006).

4.3.2 Biological and Environmental Sampling

The survey collects environmental data including water temperature, tidal height, wave height and biological data such as sex and spawning activity.

4.3.3 Evaluation of Survey Data

The ARM workgroup was primarily interested in this survey for the sex ratio data it provides in order to inform control rules in the Delaware Bay region. The ARM workgroup determined that this survey provides the most reliable data available for spawning beach sex ratios. For other data provided by this survey, the full annual reports are available at https://www.delawarebayhscsurvey.org/surveyreports/.

4.3.4 Sex Ratio Trends

Annual sex ratios from the spawning beach survey are available in Table 11. Current horseshoe crab harvest management strategies in the Delaware Bay area limit the harvest to predominantly male crabs. Concern was expressed that these strategies may cause spawning sex ratios (M:F) to drop and yet the sex ratio has increased in recent years. Annual sex ratios have varied over the course of the survey but has been above five male horseshoe crabs to one female horseshoe crab for the last three years.

4.4 Virginia Tech Horseshoe Crab Trawl Survey

4.4.1 Survey Design and Methods

The trawl survey conducted by Virginia Polytechnic Institute and State University (Virginia Tech) is the only survey available that is designed specifically to characterize the horseshoe crab population in coastal and lower Delaware Bay (Figure 18; Bi et al. 2020). The survey has operated from 2002-2011 and then again from 2016-present due to a lack of funding during the missing years. The survey area is stratified by distance from the shore and bottom topography. Tows are 15-minutes long and the survey only operates in the fall (mid-September-late October).

4.4.2 Biological and Environmental Sampling

All horseshoe crabs are counted and a subset are measured for prosomal width and identified by sex and maturity. Immature, newly mature, and mature crabs are differentiated in the data set.

4.4.3 Evaluation of Survey Data

This is the only survey specifically designed to catch and characterize the horseshoe crab population in its sampling region. The ARM workgroup decided to accept the indices as provided by Virginia Tech since they also used the delta distribution to model the mean and error of the annual catch.

4.4.4 Abundance Index Trends

The indices of abundance developed by sex and stage for horseshoe crabs in the Virginia Tech trawl survey can be found in Figure 19. Total abundance is estimated by extrapolating the mean catch per tow to the sampling universe illustrated in Figure 18 for the Delaware Bay Area. Abundance varied by stage and sex, although there is a slight increase in abundance across the stages throughout the time series until the terminal year of 2019 when all indices saw a decrease.

5 RED KNOT SURVEYS

5.1 Red Knot Mark-Resight Survey

5.1.1 Methods

Mark-recapture-resight data were used to estimate passage population size and parameters related to migration ecology (Nichols 1996). The Jolly-Seber mark-recapture model for open

populations (Jolly 1965; Seber 1965) is appropriate for migration studies because a stopover area can be viewed as an open, "flow-through" system. Estimation focuses on the total number of individuals going through the system in a relatively short period of time.

Red knots have been individually marked at Delaware Bay and other locations with engraved leg flags since 2003. Each leg flag is engraved with a unique 3-character alphanumeric code (Clark et al. 2005). Mark-resight data (sight records of individually-marked birds and counts of marked and unmarked birds) were collected on the Delaware and New Jersey shores of Delaware Bay according to the methods for mark-resight investigations of Red Knots in Delaware Bay (Lyons 2016).

The spatial sampling plan was as follows. The study area is a collection of 22 sites (beaches or shoreline segments), 13 in Delaware and nine in New Jersey. To facilitate even sampling of all sites, the site boundaries were delineated on a map of the study area and defined with a written description. Observers thus know the area to be sampled on each visit to the site. It is not possible to sample all 22 sites at Delaware Bay in one day because the study area is too large. From previous work in the study area, it was estimated that three days would be required to complete a circuit of all sites for mark-resight sampling. Thus the mark-resight "sampling occasion" was defined as 3-day periods between 10 May and 6 June and all data for each 3-day period are aggregated. That is, multiple observations of the same individual bird in each 3-day period are lumped into one observation (detected) for that 3- day period.

The temporal sampling plan defined two different aspects important for an effective study design to estimate population size. First, resighting surveys were conducted at all sites during each sampling occasion (e.g., 3-day period). Second, sampling periods were defined so that sampling begins when the first birds arrive and continue until the last birds depart the study area. This temporal coverage is essential to capture the entire passage population; if resighting surveys began after birds have arrived in the study area, the stopover population size estimate will not include any birds that arrived and left before sampling began.

On the same days as the resight surveys, observers also conducted scan samples of randomly selected flocks to determine the proportion of the population with marks (Lyons et al. 2016). For each randomly selected flock, observers checked a sample of birds for marks and recorded the number of individually marked birds and the number of birds checked for marks in each sample (Appendix A).

All flag resightings were validated each year with physical capture and banding data available in the data repository at http://www.bandedbirds.org/. Resightings without a corresponding record of physical capture and banding (i.e., "misread" errors) were not included in the analysis. However, banding data from Argentina are not available in bandedbirds.org; therefore, all resightings of orange engraved flags were included in the analysis without validation using banding data. Resightings of 21 flagged individuals whose flag codes were accidentally deployed in both New Jersey and South Carolina were omitted (A. Dey, *personal communication*) because it is not possible to confirm individual identity in this case.

To estimate stopover population size, the methods of Lyons et al. (2016; see section 5.1.1.1) were used to analyze 1) the mark-resight data (flag codes), and 2) data from the scan samples

of the marked-ratio. In this "superpopulation" approach, passage population size is estimated using the Jolly-Seber model for open populations, which accounts for the flow-through nature of migration areas and probability of detection during surveys.

5.1.1.1 Statistical Methods to Estimate Red Knot Population Size Using Mark-Resight Data and Counts of Marked Birds

The observations of marked birds were converted into encounter histories, one for each bird, and encounter histories were analyzed with a Jolly-Seber (JS) model (Jolly 1965; Seber 1965; Crosbie and Manly 1985; Schwarz and Arnason 1996). The JS model includes parameters for recruitment (β), survival (φ), and capture (p) probabilities; in the context of a mark-resight study at a migration stopover site, these parameters are interpreted as probability of arrival to the study area, stopover persistence, and resighting, respectively. Stopover persistence is defined as the probability that a bird present at time *t* remains at the study area until time *t* + 1. The Crosbie and Manley (1985) and Schwarz and Arnason (1996) formulation of the JS model also includes a parameter for superpopulation size, which in this approach to mark-resight inferences for stopover populations is an estimate of the marked (leg-flagged) population size.

Three-day periods were used rather than days as the sampling interval for the JS model given logistical constraints on complete sampling of the study area; multiple observations of the same individual in a given 3-day period were combined for analysis.

Inference was made from a fully-time dependent model; arrival, persistence, and resight probabilities were allowed to vary with sampling period [$\beta_t\ \varphi_t\ p_t$]. In this model, $p_1 = p_2$ and $p_{K-1} = p_K$ (where K is the number of samples) because not all parameters are estimable in the fully-time dependent model (Jolly 1965; Seber 1965; Crosbie and Manly 1985; Schwarz and Arnason 1996).

The methods of Royle and Dorazio (2008) and Kéry and Schaub (2012, Chapter 10) were followed to fit the JS model using the restricted occupancy formulation. Royle and Dorazio (2008) use a state-space formulation of the JS model with parameter-expanded data augmentation. For parameter-expanded data augmentation, the observed encounter histories were augmented with all-zero encounter histories (n = approximately 2000) representing potential recruits that were not detected (Royle and Dorazio 2012). Lyons et al. (2016) was followed to combine the JS model with a binomial model for the counts of marked and unmarked birds in an integrated Bayesian analysis. Briefly, the counts of marked birds (m_s) in the scan samples are modeled as a binomial random variable:

$$m_s \sim Bin(C_s, \pi), \qquad (1)$$

where m_s is the number of marked birds in scan sample *s*, C_s is the number of birds checked for marks in scan sample *s*, and π is the proportion of the population that is marked. Total stopover population size $\widehat{N^*}$ is estimated by

$$\widehat{N^*} = \widehat{M^*}/\hat{\pi} \qquad (2)$$

where $\widehat{M^*}$ is the estimate of marked birds from the J-S model and $\hat{\pi}$ is the proportion of the population that is marked (from Eq. 1). Estimates of marked subpopulation sizes at each

resighting occasion t $\left(\widehat{M_t^*}\right)$ are available as derived parameters in the analysis. An estimate of population size was calculated at each mark-resight sampling occasion $\widehat{N_t^*}$ using $\widehat{M_t^*}$ and $\hat{\pi}$ as in equation 2.

To better account for the random nature of the arrival of marked birds and addition of new marks during the season, a time-specific model was used for proportion with marks in place of equation 1 above:

$$m_s \sim Binomial\left(C_{s,t}, \pi_{occasion(st)}\right) \quad (3)$$

$$for\ s\ in\ 1, \ldots, n_{samples}\ and\ t\ in\ 1, \ldots, n_{occasions}$$

$$logit(\pi_t) = \alpha + \delta_t$$

$$\delta_t \sim Normal(0, \sigma^2_{occasions})$$

where m_s is the number of marked birds in scan sample s, C_s is the number of birds checked for marks in scan sample s, δ_t is a random effect time of sample s, and π_t is the time-specific proportion of the population that is marked. Total stopover population size $\widehat{N^*}$ was estimated by summing time-specific arrivals of marked birds to the stopover (B_t) and expanding to include unmarked birds using estimates of the proportion marked:

$$\widehat{N^*} = \sum \widehat{B_t}/\pi_t$$

Time-specific arrivals of marked birds are estimated from the Jolly-Seber model using $\widehat{B_t} = \widehat{\beta_t}\widehat{M^*}$ where $\widehat{M^*}$ is the estimate of the number of marked birds and $\widehat{\beta_t}$ is the fraction of the population arriving at time t.

5.1.1.2 Assumptions of the Mark-Resight Jolly-Seber Model to Estimate Population Size

The mark-resight Jolly-Seber model to estimate Red Knot population size has six assumptions: rate parameters are homogeneous in all birds, marks are not lost or overlooked and are recorded correctly, sampling is instantaneous, emigration is permanent, fates are independent with respect to rate parameters, and marked ratio data are representative of the population. Here, a summary of these assumptions is provided and the bias that may result from violations of the assumptions is discussed.

The first assumption is the homogeneity of rate parameters. The rate parameters of the JS model are probability of arrival to the stopover, probability of stopover persistence, and probability of resighting. The assumption of homogeneity of rates implies that the same rate parameters govern the arrival, persistence, and resighting of all marked and unmarked individuals.

As noted above, the estimation of M* is based on the resightings of marked birds encountered at each sampling occasion. Observations of unmarked birds are not used in this part of the inference process. Heterogeneity in resighting probability, in which different marked birds present during the sampling occasions have different probabilities of being resighted, can cause bias in parameter estimates (Williams et al. 2002). “Trap response” refers to the situation in which a bird’s previous detection history (usually whether it has been seen before or not)

influences its subsequent probability of being resighted. If birds exhibit a “trap-happy” response, in which previously detected birds are resighted repeatedly, marked population size estimates will be negatively biased; if birds exhibit a “trap-shy” response, marked population size estimates will be positively biased (Williams et al. 2002). Trap response may seem unlikely in a mark-resight study because animals are not physically captured. However, uneven sampling of the study area may result in a form of heterogeneity and/or trap response of resighting probability. For example, if certain sites in the study area are visited more often than others, the same birds may be resighted in a pattern that mimics either heterogeneity or a trap-happy response. Finally, the legibility of the alphanumeric code may be a function of how much ink remains in the engraving. Ink is lost from the engraved leg flags over time (years). Flags that were applied many years ago may not be as legible or readable as flags applied in recent years, creating heterogeneity in resighting probability. Flags that have become completely illegible were treated as unmarked. Birds with illegible flags do not appear in the resighting statistics, and therefore they are counted as unmarked when tallying the counts of marked and unmarked birds for estimation of π.

The above assumptions about detection probability apply to resightings of individual marked birds. The special counts used to estimate marked to unmarked ratios, π, are typically different than the surveys used to obtain detection histories of marked birds. These counts do not require individual identification information for marked birds and usually entail special counts during surveys designed to record marked bird identifications. Estimation of π requires the assumption that marked and unmarked birds have equal probabilities of being detected in these special counts. Trap response would occur if marked birds showed different detection probabilities than unmarked, but this sort of response seems unlikely in such counts. Finally, it should be noted that detection probabilities for marked birds in the two types of surveys, those used to estimate marked to unmarked ratios and those used to estimate M*, need not be the same.

Effects of heterogeneity in stopover persistence on estimates of stopover duration and population size have not been thoroughly investigated (Williams et al. 2002). Heterogeneity in stopover persistence may result from population structure (e.g., different stopover dynamics for age classes or migratory subpopulations), and stopover-age effects, where stopover-age is measured by length of time at the stopover. In a simulation study of age-related variation in survival probability, Manly (1970) found that the JS model could be reliably used when there is small to moderate variation in survival (persistence) probability.

Some amount of heterogeneity in stopover persistence may result from aggregating data into sampling occasions for analysis, e.g., the 3-day sampling occasions used in Delaware Bay. For example, individual birds observed on day 3 of the sampling occasion may have a greater probability of remaining until the next sampling occasion than birds observed on day 1. However, because the average stopover duration of knots in Delaware Bay is much greater than 3 days, heterogeneity in stopover persistence resulting from data aggregation should be small. Hargrove and Borland (1994) found that effects of aggregating data for sampling occasions did not produce bias in population parameters when survival is high within the pooled periods.

Effects of heterogeneity of rate parameters resulting from age and population structure require additional research. The ARM workgroup plans to explore models that accommodate age-related variation in stopover persistence as part of the ongoing review of monitoring data for the Adaptive Resource Management Working Group for Delaware Bay. In addition, it may be possible to model stopover persistence as a function of boreal-wintering area of marked birds using observations away from Delaware Bay.

The second assumption is that marks are not lost or overlooked, and are recorded correctly. Birds are marked with a leg flag (Clark et al. 2005), which is attached using epoxy and is not expected to fall off over time. Furthermore, loss of flags is not expected to impact population size estimates because the JS model currently implemented at Delaware Bay is a single-season model (i.e., loss of flags during the approximately 15-day stopover may be minimal).

Incorrect recording of alphanumeric combinations, however, may impact parameter estimates. Using the centralized database of capture and banding data (bandedbirds.org), alphanumeric combinations that have not been deployed in the field are removed before analysis. Some errors of recording are thus handled as part of data management. However, it is not possible to identify instances in which alphanumeric codes are incorrectly recorded as codes that actually have been deployed (i.e., "false-positives"). The rate of false positive identifications and impacts on parameter estimates requires additional research.

A form of "flag loss" may result as the ink in engraved leg flags is lost over time or the alphanumeric code otherwise becomes unreadable; this type of flag loss may be an important consideration of multi-year studies of annual survival and other parameters but is not expected to impact passage population size estimates in single-season investigations if such flags are properly treated in analysis. Either birds with such flags should be counted as "unmarked" in the surveys for marked to unmarked ratios, or if this is too difficult (requires too much extra time), then the ratio of unreadable to readable flags in the detection history sampling can be used to adjust the marked to unmarked ratio.

The third assumption of the method is that sampling is instantaneous. This assumption is related to the assumption of homogeneous survival (persistence) probability. Strictly speaking, the assumption of instantaneous sampling is rarely met in practice. The interval between sampling occasions is typically long relative to the duration of the sampling occasion, however. In a simulation study of sampling occasions created from pooling data, Hargrove and Borland (1994) found that estimates of population sizes were acceptable because bias was small.

The fourth assumption is "permanent emigration". Emigration from the study area is expected to be permanent. Temporary emigration will not bias estimates of passage population size if it is a completely random process (Kendall et al. 1997). That is, birds not available for detection (temporary emigrants) at one sampling occasion are no more or less likely to be available for detection at the next sampling occasion than birds that are currently available. Knots move from the bay shore to the Atlantic shore during the stopover season but these movements are considered random temporary emigration and therefore not a source of bias.

Fifth, independence of fates with respect to rate parameters was assumed. This assumption may be violated if birds migrate in pairs, family groups, or other associations that remove

independence of fates with respect to arrival, persistence, and resighting. Thus far, there is no evidence that shorebirds migrate in groups that would result in a violation of this assumption. If this assumption is violated, variance estimates will be negatively biased resulting in confidence intervals that do not accurately reflect uncertainty in parameter estimates, but such a violation will not create bias in population estimates. Variance estimates can be adjusted with quasi-likelihood methods to accurately reflect uncertainty in parameter estimates.

Finally, it was assumed that the marked ratio data collected with scan samples are representative of the population. Scan samples of flocks of birds are used to estimate the proportion of the population with marks; in each scan sample, the observer records the number of marked birds and the number of birds checked for marks. Care is taken to ensure that the samples are representative of the flocks under study and the population as a whole. A field protocol has been developed to randomly select birds to be scanned and avoid bias in the data collection. Sampling is maintained throughout the season to maintain a representative sample.

5.1.2 Results

The first mark-resight estimate of red knot passage population size at Delaware Bay was made in 2011 (Table 12). The passage population estimates were fairly stable between 2011 and 2020 at approximately 45,000 birds. In 2011, the passage population was estimated to be 43,570 (95% credible interval: 40,880 – 46,570). The passage population peaked in 2015 at 60,727 (55,568 – 68,732) and was lowest in 2020 (40,444 [33,627 – 49,966]).

5.2 Red Knot Delaware Bay Peak Count

5.2.1 Methods

Aerial surveys in the Delaware Bay are conducted annually. The survey covers approximately 80 km of beach in New Jersey and 80 km of beach in Delaware during northbound stopover of shorebird migrants in May and early June. Aerial surveys are conducted in a Cessna high-wing airplane, beginning on the New Jersey side of the bay at Cape May (38.97444948 latitude and -74.96220913 longitude) and ending on the Delaware side at Cape Henlopen (38.7831592730231 latitude and -75.121961041194 longitude; Clark et al. 1993). The survey route is divided into 81 segments defined by geographic features easily discerned from the air. Two observers count during each survey, one person records GPS location data. The plane is flown 25-30 m offshore at approximately 110km/hr, temporarily flushing for ease of counting and species identification. Surveys commence at Cape May approximately 1 to 2 hours after high tide and conclude at Cape Henlopen approximately 2 to 3 hours after high tide as birds are more concentrated and easier to count. From 1986 – 2008 surveys were conducted weekly through May and early June (5-6 counts) by the same observers (Kathleen Clark and Jim Dowdell); all migrant shorebird species were counted including red knot (REKN), ruddy turnstone (RUTU), sanderling (SAND), short-billed dowitcher (SBDO), dunlin (DUNL), and semipalmated sandpiper (SESA).

In 2009 observers and method for aerial counts changed. Counts were reduced to two flights during the peak of stopover (May 18 – 28). In 2009 a bay-wide ground and boat count (of

inaccessible areas) was instituted to reduce uncertainty in aerial estimates especially in areas with high densities of birds (Mispillion Harbor, DE; Egg Island, NJ). From 2009 – 2015 only REKN and RUTU were counted. In 2015-2019 surveyors changed; REKN and RUTU were consistently counted; SAND, SBDO, DUNL, SESA/Peep were inconsistently counted during this period. There were no aerial counts taken in 2020 due to the COVID-19 pandemic.

5.2.2 Results

Peak stopover abundance of red knots in Delaware Bay (aerial/ground counts) had been low and stable for much of the last decade, 2009 to 2021 (Figure 20). Peak abundance declined in 2017 (17,969); resightings of marked red knots (NY, MA) indicate some birds left the Bay early to seek food elsewhere due to low egg resources. This departure was seen in estimates of time-specific stopover population size by Lyons (2017). In 2018 and 2019, peak numbers of red knots were higher (32,930 and 30,880, respectively) as more birds remained in the bay to take advantage of surface eggs more widely available through the stopover period. In 2020, red knot peak abundance declined, (19,397 on May 24) and 2021 observed fewer than 7,000 red knots, the lowest count since surveys began in 1986 and well below the previous 1-year record low count of 12,375 birds in 2007. Aerial and ground surveys do not account for turnover; (the total number of knots moving through Delaware Bay stopover, May 1 to June 7).

6 HORSESHOE CRAB POPULATION MODEL

6.1 Catch Multiple Survey Model

6.1.1 Model Background

Initial attempts at modeling Delaware Bay horseshoe crab stock dynamics using a catch-survey analysis (CSA) began in 2008 (ASMFC 2009b) adhering largely to the methods described in Collie and Sissenwine (1983). The horseshoe crab's unique life history was well-suited to the two-stage modeling approach, as newly mature horseshoe crabs, termed primiparous, exhibit readily-identifiable secondary sexual characteristics, cease molting, and recruit into the spawning population in the ensuing year (Schuster and Sekiguchi 2003; Section 2.1.3). Horseshoe crabs that have spawned at least once, termed multiparous, bear identifiable, permanent, mating abrasions (Hata and Hallerman 2009). Relative abundances of primiparous and multiparous crabs are measured in the Virginia Tech Horseshoe Crab Trawl Survey in the fall directly outside of the population's major spawning grounds (Bi et al. 2020). Primiparous and multiparous females were used as indices of pre-recruits and full-recruits in the catch survey model.

While the initial CSA in 2008 provided a promising model for horseshoe crab, it was not fully developed at that time and was not used for management. Subsequently, a catch multiple survey analysis (CMSA) was developed and peer reviewed for the 2019 stock assessment and tailored to available horseshoe crab survey and harvest information in order to produce estimates of Delaware Bay adult female abundance and fishing mortality rates. The 2019 CMSA was tested with an operating model and found that model fits were very close to simulated data (ASMFC 2019). Additionally, a retrospective analysis was done which showed minor error

or bias from a data peel to 2009, and several sensitivity runs were conducted and the base model was shown to be highly robust. For the 2019 assessment, poor fit to survey indices prevented the development of male-only model. The peer review panel stated that the population estimates from the CMSA were the best available estimates of abundance and fishing mortality for female horseshoe crabs in the Delaware Bay region and that the estimates were suitable for input in the ARM model.

For this ARM Revision, the benchmark CMSA was extended to add additional years of data. The structure of the model, as described below, is generally unchanged. Inputs to the model were unchanged except in instances where the ARM subcommittee had an opportunity to address peer review comments from the assessment, for example, the discard estimates. During the 2019 benchmark assessment, the assessment team focused on the CMSA model development of female horseshoe crabs. While a male model was attempted at that time, there were initially some convergence issues and poor fit to the indices and further development was not attempted due to the timeline of the benchmark. For this ARM Revision, more time was dedicated to explore starting values and stability of the male model and a male model was successfully developed using the same data sources as the female model.

6.1.2 Model Description

The CMSA contains a similar, simplified model structure to the Chesapeake Bay Blue Crab sex-specific catch multiple survey analysis by Miller et al. (2011). The model tracks the dynamics between two horseshoe crab stages: i) primiparous (newly mature yet spawning-naive); and ii) multiparous (spawning-experienced). The broad assertion is that all primiparous females will participate in the proceeding spring spawning event, thus fully entering the multiparous stage within a single year (12-month period). Therefore, multiparous abundance in a given year is a direct function of the primiparous and multiparous abundance in the previous year minus harvest and natural mortality.

The catch multiple survey model is based on the first order difference equation:

$$N_{y+1} = \left(\left(N_y + R_y\right)e^{-Mt} - C_y\right)e^{-M(1-t)} \quad (1)$$

which relates the fully-recruited abundance at the beginning of the year (N_{y+1}), to the fully-recruited abundance at the beginning of the previous year (N_y), plus pre-recruit abundance in the previous year (R_y), minus catch (C_y), all decremented by natural mortality, *M*, with t representing the fraction of the year corresponding to the harvest midpoint.

Minimum data requirements for the model include: i) annual indices of relative abundance for each size stage; ii) relative selectivities of size stages to the survey gear; iii) annual harvest; and iv) an estimate of instantaneous natural mortality rate.

Survey indices of abundance are assumed proportional to absolute stock sizes and are described by

$$r_{i,y} = s_i q_i R_y e_i^{\delta y} \quad (2)$$

and

$$n_{i,y} = q_i N_y e_i^{\eta y} \quad (3)$$

where $r_{i,}$ and $n_{i,}$ are the observed indices of pre-recruit and fully-recruited horseshoe crabs from survey *i*, q_i is the survey catchability coefficient, and $e^{\eta y}$ and $e^{\delta y}$ are lognormally distributed random variables, which represent survey measurement errors. The term *s* relates the pre-recruit catchability to the full-recruit catchability expressed as the ratio of q_r/q_n (Conser 1994).

$$s = q_r/q_n \quad (4)$$

Annual exploitation rates μ were calculated as

$$\mu_y = {C_y}\Big/{(R+N)_y} \quad (5)$$

Instantaneous fishing mortality rates *F* were calculated from relationships between μ, instantaneous total mortality rate *Z*, and annual mortality rate *A*.

$$Z_{y+1} = \ln\left(\frac{(R_y+N_y)}{N_{y+1}}\right) \quad (6)$$

$$A_y = 1 - e^{-Z_y} \quad (7)$$

$$F_y = \mu_y \frac{Z_y}{A_y} \quad (8)$$

Parameters are estimated by minimizing the objective function, which is the sum of the likelihood components for each data source. Each likelihood component consists of

$$L_i = k_i + \frac{1}{2}\sum_{y\in i}\left(\left(\ln O_{i,y} - \ln P_{i,y}\right)^2 / cv_{i,y}\right) \quad (9)$$

where *O* and *P* are observed and predicted values of the indices of abundance for each survey *i*. Constants *k* were ignored to simplify the equations. Empirical survey *cv* (coefficient of variations) were used for each year of the index *i,y*. Likelihood weightings λ were employed to best use available horseshoe crab data sources.

6.1.3 Model Configuration

The unit stock being modeled in the CMSA was the Delaware Bay horseshoe crab population, and male and female horseshoe crabs were modeled separately. The region, for purposes of defining the boundaries of this unit stock, included states from New Jersey to Virginia. All horseshoe crabs found in Delaware Bay and ocean waters of New Jersey and Delaware are considered part of the Delaware Bay stock. A significant proportion of horseshoe crabs found in ocean areas of Maryland and Virginia also belong to this unit stock. After a review of genetics and tagging work, the DBETC and ARM subcommittee concluded that 45% and 20% of horseshoe crabs found in the ocean areas of Maryland and Virginia are likely of Delaware Bay origin, as necessary to determine quota allocations across the region (ASMFC 2012). This assessment operated under this allocation arrangement for purposes of defining the unit stock and its harvest removals from within this region.

A one-year model time step based on the January to December calendar year was used. All model parameters were estimated in the log scale.

The CMSA model was implemented in ADMB version 12.0. Log-scale standard deviations of parameters and derived values were generated in ADMB as described in Fournier et al. (2012).

Three fishery-independent surveys provided information about Delaware Bay adult abundance: the Virginia Tech, Delaware Fish and Wildlife Adult Trawl, and New Jersey Ocean Trawl Surveys. Stage-specific, swept-area abundance estimates of primiparous and multiparous females and males from the Virginia Tech survey (Bi et al. 2020) were used as pre-recruit (*R*) and full-recruit (*N*) indices. Virginia Tech swept-area estimates were based on mean crab densities (assuming a lognormal delta-distribution) expanded to the Delaware Bay survey area, 5,127 km^2. The ratio *s* was set to unity, given no evidence to support differences in catchability between stages of similar size and, ostensibly, distribution. Since Virginia Tech collections occur in October, these indices were lagged forward to represent *N* and *R* at the start of the ensuing calendar year (January). The survey did not operate from 2012 to 2015 due to funding limitations leading to a gap in the middle of the time series. Therefore, two aggregate stage (*R*+*N*) indices were constructed from the Delaware and New Jersey trawl surveys, since mature animals were not specifically categorized as primiparous or multiparous in the field. Aggregate stage indices were based on spring trawl collections and were assumed to reflect abundance at the start of the model time-step. As was done in the peer-reviewed 2019 benchmark assessment, these two additional surveys were used for the full time series of the model as indices of relative horseshoe crab abundance, not just as "gap fillers" for the missing years of the VA Tech Trawl data. Empirical annual survey CVs were incorporated into the modeling framework.

Three sources of harvest were included in the CMSA model: i) commercial bait landings; ii) commercial dead discard estimates; and iii) biomedical mortalities. All harvest data were partitioned to only adult horseshoe crabs of Delaware Bay origin by sex. Discard data were unavailable for 2003, so it was assumed that discard mortalities equaled the 5-year average value estimated in 2004-2008. The biomedical data in this report represents the coastwide data for the purposes of model development since the regional data is confidential. Delaware Bay-specific biomedical data will be used in the ARM model to determine the harvest in the region if the model is approved for management use.

Instantaneous natural mortality rate (*M*) on adult females was assumed to be *M*=0.3 (Section 2.1.4), which was higher than the 2019 stock assessment where *M*=0.274. *M* was assumed constant across years and equal for primiparous and multiparous crabs since both stages will experience spawning-related mortality, the primary source of adult natural mortality. Both sexes used the same *M*, as differences in survival were not significant in the data for males and females.

In the 2019 model, the three surveys were weighted based on estimated process error variances. The peer review panel suggested that the survey weights be removed since the CVs for the surveys also weight the data and it was unclear whether uncertainties were double counted. Sensitivity analyses showed that the results were robust to the configuration of the weights. Following the recommendation of the peer review, the ARM subcommittee removed the survey weights for this model configuration.

All input values can be found in Table 13 for female horseshoe crabs and Table 14 for male horseshoe crabs. Twenty-one parameters were estimated: median primiparous abundance (1);

primiparous abundance for each year (17); catchability coefficients (2) for the Delaware and New Jersey surveys; and multiparous abundance for the start of time series (1), summarized in Table 15.

6.1.4 Results

Base model predictions fit indices well for both female and male horseshoe crabs, with excellent agreement with the primiparous index and well-behaved fits through observed multiparous indices (Figure 21 - Figure 22).

Estimated female and male primiparous abundance was fairly stable through the time series with the exception of the missing years of the Virginia Tech trawl survey (2013-2016; Table 16 - Table 17, Figure 23- Figure 24). Rising multiparous abundance was evident in both sexes and reflects some of the large increases seen in the multiparous trawl indices in later years (Table 16 - Table 17, Figure 23- Figure 24). Fishing mortality rates are very low (average female F=0.018 and average male F=0.024), seemingly reflecting the current period of highly protective fishery restrictions and moratoria (Figure 25).

6.1.5 Sensitivity Runs

Numerous sensitivity runs were explored during the initial development of the CMSA model for horseshoe crabs (ASMFC 2019) to evaluate the effects of assumptions on natural mortality, harvest, survey weights, CVs, catchability (q), and starting values. The base model was highly robust to large variations in starting values of primiparous crabs, multiparous crabs, and q. Model convergence and parameter estimations were unchanged from changes in starting values ranging by more than an order of magnitude.

The configuration of the CMSA for this report remains the same as the 2019 peer-reviewed model with three changes: (1) the survey weights were removed, (2) discard estimates were re-estimated and different values of discard mortality by gear were considered, and (3) a different value of M was used. The survey weights and discard estimate changes were made to address comments made by the peer review panel. Natural mortality was re-estimated from the 2019 benchmark and the revised value was used for this ARM revision. The sensitivity to these changes in the model configuration were evaluated. Similar to the benchmark, the model was robust to the changes explored (Table 18 and Table 19).

6.2 Projection Model

6.2.1 Population Dynamics

The ARM model makes harvest recommendations based on the values of a number of components of the current state of the Delaware Bay ecosystem. Fundamental to the operation of the ARM algorithm and the choice of an optimal harvest policy is the ability to simulate the system state into the future. Because the state of the Delaware Bay system is represented in the ARM model via abundances of horseshoe crabs and red knots, population projection models are required for both species. This is true of both the previous and present ARM model versions.

The previous ARM model used a stage-based horseshoe crab projection model (ASMFC 2009a), which required knowledge of a number of parameters that are difficult to estimate and not regularly monitored. These included survival rates for eggs and juveniles, maturation rates for juveniles, and per capita fecundity (Figure 26). Because egg and juvenile abundances are not monitored, it is not straightforward to update the associated parameters: they are essentially latent.

In contrast, the horseshoe crab projection model used in the revised ARM model derives directly from the Catch Multiple Survey Analysis (CMSA; Section 6.1.2). It includes only two life stages, multiparous and primiparous adults, with the sexes distinguished within each. The resulting model is simpler (Figure 27), and all four population segments are monitored each year. Multiparous abundances in year y + 1 are given by

$$N_{y+1}^{f} = \left(\left(R_y^f + N_y^f\right) \cdot e^{-M^f z} - H_y^f\right) \cdot e^{-M^f(1-z)} \qquad (1)$$

for females (superscript *f*) and

$$N_{y+1}^{m} = \left(\left(R_y^m + N_y^m\right) \cdot e^{-M^m z} - H_y^m\right) \cdot e^{-M^m(1-z)} \qquad (2)$$

for males (superscript *m*), with R_y the abundance of primiparous crabs in year *y*, N_y number of multiparous crabs in year *y*, *M* the instantaneous mortality rate, and *z* the timing of harvest expressed as a proportion of the annual cycle (see Table 20 for parameter values). These expressions exactly mirror Equation 1 of Section 6.1.2, though the notation differs somewhat.

In place of a description of fecundity, survival of eggs, and survival and maturation of juveniles, a simplified recruitment process is used to generate primiparous adults of each sex, each year (Section 6.2.2).

6.2.1.1 Natural Mortality

Whereas the CMSA model uses only the point estimate of female and male horseshoe crab instantaneous natural mortality ($M^f = M^m = 0.3$; Section 6.1.3; D. Smith, USGS, unpublished data), the projection model incorporates uncertainty around that estimate as well. Annually, and separately for each sex, mortality values are drawn from a normal distribution:

$$M_y \sim Norm(\mu^M, \sigma^M) \qquad (3)$$

with $\mu^M = 0.3$ and $\sigma^M = 0.0182799$ (Table 20).

6.2.1.2 Background Harvest

When the horseshoe crab projection model is used as part of the optimization algorithm, bait harvest is determined annually by a harvest model component that takes as input 1) the state

of the system (female and male adult crab abundances; adult red knot abundance), and 2) the harvest policy. Two other kinds of harvest are accounted for in the horseshoe crab simulation model, however: 1) dead commercial discards (mortality from becoming bycatch; Section 3.3), and 2) biomedical mortality (Section 3.2).

For each sex, ranges were found of estimates for the number of crabs killed as commercial discards and by the biomedical fishery in years 2014-2018. The low values from each of the two ranges were then added together, as were the high, to find the range in background mortality from fishing activity not managed by the ASMFC. In the horseshoe crab projection model, this background harvest was drawn each year from a uniform distribution. Separately for each sex

$$H_y^{bg,f} \sim Unif\left(L_{bg}^f, U_{bg}^f\right) \quad (4)$$

$$H_y^{bg,m} \sim Unif\left(L_{bg}^m, U_{bg}^m\right) \quad (5)$$

with L_{bg} the minimum and U_{bg} the maximum observed background harvest value (see Table 20 for values). Total harvest H_t is then found by adding bait harvest to the background harvest.

In the runs of the horseshoe crab projection model described in this report, both as a standalone simulation and as part of the revised ARM model, coastwide estimates for biomedical mortality are used (Section 3.2.2). In generating the optimal harvest policy for final use by ASMFC in setting horseshoe crab harvest limits, confidential estimates specific to Delaware Bay would be used instead (Section 3.2.3).

6.2.2 Horseshoe Crab Recruitment

In the horseshoe crab projection model, primiparous crabs (*R* in Equations 1 and 2) are generated annually by a process that is parameterized directly from CMSA estimates of primiparous abundances. This represents an advance over the horseshoe crab model in the previous ARM version, since parameters of the recruitment process may be updated annually as new CMSA estimates are generated from trawl surveys.

For a given year, the recruitment process includes two main steps:

1) proposed abundances of female and male primiparous abundances are generated from a bivariate lognormal distribution;

2) the number of spawning females whose eggs were fertilized (N^e) in years y-10 and y-9 are checked: if$N_{y-10}^e$is lower than a threshold, the proposed number of female recruits is scaled downward; if $N_{y-9}^e$is lower than the threshold, the proposed number of male recruits is scaled downward.

These steps are explained in detail in the subsequent sections.

6.2.2.1 Proposed Primiparous Abundance

Each year proposed female and male primiparous abundances $\boldsymbol{d_y} = \begin{bmatrix} d_y^f & d_y^m \end{bmatrix}$ are drawn from a bivariate lognormal distribution:

$$ln(\boldsymbol{d}_y) \sim Norm(\boldsymbol{\mu}, \Sigma) \qquad (6)$$

with $\boldsymbol{\mu} = [\mu^f \quad \mu^m]$, the natural log of the mean abundances for females and males, and Σ the variance -covariance matrix:

$$\Sigma = \begin{bmatrix} \sigma_f^2 & \rho\sigma_f\sigma_m \\ \rho\sigma_f\sigma_m & \sigma_m^2 \end{bmatrix} \qquad (7)$$

with σ^f and σ^m standard deviations and ρ the correlation between female and male primiparous abundances. An advantage to using a bivariate distribution, is that the observed correlation between female and male primiparous abundances can be preserved in the projection model. Parameters of this distribution were obtained directly from CMSA estimates, in the following way.

For the purpose of parameterizing the recruitment distribution described above, estimates of primiparous abundances beginning in 2013 were chosen. Visual inspection of the CMSA time series (Figure 23 and Figure 24) suggests a qualitative shift in the population trajectory beginning around 2013, and it was thought that including all years in the time series might lead to an underestimate of the potential for recruitment in the future. The latest CMSA estimates available for analyses in this report are from 2019.

The strategy for developing the recruitment distribution comprised these steps: 1) find the parameters of lognormal distributions corresponding to the point estimates and 95% confidence intervals of female and male primiparous abundances in each year in 2013-2019; 2) draw a large number of samples from each of these fourteen distributions (seven years by two sexes); 3) arrange the samples in a two-column matrix, one of female values, the other male, making sure each row is from the same year; 4) fit a bivariate lognormal distribution to the samples via maximum likelihood.

For each year in the period 2013-2019 and for each sex, a mean and standard deviation was required for each of 14 normal distributions describing logarithms of primiparous abundances. This was complicated significantly by the gap in the time series of the Virginia Tech trawl survey (Section 4.4), because the estimates of primparous abundances during 2013-2016 are quite uncertain and unstable (top panels in Figure 23 and Figure 24). This instability is a consequence of the CMSA model structure, and of the fact that the Virginia Tech trawl is the only one of the three trawl surveys used in the CMSA that provides counts of primiparous crabs.

However, it was thought that when taken together, the average of the estimates of the mean primiparous abundance would be a reliable expression of the recruitment required to yield the adult abundances observed following the VA Tech gap, in 2017-2019. The justification for this position lay in the structure of the CMSA, and the fact that its estimates represent a balance

between observed counts and the population dynamics codified in the CMSA. So, separately for females and males, the average of the point estimates of primparous abundance was taken over 2013-2016 to represent the mean abundance for each of those years.

The confidence intervals for primiparous abundance over 2013-2016 were deemed unusable. To generate standard deviations over this period, the ARM workgroup reasoned that the coefficient of variation (CV) ought to remain fairly stable over the entire CMSA time series, 2003-2019. Therefore, the VA Tech gap years 2013-2016 were excluded and standard deviations for all remaining years were found; then the mean CV over those years was determined, separately for females and males. Then the average means described previously were used as well as the mean CVs to calculate a standard deviation to use in each year in 2013-2016. The method used to find standard deviations 'directly' for years 2003-2012 and 2017-2019 is described next.

To approximate standard deviations of normal distributions that when exponentiated would correspond to means and confidence intervals output by the CMSA, the natural logarithm of the mean and confidence limits was found. The confidence limits were treated as quantiles of a normal distribution. On the log scale, the appropriate standard deviation was found by taking the mean difference between each confidence limit and the mean, and dividing this value by the quantile of a standard normal distribution corresponding to a probability of 0.975 (approximately 1.96).

Having thus found means and standard deviations for the desired normal distributions (generating logarithms of primiparous abundances) - indirectly for years 2013-2016 and directly for 2017-2019 - 10,000 random deviates were drawn from each of them. These were arranged in a two-column matrix, with female values in one column and male in the other. Each row was drawn from distributions representing the same year, preserving any correlation present in the time series.

Then maximum likelihood was used to fit a bivariate normal distribution to the samples. The mean and variance of male primiparous abundances is estimated to be considerably higher than those of females; and the correlation is moderately positive (Table 20).

6.2.2.2 Stock-Recruitment Relationship

For a given year y, the primiparous abundances d_t generated by the recruitment distribution (Equation 6) are considered realistic provided that the number of fertilized eggs was sufficiently high in the year of the cohort hatched. As a proxy for the number of fertilized eggs, a value the ARM workgroup named the effective number of spawning females, N^e, was used. If N^e is below a threshold, the values d_y are scaled downward.

Because the time steps in the projection model do not correspond to calendar years, but rather begin October 1, both primiparous and multiparous crabs observed in year y will breed in year y. The effective number of spawning females in year *y* is the product of the number of adult females (that is, the number of primiparous plus the number of multiparous) and a fertility factor, f. If $S_y^f = R_y^f + N_y^f$ is the total number of spawning females and $S_y^m = R_y^m + N_y^m$ is the total number of spawning males, then

$$N_y^e = f_y S_y^f , \quad (8)$$

with fertility dependent on the sex ratio in year *y*:

$$f_y = \min\left(1, \frac{2S_y^m}{S_y^f + S_y^m}\right) \quad (9)$$

Expected maturation time to the primiparous stage is ten years for female crabs; nine years for males (Section 2.1.2). The scalars to be used in adjusting the number of recruits in year y are $s_y = [S_{y-10} \quad S_{y-9}]$, with each element of the vector defined as

$$s_y = \begin{cases} 1, & \text{if} N_y^e \geq N^*, \\ N_y^e / N^*, & \text{if} N_y^e < N^* . \end{cases} \quad (10)$$

The threshold value N^* was chosen to be 3,750,000. This value was chosen as the point at which recruitment would decline because it was approximately the lowest number of total females estimated by the CMSA during the time series (3.9 million in 2006) and harvest restrictions had been in place for several years prior to this time. The scalars s_y thus follow a 'broken-stick' curve (Figure 28).

Finally, the proposed recruitment values d_y are scaled by s_y to obtain the number of recruits (i.e., primiparous crabs) $\boldsymbol{R}_y = [R_y^f \quad R_y^m]$:

$$\boldsymbol{R}_y = \boldsymbol{d}_y \circ \boldsymbol{s}_y , \quad (11)$$

where '○' indicates elementwise multiplication.

The recruitment process governing primiparous abundances in year y thus incorporates stock-recruitment information for two different cohorts, one from year *y*-9 (for males) and one from year y-10 (females). It is important to note, however, that although the males and females maturing to primiparous stage in year y were hatched in different years, they were subject to the same conditions in subsequent years. The specification of a covariance in the bivariate recruitment distribution (Equations 6 and 7) accounts for this shared history.

However, it is also worth noting that some of the observed correlation in estimates of primiparous abundances produced by the CMSA may be due to annual variation in sampling efficiency. The survey methods and analysis approach currently in use do not allow estimation

of and correction for detection probability (or availability). It is not currently possible, then, to determine how much of the observed correlation between male and female abundances is due to shared variation in annual survival probabilities, and how much is an artifact of annually varying detection probability or availability (see Research Recommendations, Section 10).

Although it will not address heterogeneity in detection probability, consistent monitoring via trawl surveys and estimation with the CMSA model will allow rapid learning about the recruitment process. At present, only seven years of CMSA estimates are used to inform recruitment, and four of those are quite uncertain because of the absence of the Virginia Tech trawl survey data in that period. Each additional year of data will add considerably to the understanding of horseshoe crab recruitment, provided the Virginia Tech trawl data are available. Without the Virginia Tech trawl and the ability to reliably estimate primiparous abundances, knowledge of the horseshoe crab recruitment process will not advance (see Research Recommendations, Section 10).

Finally, the ARM workgroup acknowledges that the transition from a more mechanistic horseshoe crab projection model in the previous ARM version, to one that does not attempt to explain changes in abundance in terms of precise demographic stages may seem counterintuitive. However, a more mechanistic model requires more data about more life stages; and the only stages that have been consistently monitored in Delaware Bay are primiparous and multiparous adults. Use of a model that relies only on those segments of the population that are regularly observed allows for constant refinement of its parameters at no additional cost.

6.2.3 Projection Model Results and Sensitivity

Summaries of a number of applications of the new horseshoe crab projection model are provided primarily in graphical form. For each scenario considered, 5,000 simulations of the model were run and the median and 2.5th and 97.5th quantiles were reported. First, the sensitivity of the model to different levels of harvest will be discussed, then to changes in parameters of the recruitment process.

6.2.3.1 Effect of harvest on long-run horseshoe crab abundance

A comparison of simulations with zero harvest (Figure 29), against a set that experiences background harvest levels (that is, mortality from biomedical use and bycatch) shows a modest reduction in the long-run equilibrium abundances (Figure 30): about 50,000 fewer females expected in year 100 (a 0.38% reduction); 80,000 fewer males (a 0.22% reduction).

The maximum harvest allowed under the previous ARM Framework was 210,000 females per year and 500,000 males (ASMFC 2009a). The expected long-run equilibrium abundance under this maximum harvest scenario (Figure 31) is somewhat lower than the background harvest scenario (Figure 30): 0.74 million (5.6%) fewer females, 1.8 million (5.1%) fewer males. Even under this maximum harvest scenario, however, the population is still predicted to increase and then stabilize after about ten years from the present.

Under a much higher harvest scenario of 2 million females and 2 million males annually (Figure 32), the population trajectory is considerably more affected over the projection period,

showing reductions from recent abundances almost immediately. The expected female abundance in projection year 100 is reduced relative to the maximum ARM harvest (Figure 31) by 7.08 million (57%); expected male abundance is reduced by 8.13 million (24%).

6.2.3.2 Sensitivity to recruitment parameters

Because relatively few years of CMSA estimates inform the recruitment process in the horseshoe crab projection model, the possibility that the mean primiparous abundances estimated from this period are too high was considered and that the estimates will be reduced as more years of CMSA estimates become available. To understand the sensitivity of the projection model to reduced values of the female ($\exp(\mu^f) = 3.11 \times 10^6$) and male ($\exp(\mu^m) = 6.90 \times 10^6$) nominal means $\boldsymbol{\mu}$ used in the recruitment distribution (which generates the logarithm of primiparous abundances; Equation 6), the workgroup ran 5,000 simulations at each of a number of reduced values of $\boldsymbol{\mu}$. The expected HSC abundances 100 years in the future (Figure 33) appear quite sensitive to changes in the median of the lognormal recruitment distribution, $\exp(\boldsymbol{\mu})$. Both sexes show a similar pattern, with a generally linear reduction in the long-run abundance with reduced values of $\exp(\boldsymbol{\mu})$, but then a steep dropoff to zero beginning at some threshold value between 35-40% of the nominal value of $\exp(\boldsymbol{\mu})$.

6.2.3.3 Sensitivity to recruitment and harvest

If recruitment is indeed lower than the estimates made here or estimates become lower as more years of CMSA become available, the effect of harvest on horseshoe crab abundance could in turn be affected. To assess this possibility, the projection model was run across a range of harvest values, at three levels of mean recruitment values, $\exp(\boldsymbol{\mu})$:

1) its nominal value (Table 20),

$\exp(\boldsymbol{\mu}) = \exp([\mu^f \; \mu^m]) = \exp([14.95 \; 15.75]) = [3.11 \; 6.90] \times 10^6$ (Figure 34 and Figure 35);

2) a 5% reduction, $\exp(\boldsymbol{\mu}) \times 0.95 = [2.95 \; 6.55] \times 10^6$ (Figure 36 and Figure 37);

3) a 10% reduction, $\exp(\boldsymbol{\mu}) \times 0.90 = [2.80 \; 6.21] \times 10^6$ (Figure 38 and Figure 39).

Looking across expected long-run female abundances (Figure 34, Figure 36, Figure 38) reduction in expected recruitment can be seen to induce increased sensitivity of the population to harvest; the same pattern is apparent for males (Figure 35, Figure 37, Figure 39). The complex pattern to the right side of the male abundance plots results from the effect of the sex ratio, through the fertility factor (Equation 9).

7 RED KNOT POPULATION MODEL

7.1 Multi-State Framework

7.1.1 Model Background and Description

This section describes this Revision's attempt to replicate the analyses of ASMFC (2009a) and McGowan et al. (2011a). The approach of ASMFC (2009a) and McGowan et al. (2011a) was followed to develop mark-recapture models in a multistate open robust design and to address the ARM revision's TORs.

The purpose of these models is to estimate annual survival of red knots that stop at Delaware Bay based on their body mass at departure and to estimate the probability of gaining weight during stopover. Because of the hypothesized relationship between female horseshoe crab abundance and mass gain of red knots (Niles et al. 2008), the survival modeling provides a direct link between red knot population dynamics and female horseshoe crab abundance. The approach used here expanded on existing methods of open robust design (Kendall et al. 1997; Kendall and Bjorkland 2001) and multistate survival analyses (Nichols and Kendall 1995) and incorporated both mark-recapture data and mark-resighting data to estimate mass-specific survival probabilities and the probability of gaining weight during stopover. The resighting data do not have any information on an individual's body mass at the time of observation; however, this assessment developed models to take advantage of the substantial resighting dataset, which greatly improves precision of survival estimates. This analysis represents an effort to quantify the relationship between red knot demography (annual survival) to horseshoe crab abundance through weight gain at Delaware Bay.

Two body mass classes (states) were established for knots at the bay: < 180 g and ≥ 180 g. The stopover season was divided into three secondary periods for the robust design: 1–19 May, 20–25 May, and 26 May–5 June (Figure 40), the same time windows used in the original analysis. Most of the information required by the state transition analysis (e.g., weight gain) is provided by individuals that were caught and weighed more than once. Birds that were weighed in two different secondary periods within a single season were especially useful in informing the models of state transition dynamics. The secondary periods for the robust design were created to maximize the number of within season recaptures to improve precision of parameter estimates. Approximately one third of all captures between 1997 and 2019 occurred in each of the three sampling periods.

In the analysis, birds could enter or depart the study area (Delaware Bay) during any of the three periods in either mass state. Once at Delaware Bay, the birds could transition between periods from either mass state to the other mass state or remain in the same mass state. In each period, birds could be 1) physically captured, weighed, and assigned to a mass state, 2) observed in the field, in which case its mass state is unknown, or 3) both physically captured and observed in the field in the same period. For each secondary period in the stopover season, there were two pieces of data that were represented in the individual encounter histories: captured or not (with mass state for captures) and observed in the field or not (Figure 41).

Example encounter histories for four years of data collection are provided in Figure 41. The data are grouped into three doublets in each year to represent the three secondary encounter periods. In each encounter history (row), "A" indicates that the bird was captured below the 180 g threshold (light), "B" indicates that the bird was captured above the 180 g threshold (heavy), and "1" indicates that a bird was observed in the field. A "0" in the first column of a doublet for any secondary period indicates the bird was not captured whereas a "0" in the second column of a doublet indicates that the bird was not observed in the field.

With these data and the multistate open robust design analysis, several parameters were estimated that were associated with the ecological and sampling processes that generated the data (Figure 40): arrival probability (β), departure probability (δ), capture probability (p),

resight probability (r), transition probability (ψ), and annual survival probability (S). Survival probability was assumed to approach 1 during the stopover period but otherwise possible state-dependence, period-dependence, and/or year-dependence for all other parameters had potential to be evaluated. Time-specific environmental covariates (e.g., annual snow cover in the arctic) were also used to examine relationships between the environment and red knot demography.

Following ASMFC (2009a) and McGowan et al. (2011a), the ARM workgroup developed a set of candidate models and evaluated their support from the data using an information-theoretic approach (Burnham and Anderson 2002). The candidate model set included models that described the potential relationships between horseshoe crab populations, red knot mass increase during stopover, and red knot annual survival. The candidate models focused on evaluating three research hypotheses: 1) heavy birds have a higher probability of annual survival than light birds, 2) arctic weather conditions upon arrival influence red knot annual survival, with lower survival rates predicted for years of high snow cover, and 3) horseshoe crab spawning abundance positively affects red knot mass transition probabilities during the stopover at Delaware Bay.

To develop the set of candidate models, a sequential approach to model building was used. Initially, the best model structure was determined for parameters associated with the sampling process (capture and resighting probabilities probabilities) and ecological parameters not under direct investigation (arrival and departure probabilities). Various combinations of state-, time-, and period-dependency for these parameters were compared while keeping other parameters as general as possible (year-specific survival probabilities and period-specific mass transition probabilities constant across years). This initial phase of model building indicated that the best model for capture probabilities was mass state and year dependent (i.e., capture probabilities varied across years and between mass states independently [year × state]). Adding period dependency (additive or interaction) to the capture probabilities produced models that appeared to fit the data well, but that produced unrealistic parameter estimates in many cases. The best model structure for resight probabilities included year, state, and period interactions (year × state × period). Resighting probabilities before 2003 were set to zero since field-readable bands were not used prior to that season. Having identified the best model structure for the parameters associated with the sampling process, multiple models about the ecological parameters of interest were then evaluated, each with the same structure for the sampling process parameters.

To investigate the research hypotheses regarding adult annual survival, models were included that allowed survival to vary with mass state and snow cover (additive and interaction terms), as well as models with no structure on survival (null models). Morrison (2006) and Morrison et al. (2007) reported that the arrival condition in the arctic was a key predictor of survival of European red knots (subspecies *islandica*) breeding on Ellesmere Island, Canada. They concluded that birds leaving the stopover sites in Iceland at low weights had higher mortality after arriving on the breeding grounds if there was extensive snow cover on the ground. Those same effects may hold true for *rufa* red knots that stop at Delaware Bay. It was hypothesized here that the effects of poor departure condition would be exacerbated by snow cover on the breeding grounds and expected to see low survival of light birds in years of high snow cover.

Any relationship between survival of heavy birds and Arctic snow cover were not expected. Arctic snow cover was estimated following the methods described by MacDonald (2020). In brief, daily mean snow cover data from 1997-2019 at 32-km resolution were obtained from the National Centers for Environmental Protection's North American Regional Reanalysis (NARR) dataset (Mesinger et al. 2006). The data were filtered to only the area considered to be the preferred red knot breeding habitat (MacDonald 2020; Smith and Rausch 2013) during 15-30 June of each year (considered peak nest initiation period; MacDonald 2020; Niles et al. 2008). For each year, the overall mean percent snow cover in each grid cell was calculated.

To examine the research hypothesis regarding state transition probabilities, these transitions were modeled as a function of female horseshoe crab abundance and stopover period (additive and interaction terms), as well as with null models (no covariates or temporal structure). Horseshoe crab population estimates from the Catch Multiple Survey Model (Section 6.1) and estimates from the spawning survey of the proportion of the horseshoe crab population spawning in May each year (Section 4.3) were used. Four models were created with these two predictors: two models using each of the predictors as main effects alone, one with an additive combination, and one with the interaction (horseshoe crab abundance × proportion spawning in May). Models were also compared that restricted the covariate structure on transitions from heavy to light because the dataset included very few within-season transitions from heavy to light mass state; similarly, there were few "transitions" from heavy to heavy. Because of this paucity of data, heavy to light transitions as a function of horseshoe crab abundance were not modeled.

The models of adult annual survival and mass state transitions describe above were compiled in a candidate model set and an AIC information theoretic approach was used to compare the fit of candidate models to the data from 1997–2019 (Burnham and Anderson 2002).

7.1.2 Results and Discussion

The model with the most support based on AIC (Table 21, Model 1) was one in which annual survival was a function of mass state and year (additive main effects); transitions between mass states (both light-to-heavy and heavy-to-light transitions) were a function of horseshoe crab abundance, proportion spawning in May, and stopover period (three-way interactions; Table 21).

Model 2 was similar: annual survival was again a function of mass state and year (Table 21). With respect to the transition probabilities, however, the effects of horseshoe crab abundance and May spawning proportion were additive in Model 2, rather than interactive as in Model 1. Furthermore, the strength of these additive effects was not the same in each stopover period, as indicated by the interaction with period (Table 21). Model 3 was similar to Model 1 except that transitions from heavy-to-light state were a function of only stopover period, unrelated to horseshoe crab abundance. Models 2 and 3 were not competitive with Model 1, however. Model 2 was 80.9 AIC units from Model 1 (Table 21).

The measure of Arctic snow cover used was not a good predictor of annual survival in this analysis. A model with additive effects of snow cover and mass state (S[state + snow]) was 729 AIC units below the most-supported model. Models that allowed annual survival to vary as a

function of snow cover alone (*S*[snow]) received even less support from the data; models with this structure were at least 941 AIC units below model 1.

As noted above, Models 2 and 3 were not competitive and therefore the ARM workgroup focused on the parameter estimates of Model 1 (Table 21). Furthermore, the parameter estimates for the transitions between light and heavy states in this model were focused on given the importance of hypotheses related to mass gain during stopover for decision making and harvest management constrained by red knot conservation at Delaware Bay. In model 1, the transitions between mass states varied with horseshoe crab abundance and proportion of the population spawning in May and the interaction of these predictors.

The parameter estimates for the transitions between stopover (secondary) periods are shown in Table 22. Transition 1 occurs between 19 and 20 May, whereas transition 2 occurs between 25 and 26 May. For transition 1, the parameter estimates in the interaction model indicate little relationship between the probability of gaining weight and horseshoe crab abundance and the proportion spawning in May. For transition 2, the parameter estimates indicate an inverse relationship between the probability of gaining weight and horseshoe crab abundance and the proportion spawning in May (Table 22).

These counterintuitive results are not consistent with the ARM workgroup's hypotheses and predictions about the effects of horseshoe crab abundance on refueling performance of red knots during stopover at Delaware Bay. Furthermore, these results are inconsistent with the results of ASMFC (2009a) and McGowan et al. (2011a). McGowan et al. (2011a) found that the light-to-heavy transition probability between periods 2 and 3 (i.e., transition 2) had a strong positive relationship with the number of horseshoe crabs that spawned in May. These results show the opposite; as the number of horseshoe crabs spawning in May increased, the probability of transition from light to heavy decreased (Table 22). In addition, there was a large discrepancy in the magnitude of the estimated probability of gaining weight during stopover (ψ^{LH}) of McGowan et al. (2011a) and these results. McGowan et al. (2011a) showed that the probability of gaining weight (ψ^{LH}) was ≥ 0.75 at transition 1 and ranged from approximately 0.35 to 0.65 at transition 2, depending on horseshoe crab abundance. The estimates in this report of the probability of gaining weight (ψ^{LH}) were never > 0.3 and in most cases were < 0.2, which is not consistent with empirical observations.

Despite following the modeling and estimation framework of McGowan et al. (2011a) and having more data available for this analysis, the attempt to essentially replicate the previous approach and update the understanding of the relationships between red knots and horseshoe crabs at Delaware Bay was not successful. The results were not only counter-intuitive but also inconsistent with McGowan et al. (2011a) and the ARM workgroup's predictions. Furthermore, there was evidence that the analysis was relatively unstable and sensitive to the starting values provided. Whereas the multistate open robust design has many advantages for modeling and estimation at stopover areas, it may be that some aspects of this framework were problematic. For example, the 180 g threshold to distinguish light and heavy birds does not provide the flexibility to model the effects of horseshoe crab abundance on body mass as a continuous variable. McGowan et al. (2011a) chose the 180 g threshold based on the results of Baker et al. (2004) and Niles et al. (2008). It may be that a different mass threshold, or multiple thresholds

resulting in multiple mass classes, may provide more flexibility and more reliable results. Similarly, the delineations of the secondary periods for the robust design are another type of inflexible threshold that may have complicated the modeling and estimation. The secondary periods are somewhat arbitrary and of unequal duration (e.g., 1–19 vs. 20–25 May) for reasons described above. In the open robust design used here, these date thresholds are used across years and do not allow for annual variation in migration timing, which may limit the usefulness of the multistate robust design in this case. Given the counterintuitive nature of these results, the parameter estimates are not useful for revisions to the adaptive harvest management framework for horseshoe crabs and red knot conservation at Delaware Bay. Therefore, the ARM workgroup chose to replace the multistate open robust design framework with an integrated population modeling framework.

7.2 Integrated Population Model (IPM)

7.2.1 Background

Integrated population models (IPMs) are a statistical method for combining multiple data sources for a fuller picture of population dynamics (Besbeas et al. 2002; Schaub and Abadi 2011). IPMs lend themselves to full annual cycle applications because they are anchored on a description of the life cycle of the species, usually via a population matrix model (Caswell 2001). A key benefit of IPMs is the ability to estimate latent demographic rates, i.e., parameters of interest for which little or no data exists (Abadi et al. 2010; Schaub and Abadi 2011). For red knot in Delaware Bay, there is little information about annual recruitment rate of new adults into the breeding population. This demographic rate is difficult to estimate due to challenges of monitoring breeding success in the Arctic as well as juvenile survival during the nonbreeding season. By combining an analysis of the mark-recapture data to inform adult survival estimates with an analysis of count data to inform changes in population size, recruitment rate for this population can be inferred.

Migratory stopover sites play a critical role in the annual cycle of long-distance migrants (Alerstam 2011; Newton 2004) and are the focus of many monitoring programs. However, analysis of mark-recapture data from stopover sites is complicated by the highly mobile nature of the population, with individuals passing through the site at rates that can vary among individuals, throughout the season, or among years (Tucker et al. 2021). An IPM was developed for this assessment that accounts for interannual variation using an open robust design mark-recapture model (Kendall and Bjorkland 2001; Kendall et al. 2019), which simultaneously estimates annual variation in survival and dynamics of site use. This modeling framework uses monitoring data from a single site to infer full annual cycle population dynamics.

7.2.2 Model Description

The IPM consists of three submodels analyzed simultaneously. The mark-recapture data were analyzed using an open robust design model (Tucker et al. 2021) to estimate apparent annual survival probability as well as parameters related to the within-season processes of arrival and persistence at the site (described in detail below). The count data were analyzed using a state space model to estimate the change in population size between years while accounting for

counting error. The matrix projection model links these two analyses by describing the underlying processes of survival and recruitment that contribute to the changes in population size among years. A conceptual diagram of the IPM is provided in Figure 42.

7.2.2.1 Matrix Projection Model

The life cycle model was based on a two-stage matrix model in which the number of juveniles (superscript *J*) and adults (superscript *A*) alive in the spring of year *y+1* depends on the number of individuals of each age class in the previous year (N_y^J and N_y^A), the annual survival for each age class (ϕ_y^J and ϕ_y^A), and fecundity (f_y). This model was developed to consider a spring stopover site (i.e., a pre-breeding census), and therefore the fecundity parameter is the product of the average number of offspring produced per breeding adult and winter survival of first-year birds.

$$\begin{bmatrix} N_{y+1}^J \\ N_{y+1}^A \end{bmatrix} = \begin{bmatrix} 0 & f_y \\ \phi_y^J & \phi_y^A \end{bmatrix} * \begin{bmatrix} N_y^J \\ N_y^A \end{bmatrix}$$

For red knot, individuals do not reproduce or undergo spring migration until their second spring, and therefore only animals in the adult age class are observable. A recruitment parameter ρ_y was estimated as the product of fecundity and juvenile survival:

$$\rho_y = f_y * \phi_{y+1}^J$$

For a system in which juveniles migrate in their first year and are distinguishable from adults, juvenile survival and fecundity could be estimated separately. This recruitment rate operates on a two-year lag; the expected number of new recruits in year *y* (i.e., individuals migrating north to breed for the first time, denoted with superscript *R*) is equal to the total number of adults in the population in year *y-2* times the recruitment rate from that year ($N_y = N_y^A + N_y^R, N_y^R = N_{y-2}\rho_{y-2}$). The expected number of returning adults in year *y* is equal to the total number of adults in year *y-1* multiplied by the annual survival probability ($N_y^A = N_{y-1}\phi_{y-1}$). To account for demographic stochasticity and other unmeasured variation in realized survival and recruitment, the true number of new recruits was drawn from a Poisson distribution around the expected value. To constrain the number of new recruits within reasonable bounds, a maximum possible number of recruits ($maxR_y$) was calculated and this value was used to truncate the Poisson distribution.

$$N_y^R \sim Poisson\left(N_{y-2} * \rho_{y-2}\right) T\left(0, maxR_y\right)$$

$$maxR_y = N_{y-2} * 2$$

The use of this maximum value is based on the assumption that recruitment is due solely to the birth of new birds, not immigration to the flyway population, and observations that the maximum clutch size for red knot is four eggs (Baker et al. 2001). If all adults in the population paired and produced a four-egg clutch, all four eggs hatched, and all four chicks survived their first winter and first full year, the number of new recruits would be equal to $maxR_y$. Given the threats to breeding success, chick survival, and first-year survival, this maximum value is unlikely to be realized and therefore the ARM workgroup thought it is reasonable and not

overly constraining. It is useful for ensuring that estimates for recruitment stay within reasonable bounds.

The true number of surviving adults was drawn from a binomial distribution with number of trials set as the number of individuals alive at year y-1 and the probability equal to the adult annual survival probability.

$$N_y^A \sim Binomial(N_{y-1}, \phi_{y-1})$$

7.2.2.2 Open Robust Design Model for Mark-Recapture Data

During migratory stopover, there is a high rate of turnover of individuals and it cannot be assumed that the entire passage population is present on any given day. Additionally, temporary emigration (skipping the stopover site) could make some individuals unavailable in some years. To account for these dynamics, temporary emigration and the entry and departure of individuals from the stopover site within a year was explicitly modeled using an open robust design model (ORD). This model is described in detail by Tucker et al. (2021). Under this model, primary sampling occasions (years, denoted *y*) are divided into secondary sampling occasions (3-day periods, denoted *t*). It was assumed that individuals can arrive and depart only once within a year, but that those arrivals and departures can occur during any secondary sampling occasion.

The ORD model consists of three likelihoods. The first (L1) describes the process of re-encountering individuals across years, which is conditioned on the number of individuals released in each year and depends on the annual probabilities of survival (ϕ_y), temporary emigration (γ^{II} and γ^{OI}), and detection (p_y^*). Two temporary emigration parameters were estimated: γ^{II} is the probability of being present at the site in year *y* if present in year *y-1* and γ^{OI} is the probability of presence if absent in year *y-1*. The second likelihood (L2) describes the process of encountering individuals for the first time in secondary period *t* of year *j*. It also conditions on the total number of individuals seen in each year and depends on the probabilities of arrival ($\delta_{y,t}$), persistence ($\psi_{y,t}$), detection ($p_{y,t}$), and transience (τ). The probability of remaining at the site for at least two sampling occasions in a given year (τ) was estimated using the age class method described by Giavi et al. (2014) and Rushing et al. (2017). The third likelihood (L3) describes the process of re-encountering individuals during secondary occasions of each year. It conditions on the total number of individuals encountered in occasion *t* of year *y* and depends on the year- and period-specific probabilities of persistence ($\psi_{y,t}$), detection ($p_{y,t}$), and transience (τ). A previous analysis of the mark-resight data indicated very little annual variation in temporary emigration or transience (Tucker et al. 2021), so to reduce the total number of parameters in the IPM those probabilities were estimated as constant across time. All within-season parameters (arrival, persistence, detection) could vary among periods and years.

For the primary period likelihood (L1), capture histories of birds first captured and marked in Delaware and all subsequent resightings were pooled; the first capture in these cases was physical capture and all subsequent encounters were resightings in the field. To estimate within-year processes (secondary period likelihoods L2 and L3), only resightings of individuals after the year of first capture were used, since birds are unobservable via resighting before first

capture (before they are marked with a field-readable tag). Therefore, within-year dynamics were not estimable for the first year of monitoring (2005).

For most years of the monitoring program, only one color of plastic leg flag was used to mark red knot (lime green with black characters), but beginning in 2014 a new type of flag was deployed: dark green with white characters (Figure 43). Anecdotal reports from field observers suggested that the dark green flags might be more difficult to resight than lime flags. To account for potential differences in detection probability between birds marked with these two colors, observations were split based on flag color and summarized in two separate m-arrays for years 2015-2018. Different detection probabilities were allowed for each set of observations to estimate the effect of flag color on resighting probability.

$$logit(p_{y,t}) = \mu^p + \beta_G * DG + \varepsilon^p_{y,t}$$

$$\varepsilon^p_{y,t} \sim Normal(0, \sigma^2_p)$$

Here, μ^p is the average resighting probability for lime flags, β_G is the effect of dark green flag color on resighting probability, $DG = 1$ for dark green flags and 0 for lime flags, and $\varepsilon^p_{y,t}$ is the random year- and period-specific variation in resighting probability.

From the parameters described above, an estimate of the flyway population-wide probability of being present at the stopover site in each secondary occasion of each year was derived. Here, the flyway-wide population is all red knot that used Delaware Bay at least once. This parameter depends on the temporary emigration probabilities (γ^{II} and γ^{OI}), transience probability (τ), year- and period-specific entry probabilities ($\delta_{y,t}$), and year- and period-specific stopover persistence probabilities ($\psi_{y,t}$). The probability of being present in secondary period *t* given that an individual is available and using the site to refuel (i.e., a "resident") in year *y* is denoted a_{yt} and is a function of the probabilities of entry and persistence in that year. This value is calculated by summing the arrival and persistence probabilities across the stopover period to determine the cumulative probability of either arriving just before a given period, or arriving previously and remaining in the study area.

$$a_{y,t} = \begin{cases} t = 1 & \delta_{y,1} \\ t > 1 & \delta_{y,t} + a_{y,t-1}\psi_{y,t-1} \end{cases}$$

To account for transients that do not remain after the first occasion, the stopover residency probability is included for each period before the current period *t*. The probability of being present in occasion *t* for individuals using the site in year *y* is therefore calculated as:

$$z_{y,t} = \tau(a_{y,t} - \delta_{y,t}) + \delta_{y,t}$$

In each year, the probability of being available in year *y* is the sum of the probabilities of being present given that an individual was unavailable (γ^{OI}) or available (γ^{II}) in the previous year. The probability of being present in secondary occasion *t* of year *y* for all birds in the flyway population is therefore:

$$\pi_{y,t} = \gamma^{II} z_{y,t} + \gamma^{OI} z_{y,t}$$

Only data from birds first captured and marked in Delaware Bay were included in this analysis, for a total 179,785 resightings of 12,134 individual birds.

7.2.2.3 State Space Model for Counts

Each year aerial surveys are conducted in Delaware Bay to count the number of each species of shorebird present (see Section 5.2). Surveys typically occur in late May to capture the peak of spring migration, but timing varies among years due to weather conditions and other logistical constraints. In 2009 the survey flight path was expanded to include some areas not previously sampled (Dey et al. 2011). For this analysis, the peak count from each year was used to estimate an index of the population size. In most years this count was from the aerial survey, but in three years (2009, 2012, 2013) the peak count was from the ground count conducted concurrently with the aerial survey.

The number of birds available to be counted during a given occasion in a given year depends on both the proportion of population present in Delaware Bay at that time and, of those using Delaware Bay, the proportion present on beaches included in the survey. The proportion of the flyway population estimated to be present in Delaware Bay is the parameter $\pi_{y,t}$ from the mark-recapture submodel. An additional parameter, $\omega_{y,t}$, was included to estimate the proportion of the birds present that were available for counting on surveyed beaches. Prior distributions for ω_{yt} were developed by comparing aerial counts to the estimated period-specific population size from the superpopulation model of mark-recapture data (Lyons et al. 2016). The superpopulation model uses the mark-resight data to estimate the number of birds present in the Bay during each sampling period in each year. Assuming that the superpopulation model estimates reflect the true number of birds present, the ratio of counts to model estimates provides a heuristic for the proportion of the population that was counted.

$$Count_{y,t} = N_{y,t}^{super} * \omega_{y,t}$$

$$\widehat{\omega}_{y,t} = \frac{Count_{y,t}}{N_{y,t}^{super}}$$

The parameter $\widehat{\omega}_{y,t}$ was calculated for all years for which both superpopulation estimates and counts were available, 2011-2018. There were two years in which the aerial count exceeded the period-specific superpopulation estimate (2017 and 2018); in those years it was assumed that $\omega_{y,t}$ is 1, i.e., that all of the birds present were available to be counted with error, where overcounting is possible. The distributions of $\widehat{\omega}_{y,t}$ were visually examined and the prior distribution of $\omega_{y,t} \sim Beta(6,2)$ was set for 2009-2018. For 2005-2008, it was assumed that ω_{yt} would be lower since fewer beaches were included in the aerial survey. For those years, a prior distribution of $\omega_{y,t} \sim Beta(4,3)$ was used. The effects of the choice of priors on the model results was explored using a sensitivity analysis, described in a following section. For each year, the count was modeled as follows:

$$N_{y,t}^{avail} = N_y * \pi_{y,t} * \omega_{y,t}$$

$$\log(C_{y,t}) \sim Normal\left(\log\left(N_{y,t}^{avail}\right), \sigma_{obs}^2\right)$$

where σ_{obs}^2 is the counting error. Prior distributions for all model parameters are provided in Table 24.

7.2.2.4 Effects of Environmental Variables on Red Knot Demographics

The effects of horseshoe crab abundance and the timing of spawn on both apparent survival probability and recruitment rate were estimated. Horseshoe crab abundance (HSC_y) was estimated for each year using the CMSA (see Section 6.1). Due to the large range of estimated abundances and to reduce the effect of extreme values, HSC_y was $\log_{10}$-transformed and used as a predictor in the analysis. The proportion of spawning activity that occurred in May ($MaySpawnPct_y$) was used as an estimate of the relative amount of spawning that coincided with red knot stopover, which typically peaks in late May. The proportion of spawn occurring in May was estimated from spawning surveys by finding the cumulative female spawning density that occurred by the end of May and dividing by the total female density for that year (see Section 4.3). An interaction between horseshoe crab abundance and timing was estimated, which posited that the effect of the overall abundance of horseshoe crabs depended on the timing of spawn in a given year. Previous analyses have also indicated that Arctic snow cover during the breeding season is associated with apparent survival probability, so an effect of mean Arctic snow cover ($snow_y$) on survival was also estimated. Arctic snow cover was estimated following the methods described by MacDonald (2020). In brief, daily mean snow cover data from 2005-2017 at 32-km resolution was obtained from the National Centers for Environmental Protection's North American Regional Reanalysis (NARR) dataset (Mesinger et al. 2006). The data were filtered to only the area considered to be the preferred red knot breeding habitat (MacDonald 2020; Smith and Rausch 2013) during 15-30 June of each year (considered peak nest initiation period; MacDonald 2020; Niles et al. 2008). For each year, the overall mean percent snow cover in each grid cell was calculated. Both $MaySpawnPct_y$ and $snow_y$ were centered for analysis by subtracting the mean, to aid model convergence (average $MaySpawnPct$ = 0.599, average $snow$ = 0.568). For each year, apparent annual survival probability (ϕ_y) was estimated as:

$$logit(\phi_y) = \mu^{\phi} + \beta_1 * HSC_y + \beta_2 * MaySpawnPct_y + \beta_3 * HSC_y * MaySpawnPct_y + \beta_4 * snow_y + \varepsilon_y^{\phi}$$

$$\varepsilon_y^{\phi} \sim Normal(0, \sigma_{\phi}^2)$$

where μ^{ϕ} is the intercept and ε_y^{ϕ} is a random error term.

The ARM workgroup was also interested in evaluating the effect of horseshoe crab abundance on recruitment rate. Since recruitment rate is a latent parameter in this analysis (i.e., not directly informed by data), the ARM workgroup thought it would be an overparameterization to try to estimate the full interactive effects described above. Timing of spawn is related to water temperature and is therefore not controllable, and horseshoe crab abundance is the more relevant metric to the harvest optimization (see Section 8); therefore, only a relationship between recruitment rate and horseshoe crab abundance was estimated:

$$\log(\rho_y) = \mu^{\rho} + \beta_5 * HSC_y + \varepsilon_y^{\rho}$$

$$\varepsilon_y^{\rho} \sim Normal\left(0, \sigma_{\rho}^2\right)$$

where μ^{ρ} is the intercept and ε_y^{ρ} is a random error term.

7.2.3 Model Configuration

7.2.3.1 Informative Priors

Informative priors were used on some model parameters to aid convergence and MCMC sampling efficiency (Table 24). Priors for temporary emigration probabilities (γ^{II} and γ^{OI}) and stopover residency probability (τ) were based on a previous analysis of the mark-resight data collected in Delaware from 2005-2018 (Tucker et al. 2021). A vaguely informative prior for the intercept for recruitment rate, μ^{ρ}, was also provided. This parameter was drawn from a Uniform distribution with a mean of 0 and maximum of 0.5. A recruitment rate of 0.5 would be realized if every pair produced one offspring that survived its first two winters.

7.2.3.2 MCMC Estimation and Model Fit

The IPM was specified and fit using JAGS, jagsUI, and R version 4.0.5 (Plummer 2003; Kellner 2015; R Core Team 2019). Three MCMC chains of 5,500,000 iterations each were sampled, 500,000 were discarded as burn-in values, with an adaptive phase of 50,000 iterations, and every 100th sample was kept. This resulted in a total of 50,000 draws from the posterior distribution, which was sufficient to ensure convergence of all parameters ($\hat{R}$ < 1.1 and confirmed with visual inspection of traceplots). All model estimates are presented as posterior means and 95% credible intervals.

Unified goodness-of-fit tests have not been developed for IPMs, so the model fit for each submodel was assessed independently using posterior predictive checks (Kéry and Schaub 2012), which involves simulating expected data sets and comparing the deviation of expected and observed data from model predictions. The open robust design sub-model was assessed using the Freeman-Tukey diagnostic and the state-space model was assessed using χ^2. Posterior predictive checks indicated adequate fit of the state-space model with a Bayesian p-value of 0.44 (p = 0.5 indicates no evidence of systematic difference in lack of fit statistics between the observed and simulated data sets). There was some evidence of overdispersion in the open robust design model (Bayesian p-value = 0.9) which could arise due to unmodeled individual heterogeneity or the grouping of observations into 3-day sampling periods.

7.2.4 Results

7.2.4.1 Demographic Rate Estimates

Estimates of adult apparent survival probability were consistently high, with an average of 0.93 (95% CRI: 0.90, 0.96, Table 25, Figure 44). Estimates of recruitment rate showed little year-to-year variation (Figure 44), with an average recruitment rate of 0.075 (95% CRI: 0.011, 0.15, Table 25). Despite this low average recruitment rate, estimates of population growth rate (λ) indicate that the red knot population was most likely stable to increasing from 2005-2018, with an average population growth rate (λ) over this period of 1.04 (95% CRI: 1.00, 1.06). A population growth rate of 1 indicates a stable population; annual estimates of population

growth rate varied with the posterior mean < 1 for some years (Figure 44), but the overall trend over this 14-year period was positive.

The estimates of apparent annual survival probability are similar to those from the initial ARM modeling efforts (McGowan et al. 2011a) and from red knot wintering in Florida (Schwarzer et al. 2012). These estimates of survival ~0.9 are greater than previous estimates, which were closer to ~0.8 (Atkinson et al. 2001; Baker et al. 2004), as well as unpublished estimates based on resighting data from southbound migration (L. Niles, *personal communication*). There are a few potential explanations for the difference. First, it is possible that more recent estimates are positively biased. Tucker et al. (2019) showed that individual misidentification due to incorrect reading or transcription of flag alphanumeric codes could result in positively biased survival estimates if error rates are greater than ~5%. Importantly, this bias is greatest for the estimates from the earliest years and decreases over time, resulting in a spurious negative trend in survival over time. In that same analysis, the authors estimated the misidentification error rate of red knot resightings in Delaware as between 0.31% and 6.6%. The analysis presented here used resightings of flags originally deployed in Delaware Bay and screened the data for potential misreads by removing all flags that did not have a banding record or were recorded as resighted before they were deployed. Furthermore, the previous studies that resulted similarly high survival estimates showed no evidence of the characteristic negative trend that is produced by misreads. Therefore, the ARM workgroup thinks it unlikely that these estimates are positively biased.

A second possible explanation is that older estimates are negatively biased. The only other published estimates of red knot survival from Delaware Bay are from shorter studies (4-5 years) and using physical recaptures of birds only, not field resightings (Atkinson et al. 2001; Baker et al. 2004). The probability of recapturing a marked red knot is significantly lower than the probability of resighting; McGowan et al (2011b) estimated an average recapture probability of between 0.02 and 0.07, depending on mass state, compared to average resighting probability of ~0.4. A short study period combined with low detection probability can result in negatively biased estimates of survival probability (Williams et al. 2002). Additionally, earlier estimates of apparent survival probability did not account for nonrandom temporary emigration (i.e., birds preferentially skipping or returning to Delaware Bay). The estimates from this IPM and those by Tucker et al. (2021) indicate that temporary emigration is nonrandom, with the probability of using the Bay following a year of use (γ^{II} = 0.82) greater than the probability of using the Bay after a year of non-use (γ^{OI} = 0.084). This nonrandom temporary emigration can also lead to negatively biased survival estimates if not accounted for in the model (Peñaloza et al. 2014). Although the analysis by McGowan et al (2011b) does not explicitly account for temporary emigration, it is possible that the mass state transition probabilities between the end of year *t* and beginning of year *t+1* absorb some of this unmodeled variation in return rates. The analysis by Schwarzer et al (2012) does account for emigration. With the short study periods, low detection probability, and unmodeled nonrandom temporary emigration, it is likely that previous estimates of survival were negatively biased to some extent.

A third possible explanation is based on an ecological hypothesis about the segregation of birds by wintering area. Red knot stopping in Delaware Bay overwinter as far north as the southeast

U.S. and as far south as Argentina. It has been proposed that southern-wintering birds that have a longer migration have lower annual survival probabilities than northern-wintering birds. Declines in the number of red knot overwintering in Argentina (Niles et al. 2008) suggest a decline in the southern-wintering subpopulation and therefore that in more recent years a greater proportion of the Delaware Bay stopover population may be northern-wintering birds. If earlier estimates of survival were from a stopover population containing a higher proportion of southern-wintering birds than more recent estimates, this could explain why earlier estimates were lower. Discerning the wintering locations of birds using Delaware Bay and potential differences in survival probability is the focus of ongoing work involving stable isotope analysis. At the time of this report, there is little evidence to support or refute this hypothesis. This is a key area for future research (Section 10).

In the IPM, estimates of population growth rate and recruitment rate are based on an analysis of the count data. These estimates could be more precise with more information about counting error. Such information could come from survey-specific covariates (e.g., observer ID, tide state, weather conditions), the integration of simultaneous ground count data, or future implementation of a double-observer counting method. At the time of this analysis, such information was not available.

7.2.4.2 Effects of environmental variables on red knot demographics

A positive relationship between horseshoe crab abundance and adult apparent survival probability was estimated (Table 26, Figure 45 - Figure 47), but the magnitude of this effect was small (β_1 = 0.38, 95% CRI: 0.13, 0.67). The estimates indicate no evidence of survival probability responsive to either the timing of spawn or the interaction between spawn timing and abundance (Table 26, Figure 45 and Figure 46). A weakly negative relationship was estimated between mean Arctic snow cover and adult survival probability (Table 26, Figure 45), but again the magnitude of this effect was small (β_4 = -1.06, 95% CRI: -3.76, 1.74). Evidence of a relationship between horseshoe crab abundance and recruitment rate was not found (Table 26, Figure 47).

7.2.5 Sensitivity Runs

Several iterations of the IPM were run to test the sensitivity of model outputs and fit to the choice of prior distributions for the count availability ($\omega_{y,t}$), intercept for the recruitment rate (μ^{ρ}), and annual variation in the random error term for recruitment (σ_{ρ}). For each model version (Table 27, Figure 48), convergence ($\hat{R}$), model fit (posterior predictive checks), and parameter estimates were compared. Without strong information about availability in 2017 and 2018 (either by fixing $\omega_{2017-2018} = 1$ or using a strongly informative prior), model estimates indicated increased recruitment and population growth in later years. However, the ARM workgroup believes that such results are an artifact of the fact that a greater proportion of birds seems to have been counted in those years than in previous years (based on the correspondence between superpopulation model estimates and counts). In all versions in which this information was included in the model, little difference was found among prior parameterizations in the estimates of demographic rates. Additionally, the choice of priors had little effect on the ability of the MCMC sampler to reach convergence or metrics of model fit.

Unsurprisingly, posterior estimates of recruitment rate were sensitive to the choice of prior distributions for the intercept (μ^{ρ}) and annual variance (σ_{ρ}). The posterior means were largely unaffected by the choice of priors, but the uncertainty in these estimates increased when less informative priors were used. Because this parameter is estimated without additional data, the influence of the prior will naturally be stronger than for other model parameters. Ultimately, prior distributions that were slightly more informative were chosen, based on the ARM workgroup's knowledge of the species.

8 REVISED ADAPTIVE RESOURCE MANAGEMENT FRAMEWORK

The previous ARM Framework (ASMFC 2009a; Figure 49) differs in several ways from the revised version described here (Figure 50). Changes include new forms to the estimation and projection models used for each species, a new reward function and utility components, and a different approach to optimization using only a subset of the state variables used previously. These updates are detailed in the following sections.

8.1 Revised Estimation and Projection Models

Both the estimation (shown in yellow in Figure 49 and Figure 50) and projection models (in blue) have changed, for horseshoe crabs and red knots. For both species, the projection model now derives directly from the estimation model so that data collected annually to inform estimates of the system state (i.e., the species' abundances) and therefore harvest recommendations can also be used to update projection model parameters. Reliance on literature-based demographic rates has been eliminated ("Life history parameters" in Figure 49 are absent in Figure 50). The red knot model was also changed from a female-only model to one that considers both sexes.

Changes to the horseshoe crab projection model in the revised ARM Framework were described in Section 6.2.

The revised red knot projection model mirrors the structure of the integrated population model (IPM) exactly. Stochastic processes governing population dynamics are just as shown in Section 7.2.2.1. Linear predictors for recruitment rate (ρ) and adult survival (ϕ) are identical to those discussed in Section 7.2.2.4, including the same covariates and random effects. Indeed, because the projection and estimation models had the same structure, and because the IPM was fit in a Bayesian framework using MCMC sampling, the MCMC samples were used from the jointly-estimated posterior distributions of the model parameters directly. By so doing, an important kind of information was preserved which would have been lost had each parameter's posterior distribution been summarized separately, each with its own parametric distribution; and then drew samples from each parameter's distribution separately in the projection model. That is, any unmodeled correlation between model parameters was preserved. In practice this meant, for a given year in a simulation instance, all the parameter values were obtained by simply selecting a row of the MCMC output matrix at random.

Red knot adults were predicted by the IPM to have high survival, and uncertainty about recruitment resulted in some simulated populations reaching unreasonably high abundances. Employing basic expectations of population function, and based on red knot abundance

estimates from past decades, a simple density dependence mechanism was added to the projection model, so that abundances would largely stay within ranges that have been observed in Delaware Bay: 150,000 birds was chosen as the threshold above which recruitment would be reduced to zero (Morris and Doak 2002). To implement this in the model, recruitment (ρ) was multiplied by a scalar that followed a 'broken stick' curve: the scalar was equal to one when knot abundance was below 80% of the 150,000 threshold; above that value it was reduced linearly down to zero when abundance was at or above the threshold.

The previous ARM Framework made use of three competing models of red knot population dynamics, which differed mainly in the influence of horseshoe crabs they specified (ASMFC 2009). The models were assigned weights, and all three were employed in simulating red knot populations with predicted abundances representing a weighted average of the three models' predictions. In a 'passive' approach to adaptive management, these model weights would be periodically updated using monitoring data. However, model weight updating was never pursued.

In place of the use of competing models of population dynamics, the revised ARM version uses a single red knot model chosen to reflect previous findings regarding important effects on red knot survival (McGowan 2011b); parameter uncertainty regarding fixed covariate effects and accompanying annual random effects are now the targets for periodic updating. It is hoped that increased harmony between estimation and projection models—for both horseshoe crabs and red knots—will encourage more frequent model updating than was carried out under the previous ARM Framework.

The ability to simulate the focal ecological system is fundamental to adaptive management; this was true of both the previous and revised ARM Frameworks. The simulation models are used in different ways in the two versions, however, because the approach to optimization differs. These differences are described in the following section.

8.2 Changes to the Optimization Approach

The original ARM Framework made use of an optimization approach called dynamic programming to provide harvest recommendations given observed abundances of horseshoe crabs and red knots in Delaware Bay (ASMFC 2009a). There are many approaches to dynamic programming, and a number of software implementations are available. The software used to solve the original ARM model was named ASDP (for Adaptive Stochastic Dynamic Programming; Lubow 1995, 2001). Two major developments precluded its continued use in the revised ARM version, one connected to the software itself and another to the particular approach to dynamic programming it employs.

The ASDP software is no longer actively maintained by its author or any other entity (B.C. Lubow, *personal communication*), and indeed does not run in any modern operating system (Windows XP is the latest platform with which it is compatible). This fact alone has and will make its continued use by the ARM subcommittee onerous.

However, another detail of the revised horseshoe crab projection model makes the use of stochastic dynamic programming, as implemented by ASDP, unworkable. Instead of a stage-

based model that can be updated each time step based entirely on the state of the population in the previous time step (a first-order Markov process), the revised horseshoe crab model uses a stock-recruitment relationship (Section 6.2.2) which requires reference to the population state nine and ten years previously, to update to the next time step. Under conventional dynamic programming, abundances in all years {*y*-10, *y*-9, … , *y*-1} would become state variables over which the optimization would operate (the notion of a state variable is discussed further in Section 8.4). Problem definition in conventional dynamic programming relies on keeping the number of state variables very small, to ensure that the problem is tractable. Inclusion of such a large number of additional state variables would have made obtaining solutions under conventional dynamic programming approaches, even using modern software such as MDPSolve (Fackler 2011), either impossible or too time-consuming to be useful (Moxnes 2015).

Therefore, an optimization approach was chosen based on replicated forward simulations of the system, called Approximate Dynamic Programming (ADP; Powell 2007; Springborn and Faig 2019). In contrast to conventional dynamic programming, the system is simulated many times, over some sufficiently long time period, beginning with the present day. Many varieties of ADP exist; the one selected here, policy approximation (Krakenes and Moxnes 2005; Moxnes 2005; Powell 2007; Moxnes 2015) allows all information about each of these 'time paths' to be retained for reference by the population models. It was therefore trivial under ADP to implement the horseshoe crab stock-recruitment model, as well as the red knot recruitment model, which requires referencing adult abundance in year *y*-2.

8.3 Approximate Dynamic Programming in the ARM Framework

Dynamic programming (Bellman 1957), in the context of adaptive management, seeks to maximize an objective function over some future time period up to a time horizon, *T*. In the case of the ARM, that objective function takes the form of a reward, *r*, that is determined annually. Horseshoe crab harvest is a component of the reward function, as is information about red knot abundance (specifics of the reward functions used in the previous and revised ARM versions are addressed in Section 8.5). The reward obtained in a given year y depends upon the state of the system (the abundances of horseshoe crabs and red knots in year *y*; horseshoe crab abundances in years *y*-10 and *y*-9; red knot abundance in *y*-2; see Section 8.4.2) as well as the harvest policy. The decision to be made each year is how many female and male horseshoe crabs to harvest, given the state of the system, and this is determined by a harvest policy *h*. A solution to the dynamic programming problem constitutes a particular harvest policy: the one that will, given the simulation model of the system, return the highest possible value given the present state of the system.

Over the time horizon, the value *V* of a time path (a particular simulated instance of the system) is simply the expected value of the sum of the annual products of the reward and a discount factor $\delta \in (0,1]$:

$$V = E\left[\sum_{y=1}^{T} \delta^{\,y-1} r_y\right]. \qquad (1)$$

The discount factor allows higher value to be placed on rewards obtained sooner than later. In the previous ARM Framework, the discount factor was set to 1.0; that precedent was retained here, and δ is dropped from subsequent equations.

Under the policy approximation approach this Revision took to ADP (Krakenes and Moxnes 2005; Moxnes 2005; Moxnes 2015), the harvest function has a well-defined functional form and takes a small number of parameters $\boldsymbol{\theta}$. The reward in year *y* is thus a function of the system state S_y and $\boldsymbol{\theta}$ (both vectors in this case). For a given value of $\boldsymbol{\theta}$, then, the value is

$$V^{\theta}(S_1) = \sum_{y=1}^{T} r_y\left(S_y, \boldsymbol{\theta}\right), \qquad (2)$$

where S_1 is the state of the system at the beginning of the time period.

The simulation models for horseshoe crabs and red knots are stochastic, and it is unlikely that any two time paths begun in state S_1 would follow the same trajectories; they may also yield different values V^{θ}. To accommodate the variation in value V^{θ} that can occur among time paths given a particular harvest policy, a large number of iterations *K* were run at each particular value of $\boldsymbol{\theta}$. That variation was then summarized by taking a mean over the simulated time paths

$$g(\boldsymbol{\theta}) = \frac{1}{K}\sum_{k=1}^{K} V^{\boldsymbol{\theta}}(S_1). \qquad (3)$$

K = 10,000 iterations were used for each value of $\boldsymbol{\theta}$. The function $g(\boldsymbol{\theta})$ could thus be maximized, and the values $\boldsymbol{\theta}^*$ at the maximum value of *g* corresponded to the best harvest policy $h(S,\boldsymbol{\theta}^*)$. Unlike with exact approaches to dynamic programming, true optimality is not guaranteed under this approach (as pointed out previously, methods returning truly optimal solutions were not applicable to this problem); but Moxnes (2015) was followed and $h(S,\boldsymbol{\theta}^*)$ was referred to as the optimal harvest policy.

8.4 Harvest Policy Functions

Mainly as a result of the change to the optimization algorithm used by the ARM Framework, the harvest function has undergone significant changes.

8.4.1 Change from Discrete Harvest Packages to Continuous Harvest Recommendations

The harvest policy function in the previous ARM model was constrained by the limitations imposed by the ASDP software. It was discrete, taking values in {1,2,…,5}; each number specified a harvest package (ASMFC 2009a; Table 28). However, such a small number of packages was chosen only to make obtaining a solution feasible and not for any biological or management reasons.

This ARM Revision chose not to make use of the harvest packages two reasons. First, the form of the harvest function receives special attention under this approach to ADP. Its parameters $\boldsymbol{\theta}$

are those over which maximization occurs (Equation 3) and as such the optimization is facilitated by limiting their number and ensuring their effect on the policy h is smooth and monotonic. A discrete-valued harvest policy function can be accommodated, but one that returns continuous harvest recommendations is simpler.

Second, because there are so few harvest packages, they link male and female harvest in an artificial way. It can be seen, for instance, that increasing male harvest from 420,000 to 500,000 necessarily reduces female harvest from 210,000 to 0 (Table 28). There is no ecological reasoning attached to this constraint. The ARM workgroup decided instead to allow male harvest to depend only upon male horseshoe crab abundance; and to let female harvest depend on female horseshoe crab abundance and red knot abundance.

However, one feature from the packages used in the original ARM version was retained: the maximum harvest for females was set to 210,000 and for males 500,000. Although harvest is treated as continuous in the new ARM Framework, it may be that harvest limits in practice should be rounded to some fixed values. This would in effect achieve a benefit of the harvest packages of the original ARM Framework: year-to-year stability in harvest limits. This possibility is discussed further in Section 8.7.1.

8.4.2 State Variables

In a dynamic programming problem, the state variables are used to represent the state of the system; they serve two functions: 1) their values in year y are necessary to predict the system state in year y+1, and 2) they serve as the decision variables, that is their values are used as input to the policy function (in the ARM Framework, the harvest function is the policy function). The state variables do not need to be observable; but if they are not monitored, they must be predicted each year in order to make a decision (in this case, about harvest).

The previous ARM model made use of six state variables, each of which represented an abundance of a particular population segment (ASMFC 2009a): 1) juvenile horseshoe crabs, 2) primiparous horseshoe crabs, 3) multiparous female horseshoe crabs, 4) multiparous male horseshoe crabs, 5) juvenile female red knots, and 6) adult female red knots. The possible range of each of these variables was then discretized by dividing it into a set of intervals; taken together, the discretized variables formed a grid in system state space. The harvest policy function returned a harvest package for each possible point on the state space grid: both the input and output of the harvest function were discrete.

In contrast, use of ADP in the revised ARM model allows both the input and output of the harvest function to be continuous; in fact, this simplifies specification of the model (Table 29). It also bypasses a step in the previous ARM model that could have affected the optimization process: deciding how to discretize the state variables.

Because the new simulation models for horseshoe crabs and red knots do not consider juvenile life stages, but rather base horseshoe crab and red knot recruitment on past abundance values, the state variables (i.e., those required to predict abundances in year y+1) were: 1) adult female horseshoe crabs (primiparous plus multiparous) in year y, 2) adult male horseshoe crabs (primiparous plus multiparous) in year y, and 3) adult red knots in year y; along with 4) adult female horseshoe crabs (primiparous plus multiparous) in year y-9 and 5) in year y-8, and 6)

adult red knot abundance in year *y*-1. Only a subset of the state variables, numbers 1-3 above, were used as the decision variables; that is, as inputs to the harvest policy function. Because each of the population segments used as decision variables is monitored each year, estimates can be plugged directly into the harvest function to obtain recommended harvest limits; there is no need to predict the values of unobserved population segments.

8.4.3 Form of the Harvest Policy Function

To facilitate maximization of the $g(\boldsymbol{\theta})$ function (Equation 3), logistic curves were used within the harvest function to map state variables into harvest recommendations. These curves being smooth and asymptotic to their range limits, it was thought they would lead $g(\boldsymbol{\theta})$ to be smoother and easier to optimize.

The revised harvest function returns a vector *H* of length two,

$$h(S, \boldsymbol{\theta}) = \boldsymbol{H} = [H^f \quad H^m], \qquad (4)$$

with each element H^f and H^m continuous and ranging from 0 to the maximum harvest for each (210,000 for females, 500,000 for males). Male and female harvest are determined independently; male harvest depends only upon male horseshoe crab abundance, female harvest on both female horseshoe crab and red knot abundance.

For each state variable, a logistic curve is defined, via a parameterization that specifies the inflection point and the slope at the inflection point. The value returned from this function is called a harvest factor, $\eta \in [0,1]$. For each of male horseshoe crab (s^m), female horseshoe crab (s^f) and red knot (s^k) abundances, a corresponding harvest factor (η^f, η^m, η^k) is calculated according to

$$\eta\,(s) = \frac{1}{1+e^{\alpha(\beta-s)}}, \qquad (5)$$

with α giving the slope and β the location of the inflection point. Example curves are shown in Figure 51.

The harvest factors are then used to produce the harvest recommendations $\boldsymbol{H}$. For males, this is very simple because male harvest depends only on male horseshoe crab abundance and the maximum allowable male harvest, H^m_{max}:

$$H^m = \eta^m H^m_{max}. \qquad (6)$$

Producing H^f is more complex because the harvest factors for both female horseshoe crab and red knot must be used:

$$H^f = H^f_{max} \times (\eta^f + \eta^k - \eta^f \eta^k). \qquad (7)$$

The expression $\eta^f + \eta^k - \eta^f \eta^k$ is itself always in [0, 1], and balances the influence of s^f and s^r on H^f when they both take similar values relative to their respective inflection points, β^f and β^k. The effect of this balance can be seen in contour plots of the female harvest recommendations in Section 8.7.

The parameters governing the harvest policy then, are $\boldsymbol{\theta} = [\alpha^f \beta^f \alpha^m \beta^m \alpha^k \beta^k]$; these are the variables that are optimized in the ARM algorithm. And the decision variables acting as inputs to the harvest function are $S_y = \begin{bmatrix} s_y^f & s_y^m & s_y^k \end{bmatrix} = \begin{bmatrix} R_y^f + N_y^f & R_y^m + N_y^m & N_y^k \end{bmatrix}$.

8.5 Reward Function

Unlike in the original ARM model, female horseshoe crab abundance does not directly inform male harvest in the harvest policy function, nor vice versa. However, both sexes do appear in the reward function. Also in contrast to the original ARM model, where red knot abundance acted as a constraint in the reward, here red knots are assigned a separate utility and their abundance contributes directly to the reward. The ARM workgroup felt that this way of accommodating red knot abundance – via direct contribution to the reward, rather than as constraint – better recognized the values reflected in the ARM project's objective statement (Section 1.6).

The annual reward is given by

$$r_y = u_y^h + u_y^k + u_y^h u_y^k \,, \qquad (8)$$

where the horseshoe crab and red knot utilities u^h and u^k, each take values in [0, 1]. This formulation promotes balance between horseshoe crab and red knot utilities, because although some reward can be obtained when the abundance of one or the other species is low, higher reward values are only possible when both species have high abundances.

The horseshoe crab utility depends upon the number of female and male horseshoe crabs harvested in year *t*, and reflects a precedent established in the original ARM model, that the monetary value of harvested female horseshoe crabs is twice that of males:

$$u_y^h = \frac{2H_y^f + H_y^m}{2H_{max}^f + H_{max}^m} \,. \qquad (9)$$

The horseshoe crab utility thus reflects the ratio of the total monetary value of the bait harvest in year *y*, to the highest possible monetary value attainable from bait harvest.

The red knot utility function employs a threshold representing an estimate of historic red knot abundance in Delaware Bay. The ARM Subcommittee and DBETC considered two utility functions for red knots that bookend the options:

$$u_y^k = \begin{cases} 1, & if s_y^k \geq N_k^*, \\ \frac{s_y^k}{N_k^*}, & if s_y^k < N_k^* \end{cases}. \quad (10a)$$

$$u_y^k = \begin{cases} 1, & \text{if } s_y^k \geq N_k^*, \\ \frac{s_y^k}{(1-p)N_k^*} - \frac{p}{1-p}, & \text{if } 0.9 \cdot N_k^* \geq s_y^k < N_k^* \\ 0, & \text{if } s_y^k < 0.9 \cdot N_k^* \end{cases}. \quad (10b)$$

For equation 10a, utility rises linearly from zero to one as red knot abundance s_t^k increases from zero to the threshold $N_k^* = 81{,}900$. This utility function recognizes that higher red knot abundances are always preferred to lower ones, until red knots reach a satisfactory threshold level determined by stakeholder input during the original ARM Framework development.

For equation 10b, utility remains at zero until the red knot abundance s_y^k reaches *p* = 90% of the threshold $N_k^* = 81{,}900$. Then it increases from zero to one as s_y^k moves from 90% to 100% of N_k^*.

There was some committee disagreement about which of the two utility function to use, but ultimately the committees decided to use equation 10b as the utility function for red knots in the optimization because it was the closest to the previously used red knot utility function (ASMFC 2009a). While this was the closest to the previously used utility function of the two options explored, neither operate as a constraint like it did in the previous ARM Framework. In the current decision making case, there is a greater desire to take the chance of having higher red knot abundance and increase the total reward coming from red knot abundance.

Use of the threshold N_k^* is an effort to address new language in the ARM project's objective statement, which now includes an intention to "ensure that the abundance of horseshoe crabs is not limiting the red knot stopover population or slowing recovery." Although not a formal recovery target, the threshold value of 81,900 red knots does represent an established historical abundance that is considerably higher than recently estimated stopover population sizes.

8.6 Model Coding and Optimization

Approximate Dynamic Programming, although it is used to solve dynamic decision problems, is advantageous because it does not require the use of dynamic optimization techniques: the ADP framework removes time from the optimization problem. Once all the components of the function $g(\boldsymbol{\theta})$ (Equation 3) are specified and parameterized, it can be maximized using a static optimization algorithms. This is relatively straightforward because all elements of $\boldsymbol{\theta}$ are continuous.

The revised ARM model and accompanying initialization steps were coded in program R (R Core Team 2021), which required only the following add-on packages: {abind} (Plate and Heiberger 2016), {bivariate} (Spurdle 2021) and {extraDistr} (Wolodzko 2020). Then, an optimization technique called the genetic algorithm was used, as implemented in the R package {GA} (Scrucca 2013; Scrucca 2017). The genetic algorithm uses a number of candidate solutions that then 'evolve' in a manner that is analogous to biological evolution, with solutions 'mutating' over time and converging on the extremum. Genetic algorithms, though slower than some methods, are effective at avoiding local extrema (Haupt and Haupt 2004). Parameter values relevant to the optimization are shown in Table 30. On a computer configured for the analysis of complex models, the genetic algorithm took approximately 2 hours to converge on a solution, where the criterion for convergence was no change to the solution for 200 iterations. Using the canonical model version (Section 8.7), 325 total iterations were performed, with one iteration taking on average 24.6 seconds.

Not all R packages are maintained indefinitely; some are inevitably abandoned over time. In the interest of code durability, the use of add-on packages was limited. Those used provide convenience functions for fairly common operations: they could be replaced if necessary with hand-written routines; or, if they are deprecated, will likely be replaced with similar packages.

8.7 Output from Canonical Model Version

The outcome from the revised ARM algorithm is discussed here, with maximum harvest set to $H_{max} = \begin{bmatrix} H^f_{max} & H^m_{max} \end{bmatrix} = \begin{bmatrix} 2.1 & 5 \end{bmatrix} \times 10^5$ and optimization parameters as in Table 30. The ARM model with these maximum harvest limits is referred to as the canonical version. Based on sensitivity runs of the standalone horseshoe crab projection model, these maximum harvest limits are expected to have little effect on long-run equilibrium abundances of horseshoe crabs (Section 6.2.3.1). However, this fact does not necessarily give much insight into the exact form of the optimal harvest policy.

Optimal values of $\boldsymbol{\theta}$, the parameters of the harvest function *h*, are given in Table 31. The slope of the female harvest factor curve, α^f, is shallower than that for male horseshoe crab or red knot (Figure 52). And interestingly, the inflection point for the red knot harvest factor, β^k, is somewhat higher than the threshold abundance used in the red knot utility function, 81,900.

The optimal harvest policy function for males (Figure 53) shows that bait harvest limits near the maximum of 500,000 crabs are recommended for abundances above about 15 million. Male abundances ($R^m + N^m$) are above 15 million in 10 of the 17 years for which CMSA estimates are available (Table 17); all mean abundances in the past 6 years exceed that value, however.

The optimal female harvest function shows a rather conservative approach to female bait harvest overall, with harvest increasing gradually and not nearing its maximum until above any female horseshoe crab abundance estimated by the CMSA in 2003-2019 (Table 16), with red knot abundances at contemporary levels (Figure 54 - Figure 57). However, in contrast to the original ARM model, this harvest function does not recommend zero levels of female harvest at contemporary female horseshoe crab abundances (Table 32). Equilibrium abundances for male and female horseshoe crabs and red knots are predicted to be high, but red knot abundances in particular are very uncertain throughout the simulation time period (Figure 58 - Figure 59).

8.7.1 Rounding of Continuous Output from the Harvest Function

One potential benefit of the harvest packages used in the original ARM Framework is the resistance they may provide to annual changes in harvest recommendations. Although the revised ARM model provides continuous harvest recommendations, the application of some system of rounding could provide a simple means of achieving the same effect: for instance, by choosing a regular interval of multiples of 50,000, and rounding female and male horseshoe crab harvest recommendations to the nearest of these values (Figure 60 and Figure 61). Alternatively, each continuous harvest recommendations could be always rounded down to the nearest discrete value it exceeds (Figure 62 and Figure 63).

Each of these approaches alters the de facto maximum female harvest to 200,000; some rule should perhaps be devised to snap some values to 210,000, for instance those that exceed 200,000.

It is also evident that the rounding down approach forces the male harvest recommendations to reach exactly 500,000 before the rounded recommendation would also be 500,000 (Figure 63). This may be an undesirable property.

8.8 Sensitivity Runs for the Revised ARM Model

8.8.1 Sensitivity to Harvest Limits

As shown in Section 6.2.3.1, the horseshoe crab projection model is not especially sensitive to changes in harvest in the range of the maximum harvest used in the canonical revised ARM model ($H^f_{\text{max}} = 210{,}000$, $H^m_{\text{max}} = 500{,}000$). Increasing harvest to these levels from zero (i.e., full moratorium) decreased equilibrium abundances by only 5-6%. Here, therefore only optimization results based on a scenario with significantly larger maximum harvest: H^f_{max}= 2 million and H^m_{max}= 2 million are presented.

Interestingly, the harvest policies resulting from this model are quite aggressive (Figure 64 - Figure 66) despite the higher maximum harvest limits. The qualitatively different shape of the contour plot in Figure 64 compared to that in Figure 54, may be partly due to the effect of setting $H^f_{\text{max}} = H^m_{\text{max}}$, in combination with the fertility factor which penalizes sex ratios that are too skewed toward females.

As expected, such aggressive harvest reduces male and female abundances considerably (Figure 67). Although the abundance of red knots at year 100 is reduced, as is survival (Figure 68), the effect is modest. This is due to the small magnitude of the effect of horseshoe crab abundance in the red knot IPM.

8.8.2 Sensitivity to Variation in Expected Recruitment

As discussed in Section 6.2.3.2, the horseshoe crab projection model is sensitive to changes in median recruitment. To assess the effect such sensitivity might have upon the optimization outcome, random variation in the median recruitment was introduced in the following way.

A proportion *v* was specified and the standard deviation was found for a normal distribution around zero with 2.5th and 97.5th quantiles equal to {-*v*, *v*}. Then n_{iter} random deviates were

drawn from this distribution and the natural logarithm of these was added to each of the n_{iter} values of $\boldsymbol{\mu}$, the vector of female and male means for the bivariate normal distribution used to generate the logarithm of primiparous horseshoe crab abundances. In this way, the median abundances exp($\boldsymbol{\mu}$) varied over iterations, mostly within the interval [exp(-v), exp(v)].

Allowing variation in the median recruitment value across simulations results in a generally more conservative harvest policy. When median recruitment varied ±5% (Figure 69), the policy differed from the canonical one primarily through an increased inflection point along both the female horseshoe crab and red knot axes (upward and rightward shifts in Figure 69, relative to Figure 54). When recruitment varied ±10% (Figure 70), however, the slopes along the female horseshoe crab and red knot axes were primarily affected: they are much shallower than without any variation in expected recruitment.

Expected recruitment is based on a relatively short time period (Section 6.2.3), and it is possible that the current estimate is not very close to the true value. Allowing random variation in these parameters could act as a safeguard against basing decisions on incorrect values. Results presented here demonstrate that the effect on the harvest policy of introducing this kind of variation is somewhat ambivalent: a small amount of variation in median recruitment leads to more conservative harvest; larger variation to more moderate harvest at high abundances, but also higher harvest at low abundances of female horseshoe crabs and red knots.

8.9 Review of Anticipated ARM Framework Workflow

There are two main tasks for which the ARM model or its components will be regularly used.

A) The first is to set harvest limits in a given year. This requires four pieces of information:

1) the definition of the harvest function h (Section 8.4.2),

2) the values of the latest optimal parameters of the harvest function, $\boldsymbol{\theta}^*$,

3) the year's CMSA estimates of multiparous and primiparous horseshoe crab abundances for both sexes (Section 6), and

4) the year's Delaware Bay red knot abundance estimate (Section 5).

Calculating the recommended harvest limits involves only plugging in abundances and parameters into the harvest function.

B) The second task is updating parameters of the revised ARM model. This could be conducted annually; two datasets would require updating, beyond those already required for task A above: 1) the proportion of female horseshoe crabs spawning in May, and 2) the estimate of snow cover in the *rufa* red knot breeding grounds (Section 7.2.2.4).

Updating the ARM model involves three steps:

1) re-run red knot IPM with updated mark-recapture/resight and count data and covariate values,

2) obtain new estimates for the horseshoe crab recruitment process (means, standard deviations, correlation; Section 6.2.2)

3) re-run optimization of the ARM model with updated IPM output from #1 and updated recruitment parameters from #2, as well as updated IPM covariate values, CMSA estimates and red knot abundance estimates.

Steps #1 and #3 require some computing time. Optimization runs of the ARM model conducted for this report generally took 2 hours or less. Obtaining converged estimates with the IPM may take considerably longer.

9 STOCK STATUS AND CONCLUSIONS

There have been no overfishing or overfished definitions adopted by the Management Board for horseshoe crabs in the Delaware Bay. The 2019 benchmark stock assessment (ASMFC 2019) characterized the status of the Delaware Bay area as "neutral". This status determination was based on fits of autoregressive integrated moving average models (ARIMA) and the probability that the terminal year of fishery independent surveys was below a 1998 index-based reference point. In the Delaware Bay area, two out of five surveys examined were below this reference point, thus giving the area a "neutral" status. However, three out of the five surveys showed an increasing trend over the most recent ten-year period and none showed a decrease.

The purpose of this ARM effort in the Delaware Bay was not to determine stock status in the traditional sense of commercial fishery management (e.g., overfished and/or overfishing). Rather, the purpose was to determine the optimal harvest strategy given the states (i.e., abundance) of horseshoe crabs and red knots. The total "reward" from the system was a function of both horseshoe crab harvest and abundance of red knots, and the optimization routine employed here determined the amount of horseshoe crab harvest that maximized that reward. Results from the optimization show the sex-specific harvest of horseshoe crabs that maximize the total reward given the state of horseshoe crab and red knot populations. For example, if abundance of both species is low, the corresponding optimal harvest should be low, and if the abundance of both species is high, the corresponding optimal harvest can also be high (within constraints of maximum allowable harvest). Also, relatively high optimal harvest of horseshoe crabs can result from a situation where the abundance of horseshoe crabs is high relative to red knots. As Figure 53 shows, there is a nonlinear relationship between optimal harvest and the abundance of both species.

Optimal harvest recommendations are dependent on the underlying population dynamics models for both species. Although the population dynamics models were parameterized with empirical data from the Delaware Bay system, these data are still limited. Sensitivity analyses of the horseshoe crab projection model demonstrated that future abundance of horseshoe crabs was most sensitive to the mean recruitment parameter and this parameter had a much greater effect on future horseshoe crab abundance than did harvest within the limits of Addendum VII (ASMFC 2012; maximum female harvest of 210,00; maximum male harvest of 500,00). For red knots, posterior estimates of recruitment rates were sensitive to the prior used in estimating recruitment rates. Recruitment parameters in any population model are notoriously uncertain, but continued monitoring of the system should help refine these parameters for both species.

As a final comparison of outputs between the previous ARM Framework and the revised Framework in this report, optimal harvest recommendations were compared between the two

using abundance data from 2017 – 2019 (Table 32). Under the previous ARM Framework, abundances of male and female horseshoe crabs came from the VA Tech trawl swept area population estimates decremented by half a year's worth of natural mortality, while CMSA estimates of abundance were used under the revised Framework. Red knot abundance estimates came from Delaware Bay stopover super-population estimates in both cases. Optimal harvest recommendations under the previous ARM Framework were for harvest package #3 (0 females, 500,000 males) in all years. However, if the revised ARM Framework were applied to abundance estimates from 2017 – 2019, female harvest would have been recommended. Male harvest was still near the 500,000 maximum under addendum VII, but female harvest would have been somewhat less than the maximum of 210,000.

It also should be noted that this ARM Revision was developed using coastwide biomedical data so as to avoid data confidentiality issues. The population estimates for horseshoe crabs from the CMSA therefore represent an overestimate. If this Revision is accepted for management use, the Delaware Bay-specific biomedical data will be used to determine the harvest package and the model will be run by someone (e.g., ASMFC staff) with confidential data access. Therefore, the final harvest recommendations are likely to be marginally lower than those reported in Table 32 when the Delaware Bay-specific values are used. No other model inputs were affected by data confidentiality.

Harvest recommendations under the revised ARM Framework are based on a continuous scale rather than discrete harvest packages as in the previous Framework. Also, the harvest of females is decoupled from the harvest of males in this revision. The previous ARM Framework needed discrete harvest packages due to capacity limitations of the antiquated ASDP software, and other than the upper limits on harvest of each sex, these packages were defined rather arbitrarily. The revised ARM Framework has an advantage in that harvest can be recommended on a continuous scale for each sex and ideally makes more intuitive sense to stakeholders. Actual implementation of the recommended continuous harvest could be discretized by management each year. For example, a recommended harvest level could be rounded or truncated to the nearest 50 or 100 thousand. Discretizing annual recommendations would likely add stability to harvest recommendations across years.

This revision of the ARM Framework represents several advancements in not only the knowledge of the population dynamics of horseshoe crabs and red knots, but also how to efficiently model them. The population dynamics models for both species are now parameterized with empirical data from the Delaware Bay rather than based on literature values for life history parameters coming from elsewhere. Because they are based on empirical data from the Delaware Bay, model updating will be more efficient and transparent as new data for both species is collected through routine monitoring efforts.

10 RESEARCH RECOMMENDATIONS

The ARM subcommittee identified several recommendations that would benefit the adaptive management of horseshoe crabs and red knots in the Delaware Bay area. These have been characterized as future research, data collection, and data analysis and modeling. The ARM subcommittee recommends that the model parameters for both species be updated in at most

five years (although annual updates with the most recent data are desirable) and another benchmark assessment and model evaluation be considered in ten years. The ARM and DBETC recommend that during the years between this assessment and the next, members remain proactive about maintaining surveys and research programs and continue to initiate or participate in activities that accomplish some of the research recommendations listed below.

10.1 Future Research

- Evaluate the effect of climate change on horseshoe crabs and red knots. This includes the effects of warming temperatures, sea level rise, and storm frequency and intensity on the timing and duration of spawning, movement of crabs into and out of Delaware Bay, and effects on spawning habitat. For red knots, this includes effects of climate change on breeding conditions in the arctic and resulting recruitment of red knots.
- Incorporate potential climate change effects into the optimization (e.g., predicted trends in arctic snow cover).
- Evaluate the relationship between horseshoe crab egg density on spawning beaches and abundance of horseshoe crabs in the bay-wide spawning survey and total population estimates derived from the catch multiple survey analysis.
- Improve the understanding of horseshoe crab recruitment for the purpose of updating the stock-recruitment relationship.
- Continue evaluation of catchability and factors influencing catchability of the Virginia Tech horseshoe crab trawl survey.
- Address the issue of gear saturation for spawning beach surveys and/or explore analyses that would be less sensitive to gear saturation. Explore the methodology and data collection of spawning beach surveys and the ability of these surveys to track spawning abundance.
- Quantify the amount of contemporary suitable horseshoe crab spawning habitat in the Delaware Bay.
- Further explore the multi-state mark-recapture analysis of red knot tagging data to estimate the probability of gaining weight and survival as a function of horseshoe crab abundance. Examine the effects of tagging biases, time periods of stopover, short- versus long-distance migrants, and selection of states (i.e., weight thresholds).
- Evaluate the proportion of New York bait landings that could be comprised of Delaware Bay-origin crabs and the movement between the two regions.
- If possible, include other sources of horseshoe crab removals (e.g., illegal take, poaching) in the CMSA. Other sources of removals are currently unknown, but can be added in the future if quantified.

10.2 Data Collection

- Continue funding and support for the annual Virginia Tech horseshoe crab trawl survey. Consider increasing the sampling effort within the Delaware Bay region or expanding the survey along the Atlantic coast if future funding allows.
- Better characterize horseshoe crab discards in other commercial fisheries and refine estimates of discard mortality.
- Continue to collect horseshoe crab sex and stage (primi- and multiparous stages) information from the Delaware Bay Adult Trawl Survey and the New Jersey Ocean Trawl Survey.
- Continue to evaluate biomedically bled crabs' mortality rates and effects on spawning behavior. Consider a tagging study of biomedically bled horseshoe crabs to obtain relative survival and collaborations between researchers and biomedical facilities that would result in peer-reviewed mortality estimates.
- Maintain consistent data collection and survey designs for spawning beach surveys each year.
- Increase effort for tagging resights for horseshoe crabs.
- Improve estimates of counting error during red knot aerial surveys by recording and maintaining records of additional information such as observer ID, tide state, and weather conditions. The integration of simultaneous ground count data or a double-observer method could also be used to improve this component of the IPM.

10.3 Data analysis and modeling

- Update horseshoe crab stock-recruitment relationships as more data become available and refine methodologies to characterize uncertainty.
- Update parameters describing the influence of horseshoe cabs on red knot survival and recruitment though re-fitting the red knot integrated population model to new data.
- Integrate red knot "proportion marked" data into the IPM so that analyses conducted to determine the state of the system can be used to update model parameters with no additional effort.
- Investigate alternative utility functions for red knots with additional stakeholder input.
- Continue to evaluate horseshoe crab tagging data by fitting capture-recapture models that include a short-term (1 year) bleeding effect, account for spatial distribution of harvest pressure, account for capture methodology, and account for disposition of recaptured tagged individuals. Potential methodological approaches include use of time-varying individual covariates to indicate which crabs are 1 year from bleeding and use of hierarchical models to estimate interannual variation in survival within time periods defined by major regulatory changes.

- Explore the possibility of modeling stopover persistence as a function of boreal-wintering area of marked birds using observations away from Delaware Bay.

11 MINORITY OPINIONS

11.1 Niles Minority Opinion

Larry Niles PhD. ARM Subcommittee Member, Wildlife Restoration Partnerships

11.1.1 Introduction

In 2011 the Atlantic States Marine Fishery Commission disbanded their Shorebird Committee after the group recommended a complete moratorium on horseshoe crab harvests until better information is available to guide both the bait and blood harvests. Shortly afterward, the Adaptive Resource Modeling committee began work to create a statistical model aimed at estimating a harvest package that would "provide adequate stopover habitat for migratory shorebirds" (ASMFC 2009a). The author believes the ARM model does not provide sufficient horseshoe crabs for shorebirds, especially the federally listed red knot. Moreover, I believe the ARM model management does not provide for the coming challenges presented by the growing threat of climate change.

The horseshoe crab population of Delaware Bay is the last remaining spawning population, from Maine to Florida, large enough to produce surface eggs for migrating shorebirds. A singular food resource, crab eggs historically allowed red knots to rapidly double bodyweight, increasing adult survival and productivity (Baker et al. 2004; Duijns et al. 2017). A rapidly developing unmanaged harvest in the 1990s cut the population and reduced surface egg densities to less than one-fifth of pre-harvest numbers, from an average of more than 50,000 eggs/square meter to less than 10,000 eggs/square meter in 2021 (Smith et al. *in review*, provided as supplemental material). The overharvest of horseshoe crabs, and reduced egg resources were causal factors in red knot population decline leading to listing as "threatened" by the US Fish and Wildlife Service (USFWS 2014, pg. 248-9).

In response, the Atlantic States Fisheries Commission (ASFMC) and the USFWS first developed the Interstate Fishery Management Plan (FMP) for Horseshoe Crabs (ASFMC 1998). However, uncertainty in setting a baseline number for horseshoe crab populations has been a limiting factor in the management plan. In 2000, the Stock Assessment Subcommittee (SAS) and Peer Review Panel (PRP) concluded there was "inadequate information for a coastwide stock assessment, to establish reference points, fishing mortality rates, recruitment estimates, and recommended a conservative risk-averse approach because of localized population decline, increased catch and effort, slow maturation, susceptibility of spawning crabs to harvest, population resiliency and the need for a superabundance of horseshoe crab eggs in the Delaware Bay" (ASFMC 2000b, pg. 2). In other words, the ASFMC, the SAS, and PRP concluded that the trawl, dredge, and other surveys being used at the time, were unsuitable for determining horseshoe crab population numbers and eggs were not only a vital resource but a superabundance of eggs was important to the Delaware Bay shorebird stopover. Addendum III (2004, pg. 4) reiterates statements from the Peer Review Panel that "horseshoe crab eggs are only profitable to shorebirds if they occur in high surface density" (USFWS 2003). In 2000, the

ASMFC initiated a new benthic trawl survey designed to sample horseshoe crabs, conducted by Virginia Tech and led by David Hata and Eric Hallerman. Addendum III (2004) put forward a monitoring program including horseshoe crab surface egg densities, an indicator of foraging conditions for red knots and shorebirds.

Ten years of harvest restrictions (1998-2009) produced little improvement in crab numbers, and the ASFMC initiated the Adaptive Resource Management (ARM) Framework (ASFMC 2009a). The ARM Model, implemented in 2013, added a more structured approach and multispecies management objective: "Manage the harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also maintain ecosystem integrity and provide adequate stopover habitat for migrating shorebirds." To date, the ARM model has not produced a substantive increase in female crabs, as documented by the Virginia Tech trawl survey, or adequate stopover habitat for shorebirds (i.e., surface eggs).

In 2013, the Horseshoe Crab Technical Committee inexplicably ended horseshoe crab egg surveys without recommendations or replacement. NJDEP and other groups continued egg surveys; however, horseshoe crab surface eggs were not supported as a metric in the 2021 ARM Model revision. In contrast, trawl and dredge surveys, previously disregarded as unsuitable but no longer suggesting decline, were added into the ARM Model revision.

11.1.2 Enumerated Concerns

The current ARM Model underwent revision to include data collected over the last ten-plus years. Although the ARM framework deserves praise for its statistical innovations and a multispecies approach, I believe it no longer serves the interests of either red knots or shorebirds. The new ARM Model, like the old model, does not provide "adequate stopover habitat", a superabundance of eggs, or the restoration of horseshoe crabs for these reasons:

1. The 1998 Management Plan specifically listed existing trawl, spawning, and egg surveys stating, "while useful for general trends within specific areas, each is complicated by factors that may bias data, such as sampling error, inappropriate equipment or incomplete sampling effort" (ASFMC 1998, pg. 22). The Plan recommended a standardized monitoring program (ASFMC 1998, pg. 22-24) formalized in Addendum III (ASFMC 2004).
2. To overcome concerns over data bias, the Atlantic Coast Benthic Trawl Survey, conducted by Virginia Polytechnic Institute and specifically designed to sample horseshoe crabs, was initiated in 2000 in the Mid-Atlantic Region (NJ to VA). Nearly two decades later, the Virginia Tech Survey has not shown a sustained increase in the number of mature female crabs over the time series (2001 to 2019) (Bi et al. 2019).
3. The 1998 plan also resulted in a bay-wide horseshoe crab egg survey, developed by Dr. Dave Smith (US Geological Survey, Leetown WV) and implemented in 2005 in NJ and DE. Egg surveys were already conducted in NJ, the first in 1986 and 1987, a second in 1990 and 1991, and continuously since 2001 (Smith et al. *in review*). The Horseshoe Crab Technical Committee disenfranchised the egg survey from the FMP in 2013 based on critiques of the technique citing a lack of correspondence between egg clusters and surfaces eggs and criticisms of enumeration methods used in DE and NJ, but offered no

recommendations or alternatives. Thereafter, Delaware discontinued participation in the egg survey, and New Jersey continued egg surveys to the present.

4. In 2015, New Jersey updated survey methods focused on increasing samples sizes and altering the count methodology conducting randomized sampling throughout the entire intertidal area to reduce variability and error margins. Side-by-side comparisons of old and new methods showed the new methods statistically robust. The current surveys being conducted collect data for two important metrics, egg clusters show horseshoe crab spawning activity, and surface egg samples show food availability for red knots and other shorebirds (Smith et al. *in review*). Eggs are the critical link in the management model that would determine whether there is an "adequate stopover habitat for migrating shorebirds" (Figure 1). To date, the survey has shown no sustained increase in surface eggs over the time series (2005 to 2021), and eggs remain below historic abundances (1985-1991: $\bar{x}$ = 144,609 eggs/sq. meter; 1990-1991: $\bar{x}$ = 47,971 eggs/sq. meter; 2015-2021: $\bar{x}$ = 11,565 eggs/sq. meter; (Smith et al. *in review*)).
5. The ASMFC created the Adaptive Resource Management (ARM) Subcommittee to develop a mechanism for deciding horseshoe crab bait harvest quotas based on the management objective: "[. . .] to maximize harvest but also to maintain ecosystem integrity and provide adequate stopover habitat for migrating shorebirds." Since implementation, ARM management has recommended male-only bait harvest (see ASMFC FMP Reviews http://www.asmfc.org/species/horseshoe-crab). The ARM Subcommittee has made nine annual recommendations despite no improvement in horseshoe crab populations in the Virginia Tech Trawl or the NJ horseshoe crab egg surveys.
6. The newly revised ARM model, presented to the ARM Subcommittee in August 2021, uses data from the Virginia Tech Benthic Trawl as well as the NJ Dredge and Ocean Trawl, and the DE 30-foot trawl in a new catch-survey model despite the ASFMC's stated concern over data bias; (See item #1 above). Added to the ASMFC's original misgivings over the survey, New Jersey's moratorium on horseshoe crab harvest adds additional uncertainty – does the newly added survey measure the results of NJ moratorium or Delaware Bay's ARM management? Greater uncertainty arises from the model's use of only five years of data, a short time series that could easily bias results. Although this relies on the Agency's use of "best available data," it also defies the long-held advice of technical and peer review committees to avoid making conclusions about populations based on a short time series of data. In contrast, surface eggs and clusters were excluded from the ARM revision because the committee judged the seven-year time series (2015-2021) too short.
7. The growing concern over ARM population estimates for horseshoe crab comes from the conclusions that the population has increased and reached an equilibrium despite the lack of evidence of an increase in both the Virginia Tech Trawl and egg counts. This prompted repeated concerns from the authors of these studies.
8. These concerns were presented by Dr. Larry Niles at the February 2021 ARM workshop, including the reservations about using data from trawl and dredge surveys not directed

at horseshoe crabs, the lack of improvement in the Virginia Tech survey, and the lack of improvement in NJ's egg survey (see Figure 3). The ARM Subcommittee largely disregarded these concerns.

9. The ARM Model's emphasis on modeled horseshoe crab numbers and narrowly defined harvest packages satisfies commercial harvest interests, but crab eggs are the primary concern for red knots and other shorebirds for whom eggs are the primary (or sole) food source for successful spring migration and productivity (Baker et al. 2004; Duijns et al., 2017). The two interests are related, but crabs maintained at levels sufficient to supply bait, and biomedical use are not necessarily abundant enough to saturate spawning beaches with a high density of surface eggs. Indeed, these diminished egg densities clearly cannot accommodate the inevitable changes wrought by Climate Change including increasingly adverse wind and wave conditions. Egg data reveals that current management does not provide enough egg clusters and surface eggs when conditions are ideal. But in less-than-ideal conditions, like cold water or bad weather years, surface eggs plummet, leaving shorebirds without any resources until after they leave for Arctic breeding areas. This occurred in 2019. This circumstance is far different than the eggs encountered by shorebirds in 1986-87 and 1990-91. These data not only show egg densities greater than five times the current densities and a longer period of robust densities in cold or warm water years
10. ARM members have suggested that a lack of suitable spawning habitat, or climate change impacts to habitat, is responsible for crab population "stability" at the current level. I conclude this is incorrect for several reasons.
    a. First, this ignores the estimated deaths of over 1 million crabs each year from legal bait and biomedical harvests, unaccounted discards, and other unmanaged mortality that may equal legal harvests, indirect impacts on survival through bleeding and harvesting anomalies. For example, genetic samples indicate nearly 44 percent of NY legal bait harvest, which includes both sexes, is of Delaware Bay Origin crabs (E. Hallerman, *personal communication*, April 2021). Similarly, ASMFC estimated mortality of horseshoe crabs from the bleeding by biomedical companies which was half of peer reviewed and published studies.
    b. Second, suggestions that habitat is limited without any supporting data also represent a lack of understanding of horseshoe crab breeding biology. If habitat were limited and female crabs were abundant enough to saturate spawning beaches with egg clusters, then suitable habitats would have high surface egg densities through May. Data on egg clusters (2015-2021) and surface eggs (2000-2021) do not reflect this condition.

Lastly, NJ has restored horseshoe crab breeding habitat to the optimal condition since Hurricane Sandy (2013), with projects totaling over $10 million and over 3 miles of horseshoe crab habitat restored. Although restored beaches contain greater egg densities than unrestored beaches (Smith et al. 2019), densities remain about one-fifth of that seen prior to the 1990's overharvest. If habitat were limited, all suitable habitats would be saturated with eggs. (Smith et al. *in review* 2021).

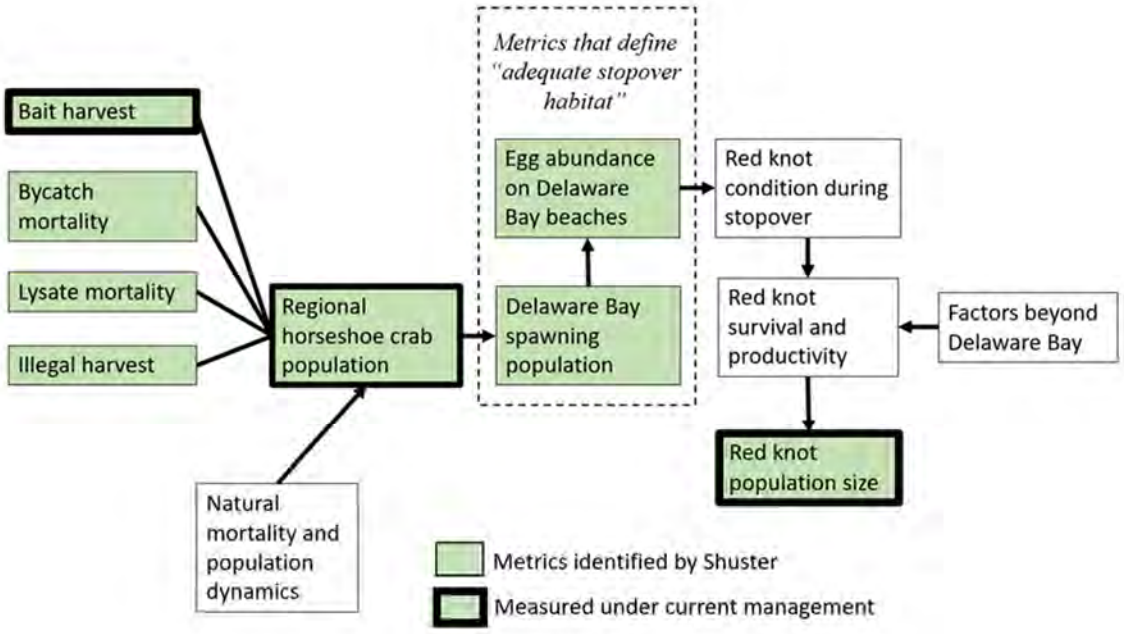
11.1.3 Conclusions

Horseshoe crab eggs and red knot populations have not increased during the 23 years of ASFMC management, including nine years of ARM Model management (Lyons 2020). The lack of sustained increase in female crabs, insufficient egg clusters on spawning beaches, and insufficient surface eggs for shorebirds leave the Bay in a destabilized condition subject to reduced, delayed, or interrupted crab spawning even under fair weather conditions. Insufficient numbers of mature females keep egg densities far below those found in the 1980s and 1990s, and this diminished egg resource will all but disappear if weather and water temperatures are not calm and warm, respectively. Where abundant egg resources once buffered the red knot population against stochastic events (population "Resiliency and Redundancy", USFWS 2021, pg. 5, paragraph 3; pg. 6, paragraph 1), red knots are now left vulnerable to any perturbation within and outside of Delaware Bay. At the start of the model, the technical groups refused fisheries survey data collected which showed horseshoe crab decline (ASMFC 2000b pg. 2) then reinstated the same data when it showed increase. This reduces the scientific credibility of the model and suggests the need for horseshoe crab harvest is greater than the continued existence and recovery of red knots.

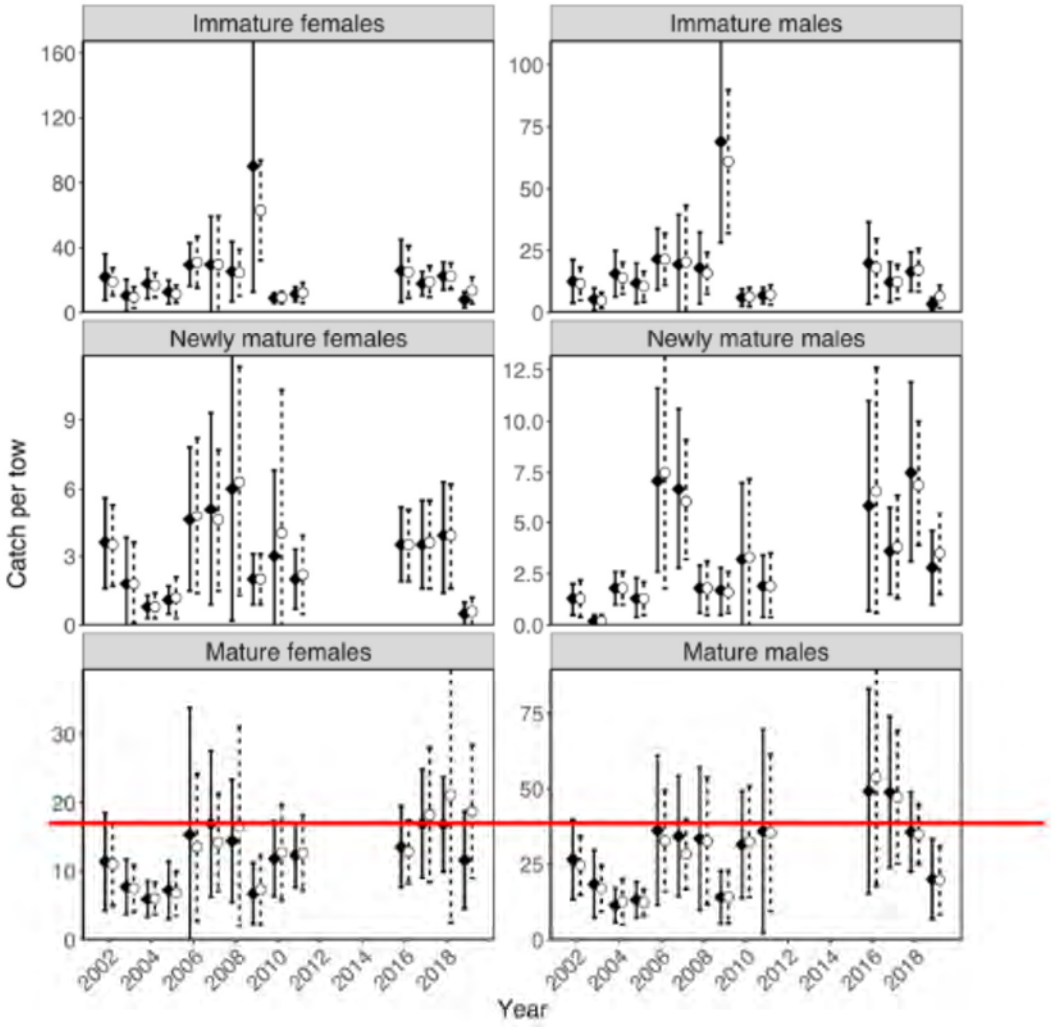
Therefore, I believe the management of horseshoe crabs on Delaware Bay, after nine years of ARM Model implementation with concurrent monitoring, does not satisfy the management objectives set forth in the 1998 Fishery Management Plan and 2009 ARM Model Framework - to maintain ecosystem integrity and provide adequate surface eggs for shorebirds. Additionally, I believe the USFWS assumption that: "as long as the ARM is in place and functioning as intended, ongoing horseshoe crab bait harvests should not be a threat to the red knot" (79 Fed. Reg. at 73,709) cannot be legitimately supported. I request the USFWS reverse or at least reconsider this assumption and "provide recommendations and technical assistance to ensure that future harvests of horseshoe crabs do not result in the take of red knots under section 9 of the [Endangered Species] Act." (79 Fed. Reg. at 73,710).

Additionally, I believe the current management cannot create the resiliency necessary to weather the impact of Climate Change. Managing horseshoe crab populations for the sake of harvesters does not provide for a robust population of horseshoe crabs necessary to weather increased threats of storm frequency and intensity during the spawning period. Increasing Climate Change impacts create an even more pressing need for new management measures to restore a robust population of horseshoe crabs and the associated superabundance of horseshoe crab eggs that previously characterized spawning conditions in the Delaware Bay.

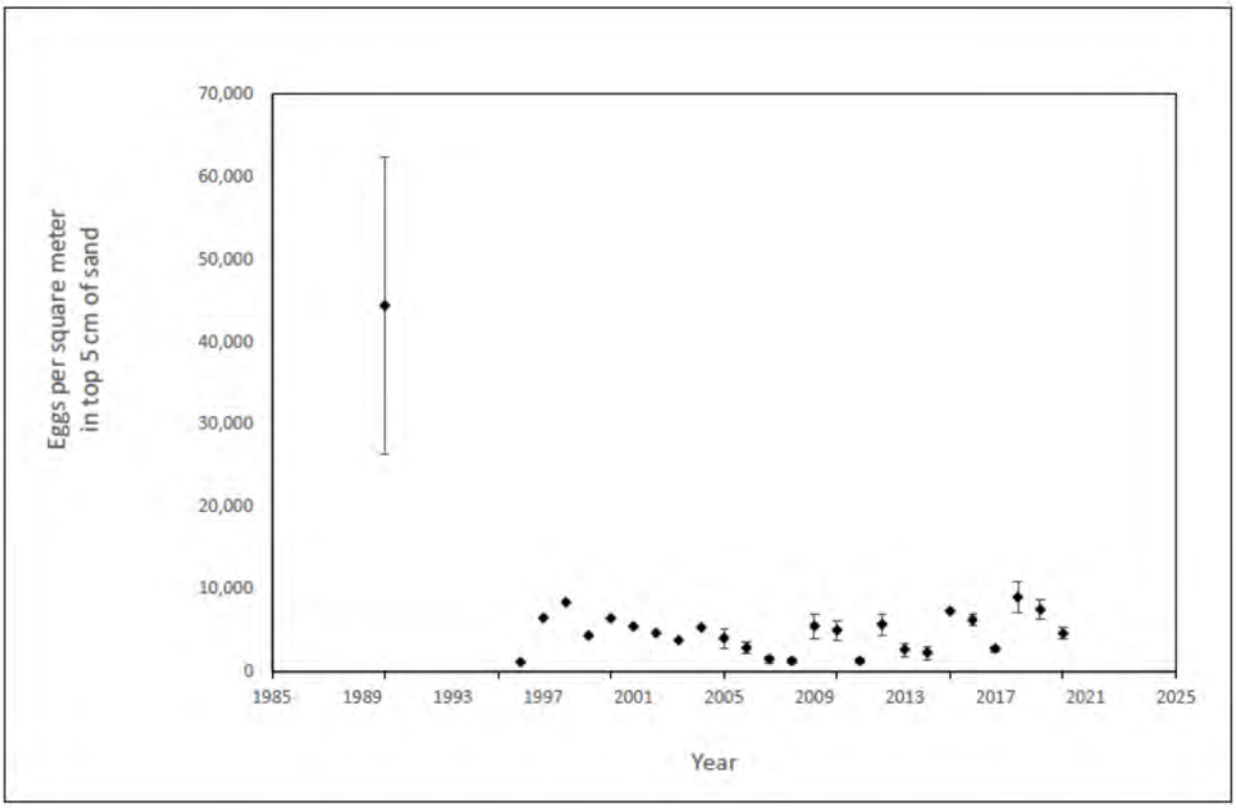
11.1.4 Tables and Figures



Niles Figure 1. The two metrics missing from the current ARM management framework are intended to describe conditions on spawning beaches. Omission of these beach-based measurements are a lost opportunity because they offer unique insights into management effectiveness. Conditions on spawning beaches serve as a critical link in a management logic model that would determine whether there is "adequate stopover habitat for migrating shorebirds."



Niles Figure 2. Plots of stratified mean catches per 15-minute tow of horseshoe crabs in the coastal Delaware Bay Area survey by demographic group. Vertical lines indicate 95% confidence limits. Solid symbols and lines indicate the Delta distribution model. Open symbols and dashed lines indicate the Normal distribution model. Note difference in y-axis scales. Source: Figure 2 in Bi et al. 2020.



Niles Figure 3. Surface egg densities on NJ beaches: Historic 1990-1991 (Botton et al. 1994), unpublished report to NJDEP 1996-1999 (Botton and Loveland), NJDFW unpublished data 2000-2021 (NJ Division of Fish & Wildlife).

Niles Table 1. Indices of bay-wide male and female horseshoe crab spawning activity (ISA), number of beaches surveyed, standard deviation (SD), coefficient of variation (CV), 90% confidence intervals (CI) and sex ratio for the Delaware Bay from 1999 to 2017 (Source: DE DFW).

Year	Beaches Surveyed	Male				Female				Annual Sex Ratio (M:F)
		ISA	90% CI	SD	CV (%)	ISA	90% CI	SD	CV (%)	
1999	17	2.5	1.86, 3.37	0.45	18	0.77	0.62, 0.97	0.1	13	3.2
2000	22	2.96	2.31, 3.80	0.45	15	0.91	0.74, 1.13	0.12	13	3.2
2001	22	2.37	1.91, 2.95	0.31	13	0.75	0.63, 0.90	0.08	10	3.1
2002	23	2.86	2.45, 3.34	0.27	9	0.91	0.79, 1.04	0.07	8	3.1
2003	23	2.89	2.50, 3.33	0.25	9	0.8	0.71, 0.91	0.06	8	3.6
2004	24	2.93	2.55, 3.36	0.24	8	0.77	0.68, 0.87	0.06	7	3.8
2005	23	3.23	2.79, 3.74	0.29	9	0.82	0.72, 0.93	0.07	9	3.9
2006	24	3.99	3.49, 4.56	0.33	8	0.99	0.89, 1.10	0.07	7	4
2007	24	4.22	3.63, 4.90	0.38	9	0.89	0.78, 1.01	0.07	8	4.7
2008	25	2.3	1.83, 2,90	0.32	14	0.68	0.59, 0.78	0.06	9	3.4
2009	26	4.67	4.11, 5.29	0.36	8	1	0.89, 1.11	0.06	6	4.7
2010	25	3.39	2.93, 3.94	0.31	9	0.8	0.70, 0.92	0.07	8	4.2
2011	25	3.31	2.83, 3.87	0.31	10	0.64	0.57, 0.72	0.05	7	5.2
2012	25	2.44	1.97, 3.01	0.31	13	0.56	0.47, 0.67	0.06	10	4.4
2013	25	3.2	2.98, 3.44	0.14	4	0.85	0.80, 0.91	0.03	4	3.8
2014	25	2.28	2.09, 2.48	0.12	5	0.54	0.50, 0.59	0.03	5	4.2
2015	23	2.75	2.59, 2.92	0.1	4	0.66	0.62, 0.70	0.02	4	4.2
2016	25	4.1	3.86, 4.36	0.2	4	0.9	0.85, 0.95	0.03	3	4.6
2017	25	3.68	3.37, 4.02	0.2	5	0.71	0.65, 0.78	0.04	6	5.2

Niles Table 2. Superpopulation estimate (mark-resighting method). Source: Lyons 2019, Table 4, Memorandum to the Delaware Bay Adaptive Resource Model (ARM) Working Group. September 30, 2020.

Table 4. Stopover (passage) population estimate using mark-resight methods compared to peak-count index using aerial- or ground-survey methods. The mark-resight estimate of stopover (passage) population accounts for population turnover during migration; peak-count index, a single count on a single day, does not account for turnover.

Year	Stopover population[a] (mark-resight N^*)	95% CI Stopover population N^*	Peak-count index [aerial (A) or ground (G)]
2011	43,570	(40,880 – 46,570)	12,804 (A)[b]
2012	44,100	(41,860 – 46,790)	25,458 (G)[c]
2013	48,955	(39,119 – 63,130)	25,596 (A)[d]
2014	44,010	(41,900 – 46,310)	24,980 (A)[c]
2015	60,727	(55,568 – 68,732)	24,890 (A)[c]
2016	47,254	(44,873 – 50,574)	21,128 (A)[b]
2017	49,405[e]	(46,368 – 53,109)	17,969 (A)[f]
2018	45,221	(42,568 – 49,508)	32,930 (A)[b]
2019	45,133	(42,269 – 48,393)	30,880 (A)[g]
2020	40,444	(33,627 – 49,966)	19,397 (G)[c]

[a] passage population estimate for entire season, including population turnover
[b] 23 May
[c] 24 May
[d] 28 May
[e] Data management procedures to reduce bias from recording errors in the field; data from observers with greater than average misread rate were not included in the analysis
[f] 26 May
[g] 22 May

1998, FMP for Horseshoe Crab.

Pg 22. Summary of Monitoring Programs

While each of the above-mentioned monitoring programs are useful in identifying general trends within specific areas, each is complicated by factors that may bias the data, such as sampling error, inappropriate equipment, or incomplete sampling effort. The independent monitoring programs also lack a comprehensive data collection goal. The goal of a comprehensive horseshoe crab monitoring program should be to produce data necessary to develop a stock assessment for the Atlantic Coast horseshoe crab populations that can be used in future management decisions.

Numerous state and federal agencies, universities, and private organizations are involved in data-collection efforts to ascertain horseshoe crab population status. Monitoring and evaluation efforts specific for horseshoe crabs include egg counts in Delaware Bay (New Jersey and Delaware) by Dr. Robert Loveland of Rutgers University and Dr. Mark Botton of Fordham University, egg counts by Dr. Richard Weber of the University of Delaware, spawning surveys in Delaware Bay (New Jersey and Delaware) by Limuli Laboratories, spawning surveys in New Hampshire by Great Bay National Estuarine Research Reserve, and spawning surveys in Maryland's Chesapeake and coastal bays by Maryland Department of Natural Resources. Trawl surveys are conducted along the New Jersey Atlantic Coast by New Jersey Division of Fish, Game and Wildlife and within the Delaware Bay by the Delaware Division of Fish and Wildlife. Trawl surveys have been conducted along Maryland's Atlantic Coast bays by Maryland Department of Natural Resources, and in Peconic Bay, New York by New York State Department of Environmental Conservation. The NMFS Northeast Fishery Center, the State of Massachusetts, and the Connecticut Department of Environmental Protection also conduct trawl surveys. South Carolina Department of Natural Resource's Crustacean Management Section conducts trawl surveys in five estuaries in South Carolina. The National Oceanic and Atmospheric Administration / SEAMAP conducts shallow water trawl surveys between South Carolina and Florida. Limuli Laboratories and Maryland Department of Natural Resources also conduct tagging studies. Concurrently, several shorebird monitoring efforts are being conducted, including aerial surveys, diet / weight-gain studies, and banding studies by state and educational research institutions.

11.2 Majority Response to Niles and Justification for Why Opinion Not Adopted

The ARM workgroup is charged with making annual recommendations on the harvest of horseshoe crabs from the Delaware Bay area for the commercial bait industry. This revision to the ARM Framework links the population dynamics of horseshoe crabs and red knots within an optimization routine to make those recommendations. The minority opinion provided by Niles was not adopted in this revision to the ARM Framework because it lacked any proposed means or models for which to base annual harvest recommendations. Instead, the minority opinion focuses on a misrepresentation of the ecology and management of horseshoe crabs, an apparent lack of positive trend in egg density data from spawning beaches, and a lack of positive trend in the relative abundance of horseshoe crabs in the VA Tech Trawl Survey. Observation of trends without additional modeling does little to provide scientifically based harvest recommendations on an annual basis. Also, the minority opinion fails to provide any specific critiques of, or recommendations to improve, the population dynamics modeling of horseshoe crabs and red knots or the optimization techniques used in the majority report.

The opening paragraphs of the minority report materially misrepresent the ecology and management of horseshoe crabs. In the first paragraph, the author misstates the rationale for current ASMFC committee structure for horseshoe crab management in the Delaware Bay. In 2010, the ASMFC conceived of a committee structure to formalize the multiple species aspects of horseshoe crab management in Delaware Bay. Before the reorganization, the inclusion of shorebirds in horseshoe crab management was ad hoc. As part of the restructuring, the shorebird stakeholders were given formal positions in the newly created Delaware Bay Ecosystem Technical Committee (DBETC) and the Shorebird Advisory Committee. The reorganization placed the Adaptive Resource Management Work Group (ARM) under the DBETC because the focus of the ARM is on the Delaware Bay population. In the second paragraph, the minority report falsely implies that horseshoe crab populations from Maine to Florida had been large enough in the past to produce sufficient eggs for migrating shorebirds. Ecologists have long recognized that Delaware Bay is unique in its capacity to support the horseshoe crab and shorebird relationship (Shuster and Botton 1985; Myers 1986; Botton et al. 2003). In the third paragraph, the minority report misrepresents the ASMFC governance structure. The ASMFC developed the FMP in collaboration with Atlantic coastal states, USFWS, and NOAA. The minority report implies an incorrect role for USFWS in what is a collaborative process.

The use of egg density data within the ARM Framework was removed from consideration in the early stages of the adaptive management process and prior to the original peer-review of the ARM Framework in 2009. Egg density data are highly variable and when egg density surveys were conducted by both Delaware and New Jersey, there were large differences between the states in estimated densities due to differences in sample processing (ASMFC 2009a). As stated in ASMFC (2009a) “Even though the eggs are the food source for the birds and are the actual link between these species, our decision analysis (model state variables, management actions, utility functions/objective statements) is focused on abundance of these two species.” Including egg density data into this decision analysis would require restructuring of the population dynamics models for each species. The relationship between horseshoe crab abundances

generated by the CMSA and egg densities observed on the beaches would need to be quantified. Then the relationship between egg densities and red knot survival and recruitment would need to be quantified. To date, such an analysis has not been conducted, but it is one of several research recommendations listed in Section 10 of this report. This analysis was not done in ASMFC 2009a because the data were so temporally and spatially variable that useable metrics could not be identified in the survival analyses. Instead, the number of spawning females was used in 2009a and in this Revision, which is a more useful metric because it is more consistently measured, and, it is the system attribute that is directly managed through harvest. Additionally, the results of such analyses would likely yield little resolution in decision making because a direct link between female horseshoe crab abundance and red knot survival was established not only in the previous ARM Framework (ASMFC 2009a) but again in this Revision.

The other primary focus of the Niles minority opinion was trends in the VA Tech Trawl Survey. The ARM Framework has never used the relative abundance estimates (catch-per-tow) from the VA Tech Trawl Survey in making harvest recommendations. The previous ARM Framework used the catch-per-tow data expanded to a swept area population estimate in making harvest recommendations. This revision of the ARM Framework uses the population estimates generated by the CMSA, which are dependent on the VA Tech swept area population estimates (Figure 19) plus relative abundance indices from the NJ Ocean Trawl Survey (Figure 13-Figure 14) and the DE Adult Trawl Survey (Figure 16-Figure 17). There is precedence for the additional surveys' inclusions in the ARM, as both the NJ Ocean Trawl and DE Adult Trawl Surveys were used by the ARM Subcommittee to determine horseshoe crab abundance for the model in years when the VA Tech Trawl was not funded (2012-2015). The CMSA was peer reviewed in 2019 and the peer review panel stated, "The Panel recommends CMSA results when abundance and fishing mortality estimates are required, such as in the Adaptive Resource Management (ARM) model used by managers." Figure 23 of this report shows the female abundance estimates from the CMSA. Primiparous females have been highly variable over the time series, reflecting natural variation in year class strength, but multiparous females have increased. Average CMSA estimates of multiparous females were on average 3.77 million from 2003 – 2013, but increased to an average of 7.81 million from 2014 – 2019. Thus, it is erroneous to conclude that there has been no increase in female horseshoe crabs given the CMSA-based population estimates which were endorsed by the previous peer-review panel. The increase in multiparous females observed from 2014 -2019 makes sense given the curtailment of high harvest in early 2000s and the long time to maturity for horseshoe crabs.

11.2.1 Response to Numbered Items

The Niles minority opinion listed 10 specific points of criticism on the majority report. The following are point-by-point responses to each of those:

1. Numerous fishery-independent surveys have been evaluated and reconsidered since the implementation of the first Fishery Management Plan (FMP) in 1998 through the latest benchmark stock assessment in 2019 and this ARM Revision in 2021. The surveys used in this report have statistical sampling designs, operate in a time and place that reliably capture horseshoe crabs, and have consistent methodology throughout the years used in the model. The NJ Ocean Trawl and DE Adult Trawl were approved for use in both the

2009 and 2019 stock assessments and in the ARM Framework for the years when the VT Trawl Survey was not funded.

The Niles minority opinion uses a quote from the 2000 ASMFC FMP Review ("…inadequate information for a coastwide stock assessment, to establish reference points, fishing mortality rates, recruitment estimates…") as evidence that the NJ Ocean Trawl and DE Adult Trawl were previously deemed inadequate for assessing horseshoe crabs in the Delaware Bay area. The conclusions in the FMP Review referred to the inadequacy of the available data in 1998 (ASMFC 2002) but they did not categorize all existing surveys as being unsuitable for collecting necessary data. In the FMP's section 3.5 Summary of Monitoring Programs, Component B recommended the continuation of existing state benthic sampling programs, including those in Delaware and New Jersey, and to record weight, number, and prosomal width by sex (ASMFC 1998). Though Delaware's Adult Trawl Survey already collected all this information, New Jersey's Ocean Trawl Survey did not record sex while collecting the other data. Subsequently, in 1999, New Jersey added sex data to their sampling protocol for horseshoe crabs. Additionally, in section 6.0 Management Research Needs, the FMP recommended the formulation of a "benthic sampling program for horseshoe crabs using standardized and statistically robust methodologies …" (ASMFC 1998). To meet this recommendation, the ASMFC supported the implementation of a trawl survey focused specifically on horseshoe crabs in the Delaware Bay region to be conducted by VA Tech after successfully performing a pilot survey in 2001 (ASMFC 2002). While ASMFC's support of this survey was unwavering, it also supported the continuation of existing surveys as stated explicitly in Addendum III, within the Monitoring Program Recommendations' Component B2 (ASMFC 2004).

2. The VA Tech Trawl Report for the 2019 survey year states in its key findings, "Mean catch-per-tow of mature males and females in the coastal Delaware Bay area have been variable throughout the time-series, but show increasing trends since 2002." These results are supported by increasing trends also seen in the Delaware and New Jersey trawl surveys. Regardless, the VA Tech Trawl Survey is variable from year-to-year and was not in operation for several years. Thus, this ARM Revision proposes the use of the CMSA to estimate horseshoe crab abundance since it can incorporate several indices of abundance and accounts for all quantifiable sources of removals (bait, biomedical, and discard mortality). The 2019 coast-wide benchmark assessment peer-review panel endorsed the use of the CMSA for this purpose. Additionally, the population estimates of multiparous horseshoe crabs varies less from year-to-year than the survey estimates alone.

3. During the development of the original ARM Framework (2009a), the committees discussed the substantial differences in methodology between New Jersey and Delaware's egg density surveys and the impacts that had on the survey results. There was high variability both within and between sites, sampling issues, and unresolved uncertainty in the surveys and the DBETC could not reach consensus on how to use this data. Ultimately, the committees decided to link red knot population dynamics directly to horseshoe crab abundance rather than through eggs and data analyses support this

relationship (McGowan et al 2011). Therefore, in 2012, Delaware requested a review of the state's egg survey since the survey was not being used to inform management and took personnel and money to maintain. Horseshoe crab technical committees were asked to review the survey and determine if it could be improved or if it should be discontinued. The DBETC determined in a 2013 memo that Delaware does not need to continue the survey because "egg density is not predictive of future stock recruitment… thus, egg density is not used to assess the horseshoe crab population" and "the ARM Framework relies on annual estimates of abundance for red knot and horseshoe crab populations." Finally, they concluded that "the DBETC recommends that the egg survey be discontinued as a compliance element for the states of New Jersey and Delaware. The DBETC added a note that individual states might want to continue the egg survey (for example, NJ requires it as part of their State's regulations) and the TC is willing to provide guidance and expertise to help improve the survey to detect trends for their needs." This was not disenfranchising the Delaware egg density survey but an acknowledgement that this survey was not being used for management and that states have limited staff and resources.

4. The trend in egg density from 1999 to 2021 (Figure 2 in Smith et al., unpublished data, supplemental to the Niles) appears to match the pattern in the trawl survey results over the same period. If so, the egg density data presented in Smith et al. (unpublished data) would support rather than refute the findings of the recent stock assessment and revised ARM.

   The direct comparison of the Botton et al. (1994) egg densities to recently estimated egg densities is questionable because of confounding differences in spatial and temporal sampling design. Egg densities vary across the beach width, along the beach length, and over the spawning season (Weber and Carter 2009). A failure to account for all these sources of variation can confound egg density comparisons. For example, Botton et al. (1994) sampled only 2 cross-beach transects at 3 dates corresponding to peak locations and times. In contrast, Smith et al. (unpublished data) sampled 5 to 10 cross-beach transects once per week for 6 weeks. Whereas Botton et al. (1994) averaged over "peak" locations and times, recent egg sampling averaged over locations and times that included the peaks and the tails of the data distributions. Although the sampling design used in recent egg sampling results in a representative statistical sample, the results are not directly comparable to a study designed to sample only the spatial and temporal peaks.

   Smith et al. (unpublished data) fails to adequately rule out the competing hypothesis that loss of spawning habitat explains changes in egg densities. A recently published paper by Botton et al. (in press) reveals significant habitat loss along the eastern (NJ) shoreline in Delaware Bay and concludes that loss of quality spawning habitat is the main threat to horseshoe crabs. The habitat loss that Botton et al. (in press) documents took place from the 1980s to present time, which confounds egg-density comparisons over the same time presented by Smith et al. (unpublished data). A prediction that higher egg densities would result from crowding into reduced habitat fails to account for spatial shifts in habitat use throughout the bay. Horseshoe crabs do not exhibit fidelity

to a spawning beach. Rather their habitat use is in response to the geomorphological dynamics of estuarine beaches. Spawning beaches form, erode, and migrate within an estuary. Anthropomorphic interventions, such as shoreline armoring, protect buildings and onshore property, but degrade spawning habitat by truncating the beach width and exposing peat deposits. Horseshoe crabs tend to avoid rather than crowd onto eroded beaches. Beach nourishment must be conducted on a scale and frequency to maintain sandy beaches in spite of erosive processes. The state of Delaware discontinued shoreline armoring (e.g., bulkheads and revetments) in the 1980's, whereas NJ continued to rely on hard structures to protect estuarine property. This highlights a fundamental flaw in the Smith et al. study caused by selecting sites to monitor based on past high abundance (Fournier et al. 2019) even though the habitat to support high abundance has changed. Horseshoe crabs can shift their habitat use spatially throughout the bay.

Smith et al. (unpublished data) attempt to infer population changes from a spatially constrained sample. The ASMFC stock assessments and ARM Framework combines multiple, cross-jurisdictional data sets to achieve the spatial and temporal coverage necessary to infer population status. But the data in Smith et al. (unpublished data) are restricted to a stretch of NJ shoreline that has experienced habitat loss (Botton et al., in press) and is not representative of the baywide habitat available to horseshoe crab population or shorebirds. The relevant question that is not answered or even asked by Smith et al. (unpublished data) is whether adequate eggs are available to shorebirds in the Delaware Bay.

5. Since the implementation of the ARM in 2012, the harvest package selected has consistently been 500,000 male-only horseshoe crabs in the Delaware Bay region. This is because for the duration of the ARM (2013-2022 fishing years), both horseshoe crabs (as estimated by VA Tech swept area population estimates) and red knots (stopover superpopulation estimates) have been below their thresholds of 11.2 million female horseshoe crabs and 81,900 red knots, respectively. Below these thresholds, the harvest of female horseshoe crabs has zero utility in the previous ARM optimization routine. The presence of these threshold constraints in the utility function was criticized during this revision for not being consistent with adaptive management and optimization procedures and therefore they were removed from the utility functions. The threshold functions were also criticized during the peer review of the original ARM Framework (ASMFC 2009a), specifically the knife-edge threshold. Estimates of horseshoe crab abundance from the CMSA, which have been adopted as the best estimates of horseshoe crab population size, show that the population has increased. Currently, the ARM does not consider the NJ horseshoe crab egg surveys nor were the raw data, methods, or estimated values and associated error provided for this ARM Revision for consideration by the committee.

6. As stated in the response to item #1, the NJ Ocean and DE Adult Trawls have been reevaluated by technical committees and the stock assessment subcommittee and included in both the ARM Framework for when the VA Tech Trawl was not funded (2012-2015) and in two peer-reviewed benchmark assessments (ASMFC 2009b, 2019) as

reliable indices of horseshoe crab abundance. There is no NJ dredge survey used as input to the CMSA or ARM framework. Both the NJ Ocean and DE Adult Trawls have consistent survey methods and reliably catch horseshoe crabs. Additionally, NJ Ocean Trawl has also started staging horseshoe crabs (primiparous and multiparous stages) to support the CMSA modeling in the future. The CMSA model uses both these surveys for the full time series (2003-2019), which is much longer than five years. While a short time series, such as the 2015-2021 NJ egg survey, would be challenging for modeling, it is not impossible but this data was not provided for consideration during model development.

The relative effects of NJ's moratorium versus ARM management are indistinguishable within a survey. The survey indexes the population which is influenced by overall harvest pressure on the population. Both the NJ moratorium and ARM management have reduced harvest compared to what it was prior to implementation of the horseshoe crab management plan in 1998. The uncertainty mentioned here could be applicable to the VA Tech survey results as well. These surveys provide abundance data regardless of the reasons for any increase/decrease/status quo trends seen in their data.

7. While outside the years of this report, the 2020 estimates from the VT Trawl Survey used in the ARM Framework was 9.5 million female horseshoe crabs (10.5 million females at the time of the survey in the fall of 2020 reduced by half a year's natural mortality to coincide with what would be available during the time of shorebird stopover in the spring of 2021). This value is approaching the 2009 ARM threshold of 80% carrying capacity, or 11.2 million females. While carrying capacity is not used in the ARM Revision, the long-term simulated equilibrium of female horseshoe crabs is estimated at 13.2 million females under the assumption of no female harvest from any source (Figure 29). The 2019 female horseshoe crab population estimated from the CMSA is 9.8 million (Table 16). This female population estimate from the CMSA represents an overestimate, as it is calculated using coastwide biomedical data and not the confidential Delaware-Bay only data. Regardless, both methods and estimates have the female horseshoe crab population approaching the former threshold (80% carrying capacity or 11.2 million females) or predicted equilibrium (13.24 million females). The egg counts have not, nor have they been since the ARM was implemented, a benchmark used by the ARM Framework due to multiple issues with the survey(s).

8. The ARM Subcommittee did not disregard these concerns, rather the two surveys (NJ Ocean Trawl and DE Adult Trawl) have demonstrated through two stock assessment peer reviews and vetting through the ARM Subcommittee that they are tracking the regional population. Both are multispecies trawls used in several species' stock assessments. Neither the NJ Ocean Trawl nor the DE Adult Trawl are dredge surveys, although that gear would be considered if there was a reliable survey that met the criteria. (Note: A NJ surf clam dredge was once used as an index in the assessment of horseshoe crabs, but this survey has not been considered since 2012 when sampling methodology changed.) All the surveys (VA Tech Trawl Survey, NJ Ocean Trawl, DE Adult Trawl) used in the ARM Revision were provided for consideration by the Subcommittee, including methods, raw data, and any state or university-calculated indices with

estimated error. No data or comprehensive methods were ever provided for the NJ egg density survey. Following the February 2021 objections by Larry Niles, ASMFC staff participated in a call with Joseph Smith in March 2021 to discuss the NJ egg density survey but the raw data and methods were still not provided for consideration following that call. The unpublished draft manuscript by Smith et al. submitted with the minority report was the first time the ARM Subcommittee saw details on the current NJ egg density survey.

9. As previously stated, to incorporate the linkage between female horseshoe crab abundance, egg density on beaches, and red knot survival would require additional analysis to quantify these relationships for use in projection modeling and optimization. A direct link between female horseshoe crab abundance and survival has been established in this report as well as the previous ARM report (ASMFC 2009a) and in the literature (McGowan et al. 2011; Tucker et al. 2019, 2021). Again, one of the research recommendations from the ARM Subcommittee is continued analysis of egg density data and the relationship to horseshoe crab abundance estimates from the CMSA. Diminished egg densities wrought by climate change and increasing adverse wind and wave conditions is a possible hypothesis that would require additional research and analysis, and this is also another research recommendation specified in the report. Without actually fulfilling these research needs and conducting the appropriate analysis of those data, one is left with only speculation about the effects of these factors on the population dynamics of these two species. It is unknown if conditions in 2019 caused a decrease in red knot survival or recruitment because these data were beyond the years available at the time of the analysis contained within this report (i.e., the IPM development), therefore, to conclude weather conditions in 2019 had a deleterious effect on red knots is premature.

10. It is accurate to say that over 1 million horseshoe crabs die annually coastwide from legal bait and biomedical harvest. Reported coastwide bait landings in 2019 (the most recent available FMP Review) were 1,022,909 horseshoe crabs, below the coastwide quota of 1,587,274 horseshoe crabs. However, total Delaware Bay origin removals (bait, biomedical, and dead discards) used in the CMSA averaged 68,818 females and 267,297 males per year from 2008 – 2018 (Tables 13 and 14), and these are overestimates because they assume coastwide biomedical mortality occurred solely in Delaware Bay. This number is significantly less than 1 million crabs each year. The ASMFC-estimated biomedical mortality of 15% was in fact derived exclusively from peer-reviewed and published studies (ASMFC 2019), comprised of estimates both lower and higher than 15% depending on the study and its methods. The current use of the CMSA meets the first term of reference in this report by including “unaccounted discards” and biomedical harvests. These were sources of mortality ignored in the previous ARM Framework. If “other unmanaged mortality” and “harvesting anomalies” can be quantified and those data are available, it would be an easy task to also include them in the total removals used in the CMSA.

    It is true that 44% of the NY bait harvest of horseshoe crabs in the Long Island sound area have genotypes indicating that they originated from the Delaware Bay as noted by

Dr. Eric Hallerman (personal communication). This is not surprising given potential large coastal movements observed through tagging studies of horseshoe crabs. However, a lower percentage of horseshoe crabs from the northeast area (which would include Long Island Sound) comprised commercial catches in the vicinity of Delaware Bay (e.g., Ocean City MD, Chincoteague and Assateague Islands, VA), thus indicating greater movement out of the Delaware Bay area than into the Delaware Bay area. Tagging data also suggest a greater movement rate out of Delaware Bay to NY than from NY into Delaware Bay (ASMFC 2019). Thus, harvest in NY waters is expected to have little impact on the Delaware Bay population because individuals originating from Delaware Bay and caught in NY likely represent permanent emigration from the Delaware Bay.

Finally, this ARM Revision makes no statements about horseshoe crab habitat other than as a research recommendation to evaluate the effects of climate change on horseshoe crabs and red knots, including the effects on spawning habitat and spawning timing.

11.2.2 Response to Niles Conclusions

Niles argues that the ARM Framework no longer meets the assumption by the USFWS that “as long as the ARM is in place and functioning as intended, ongoing horseshoe crab bait harvests should not be a threat to the red knot" (79 Fed. Reg. at 73,709). However, during the time that the ARM has been instituted, horseshoe crab abundance has increased (Figures 23 and 24) and red knot stopover population size has remained stable (Table 12). Further, this is not the appropriate forum to make a request to the USFWS.

Finally in his conclusion, Niles argues that considerations of climate change are not taken into account. This is false. Climate change considerations were taken into account by including arctic snow cover as a covariate in the IPM model for red knots. Snow cover was found to have a negative but not significant influence on red knot survival and no effect on recruitment, but this covariate remains in the model and as more data are collected, perhaps an influence of this covariate will become apparent and future modeling could incorporate predictions for how snow cover may change into the future. Also, the effects of climate change were included in future research recommendations.

11.3 Walsh Minority Opinion

Wendy Walsh, ARM Subcommittee member, U.S. Fish and Wildlife Service (USFWS)

11.3.1 Introduction

I appreciate the opportunity to review the draft report entitled *Revision to the Framework for Adaptive Management of Horseshoe Crab Harvest in the Delaware Bay Inclusive of Red Knot Conservation*. The draft report represents a tremendous amount of work, knowledge, and technical expertise aimed at updating and improving the Adaptive Resource Management (ARM) framework that has guided the Atlantic States Marine Fisheries Commission’s (ASMFC) horseshoe crab bait harvest policy since 2013. Pages 20-21 of the draft report list seven major changes from the current to the proposed ARM framework, with which I generally concur.

Among the most positive changes are the replacement of literature values with empirical values for certain key horseshoe crab and red knot demographic parameters, and the explicit accounting for biomedical harvest and discard ("bycatch") as sources of anthropogenic crab mortality. Another major advance involves moving away from discretized parameters (e.g., a single, universal weight threshold for all red knots; three uneven time windows for birds to transition from "light" to "heavy;" a small number of harvest packages that linked male and female harvest levels) toward more continuous inputs and outputs that may allow the framework to more effectively "learn" and adapt absent those artificial constructs. However, I do have some concerns and objections, which are the focus of this minority report.

11.3.2 Simulation Models

The proposed changes to the ARM framework include complete replacement, not just updating, of the simulation models that are used to project horseshoe crab and red knot populations into the future. I have expressed concern that by replacing, instead of updating, these projection models, we risk losing some of the benefits of iterative learning that are supposed to accrue from the double-loop model of adaptive management (Figure 1). However, given the problems that were encountered upon updating the previous Multistate red knot model (draft report Section 7.1.2), I do concur that replacing it with the proposed Integrated Population Model (IPM) is the best path forward and represents best available science. Similarly, given the conclusion of a previous ASMFC peer review panel that the Catch Multiple Survey Analysis (CMSA) represents the best available horseshoe crab abundance estimates (draft report p. 18), I do likewise concur that CMSA should replace the previous State-based population simulation model for horseshoe crabs.

However, I request that the ARM Subcommittee revisit the possibility of weighting the Virginia Polytechnic Institute (Virginia Tech) data more heavily than the other data sets in the CMSA model, which is used in the proposed new ARM framework both to estimate current horseshoe crab abundance as well as projecting those estimates into the future. It is significant that the Virginia Tech trawl is the only survey that is purpose-designed to estimate horseshoe crab abundance in the Delaware Bay region. And it is concerning that, without such weighting, the CMSA estimates for 2016 to 2019 were 1.1 to 5.3 million higher than the Virginia Tech estimates for total adult females (primiparous + multiparous), and 7.7 to 13.7 million higher for total adult males over that same time period (draft report Tables 16 and 17; Hallerman and Jiao, Table 6). This result was predictable from the sensitivity runs conducted for the 2019 stock assessment, which noted: *"An equal weight … model produced considerably higher terminal stock size estimates since greater emphasis on the VT survey was no longer specified, allowing the model to more closely fit the sharply rising DE and NJ trawl indices."* (ASMFC 2019, p. 77).

Rather than the equal weights assigned in the draft report, I recommend weighting the three data inputs to CMSA as per the 2019 stock assessment (0.59 Virginia Tech trawl, 0.16 Delaware adult trawl, 0.25 New Jersey ocean trawl) based on: (1) the technical rigor and deliberate design of the Virginia Tech trawl survey for the purpose of estimating crab abundance; (2) the high level of confidence that stakeholders have expressed in the Virginia Tech survey; (3) the previous support among many Delaware Bay Ecosystem Technical Committee members for weighting the Virginia Tech survey more heavily than the other surveys; and (4) the real-world

consequences of a change in methodology that—had it been in place—would have changed harvest recommendations from 0 to 140,000 female crabs in 2 of the 4 recent years for which data are available. Regarding this last point about the resumption of female harvest, numerous concerns around risk and uncertainty are discussed in detail below.

11.3.3 Red Knot Utility Function

There is one other change proposed in the draft report to which I object and wish to express considerable concerns. Section 8 of the draft report describes a new red knot utility function that was developed for this update and that is proposed to guide harvest policy going forward. In a major break with the existing ARM framework, the proposed new utility function would allow for the immediate resumption of female crab harvest, potentially at levels approaching the maximum harvest limit. I have both procedural and substantive concerns with this proposed change, and respectfully request that this section of the report be reconsidered.

11.3.3.1 Procedural Concerns

As adopted by the ASMFC Horseshoe Crab Management Board, the existing ARM framework is underpinned by the concepts and principals of formalized adaptive management (ASMFC 2009a, p. iii). Adaptive management is a special case of structured decision making (SDM) for decisions that recur and for which uncertainty is an impediment.[1] In turn, SDM is a formal and transparent approach to decision making that incorporates views of all stakeholders and utilizes predictive modeling to assess the potential consequences of alternative actions (ASMFC 2009, p. 1). One of the key advances brought about by SDM in the arena of natural resource management is a great emphasis on complete elicitation of objectives and management actions from a full range of stakeholders (ASMFC 2009a, p. 1). Addendum VII, which formally adopted the ARM framework to guide harvest policy, states: *A goal of the ARM Framework is to transparently incorporate the views of stakeholders along with predictive modeling to assess the potential consequences of multiple, alternative management actions in the Delaware Bay Region* (ASMFC 2012, p. 2).

The SDM paradigm breaks the decision-making process into a number of discrete steps. As shown in Figure 2, an early step in SDM is developing explicit expressions of inherently value-laden objectives, reflecting individual, institutional, and societal preferences, weights, and risk attitudes. Accordingly, this step is typically undertaken with input from a broad group of stakeholders, helping to ensure stakeholder engagement in the process and ultimately stakeholder buy-in in the decision. Key to successful SDM is faithfully carrying forward and accurately interpreting those value-laden stakeholder inputs through the remaining steps of the process.

The draft report retains the original ARM Objective Statement, as recently updated to more explicitly reflect the red knot: *Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity, provide adequate stopover habitat*

[1] https://nctc.fws.gov/courses/programs/decision-analysis/structured-decision-making-overview.html

for migrating shorebirds, and ensure that the abundance of horseshoe crabs is not limiting the red knot stopover population or slowing recovery. However, the draft report proposes to replace the red knot utility function, which is the mechanism by which this Objective Statement is translated into harvest policy. It is the replacement of the utility function that is my key concern.

In short, my procedural concern is that the new utility function proposed in the draft report does not reflect the values and risk attitudes that were clearly expressed by the original group of stakeholders during initial setup of the existing ARM framework. The proposed new utility function substitutes very different values and risk attitudes under the umbrella of technical updates, outside of a forum for meaningful stakeholder input and absent any process to solicit updated stakeholder viewpoints. We, the ARM Subcommittee, have returned to the set-up phase (top box in Figure 1), but have failed to consult a broad array of stakeholders in the reinterpretation of previously agreed-upon objectives.

The existing utility function has recommended zero female crab harvest since 2013, and would likely continue doing so for at least the next few years.[2] In contrast, even using Virginia Tech data rather than the higher CMSA abundance estimates, the proposed new utility function would have recommended harvest in the range of 125,000 to 172,000 females per year had it been in place between 2017 and 2021 (B. Nuse, *personal communication*, 2021). Adoption of the proposed new utility function would immediately allow for female harvest, possibly as soon as 2023, with a likely harvest recommendation in the range of 175,000 to 190,000 females[3] per year (B. Nuse, *personal communication*, 2021). A precautionary, risk-averse approach to female crab harvest is a central tenet of the existing framework as expressed by the stakeholders during the initial development and adoption of the ARM (see Box 1). Such a major reinterpretation of this tenet as is represented by the proposed new utility function should not be pursued under the mantle of technical updates, but should instead involve the reconvening of a broad stakeholder group and a robust elicitation to update their views on risk tolerance with respect to female crab harvest.

The existing ARM framework does not value female crab harvest until either red knots or horseshoe crabs reach agreed-upon threshold population levels. These population thresholds act as a constraint on female harvest. Under the current framework there is no female crab harvest until female abundance reaches 11.2 million crabs OR until the Delaware Bay total red knot stopover population reaches 81,900 birds. These threshold values act as a constraint on female harvest, which was the express intent of the stakeholders. The draft report (p. 76)

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[2] Looking only at Virginia Tech data, crab abundance has ranged from 5.3 to 10.9 million females from 2016-2020 (Hallerman and Jiao, Table 6), and has never exceeded the current "female harvest threshold" of 11.2 million since surveys began in 2002. Thus, I surmise that the existing utility function would likely continue to recommend 0 female harvest for at least the next few years.

[3] This range of likely female harvest levels under the proposed new framework assumes that 2022 crab and knot abundance estimates will be similar to 2017-2021 levels and is based on the proposed (equally weighted) CMSA estimates of crab abundance. In addition to this expected range of female harvest, the new ARM framework would also continue to recommend male harvest at the maximum level of 500,000 per year (B. Nuse, personal communication, 2021), which has been the male harvest quota since 2013.

states: …*in contrast to the original ARM model, where red knot abundance acted as a constraint in the reward, here red knots are assigned a separate utility and their abundance contributes directly to the reward. The ARM workgroup felt that this way of accommodating red knot abundance – via direct contribution to the reward, rather than as constraint – better reflected the values reflected in the ARM project's objective statement*. I strongly disagree with this conclusion on two bases. First, the formulation of these values as a constraint was an explicit and clear choice in the development of the existing framework. Second, the high risk-aversion to female crab harvest by the stakeholders is clear, and thus it can be presumed that the new utility function, which would immediately recommend female harvest—potentially at levels nearing the ultimate cap of 210,000 females per year—would be of considerable concern to those same stakeholders. Support for my conclusions comes from numerous statements in the original ARM document (ASMFC 2009a) and Addendum VII (ASMFC 2012), excerpted in Box 1.

It is useful to consider this 2009 statement as shown in Box 1: *The utility functions reflect the stakeholders risk tolerance to the possibility of red knot extinction and can be revised and updated to reflect shifting society values or new data in future iterations of the adaptive management paradigm.* If anything, society has subsequently declared even greater desire to avoid red knot extinction, and even lower risk tolerance, by listing this bird as threatened under the Endangered Species Act. The red knot and horseshoe crab thresholds for resuming female harvest were value judgements made by stakeholders through a formal SDM process. They should not be discarded under the umbrella of a package of technical updates. If the ARM Subcommittee wishes to discard them, we should reconvene an equivalent stakeholder group and revisit those value judgements. This conclusion is consistent with the process for the "Longer Term Cycle" (*i.e.*, the "outer loop" of the double-loop paradigm, in which we return to the top box in Figure 1). According to Addendum VII, these are the first two steps of the longer-term cycle (ASMFC 2012, p. 4):

- *Solicit formal stakeholder input on ARM Framework to be provided to the relevant technical committees.*
- *Technical committees review stakeholder input and technical components of ARM models and provide recommendations to the Board.*

In my view and interpretation, we, the ARM Subcommittee, are attempting to proceed with the second step but have failed to carry out the first step. I recommend that we return to the first step and fully vet the proposed new utility function, and its implications for female harvest, with a broad group of stakeholders before advancing the draft report to peer review.

11.3.3.2 Substantive Concerns

In my view, risk and uncertainty are both too high for the resumption of female crab harvest at this point in time. As discussed at length above, it was the considered and collective opinion of the stakeholders during ARM development that both red knot and horseshoe crab population levels and growth were too tenuous to risk female crab harvest. There may be some indicators of more recent increases in crab abundance; however, any such trends are associated with high uncertainty and any growth to date remains modest. Furthermore, best available information indicates that red knot populations remain unchanged since the time of ARM development. In

2020 and 2021, dramatic aberrations in the temporal and spatial patterns of red knot presence in Delaware Bay have raised new alarms about the long-term viability of this critical staging area. I offer the following points in support of a continued precautionary and risk-averse approach to female crab harvest.

1. The Southern wintering red knot population has remained between roughly 9,800 and 14,000 birds since 2011. This is about 75 percent lower than during the 1980s or early 2000s (USFWS 2020, p. 22; Matus 2021, entire). The Southern wintering population is a bellwether for the subspecies as a whole because these longest-distance migrants are the most vulnerable to threats throughout their annual cycle—threats that also affect the other three populations but to a lesser degree and/or later in time. The higher intrinsic vulnerability of the Southern wintering population stems from the greater energy demands and greater timing constraints associated with this longest-distance of the four migration strategies. Relative to the other three populations, the Southern wintering population is disproportionately reliant on the Delaware Bay staging area (USFWS 2021, pp. 13, 23).
2. A CMSA model prepared for the 2019 stock assessment found that adult crab abundance was stable from 2003 to 2012 and then rose considerably by 2017 (ASMFC 2019, p. 78). The draft report likewise presents CMSA outputs showing a recent increase in the estimates of adult crab numbers (p. 49). The most recent Virginia Tech trawl survey found that mature crabs in the coastal Delaware Bay area show increasing trends since 2002, but uncertainty is high (Hallerman and Jiao, 2021, pp. 6, 8); these authors make no claims of significance, they only note a general trend relative to the low point in the data series. Considering all data sets and methods, the stock assessment concluded that the Delaware Bay horseshoe crab population is in a neutral condition (ASMFC 2019, p. 83).
3. The 2020 stopover season was noteworthy because red knot numbers peaked during the earliest (rather than the latest) part of the stopover season (Lyons 2020, pp. 3, 7), a phenomenon that had not previously been documented since arrival/departure phenologies began being tracked in 2011. Aerial surveys conducted in May 2021 found only 6,880 red knots at the peak of the spring stopover season (Lyons 2021, p. 7), the lowest count since surveys began in 1981. For context, the 3-year average count from 2018 to 2020 was 27,736 birds, and the previous 1-year record low count was 12,375 birds in 2007 (Lyons 2021, p. 7; Service 2019, p. 31). Red knots in 2021 were also extremely concentrated in just a few of the Delaware Bay beaches, with birds essentially absent from many of the beaches where they would normally occur in a typical year (A.Dey, *personal communication*, 2021; H. Bellman, *personal communication*, 2021). Although the total red knot stopover population estimate for Delaware Bay held relatively steady over this period (Lyons 2021, p. 7), these two unprecedented years in a row do raise serious concerns about if/how/why this single most important staging area may be changing, and with what implications for the recovery of this subspecies.
4. A recent Species Status Assessment for the red knot summarized current information regarding the impacts of accelerating climate change on the red knots and the virtually

certain continuation of these trends into the future. Key climate-related threats include sea level rise; ocean warming and acidification; numerous and rapid changes in the Arctic; and timing asynchronies in the knot's annual cycle (USFWS 2020, pp. 18, 32-40). The most recent international benchmark report continues to underscore the climate trajectories that are driving these threats to the red knot (IPCC 2021, entire).

5. Under all scenarios, significant climate-driven threats will continue to influence knot populations well into the future, and it is unknown if the rufa red knot's limited inherent adaptive capacity is sufficient for the subspecies to persist over the long term (Service 2020, entire). Therefore, the essential rufa red knot recovery strategy is to prevent erosion of its adaptive capacity by maintaining representation and improving resiliency and redundancy to support the rufa subspecies as it copes with inexorably changing conditions across its range and across its annual cycle. One key element of this strategy to maintain adaptive capacity is to protect, restore, maintain, and manage important nonbreeding habitats. This includes monitoring and safeguarding ample food supplies (USFWS 2021, pp. 12-13).
6. I appreciate that a maximum harvest of 210,000 female crabs per year is considered a low level of removal from a population with recent estimates between 6.6 and 11.5 million female crabs (based on the equally weighted CMSA model; draft report Table 32). The draft report states that maximum harvest levels are expected to have little effect on long-run equilibrium abundances of horseshoe crabs, and that the horseshoe crab projection model is not especially sensitive to changes in harvest. For example, increasing harvest in the model from 0 to the maximum (210,000 females, 500,000 males) decreased the projected equilibrium crab abundance by only 5 to 6 percent (draft report pp. 78-79). However, if the bait harvest—through effects of slowing the rate of increase in crab abundance and/or lowering its eventual equilibrium point—has even a small effect of slowing red knot population growth, then it is contrary to the recently updated ARM Objective Statement and it runs counter to the strategy outlined in the recent draft Recovery Plan (USFWS 2021, pp. 12-13). Given uncertainty associated with some of the inputs, and the fact that the proposed modeling framework is new and untested, I question if model outputs will be sufficiently precise—and if the models will "learn" fast enough— to reliably predict and entirely avoid any risk of slowing knot population growth.
7. The new red knot projection model (IPM) found only a small effect of horseshoe crab abundance on red knot abundance (draft report p. 69). However, the IPM is brand new and untested. And the previous Multistate model that IPM is replacing, and upon which harvest recommendations were based since 2013, essentially malfunctioned during the recently attempted update and had to be abandoned. Given the high uncertainty and high stakes, reliance on the new IPM should be tentative and cautious, increasing gradually over time as the model demonstrates its stability, accuracy, and adaptability.
8. Based on the linked system of models in the proposed new ARM framework, equilibrium abundances for male and female horseshoe crabs and red knots are predicted to be high. However, red knot abundances in particular are very uncertain

throughout the simulation time period (draft report p. 78). Revised Figures 54-59 reflect this high uncertainty in projected red knot population levels, and show considerable potential for the knot population to remain at or below its current level for at least the next 30 years, a scenario that is incompatible with recovery.

9. The CMSA-based horseshoe crab projection model is quite sensitive to changes in recruitment estimates (*i.e.*, annual expected numbers of new breeding adults). Expected recruitment is based on a relatively short time period, and it is possible that the current estimate is not very close to the true value (draft report p. 80). The draft report (p. 55) states that recruitment estimates are likely to become more robust over time. However, in the meantime, a risk-averse approach seems prudent given both high uncertainty and high sensitivity around this parameter in the new modeling framework.
10. Concerns have been raised about a potential spike in horseshoe crab harvest due to the COVID-19 pandemic (Wittenberg 2021). We do not yet know if the biomedical harvest recently increased in order to test COVID-19 vaccines, but at least some increase does seem likely. The revised ARM framework continues to apply a 15 percent mortality rate to bled crabs despite an acknowledged range of 4 to 30 percent (draft report p. 30) and sublethal effects that could potentially impact spawning behaviors or tendencies (Anderson et al. 2013, entire; Owings et al. 2019, entire). Biomedical harvesters preferentially target female crabs. Given high uncertainty around bleeding effects, and at least until the magnitude and duration of any COVID-related increase in biomedical harvest are known, a cautious approach to female bait harvest is sensible.

11.3.4 Conclusions and Recommendation

Procedurally, adoption of the proposed new utility function, and thus the immediate resumption of female crab harvest, runs counter to the basic SDM principals of stakeholder engagement and transparency, given the original stakeholders' clearly articulated views and values around female harvest. Substantively, many factors argue for a continued risk-averse approach to female crab harvest. Individually, and especially collectively, the 10 factors listed above lay out a situation of high uncertainty and high risk that make a strong case for continued caution.

Every year since 2013, the existing red knot utility function has concluded, based on expert and stakeholder input, that crab and knot populations were too low to safely resume female harvest. There has been no change in the knot population, modest and uncertain growth in the crab population, and two highly aberrant stopover seasons in a row. Yet the ARM Subcommittee is now proposing, without the benefit of updated stakeholder input, to discard the previous utility function and to replace it with one that concludes female harvest can be safely resumed. At the time of listing, the USFWS concluded that, as long as the ARM is in place and functioning as intended, ongoing horseshoe crab bait harvests should not be a threat to, or result in take of, the red knot (USFWS 2014, p. 247). Immediate resumption of female harvest by the means described in the draft report may prompt the USFWS to reconsider if the ARM is functioning as intended.

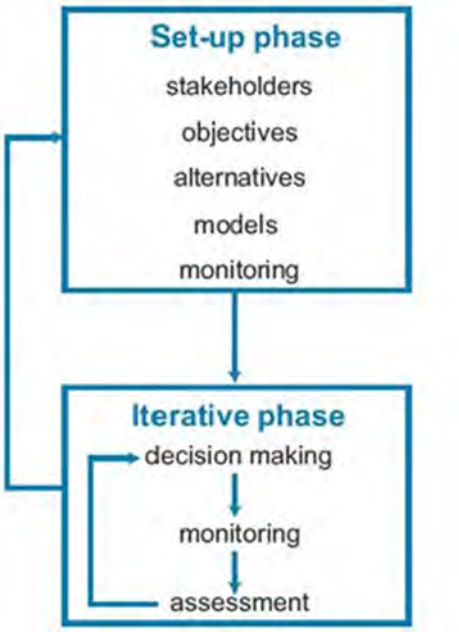
I recommend that the ARM Subcommittee consider one or both of these alternative paths forward.

- Reconvene a broad and knowledgeable group of stakeholders to review, discuss, and weigh in on the proposed new utility function and corresponding resumption of female crab harvest.
  AND/OR
- Evaluate technically sound mechanisms by which the previously agreed-upon crab and knot population thresholds can continue to act as a constraint on female harvest under the revised framework, in a manner that hews more closely to the original intent and stated risk tolerances of the stakeholders as expressed during the initial development and adoption of the ARM.

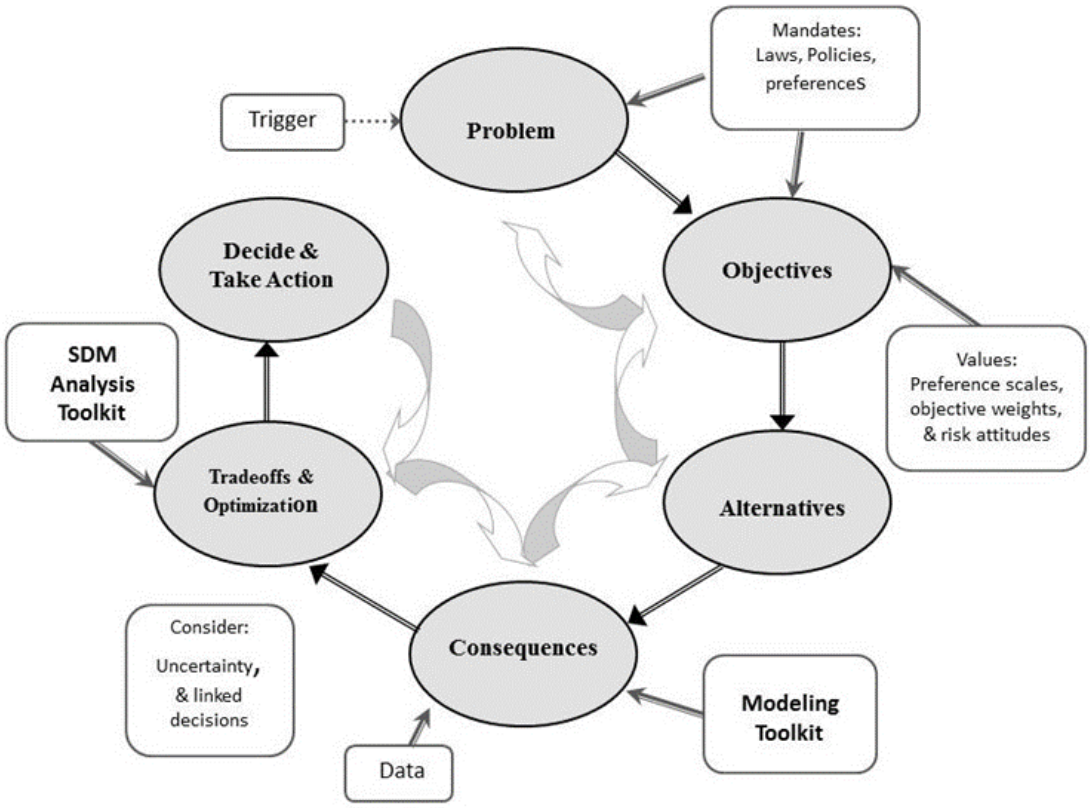
I also recommend that the ARM Subcommittee weight the three data inputs to CMSA as per the 2019 stock assessment (0.59 Virginia Tech trawl, 0.16 Delaware adult trawl, 0.25 New Jersey ocean trawl), rather than the equal weights assigned in the draft report. Such weighting is appropriate based on the intentional and robust design of the Virginia Tech survey, as well as the views of the stakeholders. This recommended weighting also supports a continued risk-averse approach to female harvest that remains a central imperative of prudent horseshoe crab management for the reasons given above.

My sincere thanks to the members of the Modeling Working Group and other expert advisors for the considerable work that has gone into the draft report. I generally concur with the draft report and appreciate its many technical innovations, updates, and upgrades, but with the important exceptions of weighting the CMSA data inputs, replacing the utility function, and resuming female harvest. With regard to these exceptions, I appreciate the time of the ARM Subcommittee in considering my concerns, objections, and recommendations as detailed above. I look forward to working cooperatively with the rest of the Subcommittee to seek consensus on a path forward that addresses my concerns while still advancing the draft report for consideration by the Delaware Bay Ecosystem Technical Committee.

11.3.5 Tables and Figures



Walsh Figure 1. Double-loop learning diagram of adaptive management (ASMFC 2009a, p. 41)



Walsh Figure 2. SDM conceptual diagram
(https://www.usgs.gov/centers/pwrc/science/structured-decision-making)

The objective statement and utility functions, which were developed through lengthy discussion with the Technical Committees, are the first step to identifying optimal horseshoe crab harvest policy. The utility functions specify the value placed on harvest as a function of the population sizes of both species. To achieve multi-species objectives, harvest of female horseshoe crabs is devalued when red knot and female horseshoe crab abundance are low … <u>The utility functions reflect the stakeholders risk tolerance to the possibility of red knot extinction and can be revised and updated to reflect shifting society values or new data in future iterations of the adaptive management paradigm</u> (ASMFC 2009, p. iii).

Translating the qualitative [objective] statement into a quantitative objective statement framed in terms of the measurable state variables of interest is a fundamental challenge … We developed a set of utility functions that define under what conditions horseshoe crab harvest is valued. The utility functions…reflect the stakeholders' risk tolerance/aversion to the possibility of red knot extinction due to horseshoe crab harvest regulations. <u>The Technical Committees often preferred to invoke caution when determining management objective and set management thresholds with the intent of being conservative to account for our scientific uncertainty. The utility functions…can be adapted, as the adaptive management effort moves forward, to reflect changes in societal values or new data and information about the system</u> (ASMFC 2009, p. 2).

The current objective statement is: Maximize harvest of horseshoe crabs in the Delaware Bay with constraints that 1) harvest of female crabs is valued only when red knots exceed an abundance threshold or female horseshoe crabs exceed an abundance threshold … (ASMFC 2009, p. 3).

<u>The harvest objective and utility functions are quantitative translations of the objective statement</u>… The utility functions assign no value to female horseshoe crab harvest when red knot abundance is below [81,900] individuals, unless horseshoe crab numbers are sufficiently high that they are not likely to be limiting red knot numbers. … Secondarily, the utility function will assign value to female horseshoe crab harvest if abundance of female horseshoe crabs reaches 11.2 million individuals, regardless of red knot status. … <u>The specific values of these thresholds are the result of the collective judgment and extensive discussion of the Joint Technical Committees, the professional opinions of shorebird and horseshoe crab biologists, and the modeling expertise of the members of the ARM working group</u> (ASMFC 2009, pp. 3-4).

While horseshoe crab abundance in the Delaware Bay Region continues rebuilding, the red knot (rufa subspecies), one of many shorebird species that feed on horseshoe crab eggs, is at low population levels. Red knots have shown no sign of recovery … despite a nearly four-fold reduction in horseshoe crab landings since 1998 … <u>Technical advisors recommend continued precautionary management</u> (ASFMC 2012, p.1)

Box 1. Excerpts from the foundational ARM documents related to the red knot utility function and to stakeholder input and risk tolerance around female harvest (emphasis added)

11.4 Majority Response to Walsh and Justification for Why Opinion Not Adopted

The minority opinion provided by Walsh was not adopted in this revision to the ARM Framework because the proposed changes are not consistent with updating the Framework using existing data or with the technical advice given to the workgroup regarding adaptive management or the CMSA by collaborators and previous peer reviewers. The task given to the workgroup was to revise the adaptive resource management framework, and the proposed use of the population thresholds by Walsh is more consistent with a simple harvest control rule. A static harvest control rule approach could be explored if the committees are interested, but it would not be adaptive management and would not require the Framework developed in this assessment. The minority opinion focuses on a proposed change to the survey weights in the CMSA, the red knot utility function, and the perceived lack of stakeholder input to the ARM Revision process. A response to each of those is provided below, along with responses to the enumerated list of substantive concerns.

11.4.1 CMSA Survey Weights

There is concurrence by Walsh with the use of the CMSA as the estimation method for horseshoe crab population size, and there is also concurrence on the move from the former stage-based projection model to a projection model following the dynamics of the CMSA. Where Walsh differs from the majority is with the weighting scheme for the surveys in the CMSA. Walsh bases her survey weight recommendation on the fact that the VA Tech Trawl Survey was designed specifically for monitoring the abundance of horseshoe crabs in the Delaware Bay region. She expressed concerns that the VA Tech estimates of abundance were lower than those from the CMSA estimates from 2016 through 2019 and quoted the 2019 assessment report where it stated that equal weighting of the surveys resulted in higher abundance estimates by allowing the model to more closely align with the increasing trends seen in the DE Adult Trawl and NJ Ocean Trawl surveys. However, the report also stated on page 79, “In reality, the VT swept area estimates are likely minimum estimates of abundance given: 1) the VA Tech Trawl gear efficiency is less than 100%; and 2) the VA Tech Survey spatial area may be a low estimate of Delaware Bay unit stock spatial area (excludes inside waters of Delaware Bay)” (ASMFC 2019). Differences in survey sampling and data inputs, both temporally (spring for DE and NJ surveys, fall for VA Tech) and spatially (DE survey through Delaware Bay; NJ survey beyond VA Tech survey bounds of 12 nm offshore and northern limit Atlantic City; VA Tech survey extending to MD and VA), may also argue for equal weighting of the surveys as they each contribute sampling inputs not shared by the others. As both DE and NJ trawl surveys have begun staging female horseshoe crabs for maturity, the utility of these surveys for future assessments will rise and more fully complement the VA Tech Survey.

During the 2019 benchmark assessment, survey weights (or lambda values) were based on results of a hierarchical analysis of adult female indices from the VA Tech Trawl, DE Adult Trawl, and NJ Ocean Trawl Surveys (Conn 2009). The Conn (2009) hierarchical analysis produced a composite index from multiple indices, whereby process error variances (σ^p) generated for each index could be used as an inverse measure of how well the index contributes to the composite (Conn 2009). The inverse Conn variances $(\sigma^p)^{-1}$ for VT, DE, and NJ survey indices (4.3, 1.12, and 1.8, respectively) were scaled to sum to 1 (0.59, 0.16, 0.25) and used as survey weights in the

base model of the CMSA. During the peer review workshop, the panel stated that it was “not clear whether uncertainties were double counted or that the product of the two types of inverse variance weights (one standardized the other not) is appropriate” (ASMFC 2019). However, it was noted in the 2019 assessment that equally weighting the surveys resulted in higher population estimates and that characterization by Walsh is accurate.

During the development of the ARM Revision, the ARM Subcommittee discussed survey weights at its data workshop and supported not using any weights so as to eliminate the possibility of double-weighting the survey inputs and to acknowledge the differences in the surveys discussed above. Only one member objected to this decision, but it was to the inclusion of the NJ Ocean Trawl Survey in its entirety and not the survey weights specifically, and a sensitivity run was done in this Revision to address that concern (Section 6.1.5). In that spirit, the workgroup did a sensitivity run with the 2019 benchmark survey weights but with the understanding that the previously used survey weights were based on the CVs of the surveys at that time and were only calculated for female horseshoe crabs (Walsh Response Table 1 and Table 2). If calculated in the same way as the 2019 benchmark, the weights would not be the same values as in the assessment or between sexes given additional years of survey data. Therefore, the use of the 2019 lambdas should be understood in the context of a sensitivity run and qualitatively represent the appropriate weightings of each survey based on committee consensus. If the committees support the use of survey weights, the weights should be determined in a different manner from the previous benchmark. The decision to not weight the surveys was based on previous ARM subcommittee discussions, but could be revisited if that would improve consensus on the proposed methods for peer review. Also, if the surveys were to be weighted in the CMSA, a new formulation of the horseshoe crab projection model would need to be developed because estimates of median primiparous crabs would change resulting in a different recruitment function for horseshoe crabs. Likewise, the IPM model results for red knots and subsequent projection model would change because input values of horseshoe crab abundance changed.

11.4.2 Red Knot Utility Function

It is true that if the previous ARM Framework remained in place in its entirety that it would likely continue to recommend zero female crab harvest. However, knowledge of both species has increased, the amount of data has increased, and the ARM Subcommittee’s expertise on adaptive management and optimization techniques has increased. To continue the use of the previous ARM Framework would be to ignore these technical advancements.

Projection of the CMSA shows an equilibrium population size (i.e., carrying capacity) in the absence of any anthropogenic mortality of 13.24 million females. Following the approach to set a utility threshold for the harvest of females horseshoe crabs in the previous ARM Framework (80% of carrying capacity), the updated utility threshold would now become 10.59 million females. Female harvest would have 0 utility below this knife-edge utility threshold and utility would reach 1.0 above this threshold. Table 16 shows CMSA population estimates would have exceeded the new 10.59 million threshold in 2013, 2016, and 2017. Under the previous ARM Framework and its utility functions, this would have triggered the recommendation of harvest package 5 in these years (210,000 females and 420,000 males). Thus, the system is hovering

near the threshold which would allow female harvest even under the tenets of the previous ARM Framework.

A major problem with the knife-edge utility functions in the previous ARM Framework was that they essentially operated as harvest control rules and resulted in “all or nothing” harvest management. Simulations of the previous version (McGowan et al. 2015) showed harvest packages 2 (250,000 male only) and 4 (140,000 females and 280,000 males) were very rarely selected. This is because the limits of harvest within all packages were sufficiently small to not cause a substantial decline in the abundance of horseshoe crabs. Thus, once an abundance threshold in the former utility functions was crossed, female harvest had value, and the optimal harvest strategy would be to immediately move to the maximum allowable harvest. Package 3 (500,000 male only) was selected when female abundance was <11.2 million crabs, and package 5 (210,000 females and 420,000 males) was selected when female abundance was >11.2 million crabs. Reinstituting these knife-edge utility functions in this ARM Revision would have similar effects – harvest of males near the maximum allowable, and an immediate increase of female harvest from 0 to near maximum once the female utility threshold is crossed.

The previous reward function, with its knife-edge horseshoe crab utility functions and manipulation of horseshoe crab utility via constraints informed by red knot abundance, was deemed inappropriate by an adaptive decision modeling expert and ARM collaborator, Paul Fackler (NC State University, Center for Environmental and Resource Economic Policy), and the previous peer review panel. Fackler had several reasons for his objection to the previous reward function structure. It may have had unpredictable side effects on the overall optimization, preventing the dynamic programming algorithm from reaching an optimal solution to the problem as the ARM understood it. It also did not quite work as understood by stakeholders as a harvest control rule based on abundance of each species. Having decided that the old reward function was inappropriate on these technical grounds, the ARM model workgroup did its best to frame the reward function to reflect the ARM objectives and previously established stakeholder attitudes, in a manner that would allow the optimization to work as intended.

The ARM subcommittee admits that Walsh’s minority opinion highlights inadequate communication and detail on why the previous utility functions were abandoned in this ARM Revision. The majority hopes that this response clarifies why this was done from a technical and practical standpoint.

11.4.3 Procedural Concerns

Although it is true that the ARM subcommittee did not explicitly invite the public to participate in meetings, ASMFC meetings (even virtual ones) are open to the public and time is allotted for public comment. The ARM Subcommittee has diverse membership representing expertise and conservation concerns from both the fisheries and shorebird communities. Likewise, the formation of the DBETC was established to provide oversight to the ARM Subcommittee and represent the various stakeholder groups. Also, within the ASMFC management structure, stakeholders’ voices are heard through the Advisory Panel and public comment periods should

an addendum to the FMP be considered. Stakeholders in this process do not represent only those in red knot conservation, but also biomedical representatives, the fishing industry, members of the public, academics and researchers, and various interest and environmental groups that do not have uniform interests.

During the ARM Revision, a broader stakeholder group was not engaged the way it was for the original ARM (ASMFC 2009a) because many of the earlier decisions made by stakeholders were maintained. For example, the maximum harvest levels of male and female horseshoe crabs remains the same, 500,000 and 210,000, respectively. Additionally, male harvest is avoided if the spawning beach sex ratio limits population growth, horseshoe crab harvest is avoided at lower red knot and horseshoe crab population numbers, and the model links horseshoe crab and red knot abundances to recommend harvest. As for the utility functions, the original ARM (ASMFC 2009a: iii) says, "The utility functions reflect the stakeholders risk tolerance to the possibility of red knot extinction and can be revised and update(d) to reflect shifting society values or new data in future iterations of the adaptive management paradigm." The model workgroup found the changes to the utility function to be consistent with this statement since more data is now available and the understanding of how the threshold constraints were functioning in the original ARM Framework evolved to be inconsistent with adaptive management. This seemed in line with the intent of the process, similar to how the committees revised the objective statement during the Revision but did not solicit outside comment on it.

A feature of the revised ARM Framework is the ability of the Approximate Dynamic Programming routine to accommodate complex functions for assigning value to harvest. The workgroup adopted a simple function that returned a proportionally scaled utility value (0 – 1) for predicted red knot abundance between the limits of 0 birds (0 utility) and the threshold value of 81,900 birds (full utility). However, more complex functions that relate to red knot persistence or a quasi-extinction threshold could be envisioned. These may correspond to objectives contained in recovery plans or species status assessments. Because the optimization structure is directly linked to the predictive models, output quantities from long-term population viability projections such as red knot abundance, trend, or persistence probability could be translated into utilities for harvest.

However, in response to concerns on procedural grounds, the red knot utility function could revert back to the form that was proposed during the ARM Subcommittee review of the Revision in October, 2021. During the review, it was changed to be linear, but the originally proposed function replicates the original red knot utility function:

$$u_t^k = \begin{cases} 1, & \text{if } s_t^k \geq N_k^*, \\ \frac{s_t^k}{(1-p)N_k^*} - \frac{p}{1-p}, & \text{if } 0.9 \cdot N_k^* \geq s_t^k < N_k^* \\ 0, & \text{if } s_t^k < 0.9 \cdot N_k^* \end{cases}$$

where utility is zero when red knot abundance s_t^k is below p = 90% of the threshold $N_k^* = 81{,}900$; as s_t^k moves from 90% to 100% of N_k^*, utility rises linearly from zero to one; at and above the threshold, utility is one. This utility function is consistent with the stakeholder preferences incorporated in the original ARM Framework because it maintains reference to the historical abundance of red knots. The same knife-edge utility function as the original ARM

Framework was not used because this utility function was criticized in the peer-review of the original Framework. This suggested approach attempts to address the comments of the original peer review and maintain consistency with the stakeholder values incorporated in the original Framework. Because the utility function above is consistent with stakeholder preferences, there are no procedural grounds on which to object to the Revision.

[Following the DBETC Review of the ARM Revision, the committees agreed to revert back to the utility function above and that change is reflected in the body of the report.]

Finally, the majority is not opposed to greater stakeholder involvement, but argues that the modeling work done here should go to peer review. If the model passes peer review or improvements are made during that process, then the proposed new Framework would be taken out to stakeholder groups through a new management document. However, if Walsh is proposing that retaining the old form of the reward be an option during those deliberations, the majority strongly opposes that idea on technical grounds. Reverting to the former reward and utility functions does not take advantage of the increase in data collection and empirically derived models since the ARM Framework was originally developed and results in simple harvest control rules, which cannot be considered true adaptive management.

11.4.4 Responses to Numbered Items

The Walsh minority opinion listed 10 substantive concerns. The following are point-by-point responses to each of those:

1. As noted in the minority report, the Southern wintering red knot population has remained between roughly 9,800 and 14,000 birds since 2011. Thus, there is no clear trend in these population estimates over this time period. This period of relative stability in the Southern wintering population is consistent with the mark-resight superpopulation estimates, which also indicate a relatively stable stopover population at Delaware Bay since 2011.

   Additionally, the decline is not necessarily related to horseshoe crab harvest, which is the current management tool. By asserting that the Southern population serves as a bellwether for the subspecies as a whole, Walsh points to the decline as justification for a precautionary approach to horseshoe crab harvest. Factors responsible for that decline may or may not be operative in the other populations, and whether horseshoe crab harvest exacerbates those factors is unknown. However, as the report describes, the revised ARM Framework, compared to its predecessor, is far more amenable to the acquisition of new data that may ultimately enhance understanding of the relationship between harvest and bird abundance.

2. Multiple lines of evidence show that the Delaware Bay horseshoe crab population has increased (ASMFC 2019). Additionally, a simple linear Poisson regression fit to the VA Tech population estimates reveals a significant increase in mature females ($P<0.01$). AICc model selection shows that the temporal trend model, with an increasing slope, is more supported than a null (i.e., intercept only) model with no temporal trend.

The 2019 benchmark stock assessment declared the Delaware Bay population to be in a "neutral" stock status based upon ARIMA modeling of fishery-independent surveys and the probability that the terminal year of each survey was less than a 1998 reference point when management for horseshoe crabs began. Stock status was based on the percentage of surveys within a region (or coastwide) having a >50% probability of their terminal year fitted value being less the 1998 index-based reference point. "Poor" status was >66% of surveys meeting this criterion, "Good" status was <33% of surveys, and "Neutral" status was 34 – 65% of surveys. In Delaware Bay, 2 out of 5 surveys showed a terminal year having a >50% chance of being below the 1998 reference point, and thus a neutral stock status was assigned. However, four out of the five surveys considered had increasing trends over the last five years, and three out the five had increasing trends over the last ten years. No survey showed a declining trend in recent times.

3. The annual stopover population estimates generated by Lyons 2021 represent the committee's best estimates of red knots visiting the Delaware Bay each year and are used as input to the ARM Framework. Aerial counts have fluctuated greatly compared to stopover population estimates that have remained very stable through time. Aerial counts have a number of sources responsible for observation error including timing of flights with respect to true peak stopover, changing observers through time, and observer detection bias. The caveats of aerial counts as a population estimator are well documented in the literature (Conroy et al. 2008; Fleming and Tracey 2008; Laursen et al. 2008; Smith and Francis 2010). Additionally, the argument made does not indicate that horseshoe crabs were the limiting factor in the red knot estimates (see response to #1).
4. Arctic snow cover was included as a covariate in the IPM and remains within the ARM Revision if and when it is shown to affect red knot population dynamics and can be modeled into the future. The argument made by Walsh indicates that there are numerous other causes of red knot decline independent of horseshoe crabs and the proposed harvest levels.
5. Walsh cites uncertainty about the bird's inherent adaptive capacity for response in the face of climate change as justification for a precautionary approach to harvest. However, as new data are gathered and incorporated into the ARM Framework over time, which is facilitated by the ARM Revision, any signal that connects harvest to population persistence should emerge (see response to #1).
6. Walsh's reservations about whether the proposed model can adapt quickly enough to new data is more of a concern for the original than the revised ARM Framework. The attractive feature of the revised ARM Framework is that routine monitoring data can be used to quickly adjust model parameters and modify optimal horseshoe crab harvest recommendations. It is possible that these updates could take place on an annual basis. If it is found that additional horseshoe crab harvest were affecting red knots, this would be apparent in declining horseshoe crab population estimates and declining red knot survival estimates as a function of horseshoe crab abundance. Also, the ARM Revision better represents the uncertainty in the population dynamics of both species compared

to the original ARM Framework. Importantly, the uncertainty is carried forward through the optimization.

7. An appropriate “test” of the new IPM will be provided by annual updating and adjustment. There is also no evidence that the multistate model provided better information than the IPM. In fact, the IPM may be better than the multistate approach since the IPM takes advantage of more data, not just more years of data. The IPM integrates count and mark recapture data to estimates parameters whereas the multistate model was only mark recapture.
8. Horseshoe crabs and red knot population projections are uncertain. This was the case under the original ARM Framework and will continue to be the case. Managers need to make decisions in the face of uncertainty. The role of science is to appropriately account for the uncertainty in the comparison of management options. In the ARM Revision, uncertainty in horseshoe crab and red knot dynamics is considered and accounted for in the ADP optimization. Adaptive management is well suited to exactly this kind of uncertainty. Portraying the uncertainty as somehow undermining the validity of the IPM and the ARM is inaccurate.
9. Horseshoe crab recruitment is a large source of uncertainty in the modeling and optimization. If the expected recruitment is an underestimate, horseshoe crab populations would be more robust than is currently thought and can withstand greater harvest without decline. If the expected recruitment is an overestimate, crab populations would decline even in the absence of any harvest. The effects of uncertainty on median horseshoe crab recruitment was examined by allowing it to vary by ±5% and ±10% (see Section 8.8.2). These sensitivity analyses generally showed more conservative optimal harvest for a given abundance of female horseshoe crabs as uncertainty increased. The ability of the ARM Revision model set to be updated with ongoing monitoring is key to decreasing this uncertainty and making adjustments in the models and management recommendations.
10. The CMSA accounts for biomedical mortality, unlike the original ARM, in order to address the Revision’s TORs. Any potential increase in biomedical mortality will be incorporated into population estimates and harvest recommendations. The 15% bleeding mortality rate was reviewed and approved during the 2019 benchmark stock assessment. One of the TORs for the benchmark was to evaluate the sub-lethal effects of biomedical bleeding on horseshoe crabs. The assessment team considered Anderson et al. (2013) and Owings (2017), both of which were hard to assess against the actual biomedical industry since neither study adhered to the Best Practices established for the industry and had very small sample sizes. The assessment concluded that more work is needed to evaluate sub-lethal effects of the biomedical industry on the population, particularly studies using the methods of the industry.

11.4.5 Conclusions and Recommendations

Regarding the first alternative path forward, there is representation from a diversity of stakeholders on the ARM Subcommittee, DBETC, Advisory Panel, and public participating in this

process from initiation to the completion of any follow-up management documents. The majority argues that the modeling work done here addresses the TORs and represents the available data, current knowledge of the species, and intentions of the original Framework. Therefore, it should go to peer review. If the Framework passes peer review, a new management document would be initiated that engages all stakeholders.

Regarding the second alternative, if the population thresholds were reinstated, it is very likely female horseshoe crab harvest would still occur because the population is near the 80% carrying capacity threshold now. Once this threshold is crossed, the management effects would be the same as under the previous ARM Framework in that harvest would increase from 0 to a very high number within a year. The advantage of the revised ARM Framework and new harvest policy functions is that lower female harvest is possible on a continuous scale. But, as stated in the response to Walsh's procedural concerns, the majority strongly opposes retaining the old form of the reward on technical grounds. If a static harvest control rule is what is desired and the amount of female harvest should be prescribed rather than determined through empirical modeling, a harvest control rule should be developed and an adaptive management framework is no longer needed.

11.4.6 Tables for Walsh Response

Walsh Response Table 1. Sensitivity runs for the catch multiple survey analysis model for female horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.9	2,247,290	7,533,500	0.006
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	86.5	2,204,475	7,834,127	0.006
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.1	15.5	-15.3	-14.3	87.9	2,247,210	7,533,130	0.006
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.1	15.5	-15.3	-14.3	88.1	2,251,259	7,511,908	0.007
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.1	15.5	-15.3	-14.3	89.3	2,278,436	7,385,285	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	66.8	2,039,061	7,572,244	0.006
2019 Survey Weights	0.3	0.59	0.16	0.25	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	22.2	1,934,390	6,734,470	0.007
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.6	2,242,272	7,564,675	0.002
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	Confidential			

Walsh Response Table 2. Sensitivity runs for the catch multiple survey analysis model for male horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	131.3	3,901,880	20,031,800	0.010
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	127.8	3,863,175	20,707,365	0.010
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.2	16.4	-15.8	-15.2	131.3	3,902,001	20,035,174	0.010
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.2	16.4	-15.8	-15.2	131.6	3,902,001	20,015,149	0.011
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.2	16.4	-15.8	-15.2	132.9	3,913,724	19,955,194	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	105.7	3,741,511	20,957,350	0.009
2019 Survey Weights	0.3	0.59	0.16	0.25	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	35.0	3,532,410	17,504,300	0.011
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.2	16.4	-15.8	-15.2	130.8	3,898,101	20,055,219	0.008
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	Confidential			

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13 TABLES

Table 1. Horseshoe crab commercial bait harvest in numbers for the Delaware Bay states, 1998-2019, validated by ACCSP.

Year	DE	MD	NJ	VA	Total
1998	479,634	114,458	241,456	252,845	1,088,393
1999	446,874	134,068	297,680	651,992	1,530,614
2000	39,524	152,275	398,629	128,377	718,805
2001	6,384	170,653	261,239	59,686	497,962
2002	298,318	278,211	281,134	42,578	900,241
2003	356,380	168,865	113,940	102,184	741,369
2004	99,135	161,928	46,569	95,064	402,696
2005	131,453	169,821	87,250	87,599	476,123
2006	116,845	136,733	3,444	180,468	437,490
2007	81,612	172,117	0	89,903	343,632
2008	102,113	163,495	0	68,338	333,946
2009	118,535	165,434	0	187,546	471,515
2010	62,519	161,545	0	146,857	370,921
2011	107,583	167,053	0	121,650	396,286
2012	102,322	169,087	0	151,887	423,296
2013	163,582	240,688	0	156,761	561,031
2014	168,044	148,269	0	145,266	461,579
2015	151,262	27,494	0	102,235	280,991
2016	109,836	157,013	0	128,848	395,697
2017	201,132	237,146	0	160,643	598,921
2018	126,065	66,647	0	145,355	338,067
2019	164,225	145,907	0	151,727	461,859

Table 2. Delaware Bay origin horseshoe crab commercial bait harvest in numbers for use in the CMSA. Horseshoe crab landings from New Jersey and Delaware are considered to be 100% Delaware Bay origin (i.e., has spawned at least once in Delaware Bay) whereas 45% of Maryland's harvest and 20% of Virginia's are believed to be Delaware Bay origin.

Year	Female	Male
2003	202,614	364,132
2004	92,855	144,729
2005	103,972	208,670
2006	83,295	134,617
2007	54,773	122,272
2008	35,838	153,516
2009	35,793	194,426
2010	30,362	134,223
2011	24,906	182,131
2012	40,745	168,034
2013	16,635	286,609
2014	7,663	256,155
2015	6,680	177,402
2016	8,527	197,734
2017	10,136	329,840
2018	10,096	175,031
2019	10,224	250,005

Table 3. Total number of horseshoe crabs that are estimated to die due to biomedical bleeding for 2003-2019 along the US Atlantic Coast. A sex ratio was used to split the total amount of crabs into male and female for use in the CMSA.

Year	Total	% Female	Males	Females
2003	43,484	0.47	23,028	20,456
2004	66,452	0.49	34,115	32,337
2005	54,774	0.42	31,889	22,885
2006	56,190	0.46	30,536	25,654
2007	74,937	0.39	45,468	29,469
2008	66,148	0.44	37,007	29,141
2009	64,235	0.46	34,948	29,287
2010	68,746	0.48	35,581	33,165
2011	97,166	0.43	55,412	41,754
2012	82,064	0.45	45,389	36,675
2013	71,507	0.45	39,285	32,222
2014	71,577	0.43	40,712	30,865
2015	77,607	0.44	43,710	33,897
2016	48,783	0.54	22,579	26,204
2017	72,674	0.41	43,039	29,635
2018	77,825	0.42	45,420	32,405
2019	118,413	0.60	47,169	71,244

Table 4. Gear categories in NEFOP and ACCSP used in the commercial discard analysis. * NOT CODED represents trips in ACCSP that do not have a gear code. These data were further examined for the discard analysis to exclude trips that captured species unlikely to encounter horseshoe crabs or that operated outside the statistical areas used. The trips without coded gear were then split among the gears of interest (trawls, gill nets, dredges) in proportion to how they appear in the dataset.**

Gear Category	NEFOP Gear	ACCSP Gear
Trawls	TRAWL,OTTER,BOTTOM,FISH TRAWL,OTTER,BOTTOM,SCALLOP TRAWL,OTTER,BOTTOM,TWIN	OTTER TRAWL BOTTOM, CRAB OTTER TRAWL BOTTOM, FISH OTTER TRAWL BOTTOM, OTHER OTTER TRAWL BOTTOM, PAIRED OTTER TRAWL BOTTOM, SCALLOP OTTER TRAWLS
Gill Nets	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES GILL NET,DRIFT-SINK, FISH	GILL NETS GILL NETS, SINK ANCHOR GILL NETS, SINK DRIFT
Dredges	DREDGE, SCALLOP,SEA DREDGE, CLAM, HYDRAULIC DREDGE, OTHER/NK SPECIES DREDGE, CRAB	DREDGE DREDGE, CLAM DREDGE, HYDRAULIC, CLAM DREDGE, NEW BEDFORD DREDGE, OYSTER DREDGE, SCALLOP
Not Coded		NOT CODED ***

Table 5. Species targeted in NEFOP that represented all trips with captured and discarded horseshoe crabs. Species are listed in the order of the amount of horseshoe crabs discarded in pounds by most to least. The first ten bolded species represent trips with approximately 99% of all trips that discarded horseshoe crabs in NEFOP.

Trip Target
FLOUNDER, SUMMER (FLUKE)
CRAB, HORSESHOE
SCALLOP, SEA
MONKFISH (GOOSEFISH)
SQUID, ATL LONG-FIN
CLAM, SURF
CROAKER, ATLANTIC
FLOUNDER, WINTER (BLACKBACK)
SKATE, LITTLE
SKATE, NK
BASS, STRIPED
DOGFISH, SPINY
BUTTERFISH
SKATE, WINTER (BIG)
SEA BASS, BLACK
HAKE, SILVER (WHITING)
DOGFISH, SMOOTH
BLUEFISH
SCUP
CRAB, BLUE
TAUTOG (BLACKFISH)
QUAHOG, OCEAN (BLACK CLAM)
SPOT
FISH, NK
HAKE, RED (LING)
MENHADEN, ATLANTIC
FLOUNDER, NK
KINGFISH, SOUTHERN
WEAKFISH (SQUETEAGUE SEA TROUT)
GROUNDFISH, NK
CLAM, NK
SQUID, SHORT-FIN
DRUM, BLACK

Table 6. The annual proportion of discarded horseshoe crabs estimated to be mature versus immature based on the biological sampling in the NEFOP database for 2012-2019. An average of those years was used for 2003-2011.

Year	Proportion Mature
2003	43%
2004	43%
2005	43%
2006	43%
2007	43%
2008	43%
2009	43%
2010	43%
2011	43%
2012	60%
2013	42%
2014	51%
2015	34%
2016	33%
2017	33%
2018	35%
2019	59%

Table 7. Estimated horseshoe crab dredge discards in weight (lbs) and numbers. To convert pounds (lbs) to numbers, a conversion of 1.5 pounds/crab was used.

Year	Ratio	Ratio CV	Discards (lbs)	Discards LCI	Discards UCI	n Fish Counted	Total Subsample Weight (lbs)	n Subsamples	Mean Weight (lbs)	Discards (numbers)
2004	0.00080	0.21	250,591	146,164	355,019	NA	NA	NA	NA	166,950
2005	0.00069	0.21	189,532	111,162	267,901	NA	NA	NA	NA	126,270
2006	0.00333	0.46	1,000,945	81,829	1,920,060	NA	NA	NA	NA	666,852
2007	0.00060	0.26	212,580	100,398	324,761	NA	NA	NA	NA	141,625
2008	0.00093	0.25	294,799	149,602	439,995	NA	NA	NA	NA	196,401
2009	0.00199	0.25	558,520	280,203	836,837	NA	NA	NA	NA	372,099
2010	0.00232	0.34	590,768	192,298	989,238	21	75	1	3.57	393,583
2011	0.00128	0.28	317,715	141,521	493,908	NA	NA	NA	NA	211,669
2012	0.00067	0.51	126,260	0	255,406	NA	NA	NA	NA	84,117
2013	0.00016	0.34	24,403	7,651	41,155	NA	NA	NA	NA	16,258
2014	0.00635	0.83	1,141,141	0	3,029,165	NA	NA	NA	NA	760,254
2015	0.00831	0.23	1,383,891	738,829	2,028,953	NA	NA	NA	NA	921,980
2016	0.04201	0.28	8,049,390	3,536,075	12,562,704	NA	NA	NA	NA	5,362,685
2017	0.02231	0.47	4,394,923	241,382	8,548,463	NA	NA	NA	NA	2,927,996
2018	0.00751	0.46	1,283,404	98,807	2,468,002	NA	NA	NA	NA	855,033
2019	0.01745	0.30	3,194,428	1,271,760	5,117,095	NA	NA	NA	NA	2,128,200

Table 8. Estimated horseshoe crab gill net discards in weight (lbs) and numbers. To convert pounds (lbs) to numbers, a conversion of 1.5 pounds/crab was used.

Year	Ratio	Ratio CV	Discards (lbs)	Discards LCI	Discards UCI	n Fish Counted	Total Subsample Weight (lbs)	n Subsamples	Mean Weight (lbs)	Discards (numbers)
2004	0.04378	0.39	379,360	80,657	678,062	NA	NA	NA	NA	252,738
2005	0.00383	0.30	39,484	16,005	62,963	1	4	1	4	26,305
2006	0.00250	0.39	21,070	4,786	37,355	NA	NA	NA	NA	14,038
2007	0.01485	0.38	210,517	48,972	372,061	NA	NA	NA	NA	140,251
2008	0.01161	0.39	123,136	28,070	218,202	NA	NA	NA	NA	82,036
2009	0.01534	0.49	186,607	2,777	370,437	NA	NA	NA	NA	124,322
2010	0.03400	0.21	330,667	189,883	471,452	NA	NA	NA	NA	220,298
2011	0.05530	0.29	596,092	248,696	943,487	NA	NA	NA	NA	397,130
2012	0.01197	0.30	112,009	44,224	179,794	NA	NA	NA	NA	74,623
2013	0.05793	0.39	548,466	121,718	975,214	NA	NA	NA	NA	365,400
2014	0.01253	0.46	197,240	17,325	377,155	NA	NA	NA	NA	131,406
2015	0.01072	0.25	119,830	59,646	180,015	NA	NA	NA	NA	79,834
2016	0.00372	0.17	25,441	16,998	33,884	NA	NA	NA	NA	16,949
2017	0.00427	0.24	28,880	15,079	42,681	NA	NA	NA	NA	19,241
2018	0.00459	0.28	30,391	13,546	47,236	NA	NA	NA	NA	20,247
2019	0.00274	0.25	17,682	8,792	26,572	NA	NA	NA	NA	11,780

Table 9. Estimated horseshoe crab trawl discards in weight (lbs) and numbers. Year-specific data were used to convert weight to numbers for 2012-2016. For the remaining years, data was pooled among all years of available data for the conversions.

Year	Ratio	Ratio CV	Discards (lbs)	Discards LCI	Discards UCI	n Fish Counted	Total Subsample Weight (lbs)	n Subsamples	Mean Weight (lbs)	Discards (numbers)
2004	0.00746	0.36	103	30	176	NA	NA	NA	NA	132
2005	0.01386	0.66	84,096	0	194,502	NA	NA	NA	NA	107,988
2006	0.00651	0.52	1,383	0	2,822	NA	NA	NA	NA	1,776
2007	0.06592	0.36	72,093	19,780	124,406	NA	NA	NA	NA	92,575
2008	0.04477	0.34	27,537	8,909	46,166	NA	NA	NA	NA	35,361
2009	0.03535	0.43	23,658	3,487	43,830	735	249	4	0.34	30,380
2010	0.02289	0.55	16,546	0	34,623	NA	NA	NA	NA	21,247
2011	0.06382	0.31	43,332	16,742	69,922	NA	NA	NA	NA	55,643
2012	0.02619	0.47	18,700	1,274	36,126	1,751	1,935	14	1.11	24,013
2013	0.04015	0.39	40,351	8,796	71,907	2,791	1,710	13	0.61	51,815
2014	0.01777	0.37	4,312	1,129	7,495	488	360	6	0.74	5,537
2015	0.07430	0.46	141,012	12,577	269,447	3,641	2,638	33	0.72	181,075
2016	0.06954	0.32	87,367	31,694	143,040	1,739	1,864	27	1.07	112,189
2017	0.05051	0.23	429,568	232,314	626,821	1,711	1,027	22	0.60	551,611
2018	0.01217	0.37	18,219	4,813	31,626	305	288	3	0.94	23,395
2019	0.02408	0.28	478	214	741	926	810	12	0.87	613

Table 10. Number of dead discards by sex for use in the CMSA model. A sex ratio, mortality rate by gear, and proportion mature was applied to total discards to determine total dead horseshoe crabs.

Year	Male	Female
2003	9,117	6,567
2004	13,265	9,554
2005	4,209	3,031
2006	12,028	8,664
2007	9,024	6,500
2008	7,059	5,084
2009	11,767	8,475
2010	16,004	11,527
2011	20,468	14,742
2012	6,488	4,673
2013	15,179	10,933
2014	21,919	15,787
2015	16,096	11,593
2016	70,904	51,069
2017	43,451	31,295
2018	12,752	9,184
2019	50,177	36,140

Table 11. Sex ratios of male to female horseshoe crabs 1999-2019 (source: The 2019 Delaware Bay Horseshoe Crab Spawning Survey).

Year	Sex Ratio (M:F)
1999	3.72
2000	3.67
2001	3.38
2002	3.48
2003	3.61
2004	3.85
2005	3.89
2006	4.53
2007	4.90
2008	4.90
2009	5.04
2010	4.25
2011	5.36
2012	4.41
2013	3.74
2014	4.38
2015	4.47
2016	4.54
2017	5.15
2018	5.54
2019	5.38

Table 12. Stopover (passage) population estimate using mark-resight methods compared to peak-count index using aerial- or ground-survey methods. The mark-resight estimate of stopover (passage) population accounts for population turnover during migration; peak-count index, a single count on a single day, does not account for turnover.

Year	Stopover population[a] (mark-resight *N**)	95% CI Stopover population *N**	Peak-count index [aerial (A) or ground (G)]
2011	43,570	(40,880 – 46,570)	12,804 (A)[b]
2012	44,100	(41,860 – 46,790)	25,458 (G)[c]
2013	48,955	(39,119 – 63,130)	25,596 (A)[d]
2014	44,010	(41,900 – 46,310)	24,980 (A)[c]
2015	60,727	(55,568 – 68,732)	24,890 (A)[c]
2016	47,254	(44,873 – 50,574)	21,128 (A)[b]
2017	49,405[e]	(46,368 – 53,109)	17,969 (A)[f]
2018	45,221	(42,568 – 49,508)	32,930 (A)[b]
2019	45,133	(42,269 – 48,393)	30,880 (A)[g]
2020	40,444	(33,627 – 49,966)	19,397 (G)[c]

[a] passage population estimate for entire season, including population turnover
[b] 23 May
[c] 24 May
[d] 28 May
[e] Data management procedures to reduce bias from recording errors in the field; data from observers with greater than average misread rate were not included in the analysis
[f] 26 May
[g] 22 May

Table 13. Catch multiple survey analysis base model inputs for female horseshoe crabs. Biomedical numbers represent coastwide mortality, not Delaware Bay-specific. Values shown for the Virginia Tech (VT) survey's swept area estimations for primiparous (*R*) and multiparous (*N*) are in millions of horseshoe crabs.

Year	Removals				Indices				CVs			
	Bait	Discard	Biomedical	Total	VT, *R*	VT, *N*	DE Adult	NJ OT	VT, *R*	VT, *N*	DE	NJ
2003	202,614	6,567	20,456	229,637	1.537	4.959	1.605	2.246	0.26	0.30	0.49	0.19
2004	92,855	9,554	32,337	134,747	0.794	3.379	0.028	2.502	0.49	0.25	1.00	0.23
2005	103,972	3,031	22,885	129,888	0.358	2.735	0.028	2.770	0.29	0.23	1.00	0.24
2006	83,295	8,664	25,654	117,613	0.479	3.138	1.526	1.856	0.27	0.27	0.36	0.26
2007	54,773	6,500	29,469	90,742	2.051	6.611	1.612	1.474	0.31	0.42	0.31	0.25
2008	35,838	5,084	29,141	70,063	2.373	7.746	0.221	2.370	0.40	0.31	0.40	0.32
2009	35,793	8,475	29,287	73,555	2.571	6.311	0.377	1.368	0.43	0.29	0.34	0.29
2010	30,362	11,527	33,165	75,055	0.885	2.975	0.223	0.579	0.26	0.32	0.55	0.30
2011	24,906	14,742	41,754	81,403	1.338	5.178	0.318	2.215	0.59	0.23	0.41	0.26
2012	40,745	4,673	36,675	82,093	0.845	5.290	0.304	1.804	0.30	0.18	0.31	0.25
2013	16,635	10,933	32,222	59,790			0.028	7.996			1.00	0.35
2014	7,663	15,787	30,865	54,315			1.518	3.358			0.27	0.24
2015	6,680	11,593	33,897	52,169			0.772	3.145			0.29	0.25
2016	8,527	51,069	26,204	85,800			1.442	3.989			0.21	0.24
2017	10,136	31,295	29,635	71,066	1.608	6.024	2.363	5.613	0.23	0.21	0.22	0.25
2018	10,096	9,184	32,405	51,686	1.480	7.185	3.868	3.118	0.26	0.23	0.25	0.23
2019					1.773	7.326	3.247	6.966	0.31	0.21	0.35	0.40

	Starting Values				
M	*R*	*N*	*q_DE*	*q_NJ*	*s*
0.3	1.4E+06	5.3E+06	2.2E-07	5.9E-07	1

Table 14. Catch multiple survey analysis base model inputs for male horseshoe crabs. Biomedical numbers represent coastwide mortality, not Delaware Bay-specific. Values shown for the Virginia Tech (VT) survey's swept area estimations for primiparous (*R*) and multiparous (*N*) are in millions of horseshoe crabs.

Year	Removals				Indices				CVs			
	Bait	Discard	Biomedical	Total	VT, *R*	VT, *N*	DE Adult	NJ OT	VT, *R*	VT, *N*	DE	NJ
2003	364,132	9,117	23,028	396,277	0.548	11.584	1.186	2.647	0.28	0.24	0.58	0.22
2004	144,729	13,265	34,115	192,109	0.078	8.069	0.000	2.077	0.84	0.29	1.00	0.25
2005	208,670	4,209	31,889	244,768	0.789	5.150	0.000	3.260	0.21	0.25	1.00	0.28
2006	134,617	12,028	30,536	177,181	0.597	5.844	0.758	1.783	0.33	0.22	0.43	0.27
2007	122,272	9,024	45,468	176,764	3.113	15.825	2.430	1.016	0.31	0.27	0.43	0.26
2008	153,516	7,059	37,007	197,581	3.129	15.795	0.247	2.319	0.28	0.28	0.42	0.34
2009	194,426	11,767	34,948	241,141	0.757	14.647	0.387	1.421	0.31	0.33	0.25	0.30
2010	134,223	16,004	35,581	185,809	0.725	6.240	0.595	0.684	0.34	0.30	0.32	0.31
2011	182,131	20,468	55,412	258,011	1.422	13.963	0.703	1.726	0.55	0.28	0.29	0.25
2012	168,034	6,488	45,389	219,911	0.749	15.060	0.304	2.069	0.36	0.40	0.28	0.30
2013	286,609	15,179	39,285	341,073			0.138	8.248			0.50	0.39
2014	256,155	21,919	40,712	318,786			2.644	3.610			0.33	0.27
2015	177,402	16,096	43,710	237,207			1.289	3.205			0.32	0.29
2016	197,734	70,904	22,579	291,218			1.614	5.041			0.28	0.31
2017	329,840	43,451	43,039	416,330	2.608	21.941	3.873	7.183	0.42	0.29	0.28	0.29
2018	175,031	12,752	45,420	233,203	1.523	20.664	7.961	4.564	0.28	0.25	0.30	0.28
2019					3.341	15.749	5.370	7.683	0.29	0.18	0.36	0.48

	Starting Values				
M	*R*	*N*	*q_DE*	*q_NJ*	*s*
0.3	1.5E+06	1.3E+07	1.3E-07	2.6E-07	1

Table 15. The number of parameters estimated in the catch multiple survey analysis: median primiparous abundance (1); primiparous abundance for each year (16); catchability coefficients (2) for the Delaware and New Jersey surveys; and multiparous abundance for the start of the time series (1).

Parameter	No. Estimates	Description
R_{median}	1	Median primiparous abundance (log-scale)
Φ	17	Deviations from median primiparous abundance (log-scale)
N_0	1	Initial multiparous abundance (log-scale)
q_de	1	Catchability coefficient for the Delaware trawl survey (log-scale)
q_nj	1	Catchability coefficient for the New Jersey survey (log-scale)

Table 16. Catch multiple survey analysis female horseshoe crab model outputs: *q*=catchability coefficients; *R*=primiparous abundance; *N*=multiparous abundance; *μ*=exploitation rate; *Z*= instantaneous total mortality rate; *A*=annual mortality rate; and *F*=instantaneous fishing mortality rate.

Year	*R*	*N*	*R+N*	*μ*	*Z*	*A*	*F*
2003	1,544,840	5,070,510	6,615,350	0.035	0.341	0.289	0.041
2004	1,177,750	4,703,120	5,880,870	0.023	0.327	0.279	0.027
2005	413,385	4,240,680	4,654,065	0.028	0.333	0.283	0.033
2006	579,474	3,336,020	3,915,494	0.030	0.336	0.285	0.035
2007	2,334,590	2,799,440	5,134,030	0.018	0.321	0.274	0.021
2008	1,430,330	3,725,280	5,155,610	0.014	0.316	0.271	0.016
2009	1,249,240	3,759,070	5,008,310	0.015	0.317	0.272	0.017
2010	832,049	3,646,940	4,478,989	0.017	0.320	0.274	0.020
2011	1,834,400	3,253,520	5,087,920	0.016	0.319	0.273	0.019
2012	761,074	3,699,160	4,460,234	0.018	0.322	0.275	0.022
2013	9,366,720	3,233,560	12,600,280	0.005	0.306	0.263	0.006
2014	162,355	9,283,060	9,445,415	0.006	0.307	0.264	0.007
2015	3	6,950,580	6,950,583	0.008	0.309	0.266	0.009
2016	7,837,230	5,104,220	12,941,450	0.007	0.308	0.265	0.008
2017	2,004,180	9,513,410	11,517,590	0.006	0.307	0.265	0.007
2018	1,757,930	8,471,280	10,229,210	0.005	0.306	0.264	0.006
2019	2,247,290	7,533,500	9,780,790				
Average	2,090,167	5,195,491	7,285,658	0.016	0.318	0.273	0.018

q_DE	1.44E-07
q_NJ	3.81E-07

Table 17. Catch multiple survey analysis male horseshoe crab model outputs: *q*=catchability coefficients; *R*=primiparous abundance; *N*=multiparous abundance; *μ*=exploitation rate; *Z*= instantaneous total mortality rate; *A*=annual mortality rate; and *F*=instantaneous fishing mortality rate.

Year	*R*	*N*	*R+N*	*μ*	*Z*	*A*	*F*
2003	554,656	14,640,000	15,194,656	0.026	0.331	0.282	0.031
2004	81,794	10,915,400	10,997,194	0.017	0.320	0.274	0.020
2005	879,707	7,981,570	8,861,277	0.028	0.333	0.283	0.032
2006	841,100	6,353,920	7,195,020	0.025	0.329	0.280	0.029
2007	4,949,330	5,177,700	10,127,030	0.017	0.320	0.274	0.020
2008	3,433,970	7,350,140	10,784,110	0.018	0.322	0.275	0.021
2009	778,775	7,819,010	8,597,785	0.028	0.333	0.283	0.033
2010	870,926	6,161,840	7,032,766	0.026	0.331	0.282	0.031
2011	3,644,500	5,050,080	8,694,580	0.030	0.335	0.285	0.035
2012	739,524	6,219,030	6,958,554	0.032	0.337	0.286	0.037
2013	8,581,000	4,965,740	13,546,740	0.025	0.330	0.281	0.030
2014	14,922,600	9,742,110	24,664,710	0.013	0.315	0.270	0.015
2015	29	17,997,700	17,997,729	0.013	0.315	0.271	0.015
2016	29,623,200	13,128,900	42,752,100	0.007	0.308	0.265	0.008
2017	3,707,470	31,420,800	35,128,270	0.012	0.314	0.269	0.014
2018	1,645,680	25,665,300	27,310,980	0.009	0.310	0.267	0.010
2019	3,901,880	20,031,800	23,933,680				
Average	4,656,244	11,801,238	16,457,481	0.020	0.324	0.277	0.024

q_DE	6.97E-08
q_NJ	1.89E-07

Table 18. Sensitivity runs for the catch multiple survey analysis model for female horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.9	2,247,290	7,533,500	0.006
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	86.5	2,204,475	7,834,127	0.006
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.1	15.5	-15.3	-14.3	87.9	2,247,210	7,533,130	0.006
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.1	15.5	-15.3	-14.3	88.1	2,251,259	7,511,908	0.007
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.1	15.5	-15.3	-14.3	89.3	2,278,436	7,385,285	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	66.8	2,039,061	7,572,244	0.006
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.6	2,242,272	7,564,675	0.002
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	Confidential			

Table 19. Sensitivity runs for the catch multiple survey analysis model for male horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	131.3	3,901,880	20,031,800	0.010
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	127.8	3,863,175	20,707,365	0.010
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.2	16.4	-15.8	-15.2	131.3	3,902,001	20,035,174	0.010
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.2	16.4	-15.8	-15.2	131.6	3,902,001	20,015,149	0.011
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.2	16.4	-15.8	-15.2	132.9	3,913,724	19,955,194	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	105.7	3,741,511	20,957,350	0.009
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.2	16.4	-15.8	-15.2	130.8	3,898,101	20,055,219	0.008
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	Confidential			

Table 20. Parameter values used in the revised horseshoe crab population projection model. The 'Equation(s)' column gives the equation number(s) where the parameter appears, within the present report section (6.2). Table continues on next page.

Symbol	Description	Value	Equation(s)	Notes
z	Timing of harvest	0.7	1,2	The annual cycle in the HSC projection model begins in October; z indicates the midpoint of bait harvest, which occurs in June.
μ^M	Mean instantaneous natural mortality (M)	0.3	3	Same value for females and males.
σ^M	Standard deviation of instantaneous natural mortality (M)	0.0182799	3	Same value for females and males.
L_{bg}^f	Minimum background harvest of females	41,589	4	This value will change, when using biomedical mortality estimates specific to Delaware Bay.
U_{bg}^f	Maximum background harvest of females	77,273	4	This value will change, when using biomedical mortality estimates specific to Delaware Bay.
L_{bg}^m	Minimum background harvest of males	58,171	5	This value will change, when using biomedical mortality estimates specific to Delaware Bay.
U_{bg}^m	Maximum background harvest of males	93,483	5	This value will change, when using biomedical mortality estimates specific to Delaware Bay.
μ^f	Female component of the mean vector used in the bivariate normal that annually generates the logarithm of primiparous HSCs	14.9493	6	
μ^m	Male component of the mean vector used in the bivariate normal distribution that annually generates the logarithm of primiparous HSCs	15.7447	6	

Table	***Continued***			
Symbol	**Description**	**Value**	**Equation(s)**	**Notes**
σ^f	Female standard deviation used in the bivariate normal distribution that annually generates the logarithm of primiparous HSCs	0.4909	6,7	
σ^m	Male standard deviation used in the bivariate normal distribution that annually generates the logarithm of primiparous HSCs	0.8837	6,7	
ρ	Correlation used in the bivariate normal distribution that annually generates the logarithm of primiparous HSCs	0.6871	6,7	
N^*	Threshold in the 'broken-stick' function that determines whether recruitment is depressed in year *t*	3.75×10^6	10	

Table 21. Model selection results from an analysis of multistate open robust design models of annual survival and body mass dynamics of red knots at Delaware Bay. Models 1–3 are the three most supported models from the candidate model set. Parameters of each model are annual survival of red knots and mass state transition probabilities: from light to heavy (ψ^LH) and from heavy to light (ψ^HL). Annual survival in these models was a function of mass state ("state") and year (additive main effects). Transitions between mass states were a function of horseshoe crab abundance as estimated with a Catch Multiple Survey Model ("HSC"), the proportion of the population that spawned in May ("% May") and the stopover period ("period") in additive and interaction effects.

		Mass state transition					
Model	Survival	ψ^{LH}	ψ^{HL}	K	log $\mathcal{L}$	AIC	ΔAIC
1	state + year	HSC × % May × period	HSC × % May × period	201	-76927.3	154256.6	0.0
2	state + year	HSC + % May × period	HSC + % May × period	197	-76971.8	154337.5	80.9
3	state + year	HSC × % May × period	period	189	-77007.4	154392.8	136.2

Table 22. Parameter estimates from Model 1 (Table 21) to evaluate mass gain of red knots at Delaware Bay, i.e., transitions from the light to heavy mass state (ψ^LH) in a multistate open robust design model. The transition probability ψ^LH was modeled as a function of horseshoe crab abundance ("HSC") and proportion spawning in May ("% May") and their interaction. Transitions 1 and 2 occur between the stopover (secondary) periods of the robust design.

				95% Confidence Limits	
Transition	Parameter	Estimate	SE	Lower	Upper
1	Intercept	-4.38	0.37	-5.10	-3.65
	% May	2.21	0.31	1.59	2.82
	HSC	1.46	0.23	1.01	1.91
	% May × HSC	-1.61	0.19	-1.99	-1.23
2	Intercept	-2.19	0.13	-2.45	-1.92
	% May	-0.35	0.07	-0.50	-0.21
	HSC	-0.81	0.14	-1.08	-0.54
	% May × HSC	-0.09	0.06	-0.21	0.03

Table 23. Model parameter notation and definitions. Years was denoted with *j*, which are the primary sampling occasions, and *t* was used to denote the secondary 3-day sampling periods within each year.

Notation	Definition
ϕ_y	Adult apparent annual survival probability – the probability that an adult bird that is alive in year *y* will survive until year *y+1*
ρ_y	Recruitment– the per capita number of new recruits entering the population in year *y+2*
τ_y	Transience probability—the probability that an individual will remain at the stopover site for more than one secondary sampling period in year *y*
γ_y^{II}	Temporary emigration probability—the probability that an individual that is alive and present in year *y-1* will stop in Delaware Bay in year *y* given that it has survived
γ_y^{OI}	Temporary emigration probability—the probability that an individual that is alive in year *y* and not present in year *y-1* will stop in Delaware Bay in year *y* given that it has survived
p_y^*	Primary period detection probability – the probability that an individual alive and present at the site in year *y* is detected at least once
$\psi_{y,t}$	Stopover persistence probability—the probability that an individual present in secondary sampling period *t* will remain in the study area until secondary period *t+1*
$\delta_{y,t}$	Entry probability—the probability that an individual that has not yet entered the stopover site will enter in time *t*
$p_{y,t}$	Secondary period detection probability—the probability that an individual present in period *t* of year *y* is detected
λ_y	Population growth rate – the proportional change in population size from year *y* to year *y+1*
$\pi_{y,t}$	Proportion of the flyway population present in the study area in period *t* of year *y*
$\omega_{y,t}$	Availability probability – the probability that a bird that is present in Delaware Bay during the aerial count in year *y* is available on a beach included in the survey to be counted
σ^{obs}	Count observation error – counts are assumed to be Normally distributed around the true number of birds present, which allows for both undercounting and overcounting

Table 24. Prior distributions for all IPM parameters.

Parameter	Model notation	Prior Distribution
Regression coefficients	$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$	$Normal(0, 0.37)$
Initial population size (log scale)	$\log(N_1)$	$Normal(10.5, 0.01)$
Recruitment rate intercept	μ^{ρ}	$Unif(0, 0.5)$
Recruitment rate random annual variance	σ^{ρ}	$Unif(0, 5)$
Observation error	σ^{obs}	$Unif(0, 1)$
Availability probability, 2005-2008	$\omega_{2005-2008}$	$Beta(4, 3)$
Availability probability, 2009-2016	$\omega_{2009-2016}$	$Beta(6, 2)$
Availability probability, 2017-2018	$\omega_{2017-2018}$	1
Survival probability intercept	μ^{ϕ}	$Beta(3, 3)$
Survival probability random annual variance	σ^{ϕ}	$Unif(0, 5)$
Temporary emigration 1	γ^{II}	$Beta(8, 2)$
Temporary emigration 2	γ^{OI}	$Beta(1, 9)$
Stopover residency	τ	$Beta(6.5, 3.5)$
Resighting probability intercept	μ^{p}	$Beta(3, 3)$
Resighting probability random variance	σ^{p}	$Unif(0, 10)$
Effect of dark green flag color on resighting probability	β_G	$Normal(0, 0.01)$
Arrival probabilities	$\delta_{j,1:t}$	$Dirichlet(1, 1, 2, 3, 3, 2, 1, 1, 1)$
Persistence probability	ψ_{jt}	$Beta(1, 1)$

Table 25. Estimates of average survival (ϕ), recruitment (ρ), and population growth rate (λ) for red knot from 2005-2018. Average survival probability and recruitment rate were calculated using the average horseshoe crab abundance. The average population growth rate was calculated using the geometric mean of year-specific estimates for each MCMC iteration. 95% CRI (credible intervals) are the upper and lower bounds that contain 95% of the posterior distribution.

Parameter	Mean	95% CRI
Annual apparent survival probability (ϕ)	0.93	0.90, 0.96
Recruitment rate (ρ)	0.075	0.011, 0.15
Population growth rate (λ)	1.04	1.00, 1.06

Table 26. Estimated effects of horseshoe crab abundance, timing of spawning, and Arctic snow cover on red knot survival probability and recruitment rate, presented as the mean and 95% credible interval of the posterior distribution.

Demographic rate	Covariate	Mean	95% CRI
Survival probability	HSC	0.38	0.13, 0.67
	MaySpawnPct	-0.05	-3.35, 3.33
	HSC x MaySpawnPct	0.01	-0.59, 0.59
	Arctic snow	-1.06	-3.76, 1.74
Recruitment rate	HSC	-0.08	-0.4, 0.41

Table 27. Model versions tested in sensitivity runs. Multiple models were run with varying prior distributions for availability ($\omega_{y,t}$), recruitment intercept (μ^{ρ}), and recruitment annual variance (σ^{ρ}) to test the sensitivity of model outputs to these priors.

Model	$\omega_{2005-2008}$	$\omega_{2009-2016}$	$\omega_{2017-2018}$	μ^{ρ}	σ^{ρ}
2	$Beta(3,4)$	$Beta(4,3)$	$Beta(4,3)$	$Unif(0,0.5)$	$Unif(0,3)$
3	$Beta(4,3)$	$Beta(8,2)$	$\omega_{2017}=1, \omega_{2018}=1$	$Unif(0,0.5)$	$Unif(0,3)$
4	$Beta(4,3)$	$Beta(6,2)$	$\omega_{2017}=1, \omega_{2018}=1$	$Unif(0,0.5)$	$Unif(0,3)$
5	$Beta(4,3)$	$Beta(6,2)$	$\omega_{2017}=1, \omega_{2018}=1$	$Unif(0,1)$	$Unif(0,5)$
6	$Beta(4,3)$	$Beta(6,2)$	$Beta(25,1)$	$Unif(0,0.5)$	$Unif(0,5)$
7	$Beta(4,3)$	$Beta(6,2)$	$Beta(25,1)$	$Unif(0,1)$	$Unif(0,5)$

Table 28. Harvest packages available to the original ARM framework. One of these packages was recommended for each possible state of the system.

Package number	Females harvested (thousands)	Males harvested (thousands)
1	0	0
2	0	250
3	0	500
4	140	280
5	210	420

Table 29. Summary of changes to components of the optimization algorithm from the original to the revised ARM model.

Aspect	Original ARM model	Revised ARM model
Optimization approach	Stochastic Dynamic Programming	Approximate Dynamic Programming
Number of state variables	6	**6**
State variable type	Discrete	Continuous
Number of decision variables	6	3
All decision variables observed?	No	Yes
Harvest function output (recommendations)	Discrete	Continuous
Optimization algorithm	Dynamic	Static

Table 30. Parameters relevant to optimization of the revised ARM model using the genetic algorithm.

Symbol / Name	Description	Value
T	Time horizon	100
K	Number of iterations (simulations) carried out for a given value of $\boldsymbol{\theta}$, to determine $g(\boldsymbol{\theta})$	10,000
$[\alpha^f_{\min}, \alpha^f_{\max}]$	Upper and lower bounds for α^f	[0.001, 30] / (2×10^7)
$[\beta^f_{\min},\beta^f_{\max}]$	Upper and lower bounds for β^f	[1, 2×10^7]
$[\alpha^m_{\min},\alpha^m_{\max}]$	Upper and lower bounds for α^m	[0.001, 30] / (3×10^7)
$[\beta^m_{\min},\beta^m_{\max}]$	Upper and lower bounds for β^m	[1, 3×10^7]
$[\alpha^k_{\min},\alpha^k_{\max}]$	Upper and lower bounds for α^k	[0.001, 30] / (1.8×10^5)
$[\beta^k_{\min},\beta^k_{\max}]$	Upper and lower bounds for β^k	[1, 1.8×10^5]
popSize	Number of individuals in the 'population' (argument of the ga() function in package {GA})	200
run	Number of iterations without change in the solution, before stopping (argument of the ga() function in package {GA})	200
parallel	Number of cores to use, for parallel processing (argument of the ga() function in package {GA})	30

Table 31. Optimal values of θ, the parameters of the harvest function *h*, for the canonical version of the revised ARM model. Slope parameters are displayed to make them comparable; they are multiplied by the maximum abundance values for each of male HSC, female HSC and REKN (Table 30).

Symbol / Name	Description	Value
α^f	Slope of the female HSC harvest factor.	$5.017 / (2\times10^7)$
β^f	Inflection point of the female HSC harvest factor.	7.219×10^6
α^m	Slope of the male HSC harvest factor.	$16.908 / (3\times10^7)$
β^m	Inflection point of the male HSC harvest factor.	7.953×10^6
α^k	Slope of the red knot harvest factor.	$15.783 / (1.8\times10^5)$
β^k	Inflection point of the red knot harvest factor.	9.929×10^4

Table 32. Comparison of harvest recommendations from the previous (top section) and revised (bottom section) ARM models when applied to recent abundance estimates of horseshoe crabs and red knots in the Delaware Bay. Coastwide biomedical mortality was used for model development, so actual Delaware-Bay specific values will result in slightly lower population estimates.

Year	VA Tech Swept Area Estimates		Red knots	Optimal HSC Harvest (previous ARM)	
	Female HSC	Male HSC		Female	Male
2017	6,654,877	21,405,997	49,405	0	500,000
2018	7,555,622	19,346,403	45,221	0	500,000
2019	7,934,057	16,645,912	45,133	0	500,000
Year	CMSA Estimates		Red knots	Optimal HSC Harvest (revised ARM)	
	Female HSC	Male HSC		Female	Male
2017	11,517,590	35,128,270	49,405	157,358	500,000
2018	10,229,210	27,310,980	45,221	143,441	499,991
2019	9,780,790	23,933,680	45,133	138,243	499,939

14 FIGURES

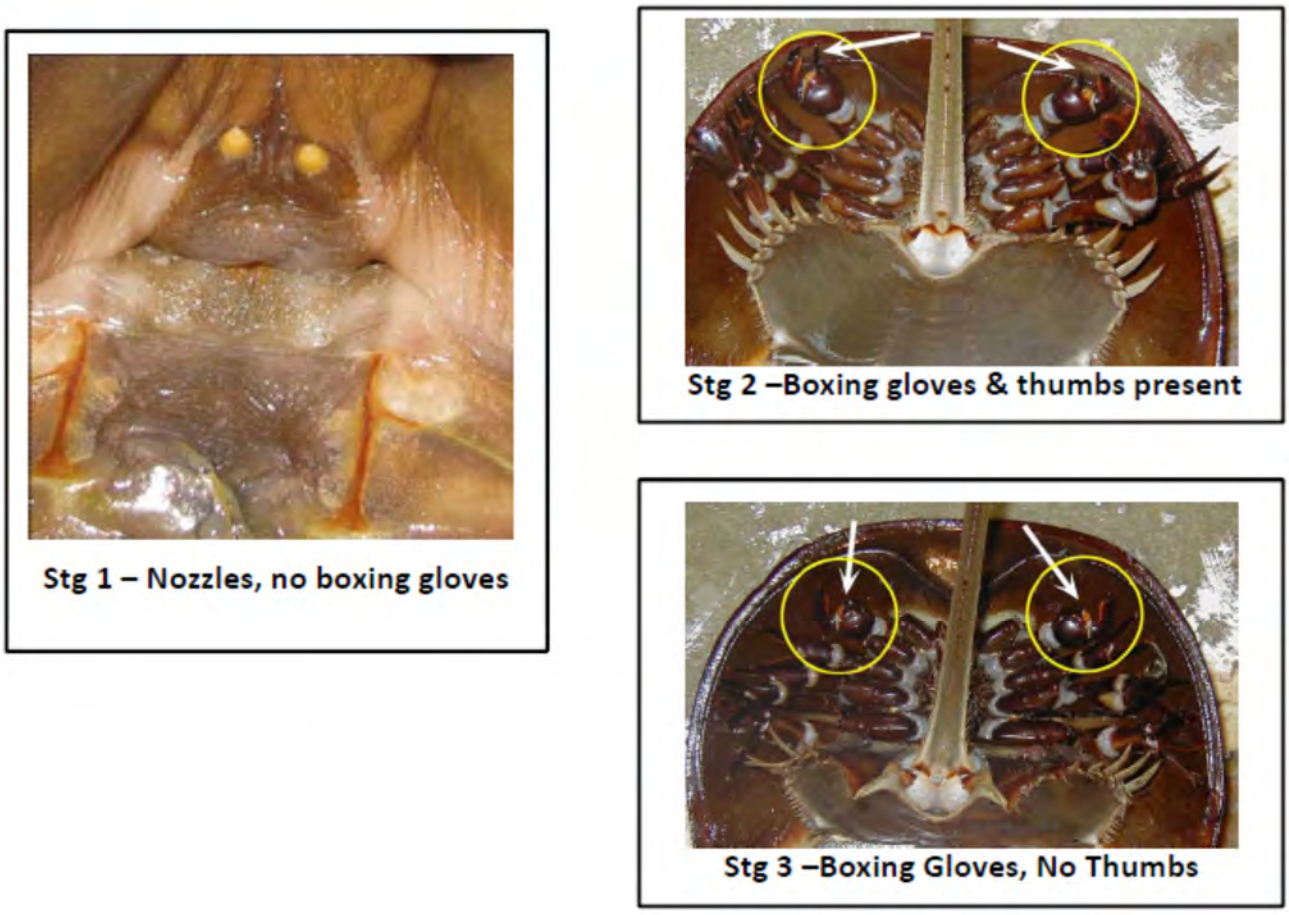


Figure 1. Male horseshoe crab maturity stages where stage 1 is immature, stage 2 is primiparous, and stage 3 is multiparous (Source: Northeast Area Monitoring and Assessment Program).

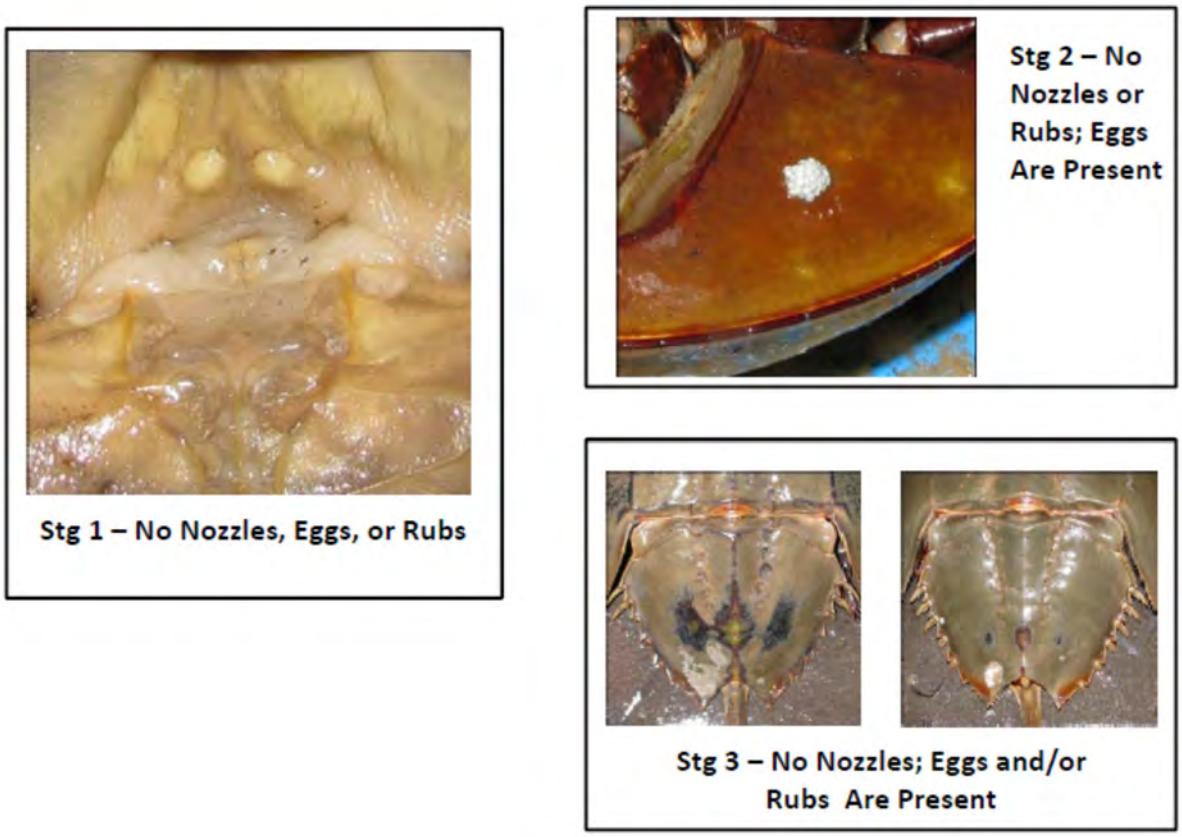


Figure 2. Female horseshoe crab maturity stages where stage 1 is immature, stage 2 is primiparous, and stage 3 is multiparous (Source: Northeast Area Monitoring and Assessment Program).

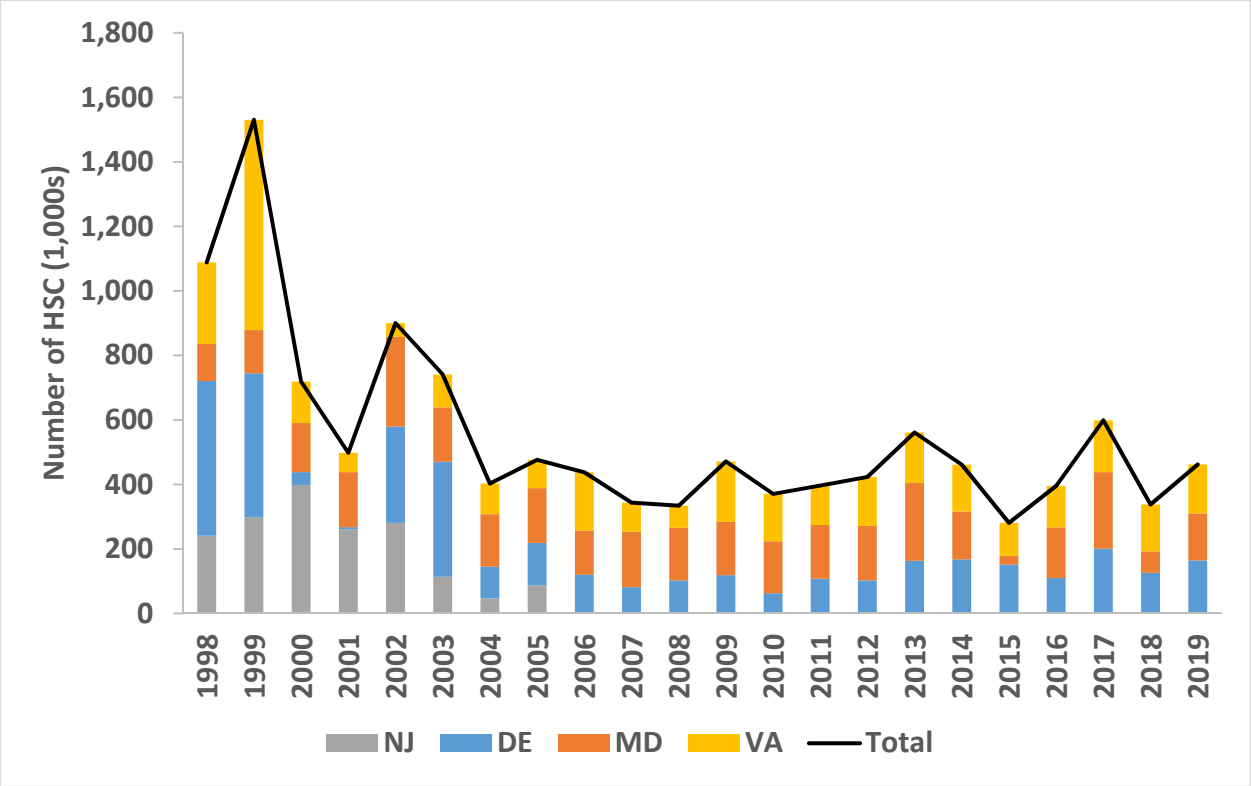


Figure 3. Commercial bait landings of horseshoe crabs in the Delaware Bay region by state, 1998-2019 (Source: ACCSP).

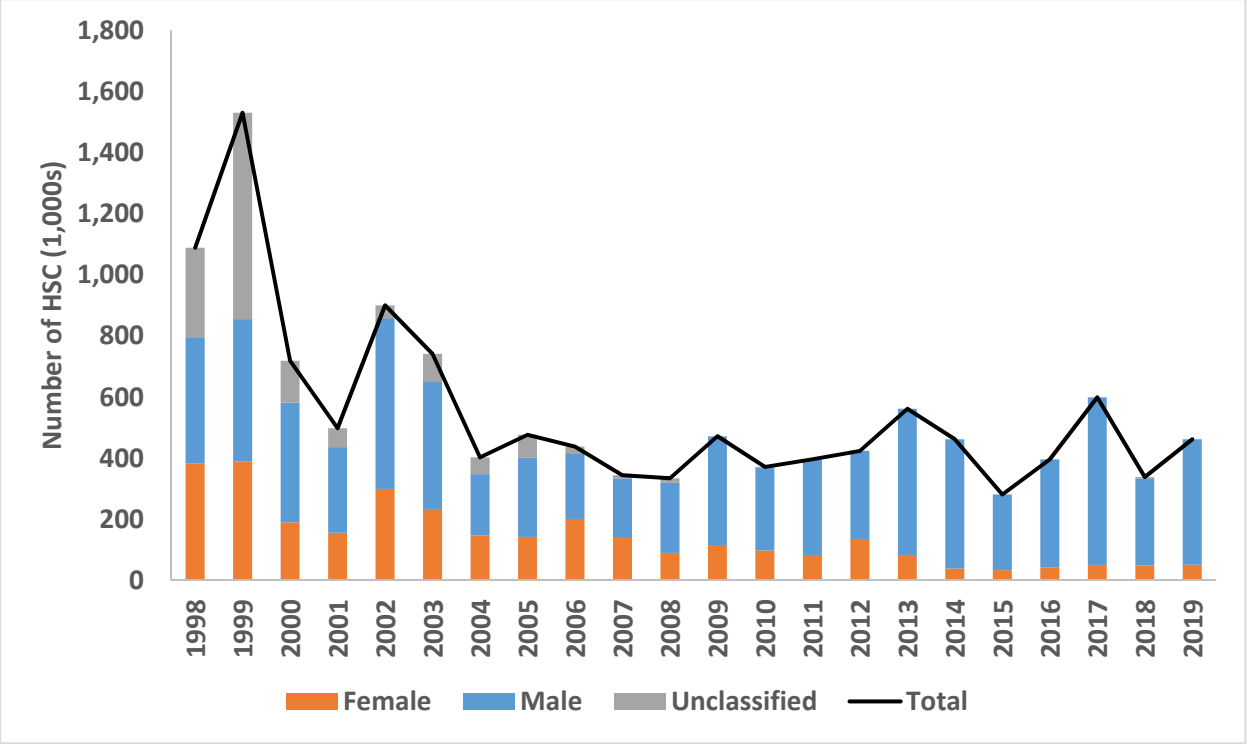


Figure 4. Commercial bait harvest of horseshoe crabs in the Delaware Bay region by sex (Source: ACCSP).

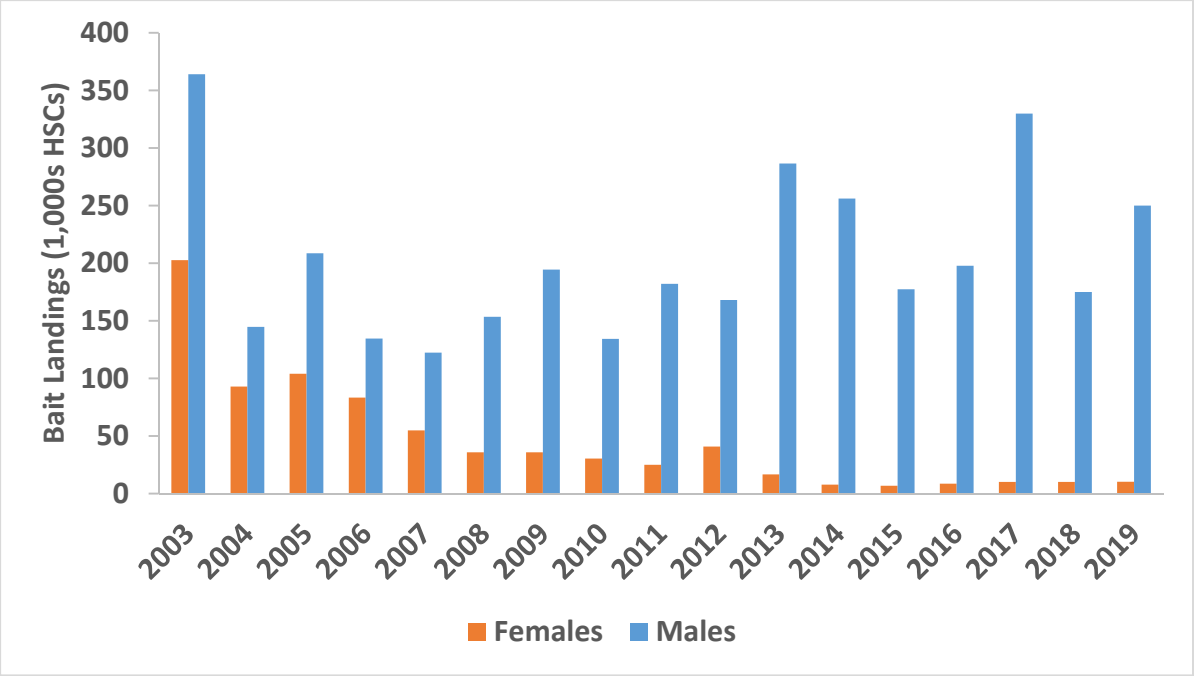


Figure 5. **Delaware Bay origin horseshoe crab commercial bait harvest by sex in numbers for use in the CMSA. Horseshoe crab landings from New Jersey and Delaware are considered to be 100% Delaware Bay origin (i.e., has spawned at least once in Delaware Bay) whereas 45% of Maryland's harvest and 20% of Virginia's are believed to be Delaware Bay origin.**

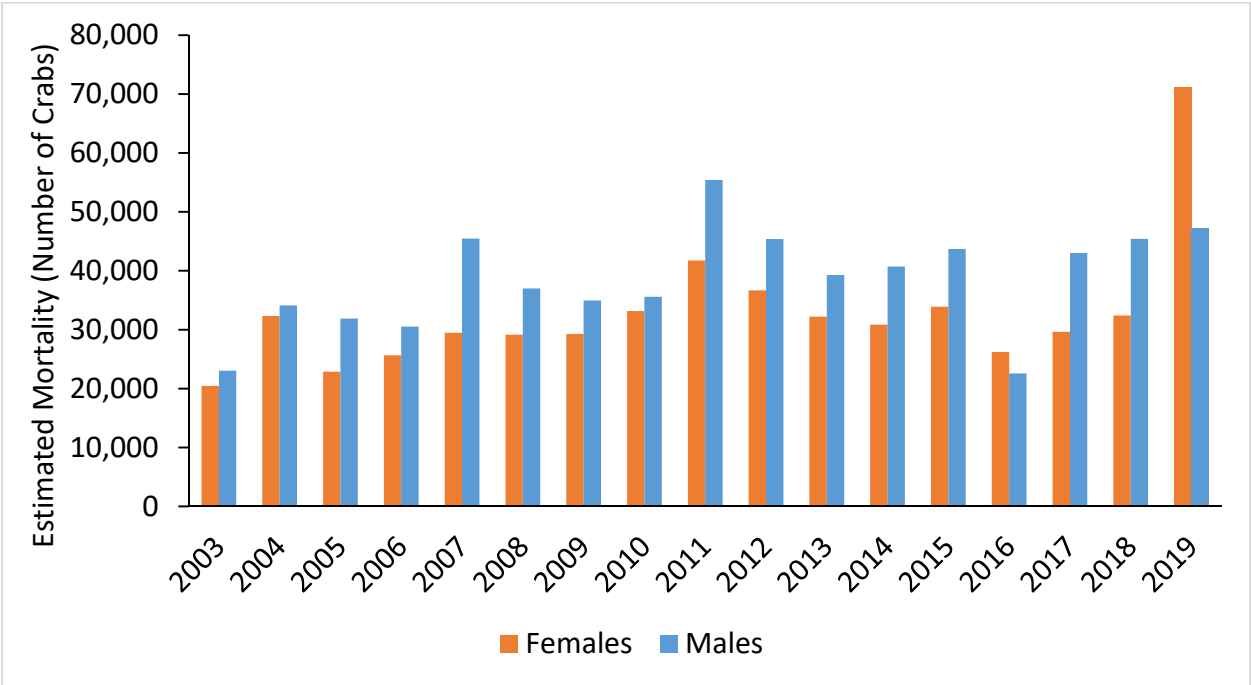


Figure 6. **Estimated mortality due to biomedical bleeding for the coastwide population of horseshoe crabs, 2003-2019, by sex for use in the CMSA.**

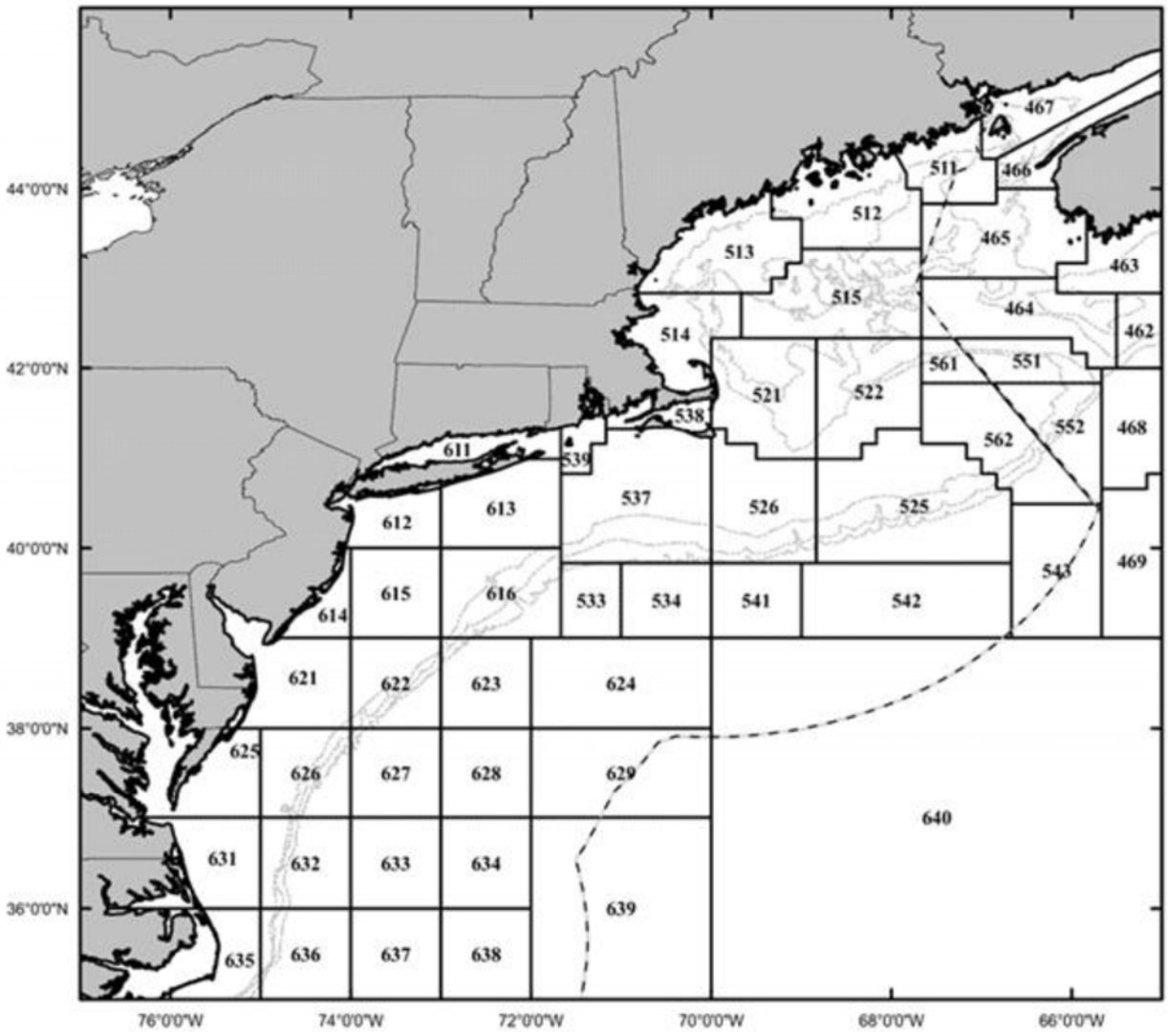


Figure 7. Statistical areas sampled in the Northeast Fisheries Observer Program (NEFOP). For estimating discards of horseshoe crabs from commercial fisheries, areas 612, 614, 615, 621, 625, and 626 were used.

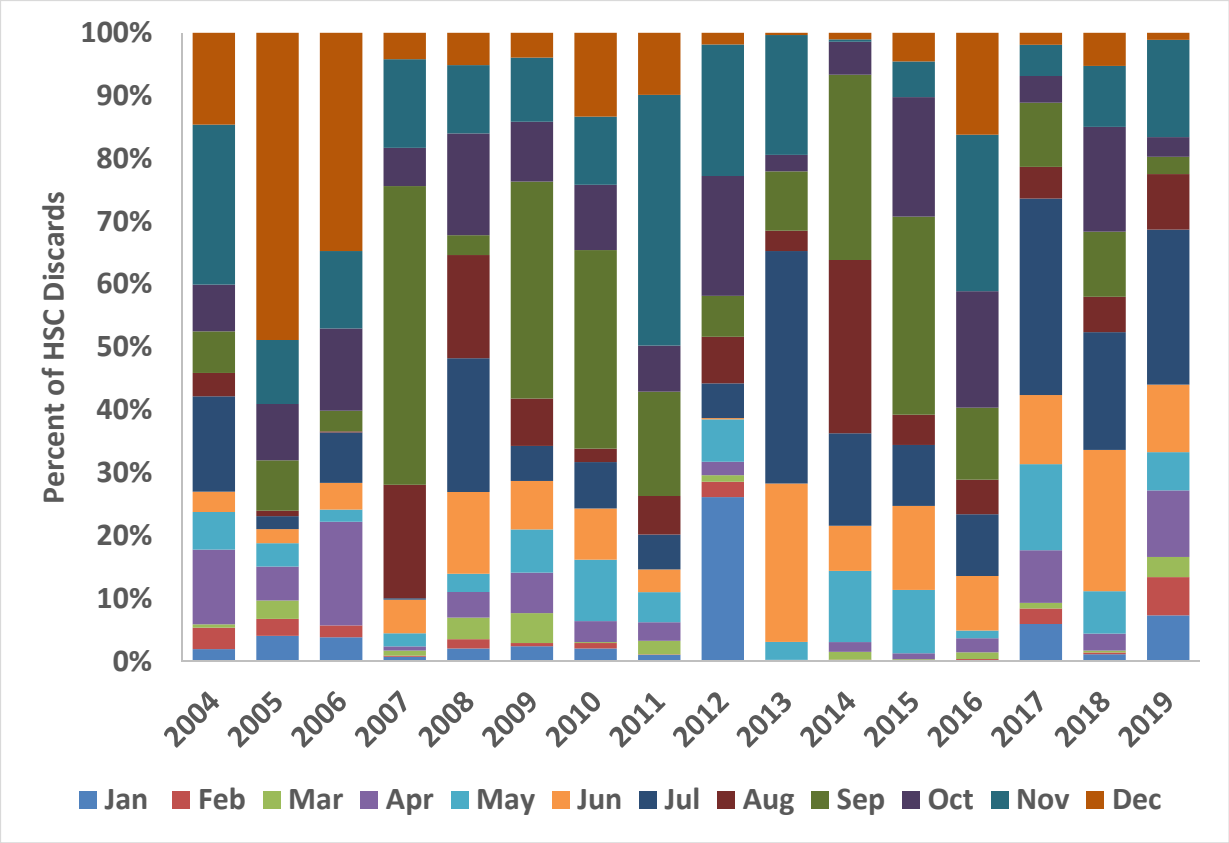


Figure 8. Percent of trips that caught and discarded horseshoe crabs in the NEFOP data by month for 2004-2019.

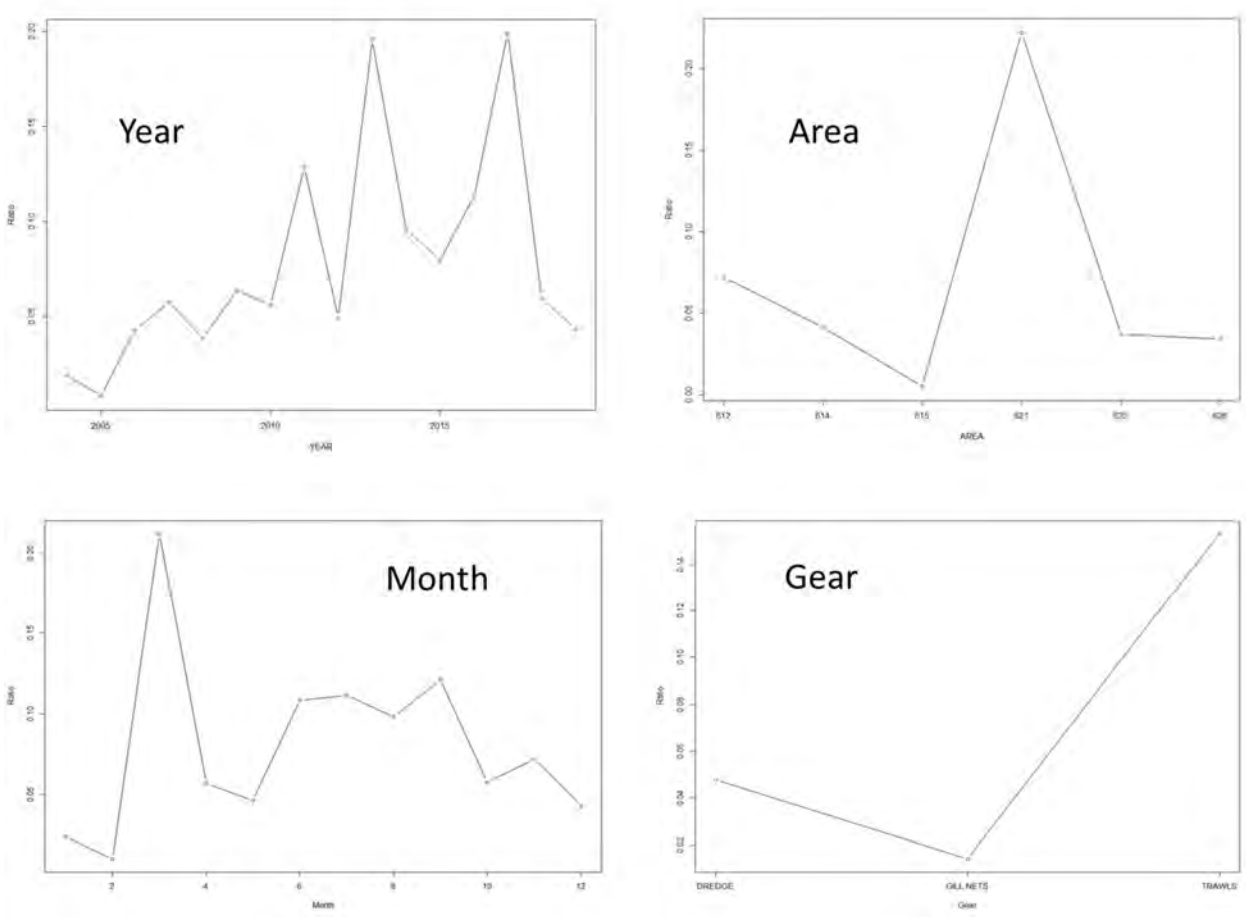


Figure 9. Ratios of discarded horseshoe crabs to all species landed in the NEFOP data by year, area, month, and gear.

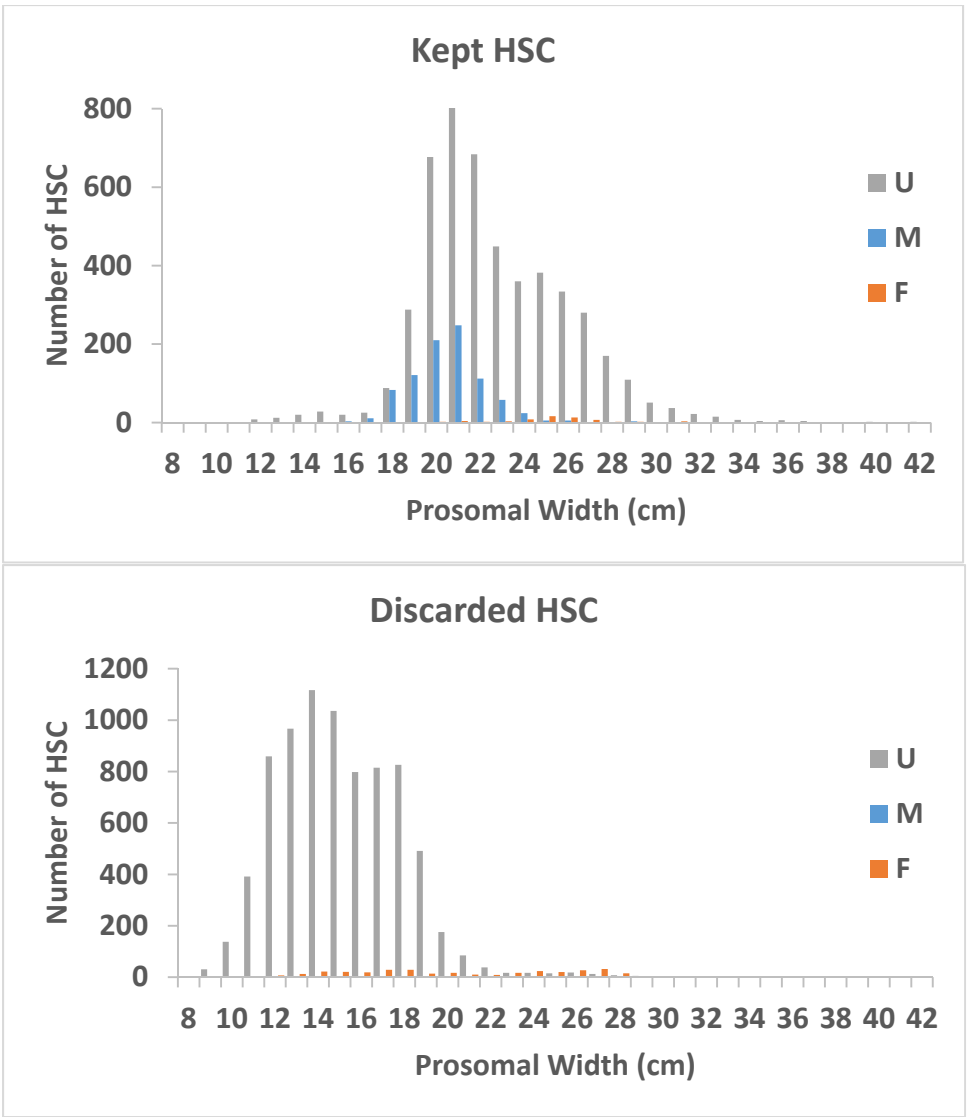


Figure 10. Prosomal width frequencies of horseshoe crabs kept (top) and discarded (bottom) on observed trips in the NEFOP database in the Delaware Bay region.

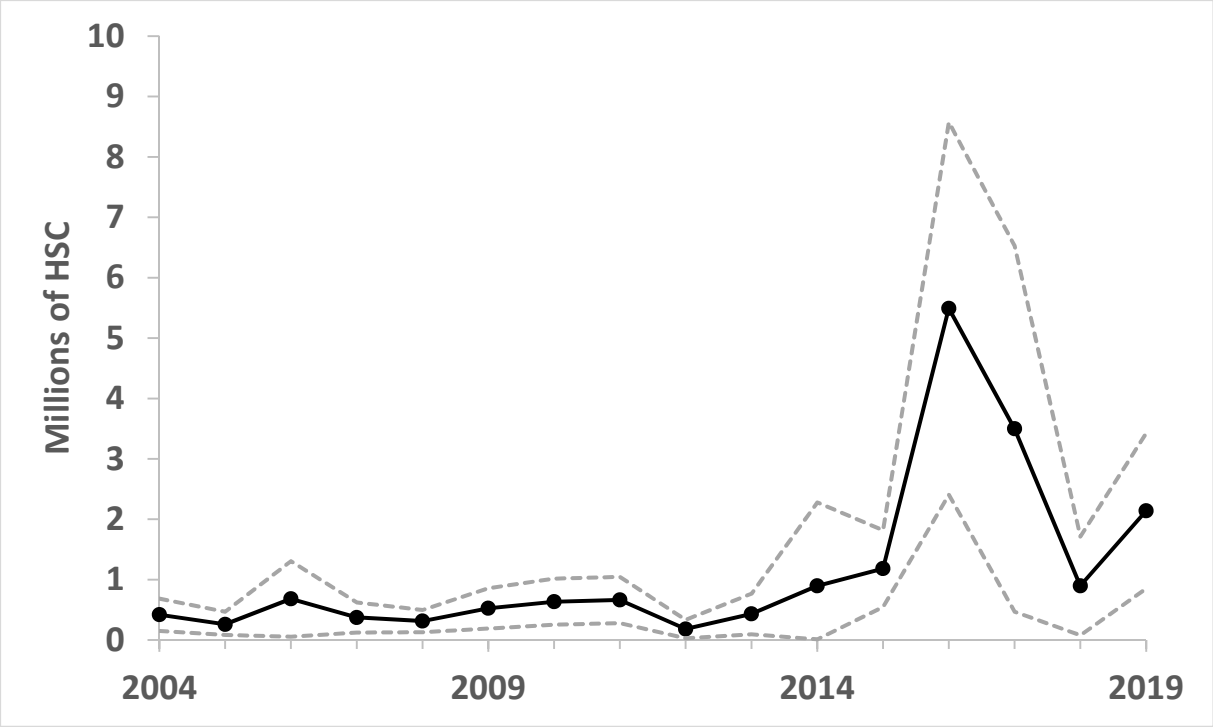


Figure 11. Estimated total number of horseshoe crabs discarded with 95% confidence intervals. Total discards represents all horseshoe crab sexes and maturities, alive and dead, in trawls, discards, and trawls.

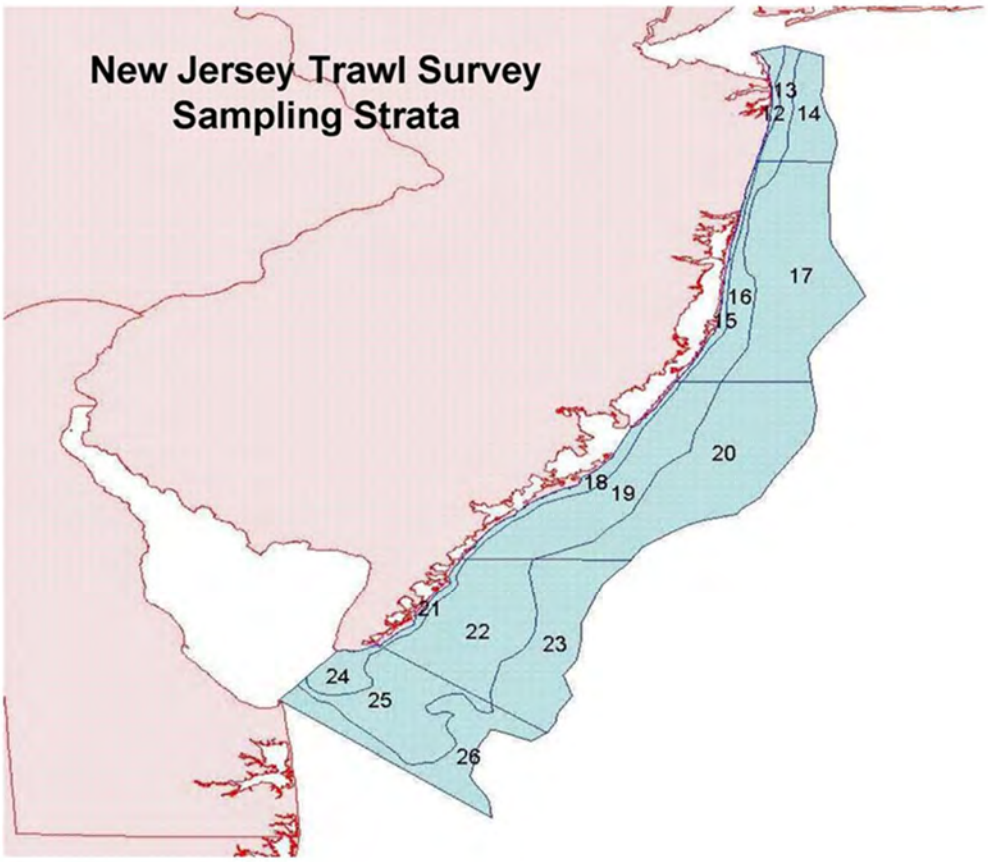


Figure 12. New Jersey Ocean Trawl Survey sampling area with survey strata defined.

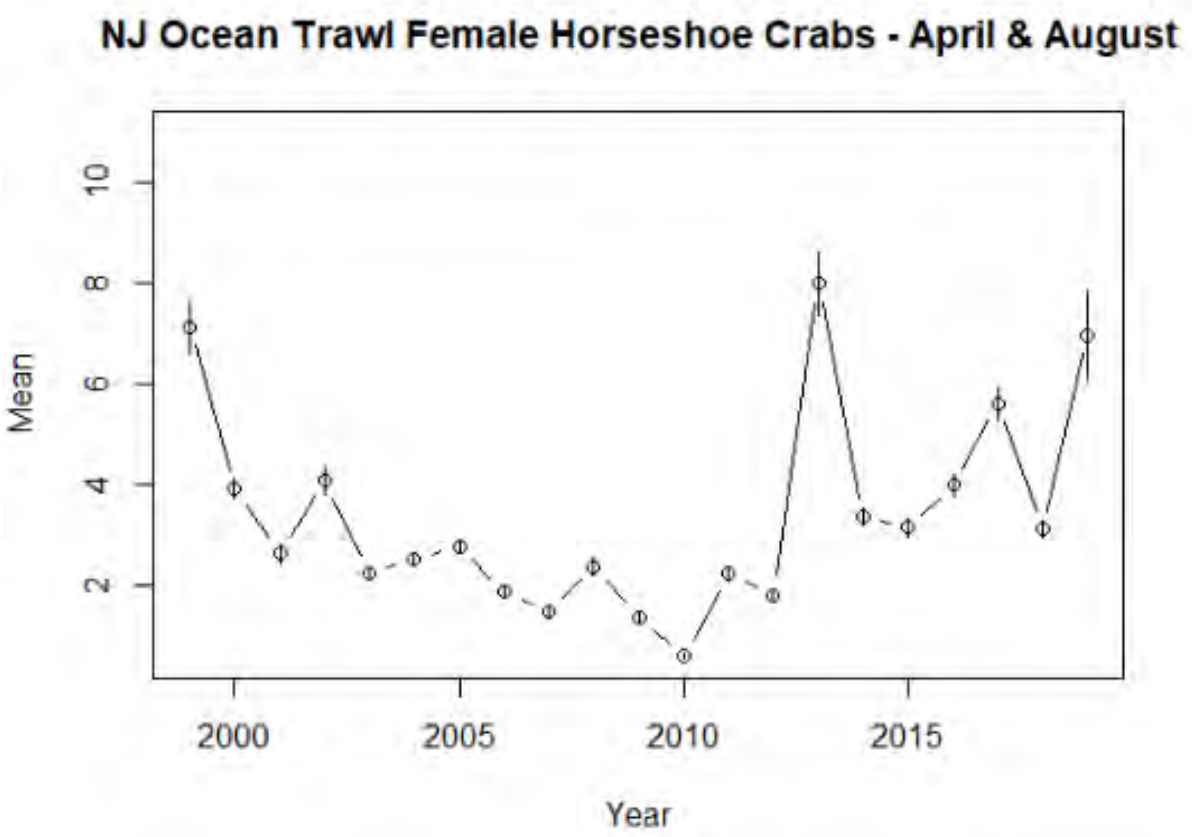


Figure 13. Abundance index for female horseshoe crabs in the New Jersey Ocean Trawl Survey for April and August tows.

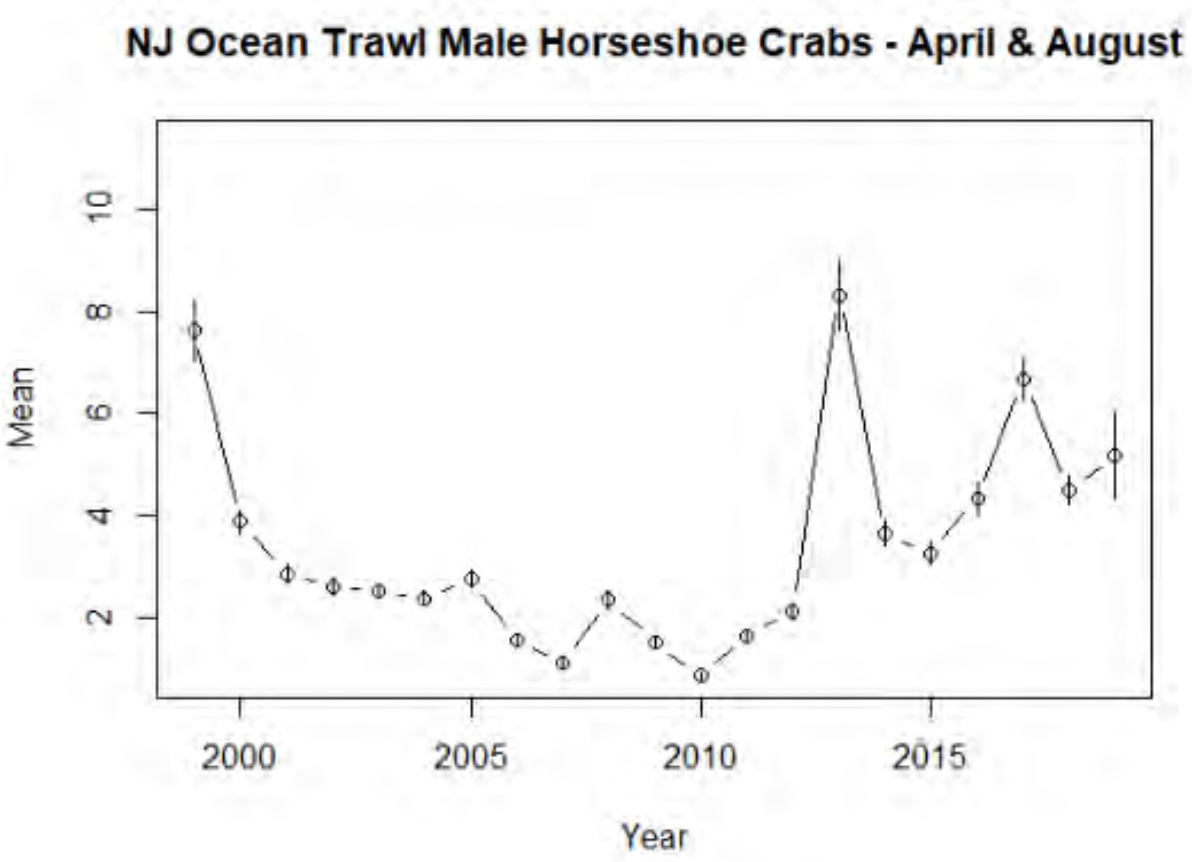


Figure 14. Abundance index for male horseshoe crabs in the New Jersey Ocean Trawl Survey for April and August tows.

Figure 15. Delaware Fish & Wildlife Adult Trawl Survey sampling area and stations.

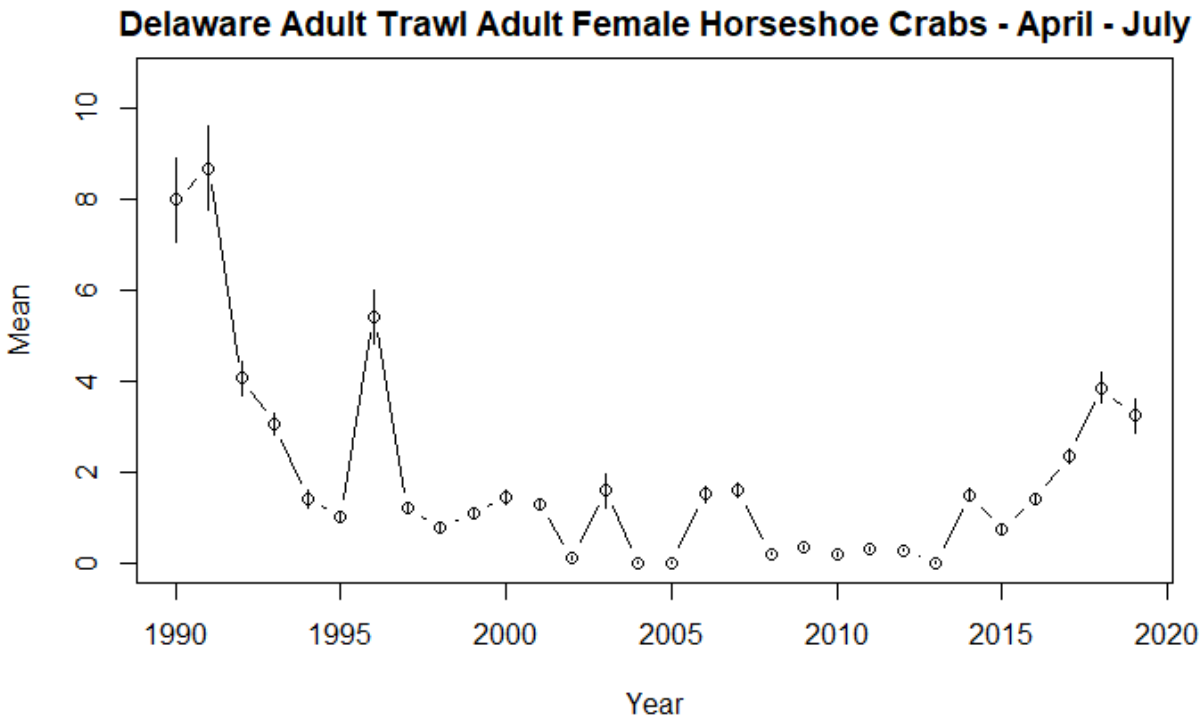


Figure 16. Delaware Fish and Wildlife Adult Trawl Survey abundance index for all adult female horseshoe crabs.

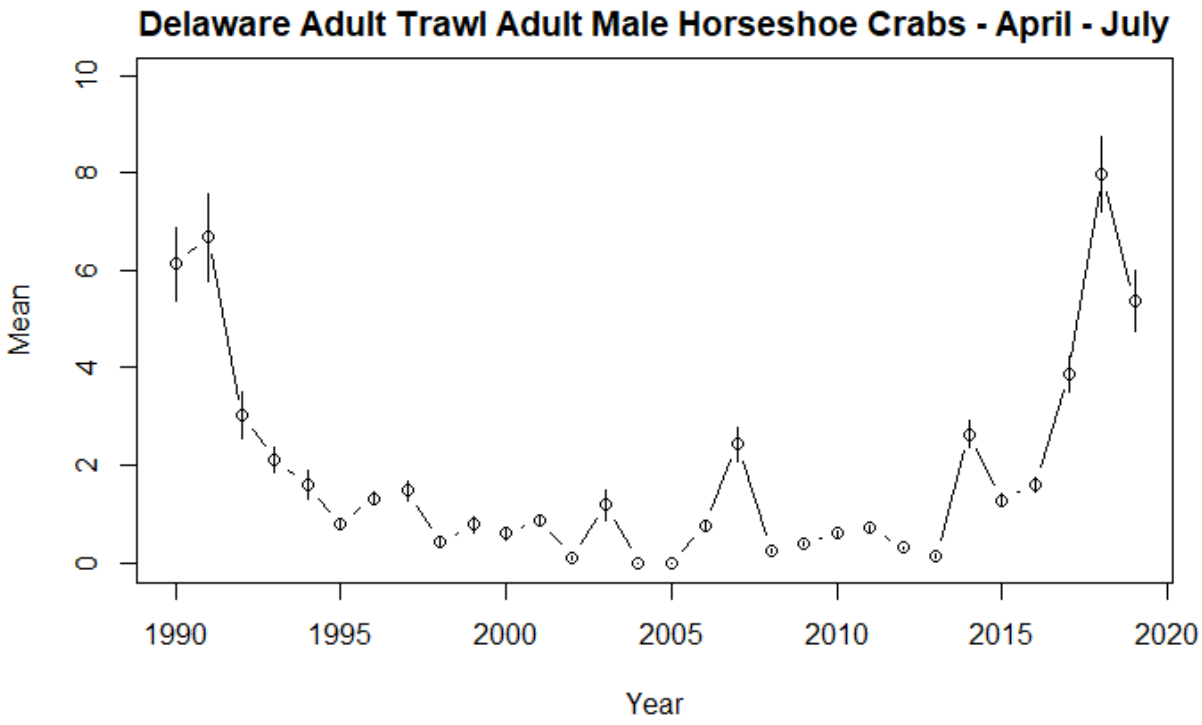


Figure 17. Delaware Fish and Wildlife Adult Trawl Survey abundance index for all adult male horseshoe crabs.

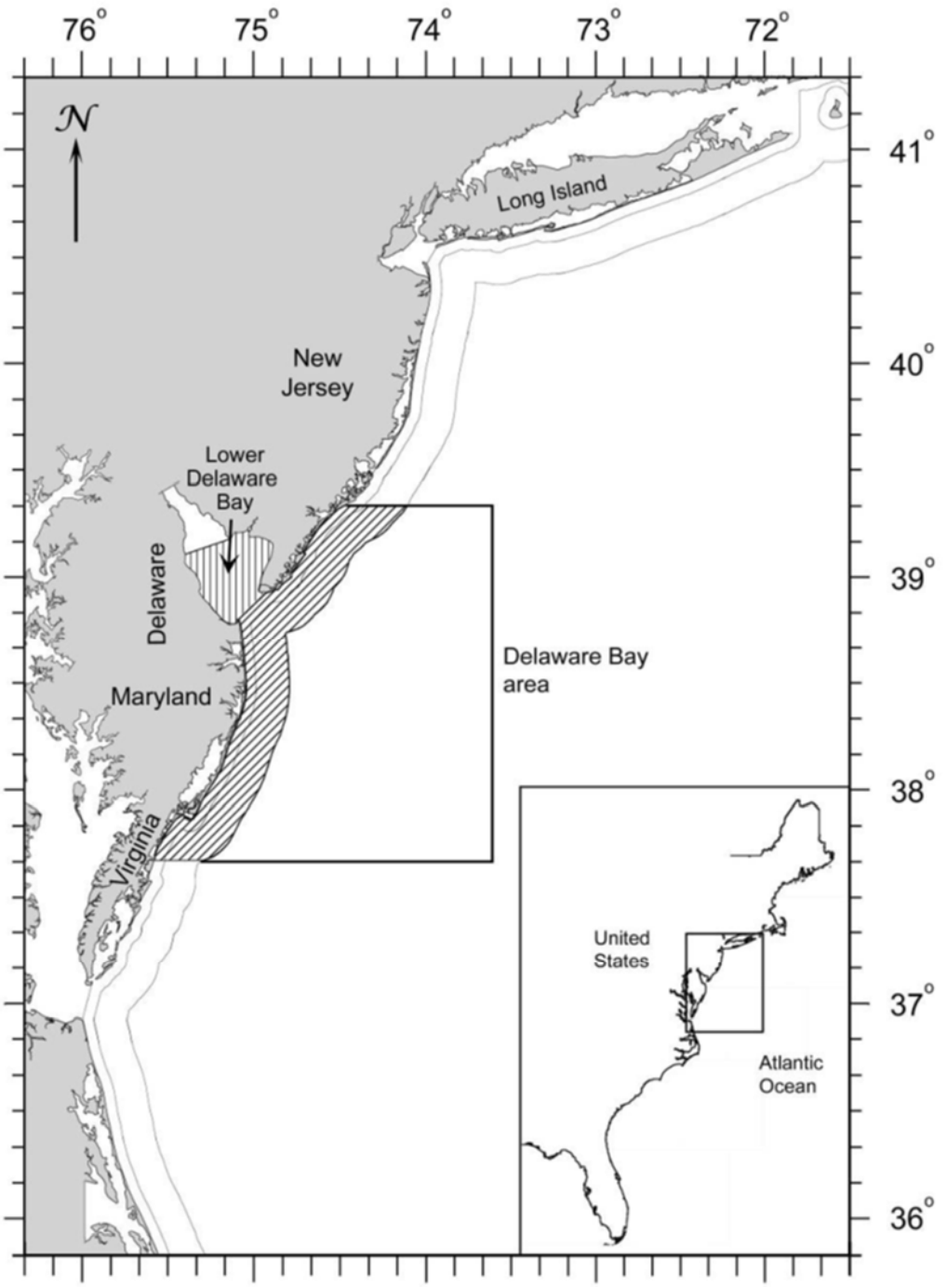


Figure 18. Virginia Tech trawl survey sampling area. The coastal Delaware Bay area (DBA) and Lower Delaware Bay (LDB) survey areas are indicated. Mean catches among years were compared using stations within the shaded portions of the survey area in the annual report (map provided by Virginia Tech).

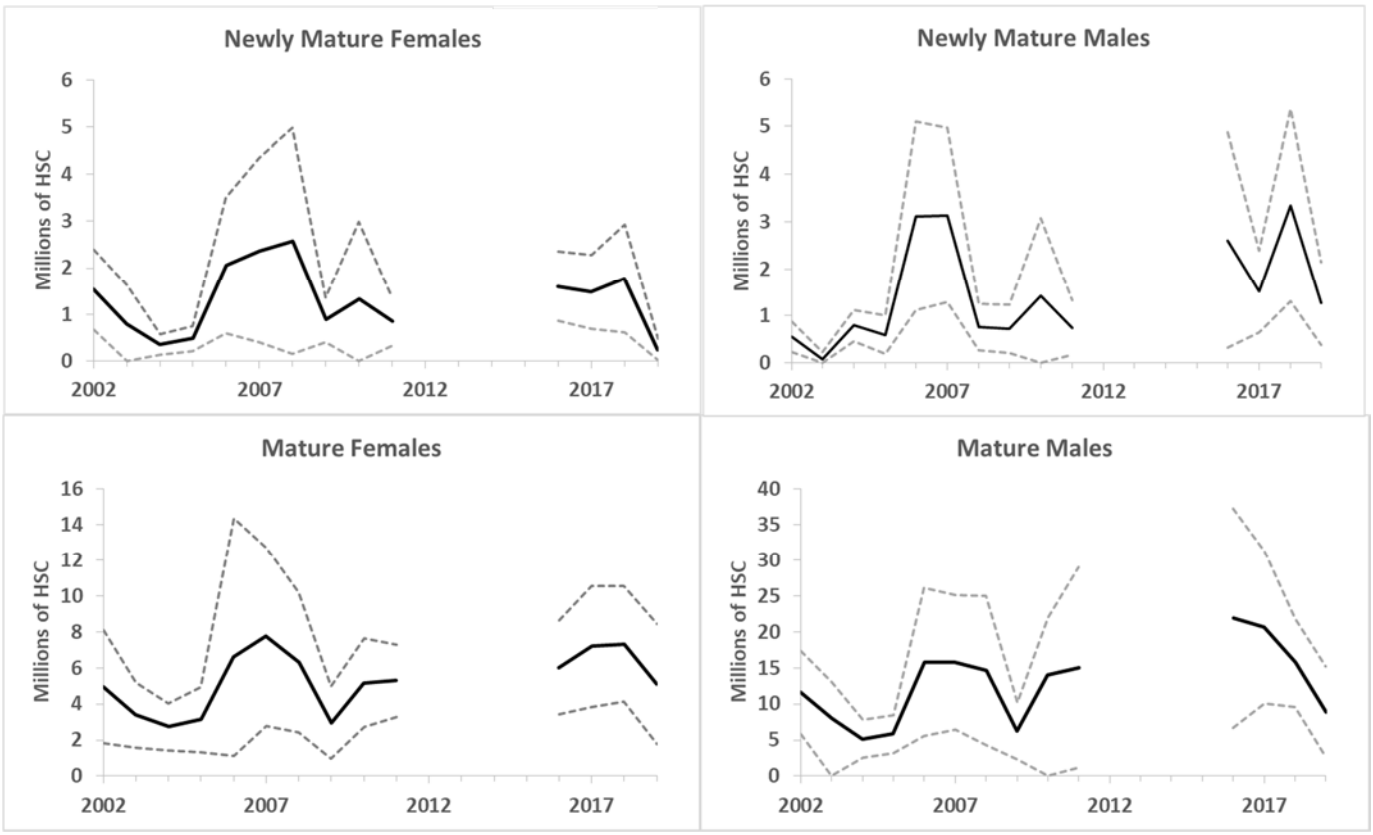
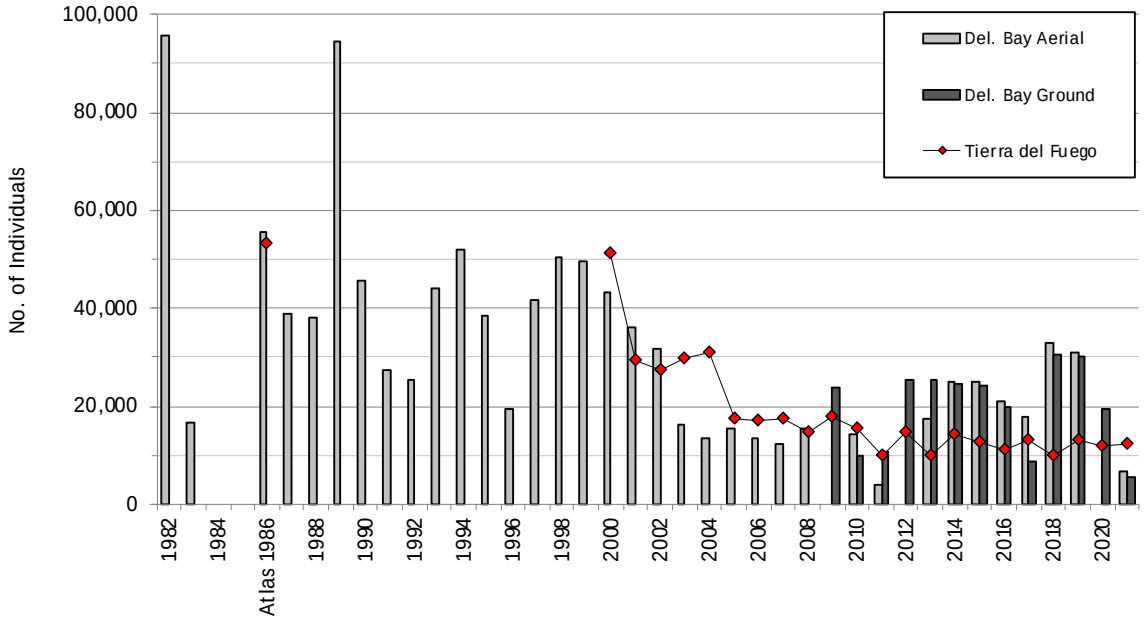


Figure 19. Swept area population estimates of horseshoe crabs in the coastal Delaware Bay by demographic group used in the CMSA with 95% confidence limits for 2002-2019. The survey did not run 2012-2015.



Aerial Counts: K Clark 1986-2008; W Pitts 2010; H Sitters 2011; L Niles 2013; M Peck 2014-2015, RIG Morrison 2016-2019. No aerial in 2020 (Covid), S. Feigin 2021. Peak aerial counts in 2009 and 2012 not conducted or not available, respectively. Tierra del Fuego RIG Morrison, K. Ross (1986-2020), R. Matus, H. Norambuena (2021).

Figure 20. Peak aerial count of Red Knots in Delaware Bay during spring stopover, 1982-2021; aerial count from Tierra del Fuego (major wintering area) are included for comparison, 1986-2021. Delaware Bay aerial counts in 1982-1983 were conducted by New Jersey Audubon; no aerial counts were conducted in 1984-1985. Aerial counts from 1986-present were conducted by New Jersey Division of Fish & Wildlife, Delaware Division of Fish & Wildlife and various individuals after 2008. Aerial counts in 2009 and 2012 were not conducted or not available, respectively; peak values for these years are from ground counts. Beginning in 2009 with a change of long-term observers, ground and boat counts were conducted simultaneously with aerial survey to help validate aerial abundances, particularly in Mispillion Harbor, DE, where birds can be missed by aerial observers, and Egg Island, NJ, where large numbers of birds stage and may be undercounted. Ground surveys are presented for years when comprehensive ground/boat surveys were conducted in NJ and DE. Source: Atlas 1986, Morrison, R. I. G. and R. K. Ross. 1989. Atlas of Nearctic shorebirds on the coast of South America. 2 vols. Special Publication, Canadian Wildlife Service, Ottawa, Ontario. 325 pp.

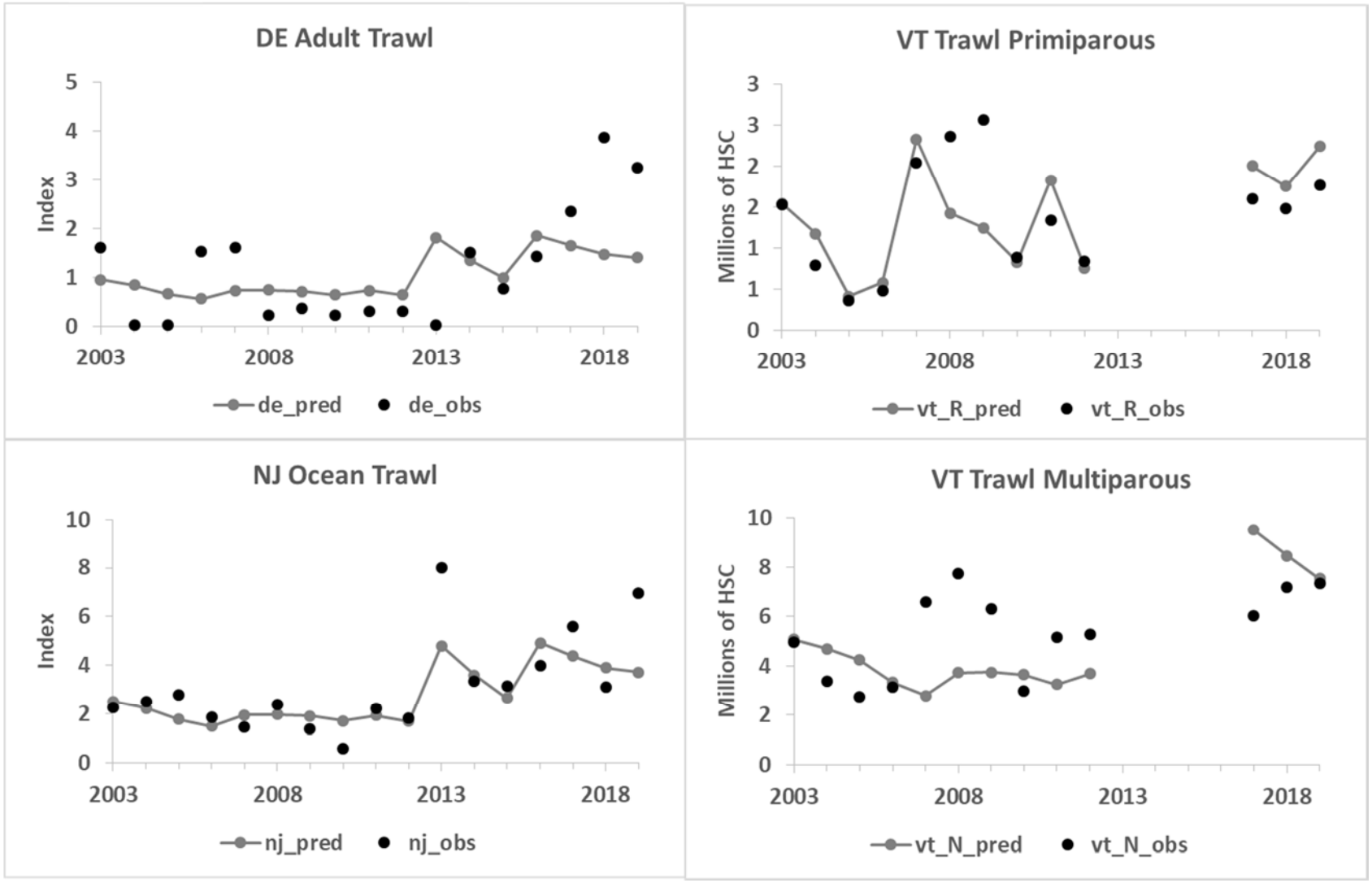


Figure 21. CMSA model fits to the indices for the Delaware (DE) Adult Trawl, New Jersey (NJ) Ocean Trawl, and Virginia Tech (VT) Trawl Surveys for primiparous and multiparous female horseshoe crabs.

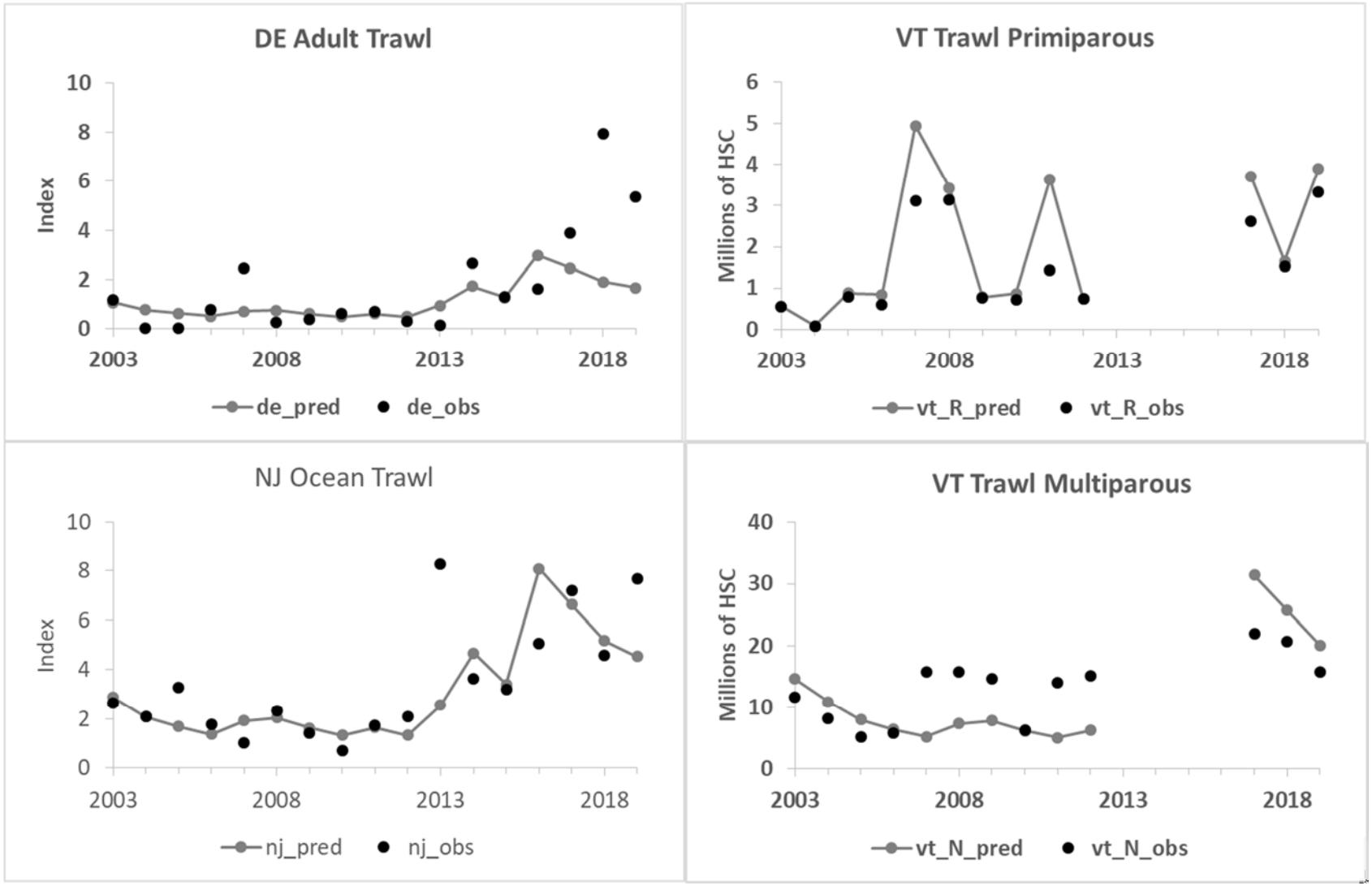
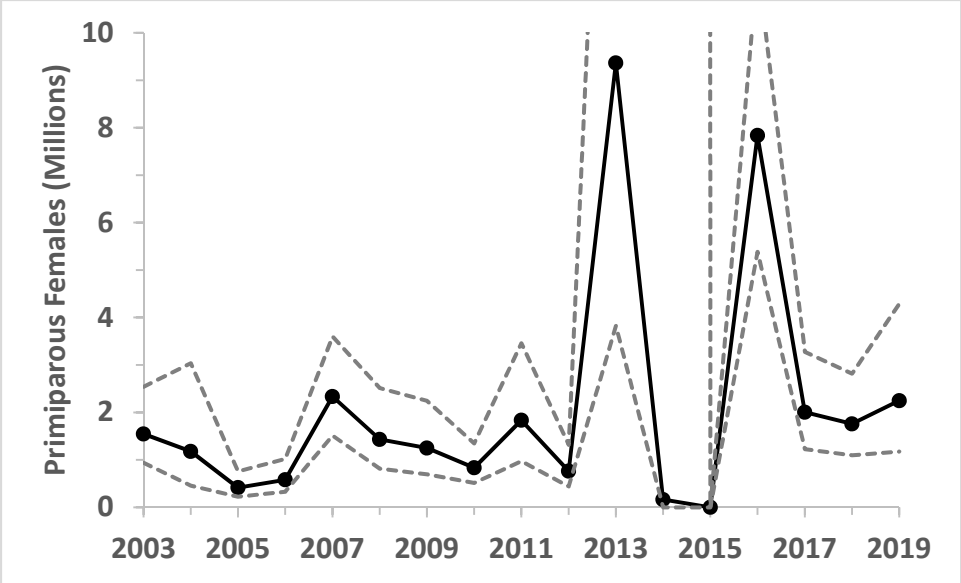


Figure 22. CMSA model fits to the indices for the Delaware (DE) Adult Trawl, New Jersey (NJ) Ocean Trawl, and Virginia Tech (VT) Trawl Surveys for primiparous and multiparous male horseshoe crabs.



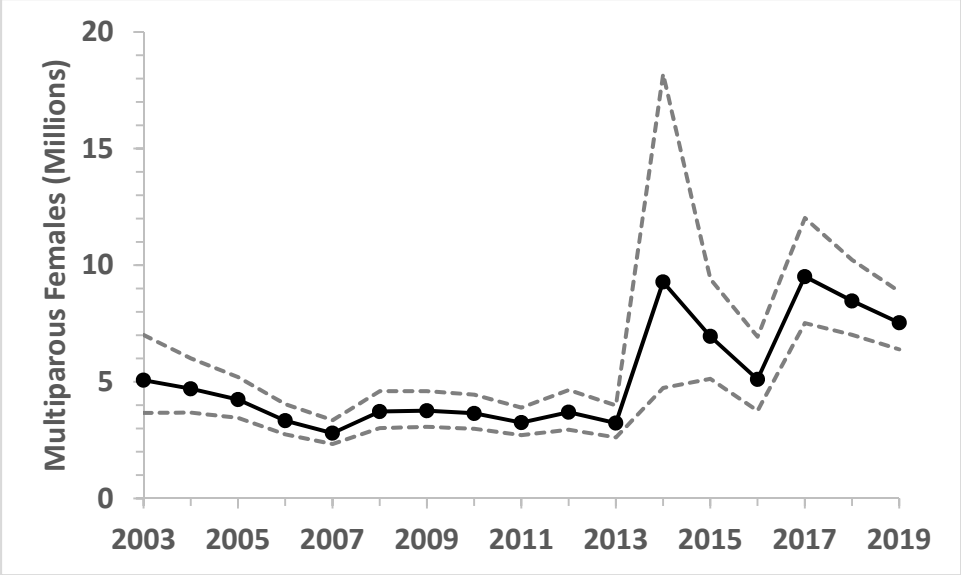


Figure 23. CMSA model estimated primiparous and multiparous female abundance with lower and upper 95% confidence limits. Upper confidence limits for 2013-2016 extend beyond y-axis for primiparous crabs due to missing years of data from the Virginia Tech Trawl Survey.

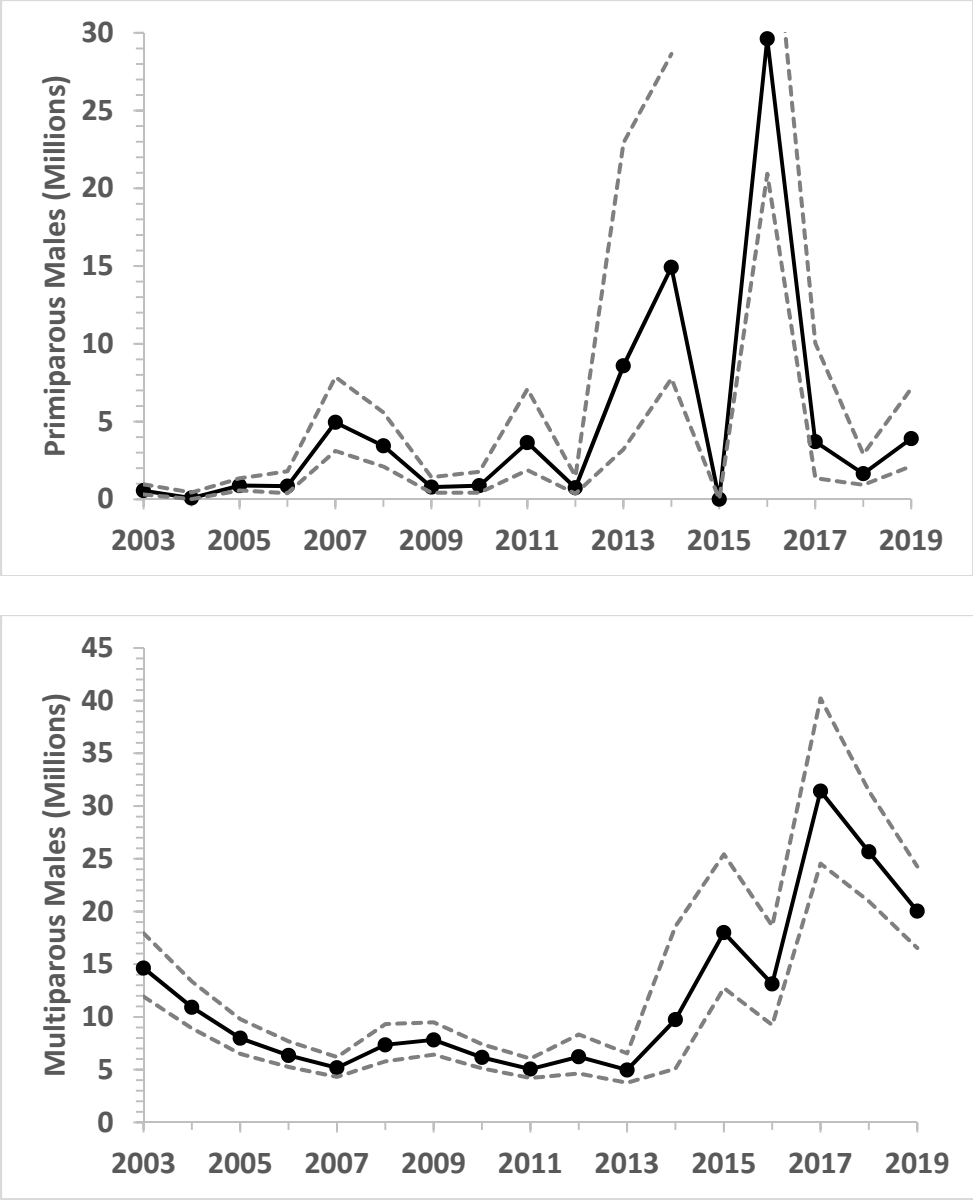


Figure 24. CMSA model estimated primiparous and multiparous male abundance with lower and upper 95% confidence limits. Upper confidence limits for 2013-2016 extend beyond y-axis for primiparous crabs due to missing years of data from the Virginia Tech Trawl Survey.

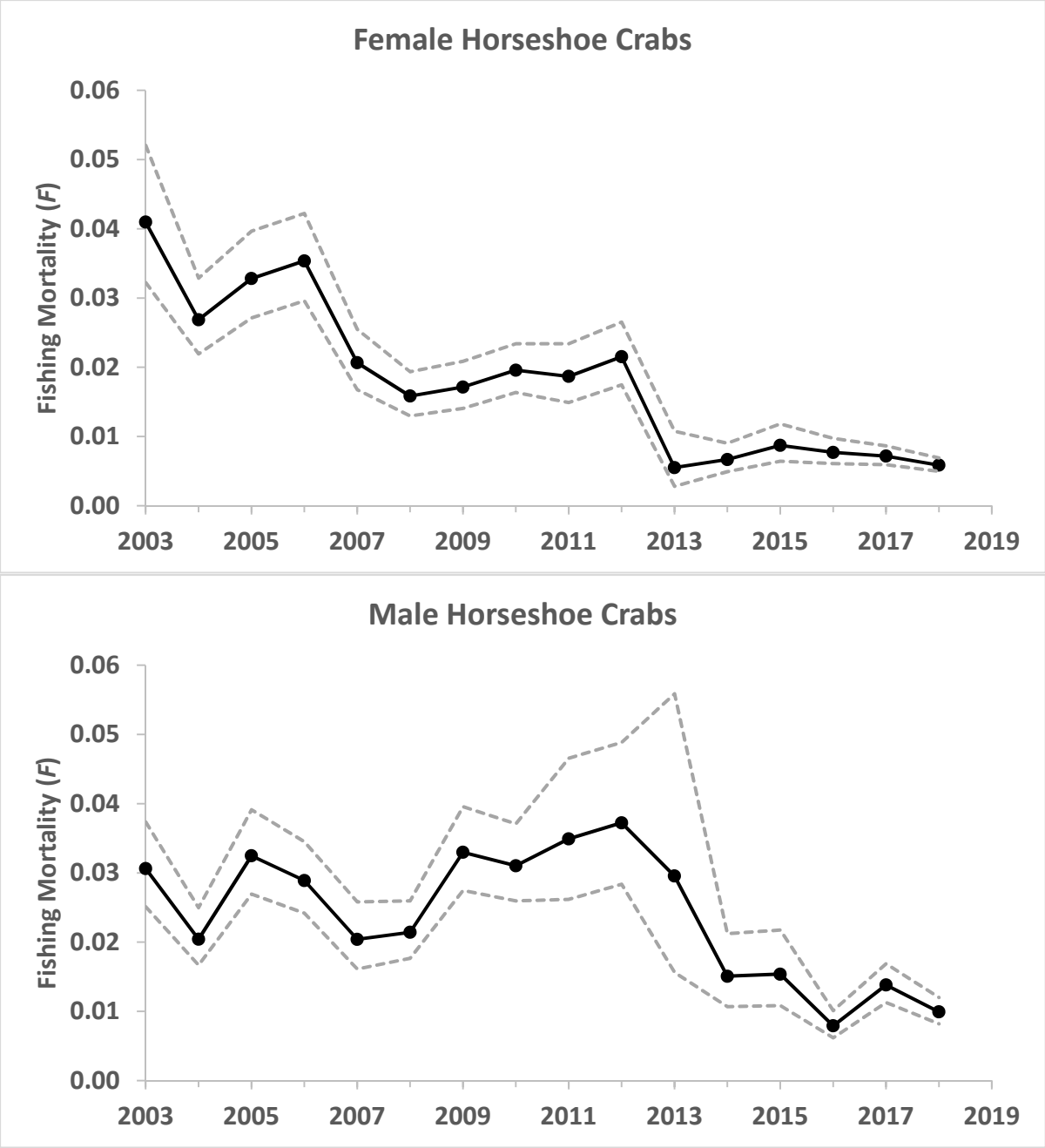


Figure 25. CMSA model estimates instantaneous fishing mortality rate (*F*) with lower and upper 95% confidence limits.

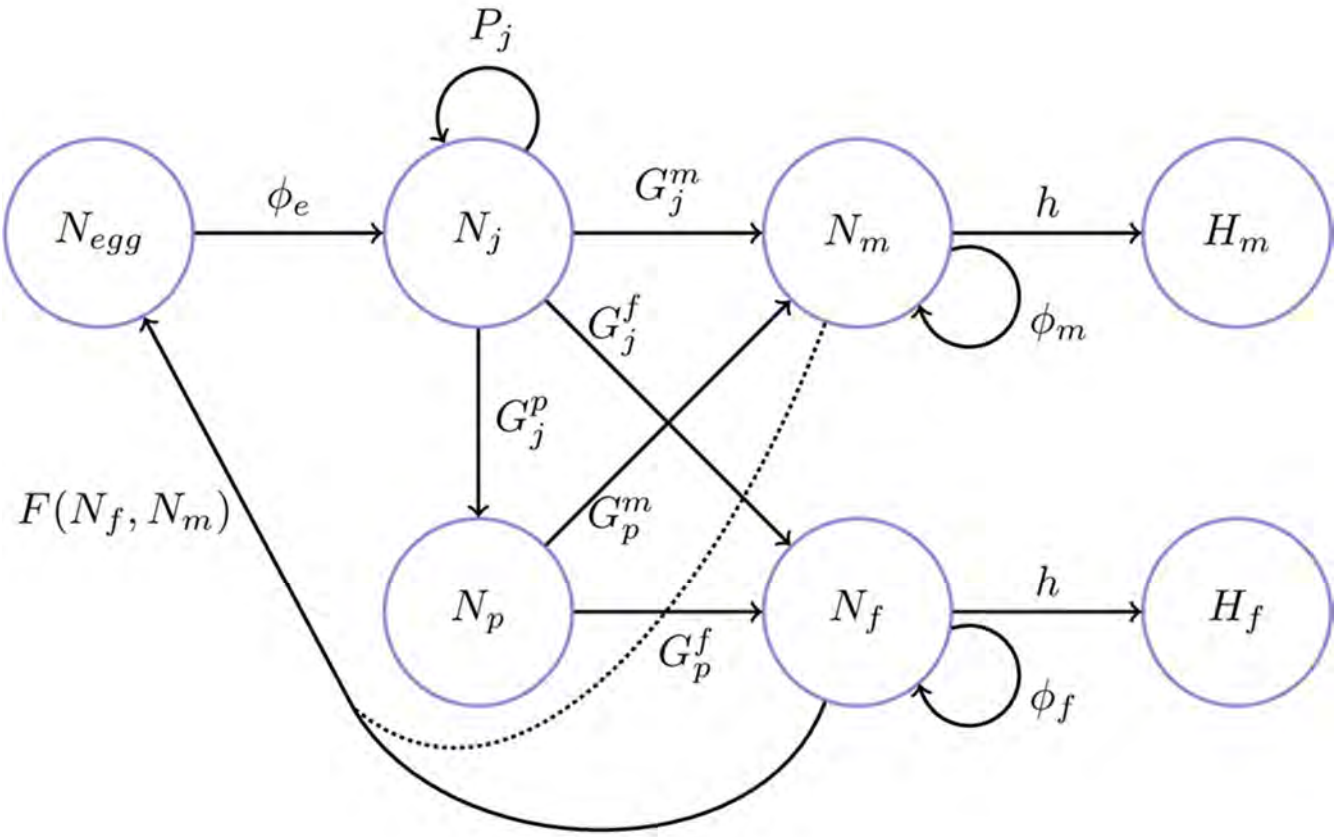


Figure 26. Life cycle diagram of the stage-based horseshoe crab population projection model used in the previous ARM version. Abundances (circle nodes): *N*, population segment; *H*, harvest. Rates (arrows): ϕ, survival; *G*, graduation from one stage to another; *P*, persistence in a stage; *F*, fecundity; h, harvest. Subscripts/superscripts: *e*, egg; j, juveniles; *p*, primiparous; *f*, multiparous females; *m*, multiparous males. For stage transition rates *G*, subscript indicates the previous stage, superscript the new. Fecundity is a function of both male and female abundance, via a fertility function that depends upon the sex ratio among multiparous adults.

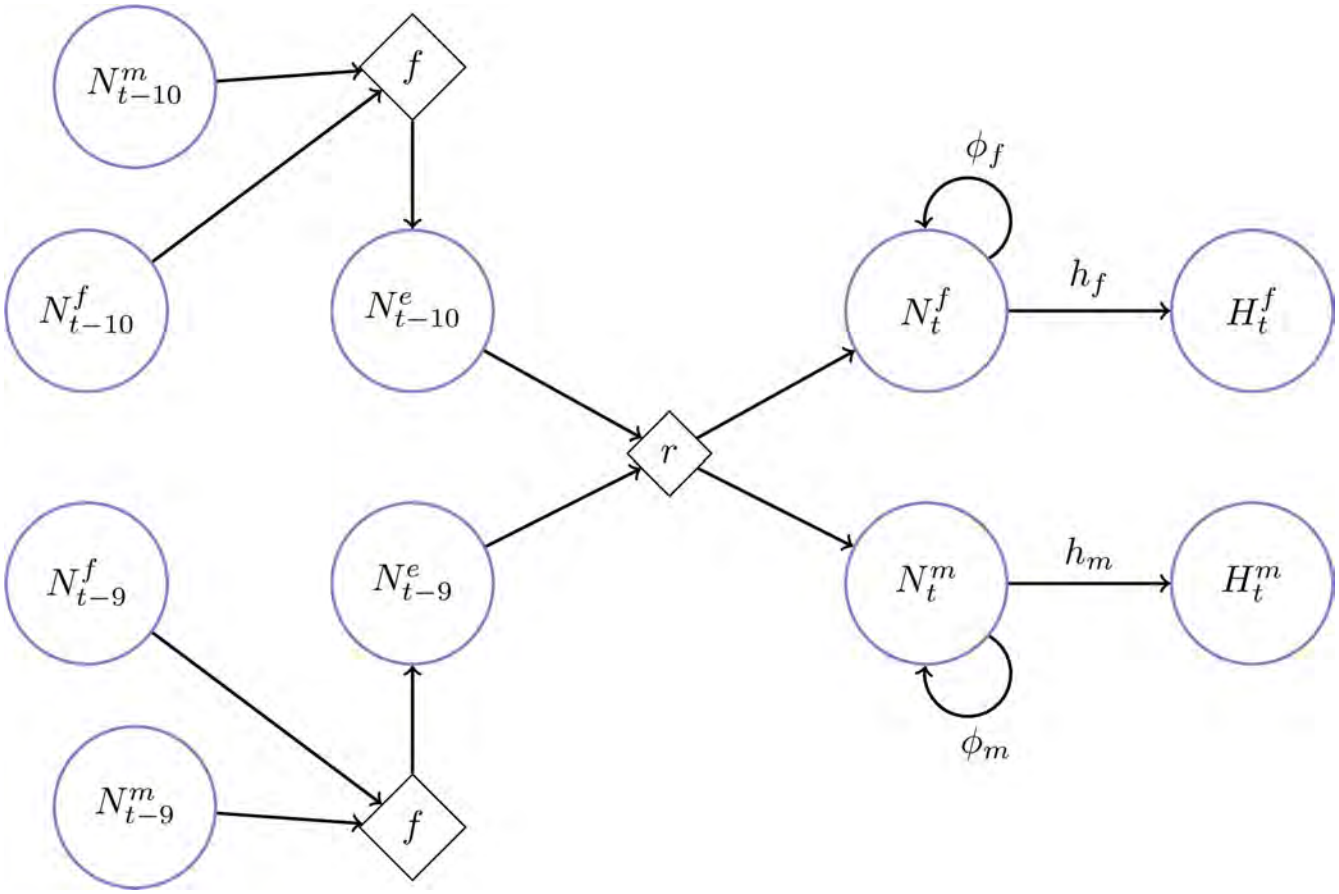


Figure 27. Annualized life cycle diagram of the CMSA-based horseshoe crab simulation model used in the revised ARM. Abundances (circle nodes): *N*, population segment; *H*, harvest. Rates (arrows): ϕ, survival; *h*, harvest. Superscripts: *f*, females; *m*, males; *e*, 'effective' spawning females, that is, those whose eggs are successfully fertilized. Processes (diamond nodes): *f*, fertility, which depends upon the sex ratio; *r*, recruitment, which generates primiparous crabs.

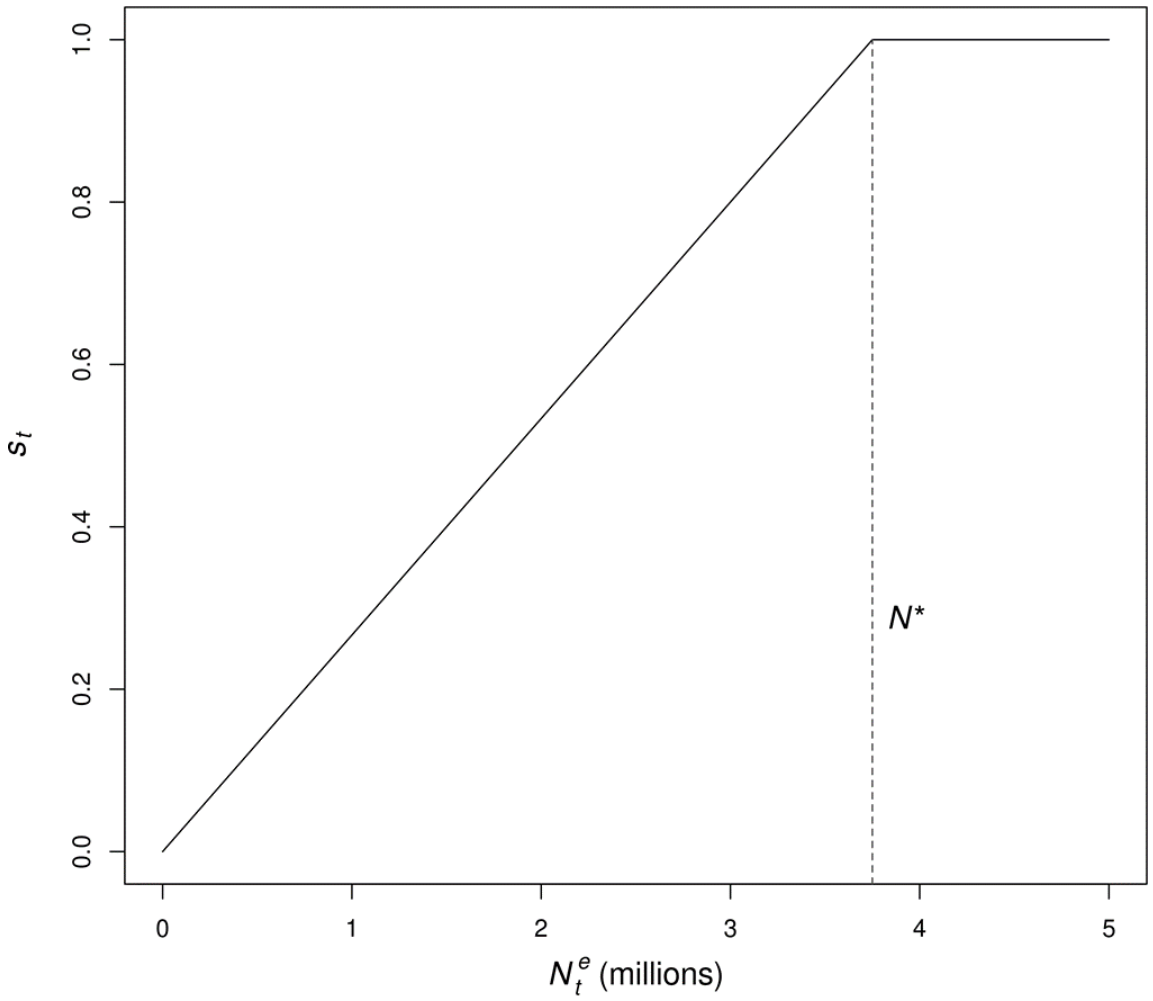


Figure 28. Broken-stick function to determine scalars s_t that are used to depress recruitment in year t+9 or t+10 (see Equations 10, 11) when the effective number of spawners N^e is below the threshold N^* = 3,750,000 in year t.

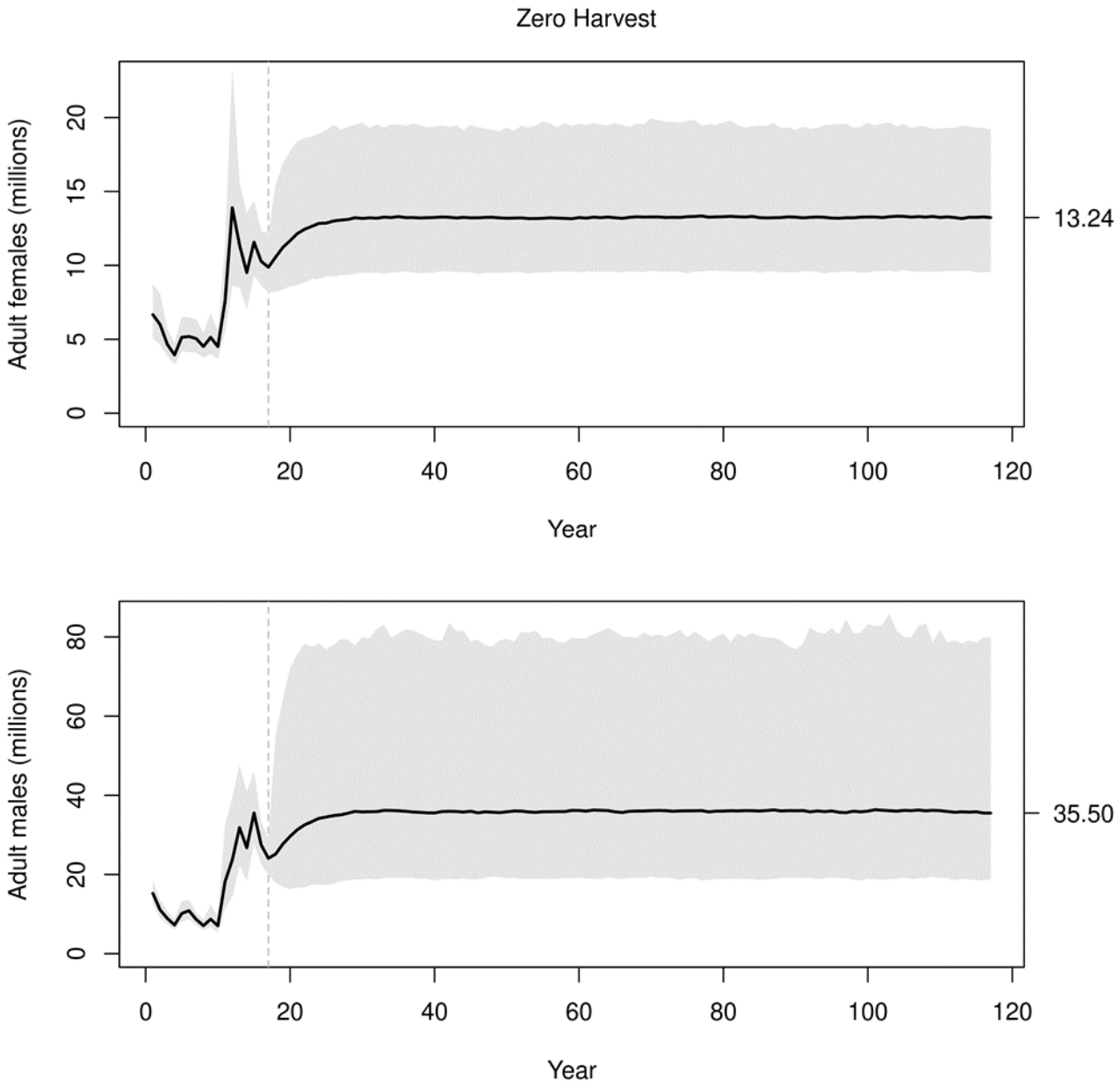


Figure 29. Summary of female (top panel) and male (bottom) horseshoe crab abundance from 5,000 simulations of the Delaware Bay population with no bait or background harvest. Black line indicates the median across simulations; the edges of the gray shaded region show the 2.5th and 97.5th quantiles. Dashed line indicates the final year for which abundance estimates from the Catch Multiple Survey Analysis are available (2019): curves to the left of this line represent CMSA estimates, those to the right are projections into the future. Value in the righthand margin gives the median abundance in year 100 of the simulations.

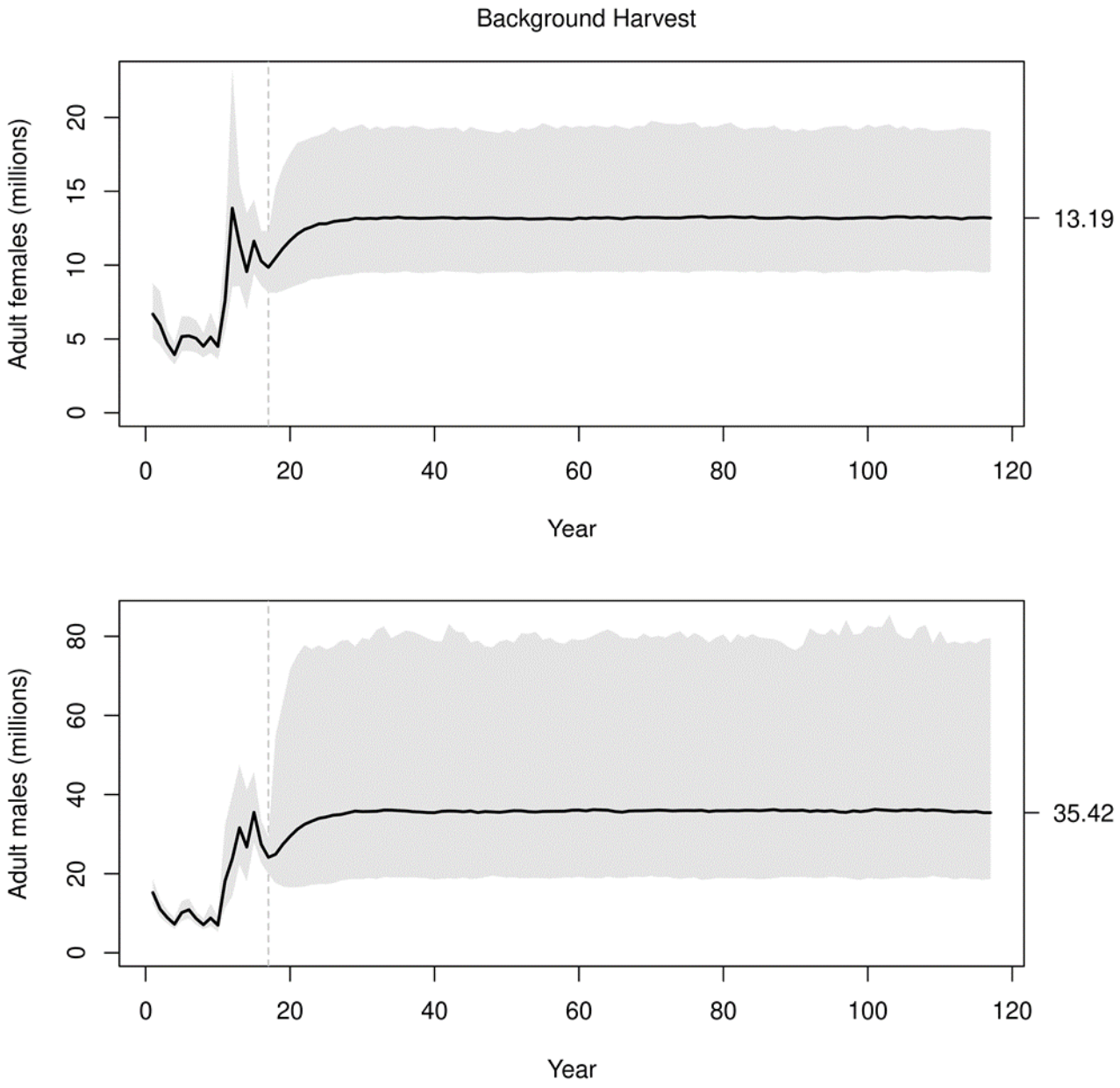


Figure 30. Summary of female (top panel) and male (bottom) horseshoe crab abundance from 5,000 simulations of the Delaware Bay population with background harvest only (no bait harvest). Black line indicates the median across simulations; the edges of the gray shaded region show the 2.5th and 97.5th quantiles. Dashed line indicates the final year for which abundance estimates from the Catch Multiple Survey Analysis are available (2019): curves to the left of this line represent CMSA estimates, those to the right are projections into the future. Value in the righthand margin gives the median abundance in year 100 of the simulations.

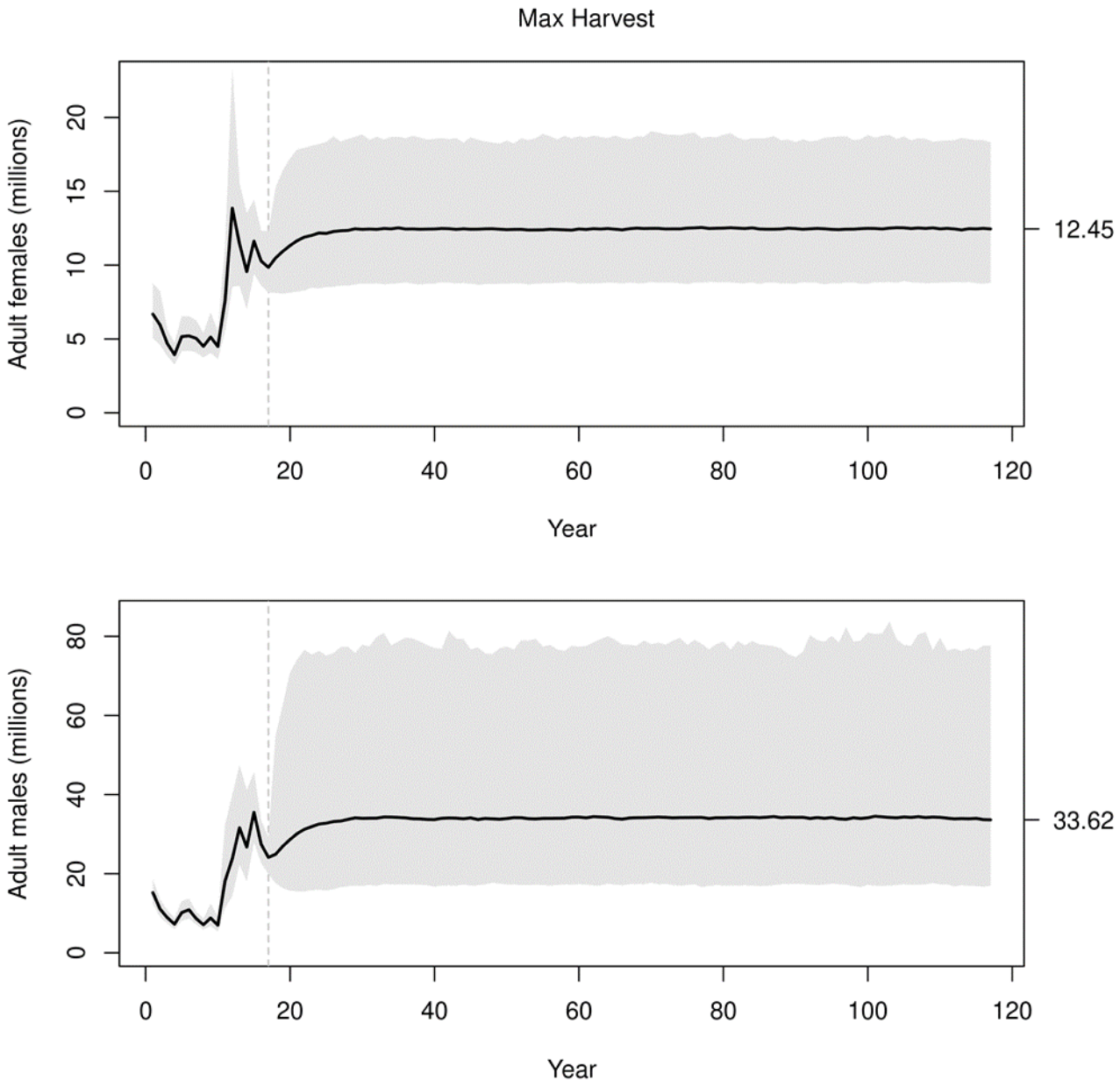


Figure 31. Summary of female (top panel) and male (bottom) horseshoe crab abundance from 5,000 simulations of the Delaware Bay population with maximum bait harvest allowed under the HSC-REKN ARM framework : 210,000 females annually, 500,000 males. Black line indicates the median across simulations; the edges of the gray shaded region show the 2.5th and 97.5th quantiles. Dashed line indicates the final year for which abundance estimates from the Catch Multiple Survey Analysis are available (2019): curves to the left of this line represent CMSA estimates, those to the right are projections into the future. Value in the righthand margin gives the median abundance in year 100 of the simulations.

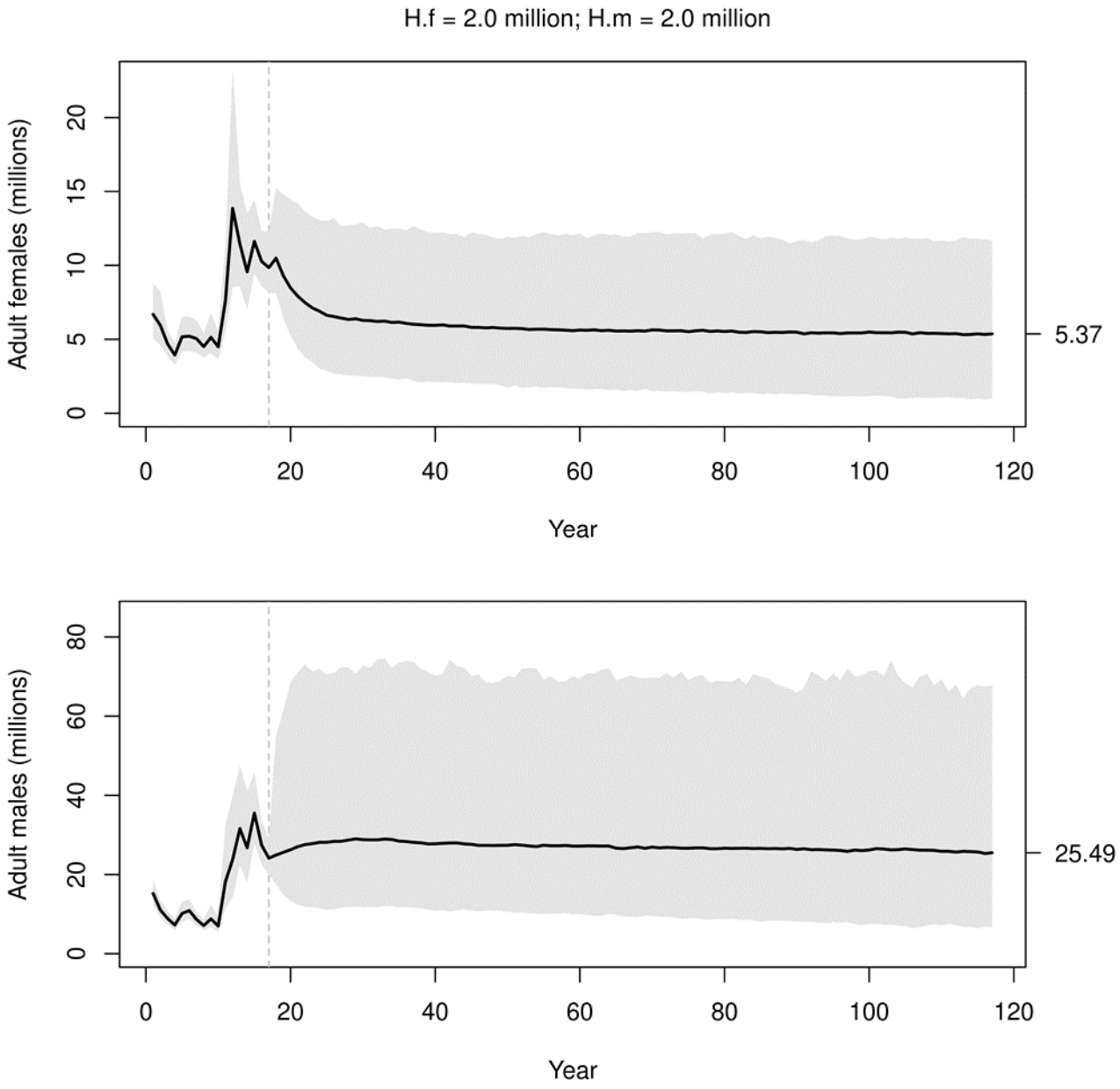


Figure 32. Summary of female (top panel) and male (bottom) horseshoe crab abundance from 5,000 simulations of the Delaware Bay population with very large harvest : 2 million females annually, and 2 million males. Black line indicates the median across simulations; the edges of the gray shaded region show the 2.5th and 97.5th quantiles. Dashed line indicates the final year for which abundance estimates from the Catch Multiple Survey Analysis are available (2019): curves to the left of this line represent CMSA estimates, those to the right are projections into the future. Value in the righthand margin gives the median abundance in year 100 of the simulations.

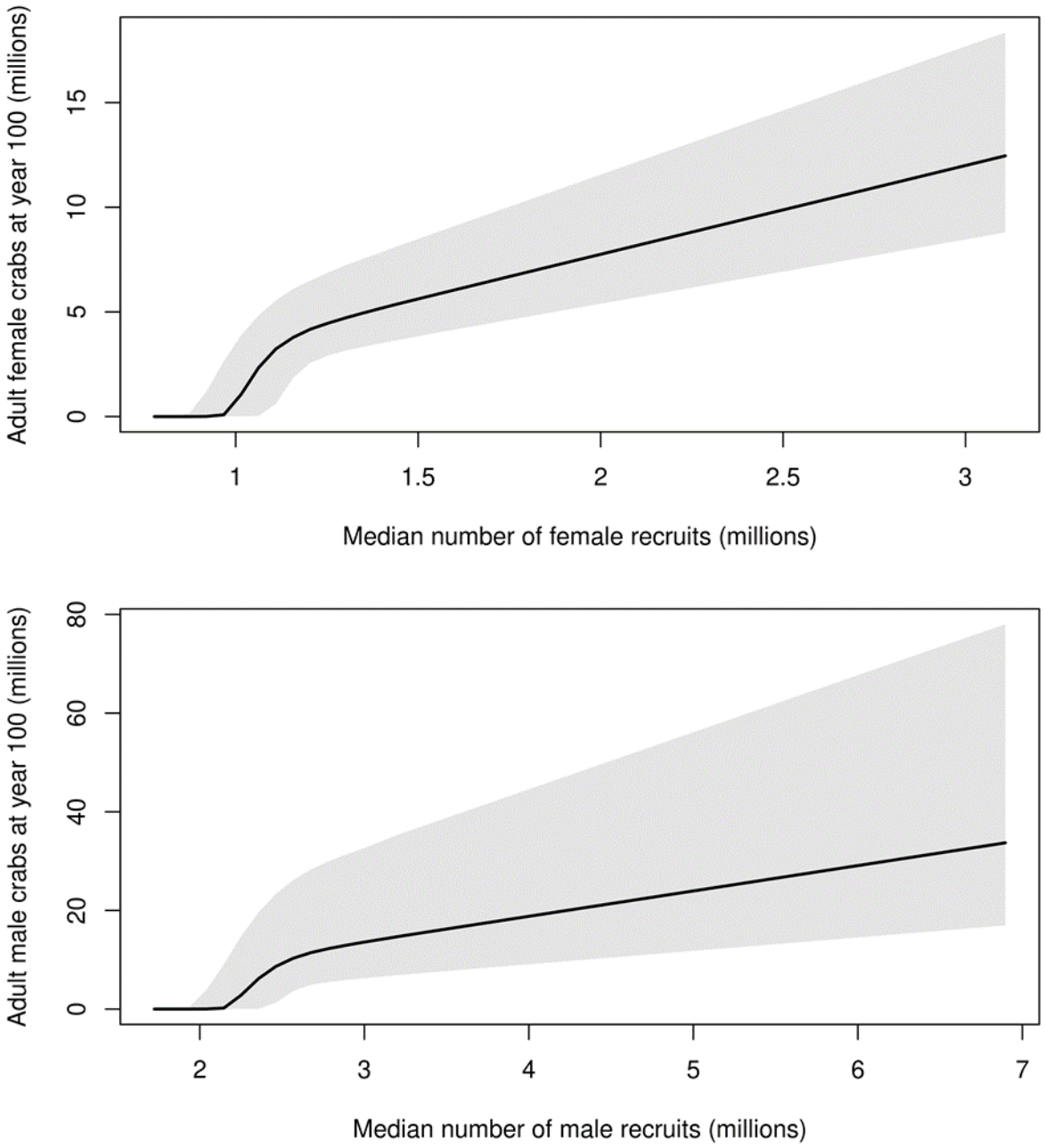


Figure 33. Sensitivity of female (top panel) and male (bottom) horseshoe crab abundance in projection year 100 to reductions in the value of exp(μ), the median of the bivariate lognormal distribution that generates recruits in the projection model. The black line represents the median over 5,000 iterations, the gray region represents values between the 2.5th to 97.5th quantiles.

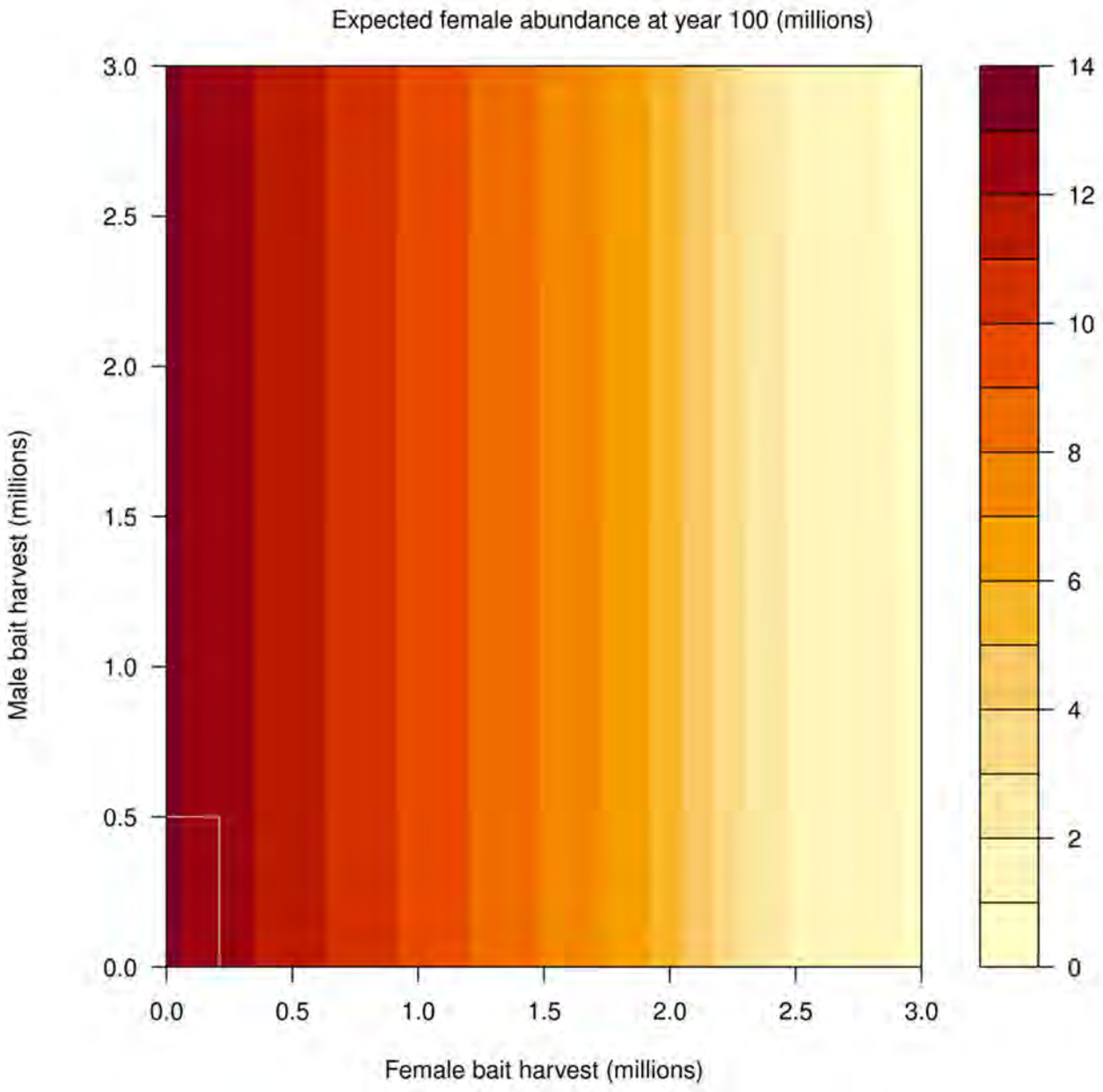


Figure 34. Expected female HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were at their nominal values (Table 20). Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

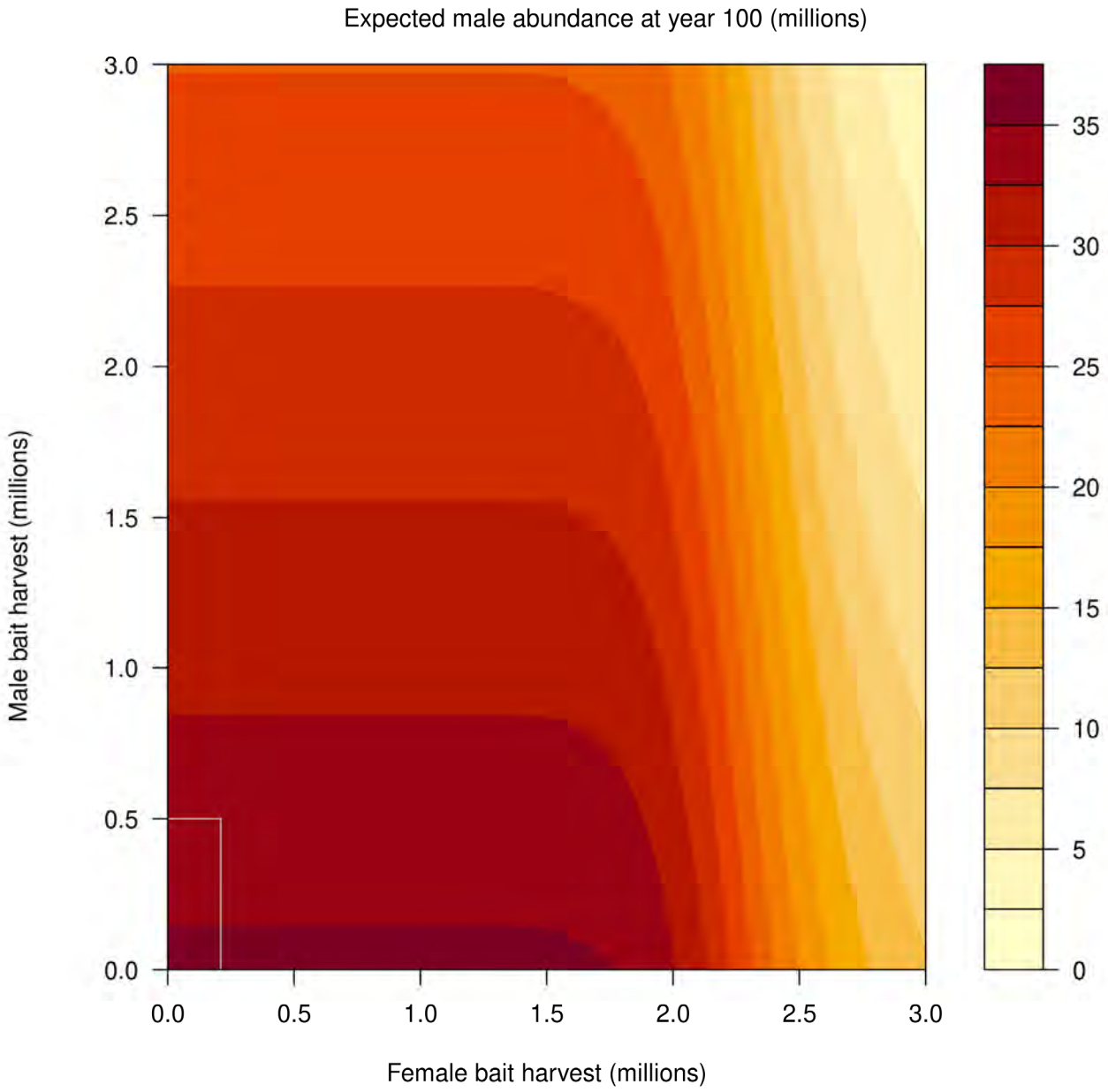


Figure 35. Expected male HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were at their nominal values (Table 1). Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

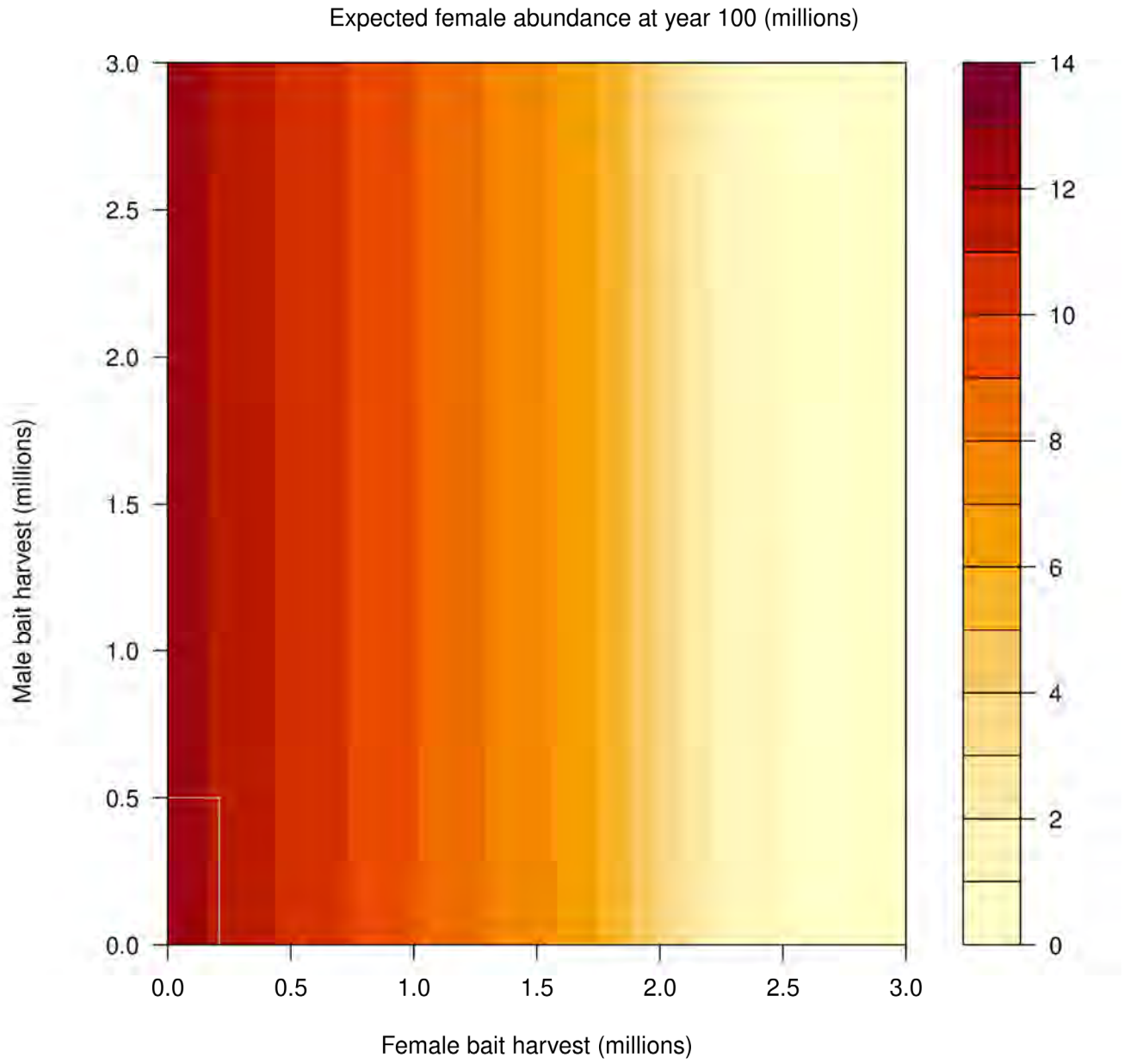


Figure 36. Expected female HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were reduced such that median recruitment was reduced by 5%: exp(μ) × 0.95. Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

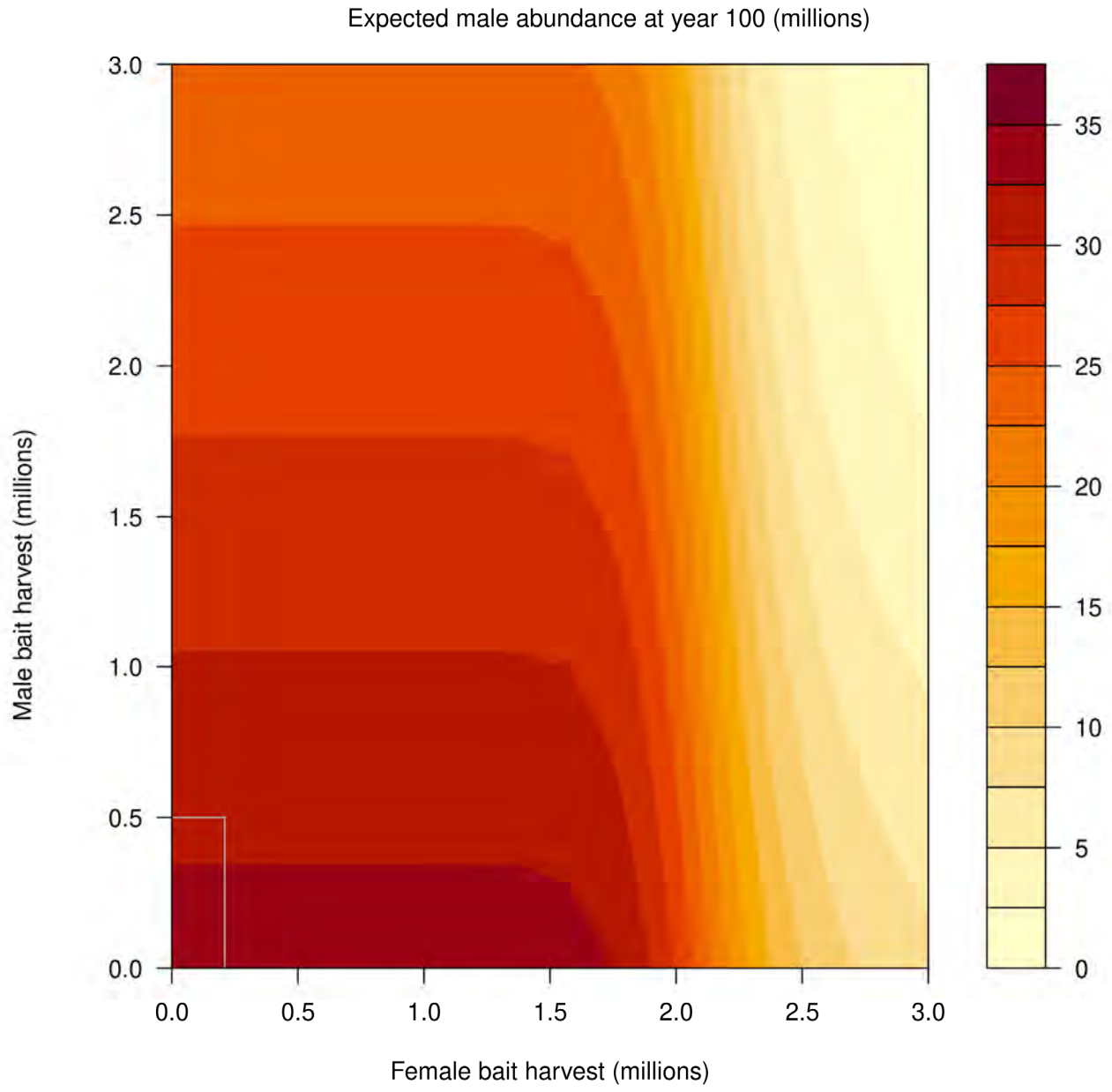


Figure 37. Expected male HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were reduced such that median recruitment was reduced by 5%: exp(μ) × 0.95. Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

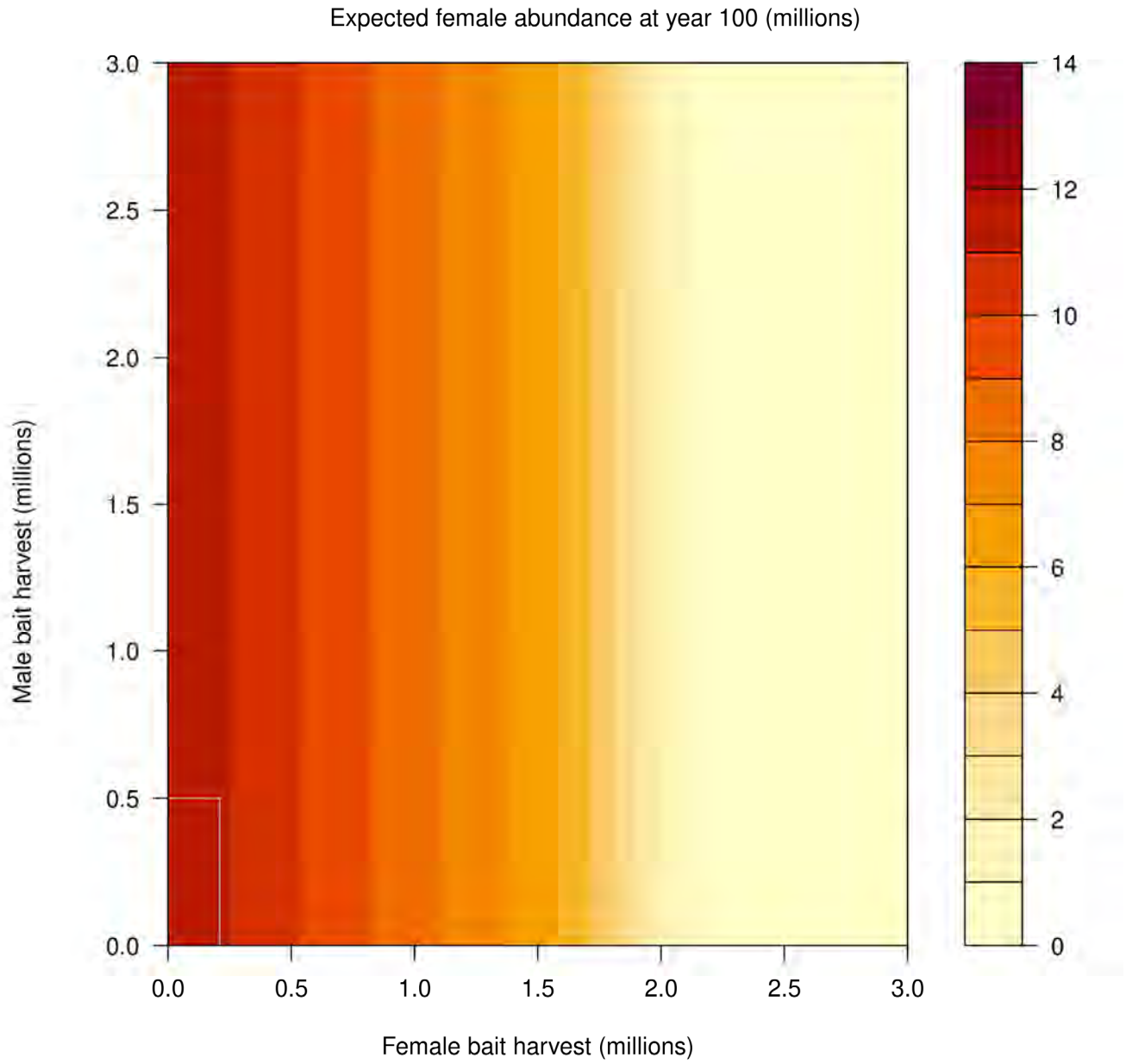


Figure 38. Expected female HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were reduced such that median recruitment was reduced by 10%: exp(μ) × 0.90. Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

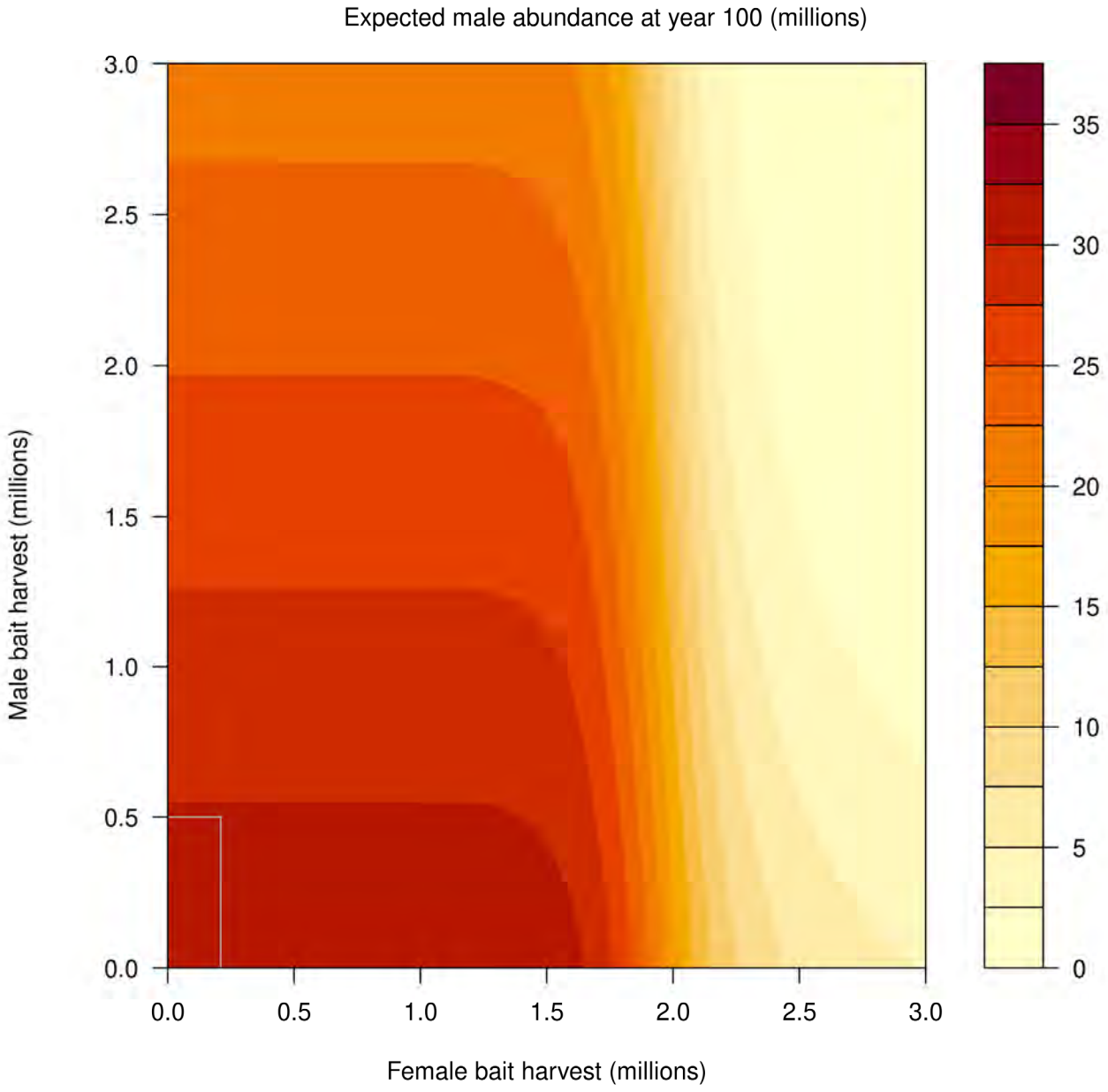


Figure 39. Expected male HSC abundance in projection year 100, over varying values of annual female and male harvest. Mean recruitment parameters μ were reduced such that median recruitment was reduced by 10%: exp(μ) × 0.90. Each point in the graph represents the median abundance in year 100, over 5,000 simulations. Note that although harvest varied across scenario, it was constant through time. The gray lines represent the maximum harvest limits considered under the ARM framework.

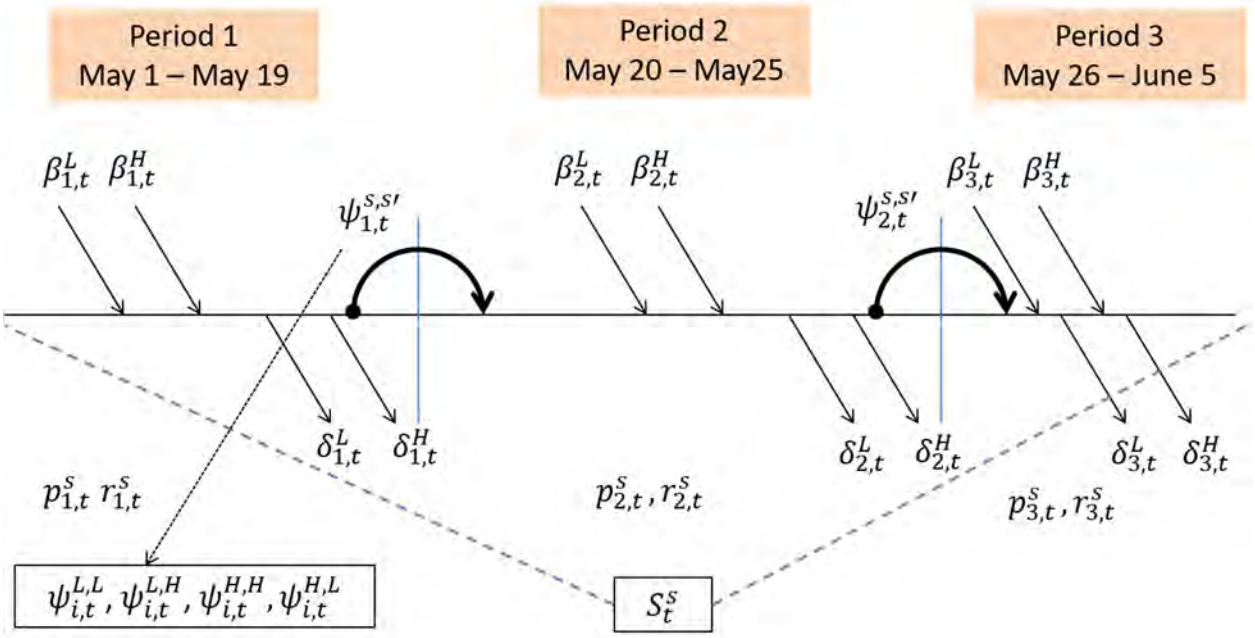


Figure 40. Schematic showing the primary period (stopover year) divided into three secondary periods to estimate survival and weight gain probabilities in a multistate open-robust-design analysis.

Figure 41. Example encounter histories for the multistate open robust design.

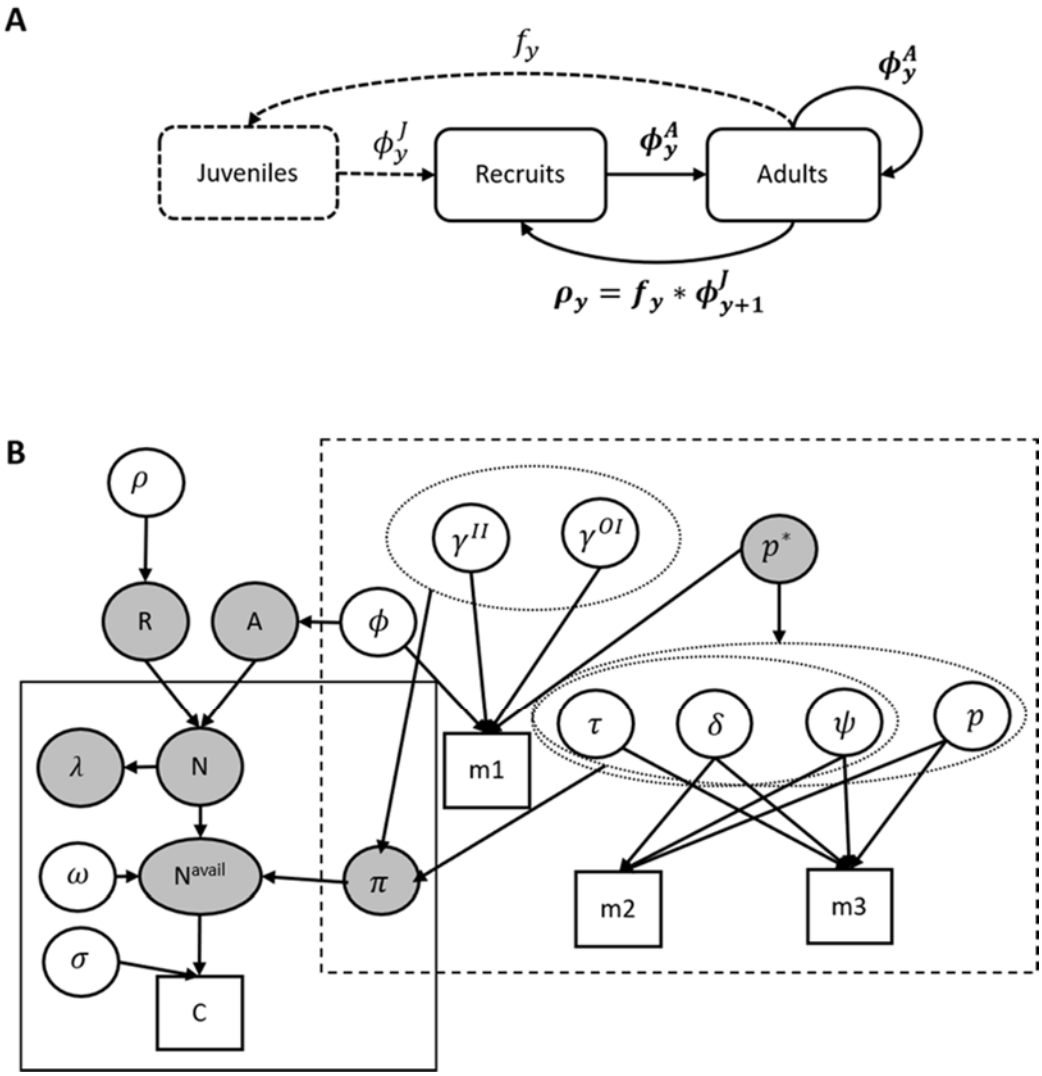


Figure 42. Conceptual diagram of the integrated population model. This model is based on a two-stage life cycle with a pre-breeding census (A) in which individuals do not breed until their second year. A recruitment rate, ρ, was estimated which is a product of fecundity and juvenile survival and assume that new recruits have the same survival probability as returning adults. The integrated population model (B) uses an open robust design sub-model to estimate annual survival probability, φ, while accounting for temporary emigration and the proportion of the population available to be counted, π, based on estimated within-season dynamics of arrival and departure. In this diagram, white circles indicate estimated parameters, gray circles indicate derived parameters, and squares indicate data (C = counts, m1 = m-array for the primary periods, m2 = m-array for new encounters within secondary periods, and m3 = m-array for subsequent encounters within secondary periods). The open robust design sub-model components are in the dashed box and the state-space sub-model for counts is in the solid box. All parameters are defined in Table 23.

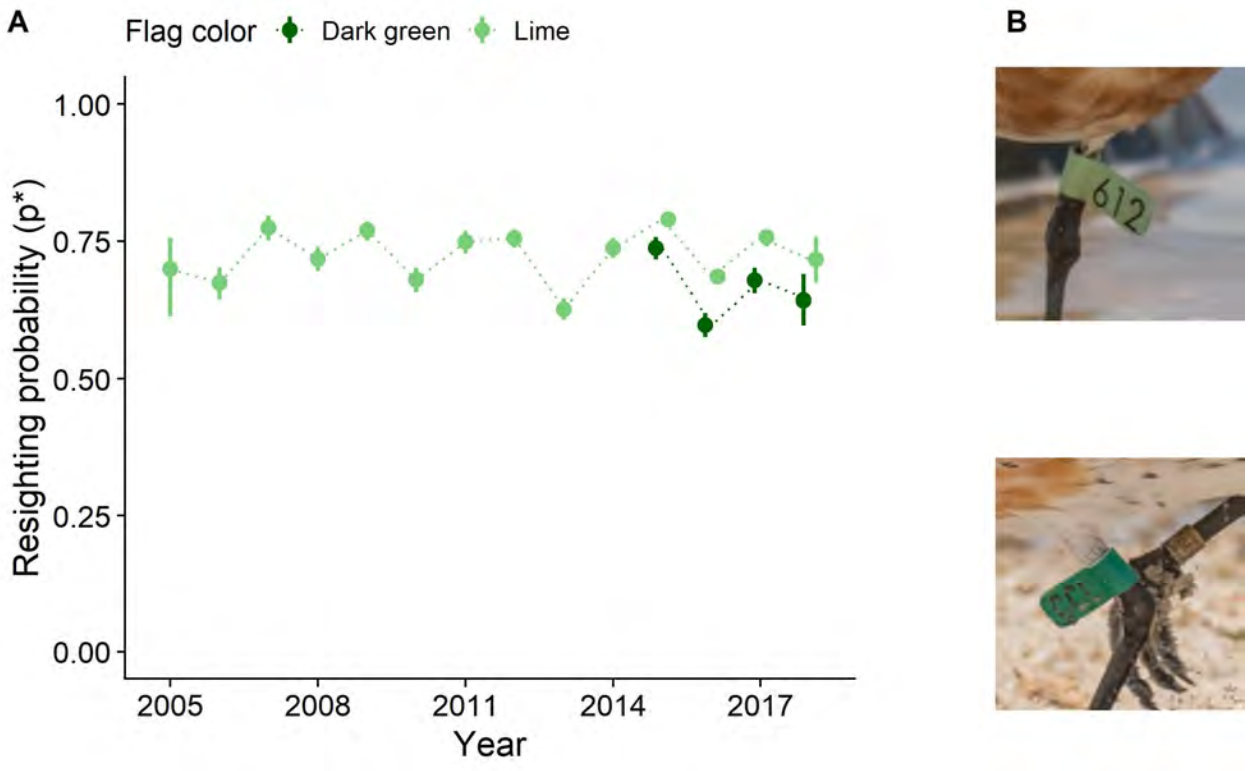


Figure 43. Estimated resighting probability of red knot marked with field-readable plastic leg flags , 2005-2018 (A). Dark green flags (B, bottom) were first deployed in 2014, and birds marked with these flags had a lower resighting probability than birds marked with light green (lime) flags (B, top).

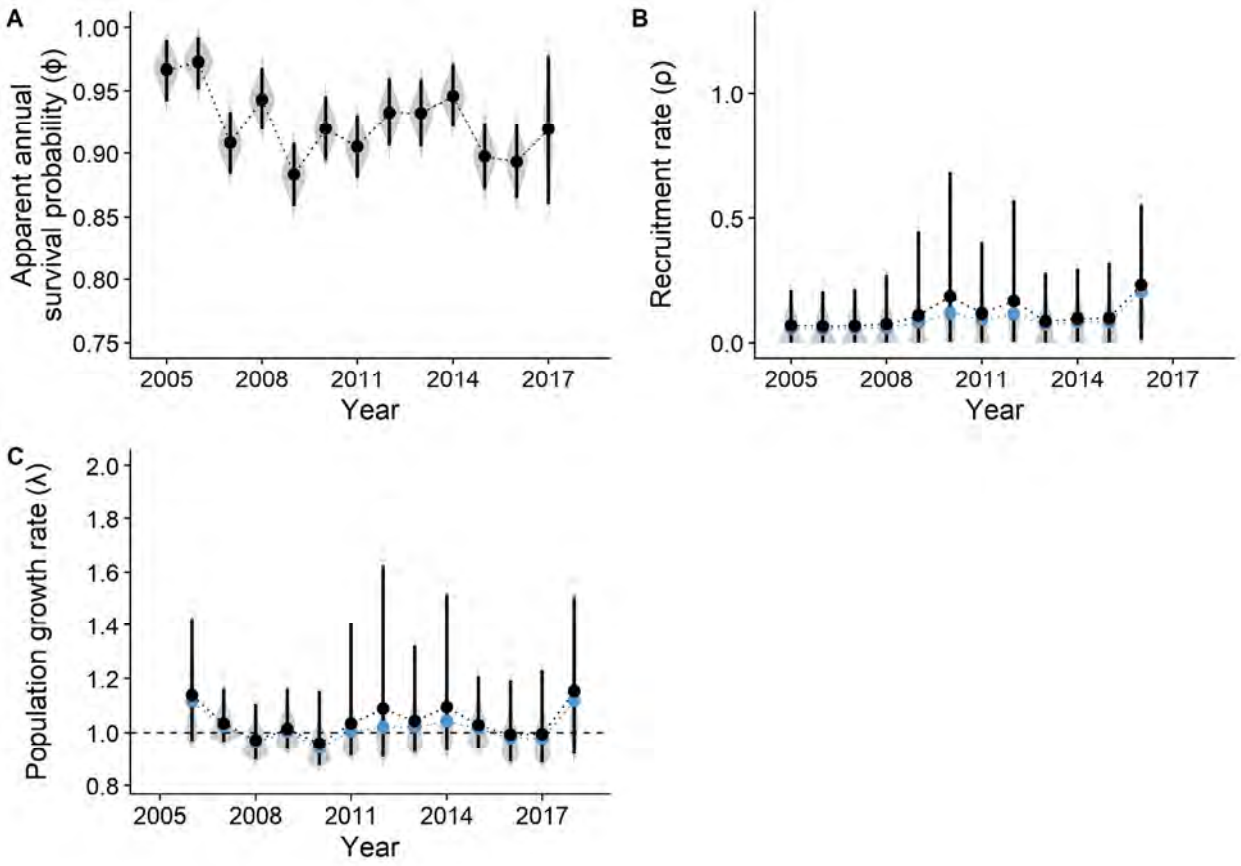


Figure 44. Estimates of survival (A), recruitment (B), and population growth rate (C) over time for red knot, 2005-2018. Gray shaded regions show the full posterior distributions. Black points and vertical lines represent posterior means and 95% credible intervals. Blue points represent the medians of the posterior distributions.

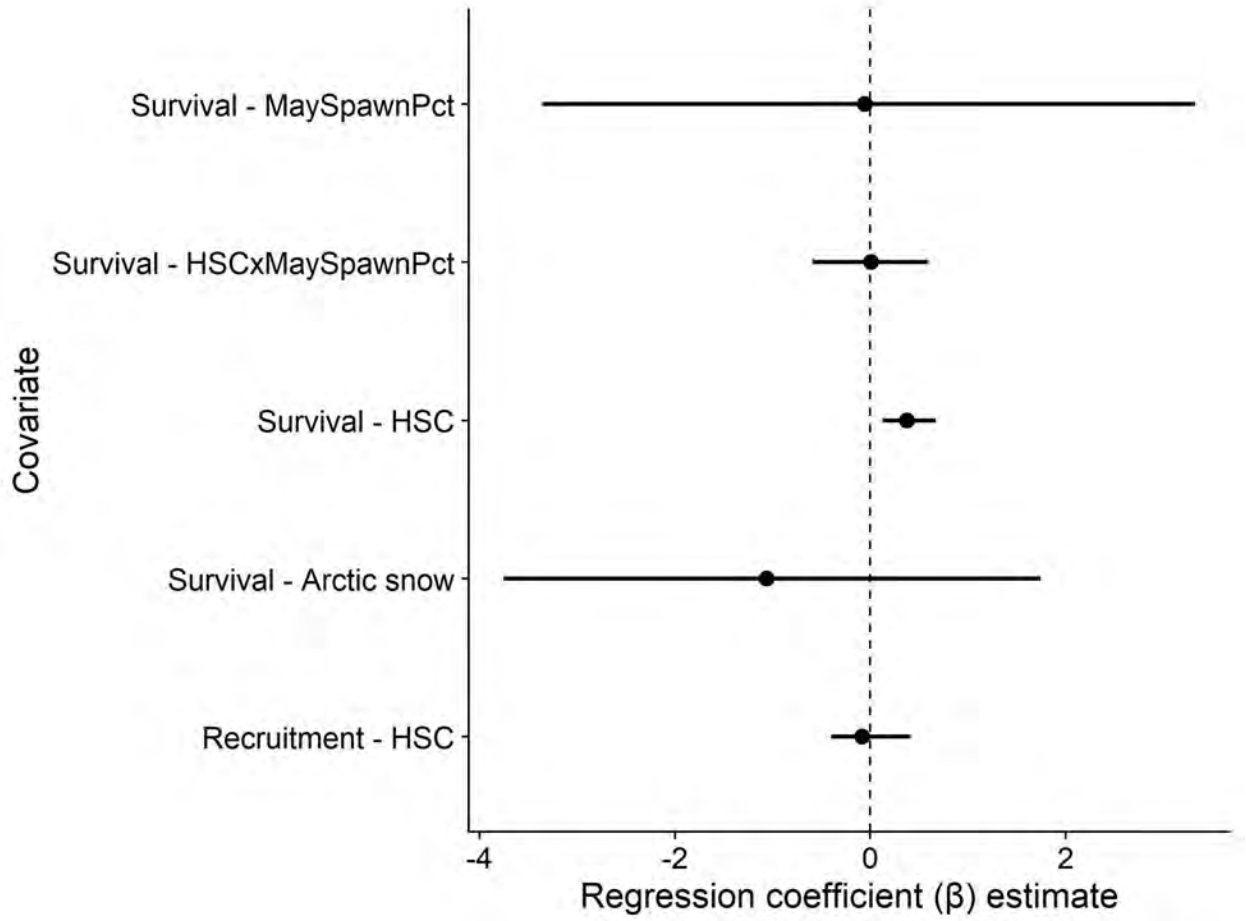


Figure 45. Estimated effects of horseshoe crab abundance, spawn timing, and Arctic snow on red knot survival probability and recruitment rate. Points represent posterior means of the standardized regression coefficients and vertical lines represent 95% credible intervals.

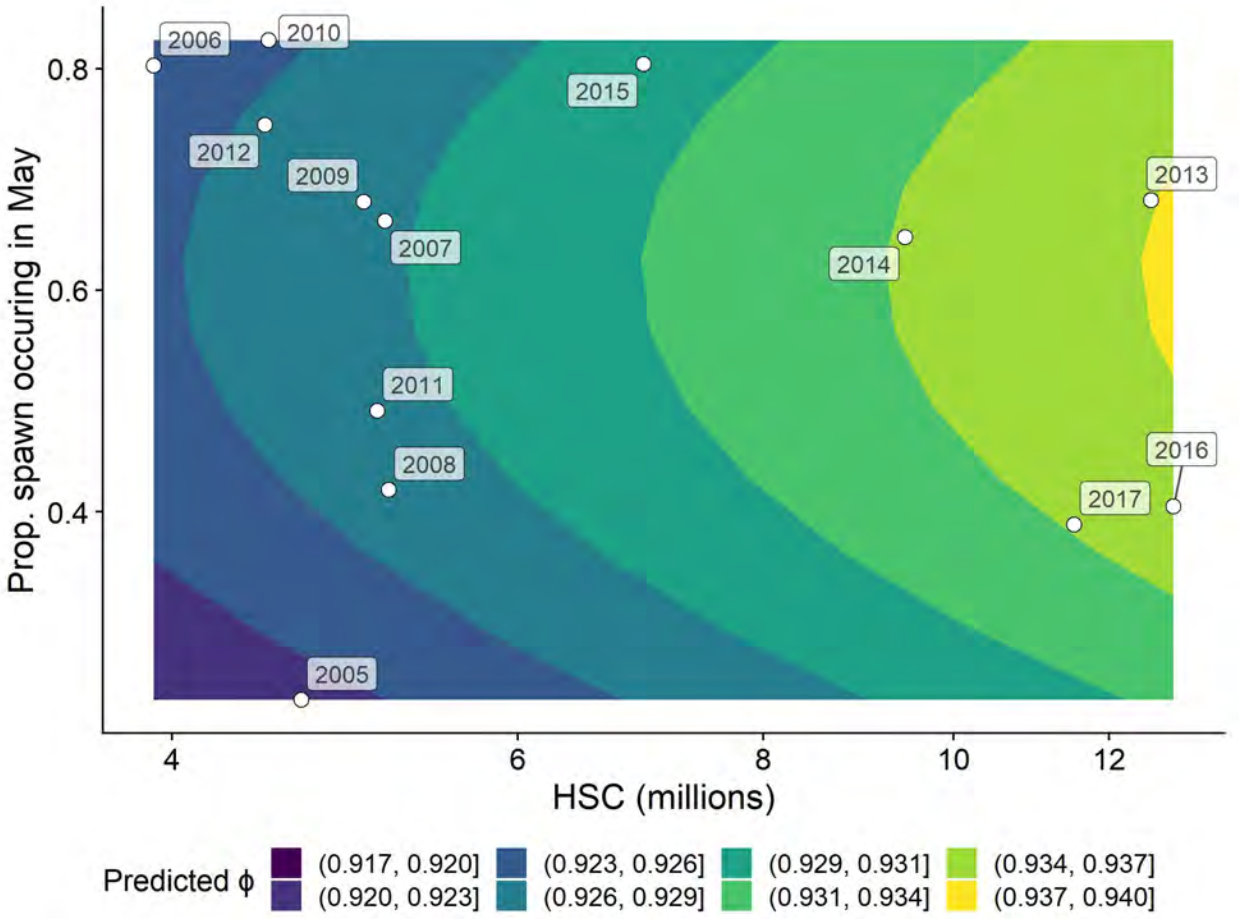


Figure 46. Interactive effects of horseshoe crab abundance and timing of spawn on predicted annual survival probability for red knot. The x-axis represents horseshoe crab abundance and the y-axis represents the proportion of spawning activity that occurred in May. Shaded regions indicate the predicted annual survival probability, and points show observed data. Horseshoe crab abundance was log-transformed for analysis, but values on the natural scale are presented here for ease of interpretation.

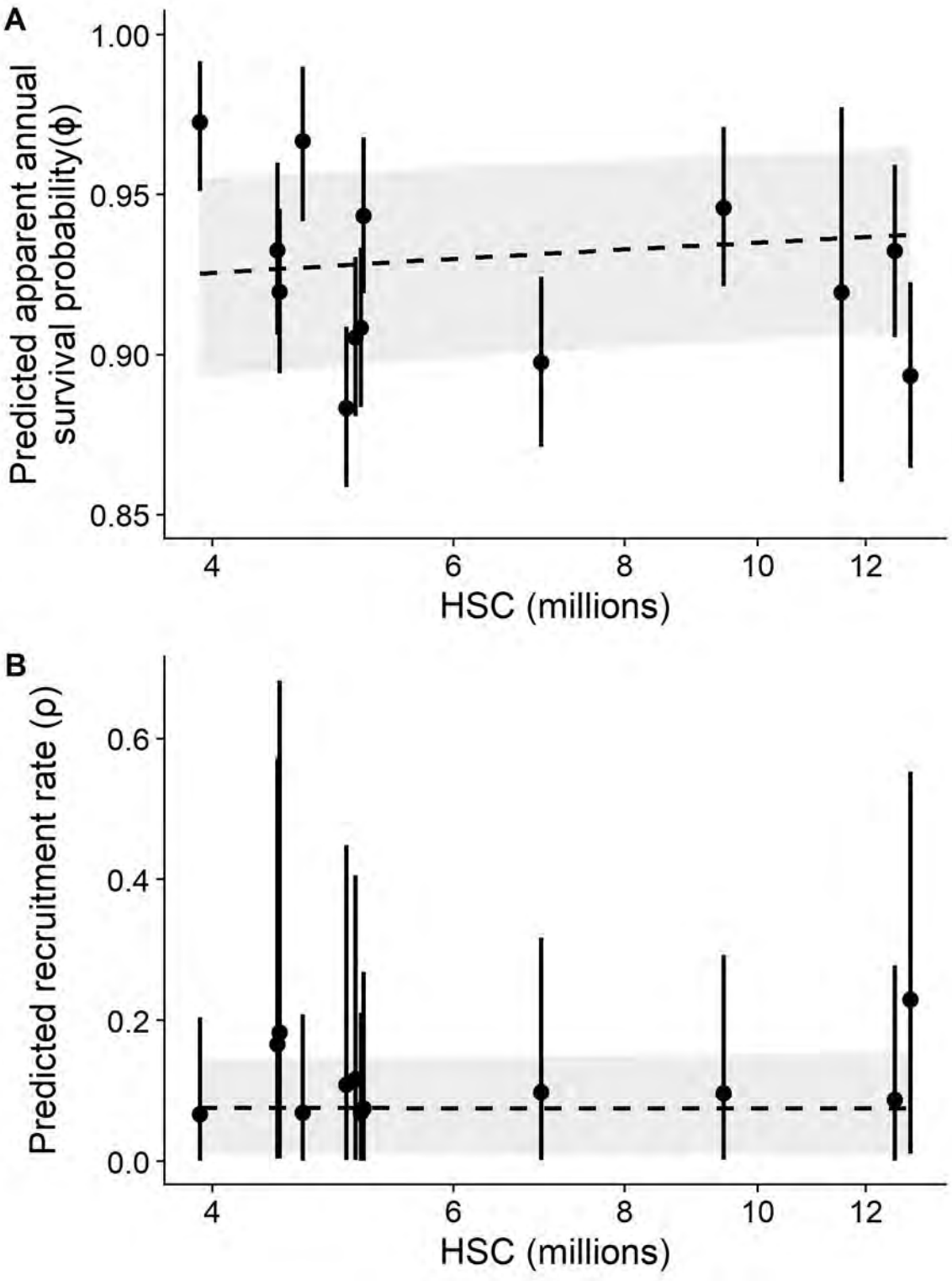


Figure 47. Estimated relationship between horseshoe crab abundance and red knot demographic rates. The black dashed line and gray shaded region show the mean and 95% credible interval of the predicted values. Points and vertical lines show the mean and 95% credible interval of model estimates.

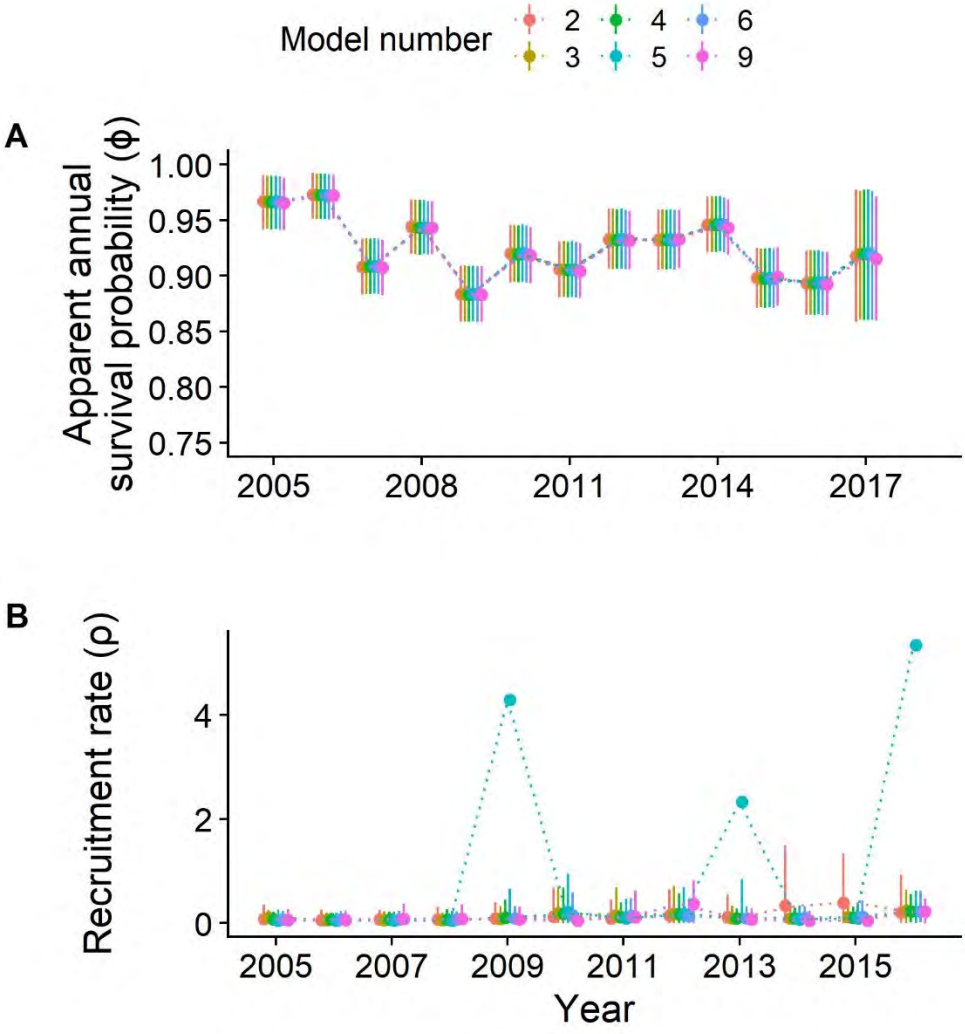


Figure 48. Results of the IPM sensitivity runs to evaluate the influence of the prior distributions for availability, average recruitment rate, and variance in recruitment rate on demographic parameter estimates. Solid points represent posterior means and vertical lines are 95% credible intervals. Model versions are described in Table 27.

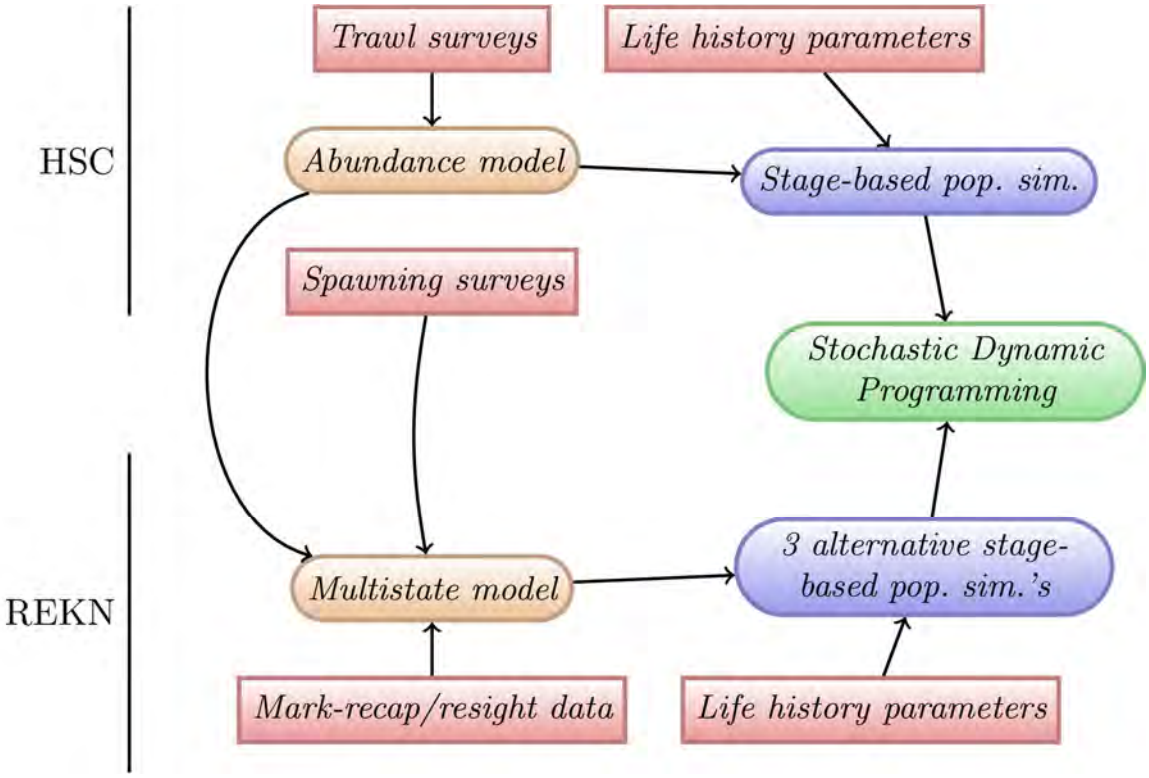


Figure 49. Components of the original ARM framework described by ASMFC (2009) and their relationships. Empirical datasets in red; estimation models shown in yellow; simulation models in blue; optimization algorithm in green. Components in the upper part of the diagram relate primarily to horseshoe crabs (HSC); those in the lower to red knots (REKN).

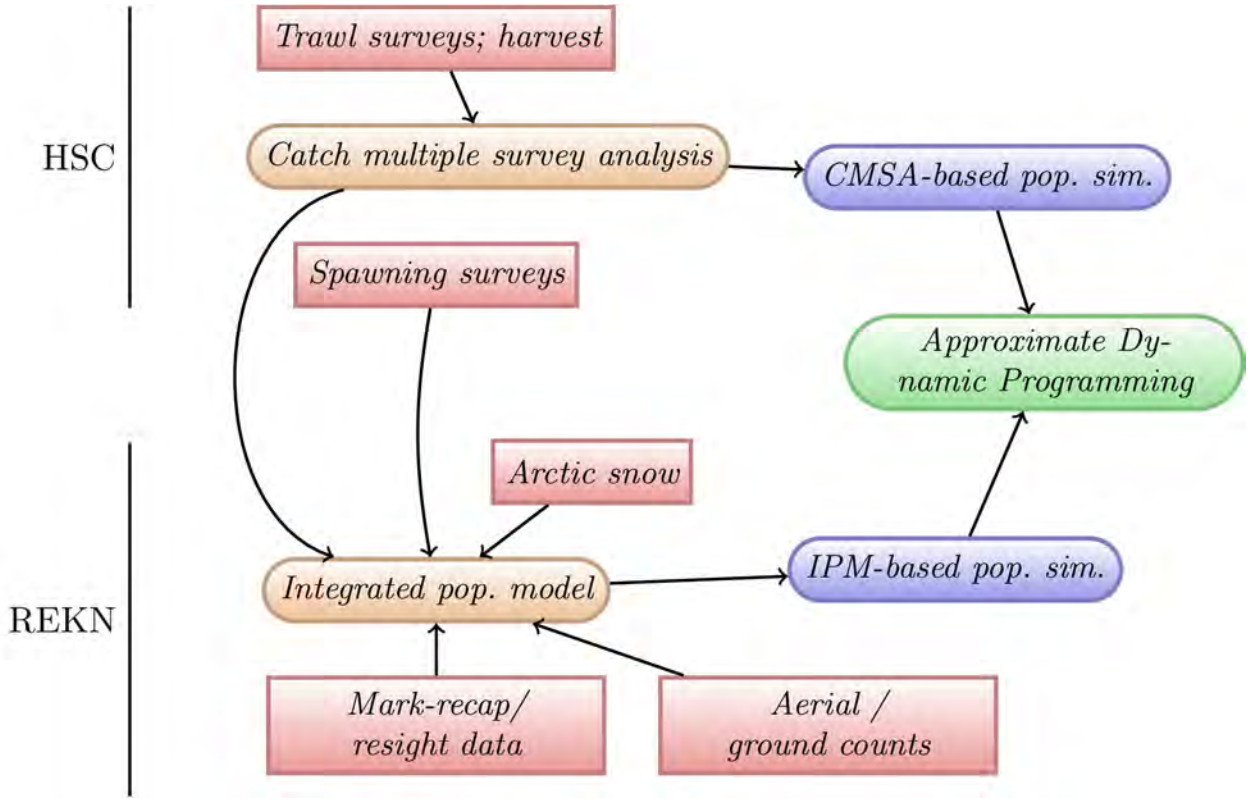


Figure 50. Components of the revised ARM framework described by ASMFC (2009) and their relationships. Empirical datasets in red; estimation models shown in yellow; simulation models in blue; optimization algorithm in green. Components in the upper part of the diagram relate primarily to horseshoe crabs (HSC); those in the lower to red knots (REKN).

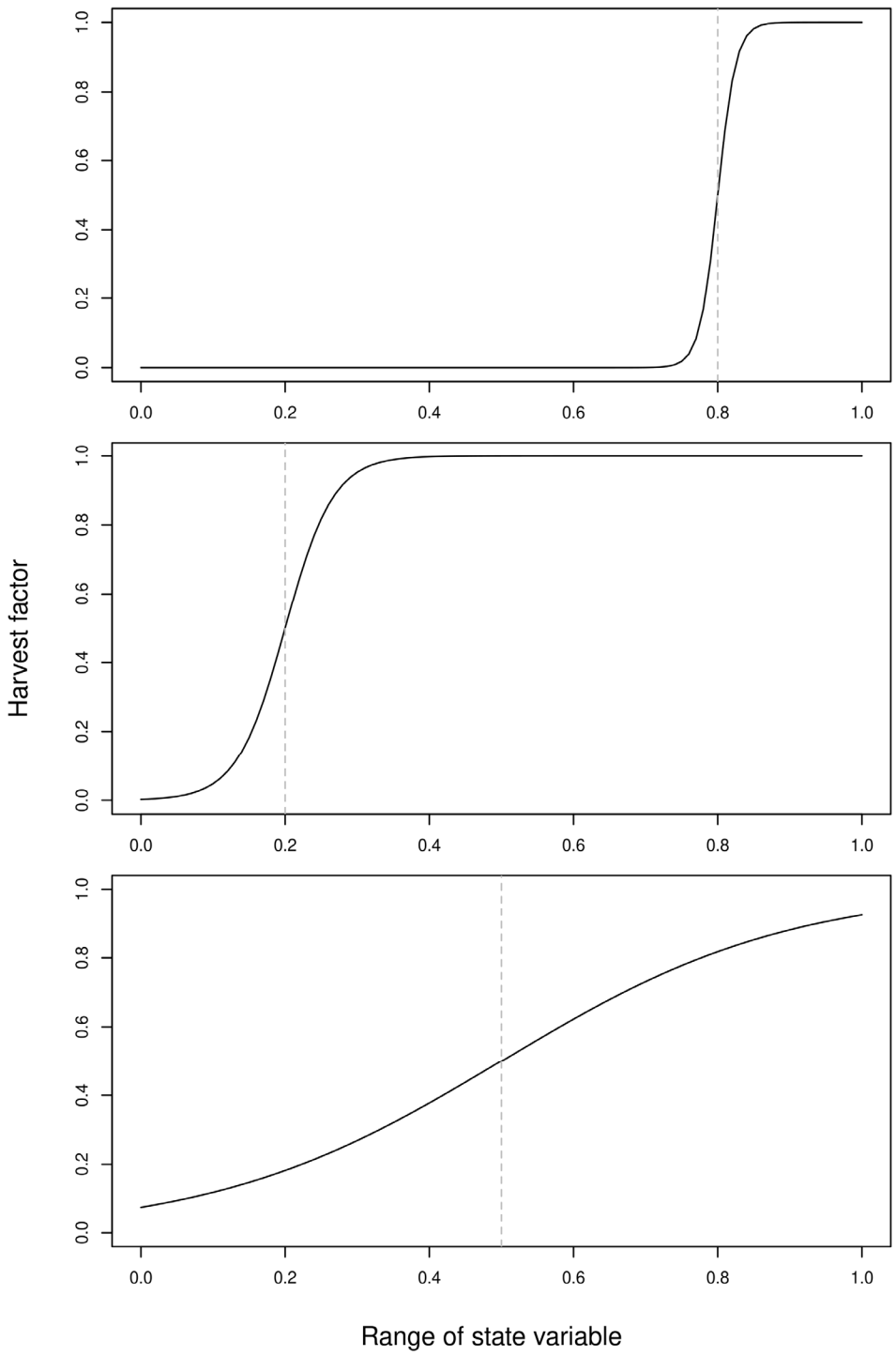


Figure 51. Examples of harvest factor curves produced by Equation 5. The x-axis shows the reasonable range of a hypothetical state variable; dashed lines show the inflection points. The top panel shows a curve with high slope (large α value) and high inflection point (large β); the middle panel one with relatively low inflection point and moderate slope; the lower panel a moderate inflection point and shallow slope.

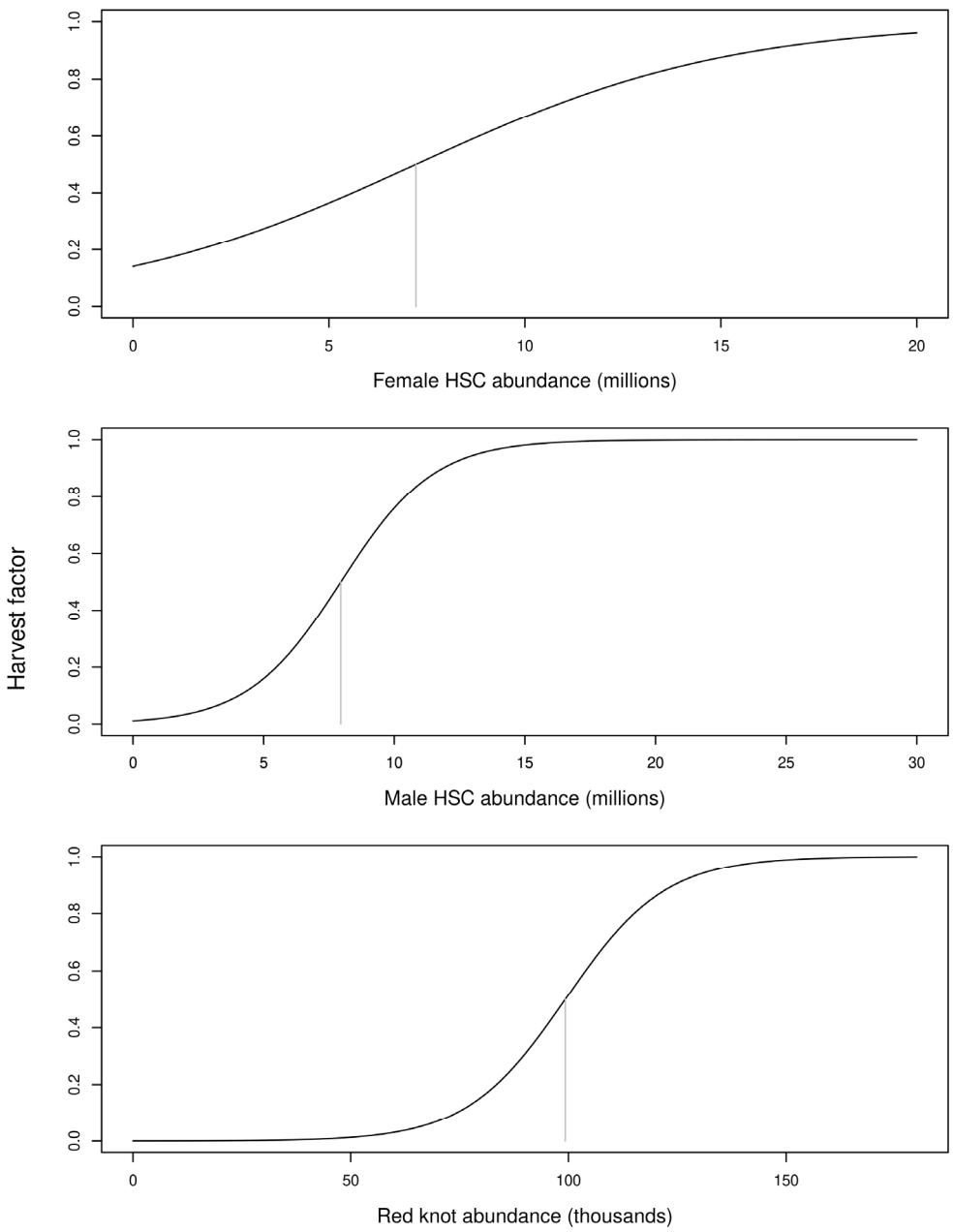


Figure 52. Optimal harvest factor curves (Table 31; Section 8.4.3). Each x-axis shows the possible range of the corresponding inflection point parameter (β) for that state variable. Gray line segments indicate the optimal inflection point.

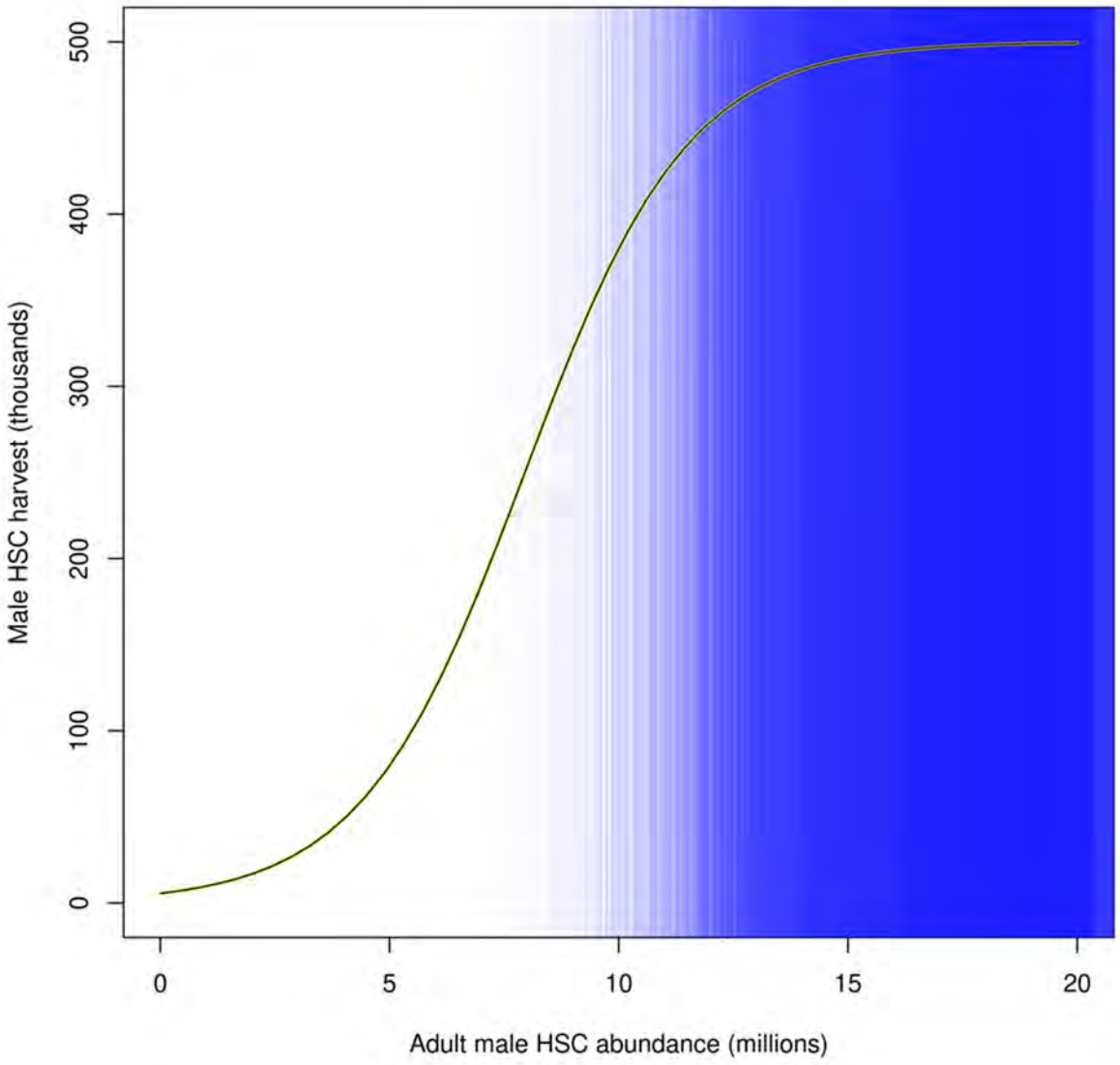


Figure 53. Optimal male bait harvest function for the canonical version of the revised ARM model , with $H^f_{\max}$ = 210,000 and $H^m_{\max}$= 500,000. Vertical blue lines indicate actual male abundance values in a particular year, in one of 10,000 simulated horseshoe crab populations; many of these values are larger than the upper limit of the x-axis used here and thus are not shown.

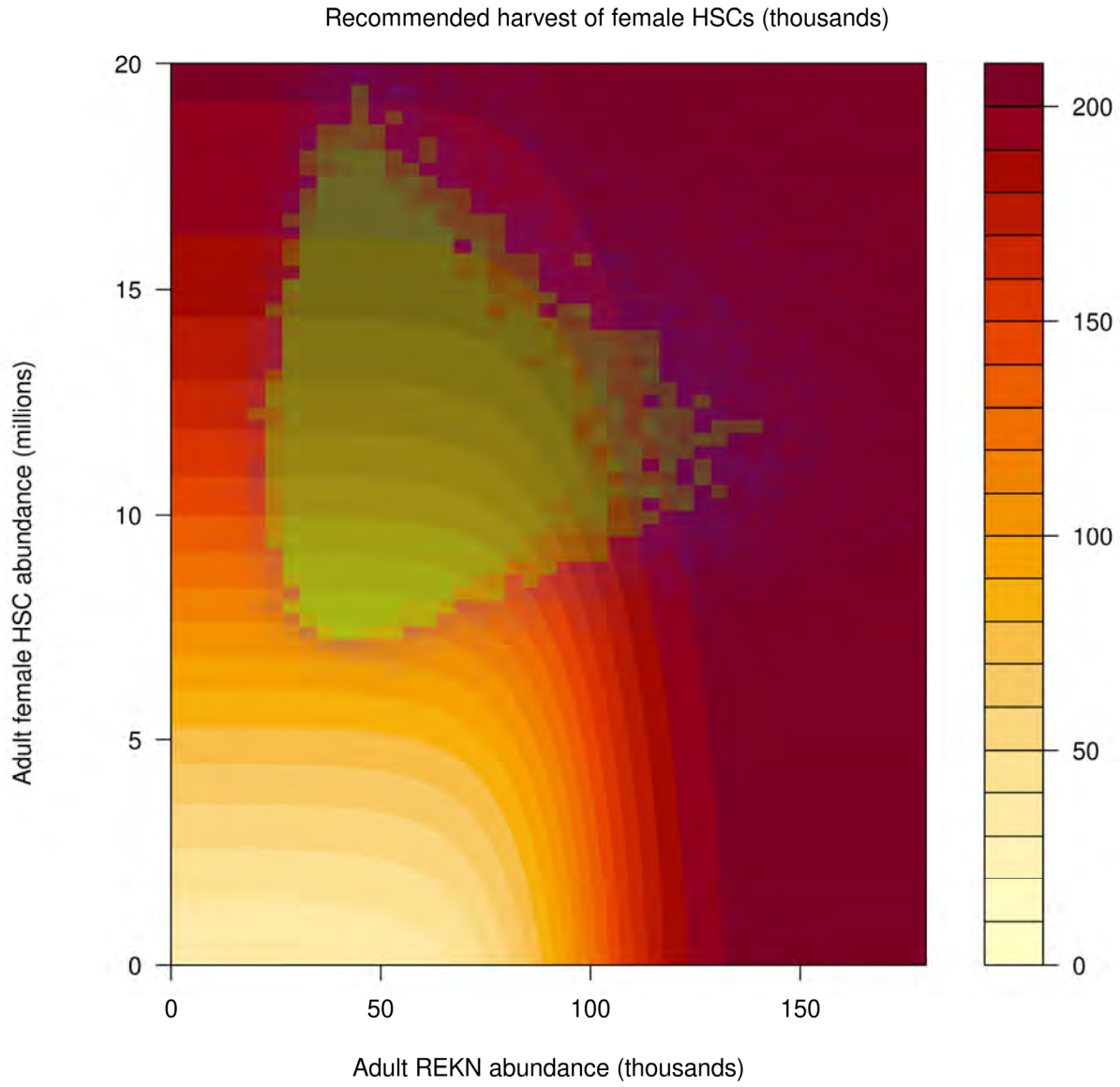


Figure 54. Optimal female bait harvest function for the canonical version of the revised ARM model , with $H^{f}_{\max} = 210,000$ and $H^{m}_{\max} = 500,000$. Recommended harvest depends on both female horseshoe crab (HSC) and adult red knot (REKN) abundances. Transparent green and blue overlay represents a non-parametric kernel, indicating where the bulk of the values of HSC and REKN abundances for the first 10 years of 10,000 simulations over 100 years: the green cells collectively contain 75% of the observations, the blue an additional 20%.

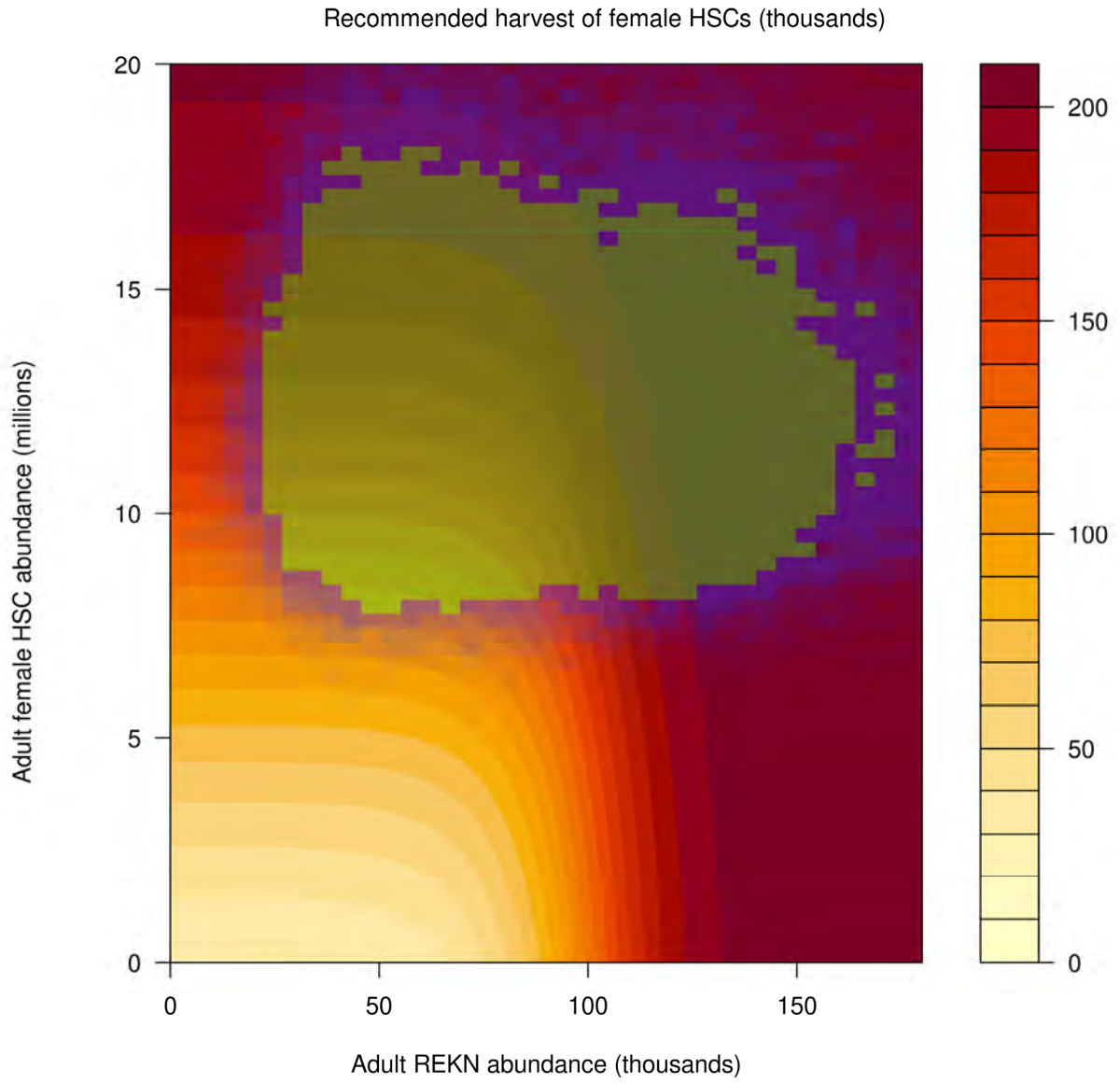


Figure 55. Optimal female bait harvest function for the canonical version of the revised ARM model , with $H^{f}_{\max} = 210,000$ and $H^{m}_{\max} = 500,000$. Recommended harvest depends on both female horseshoe crab (HSC) and adult red knot (REKN) abundances. Transparent green and blue overlay represents a non-parametric kernel, indicating where the bulk of the values of HSC and REKN abundances for years 11-20 of 10,000 simulations over 100 years: the green cells collectively contain 75% of the observations, the blue an additional 20%.

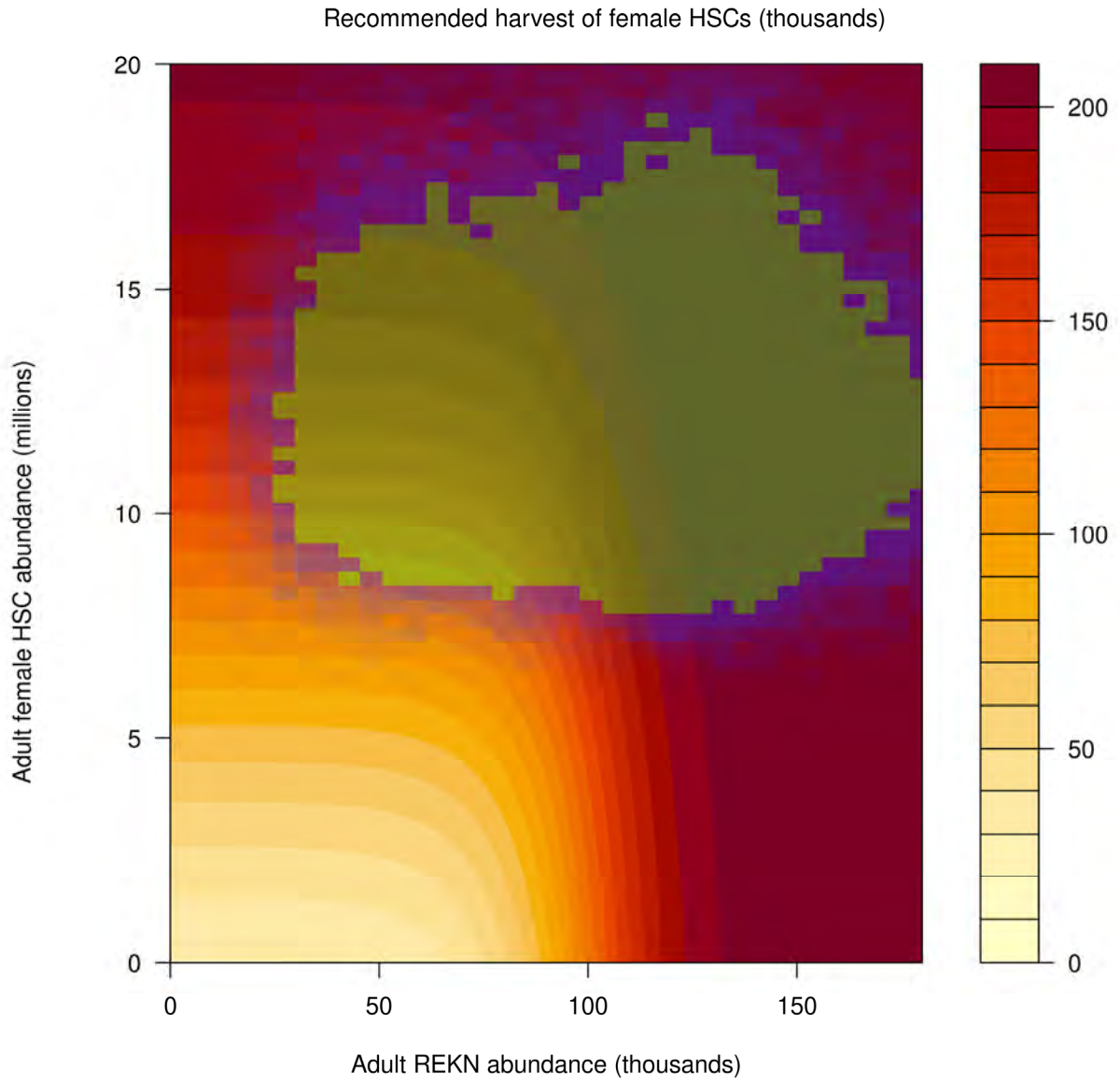


Figure 56. Optimal female bait harvest function for the canonical version of the revised ARM model , with $H^{f}_{\max} = 210,000$ and $H^{m}_{\max} = 500,000$. Recommended harvest depends on both female horseshoe crab (HSC) and adult red knot (REKN) abundances. Transparent green and blue overlay represents a non-parametric kernel, indicating where the bulk of the values of HSC and REKN abundances for years 21-30 of 10,000 simulations over 100 years: the green cells collectively contain 75% of the observations, the blue an additional 20%.

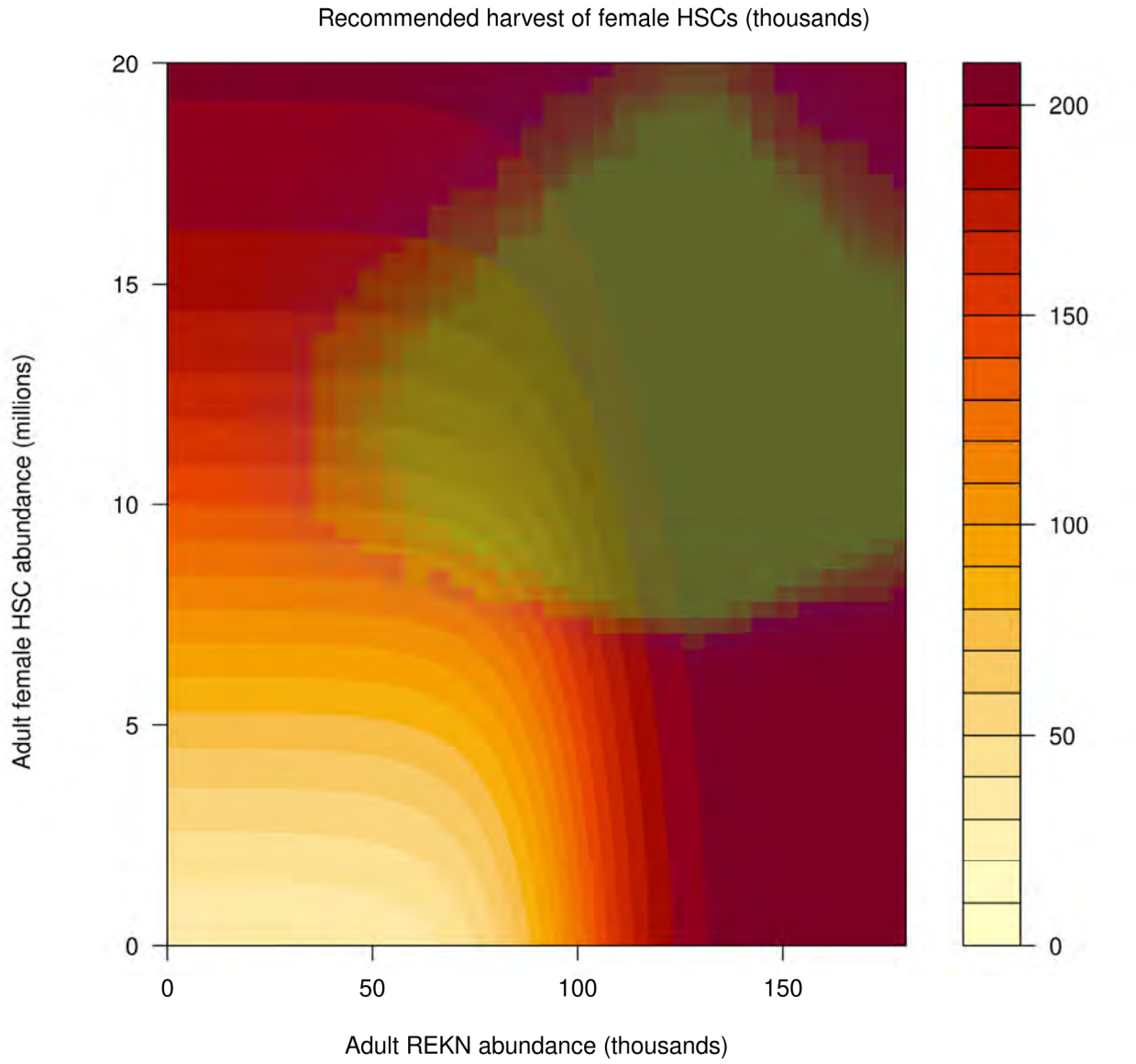


Figure 57. Optimal female bait harvest function for the canonical version of the revised ARM model, with $H^{f}_{\max} = 210,000$ and $H^{m}_{\max} = 500,000$. Recommended harvest depends on both female horseshoe crab (HSC) and adult red knot (REKN) abundances. Transparent green and blue overlay represents a non-parametric kernel, indicating where the bulk of the values of HSC and REKN abundances for years 31-100 of 10,000 simulations over 100 years: the green cells collectively contain 75% of the observations, the blue an additional 20%.

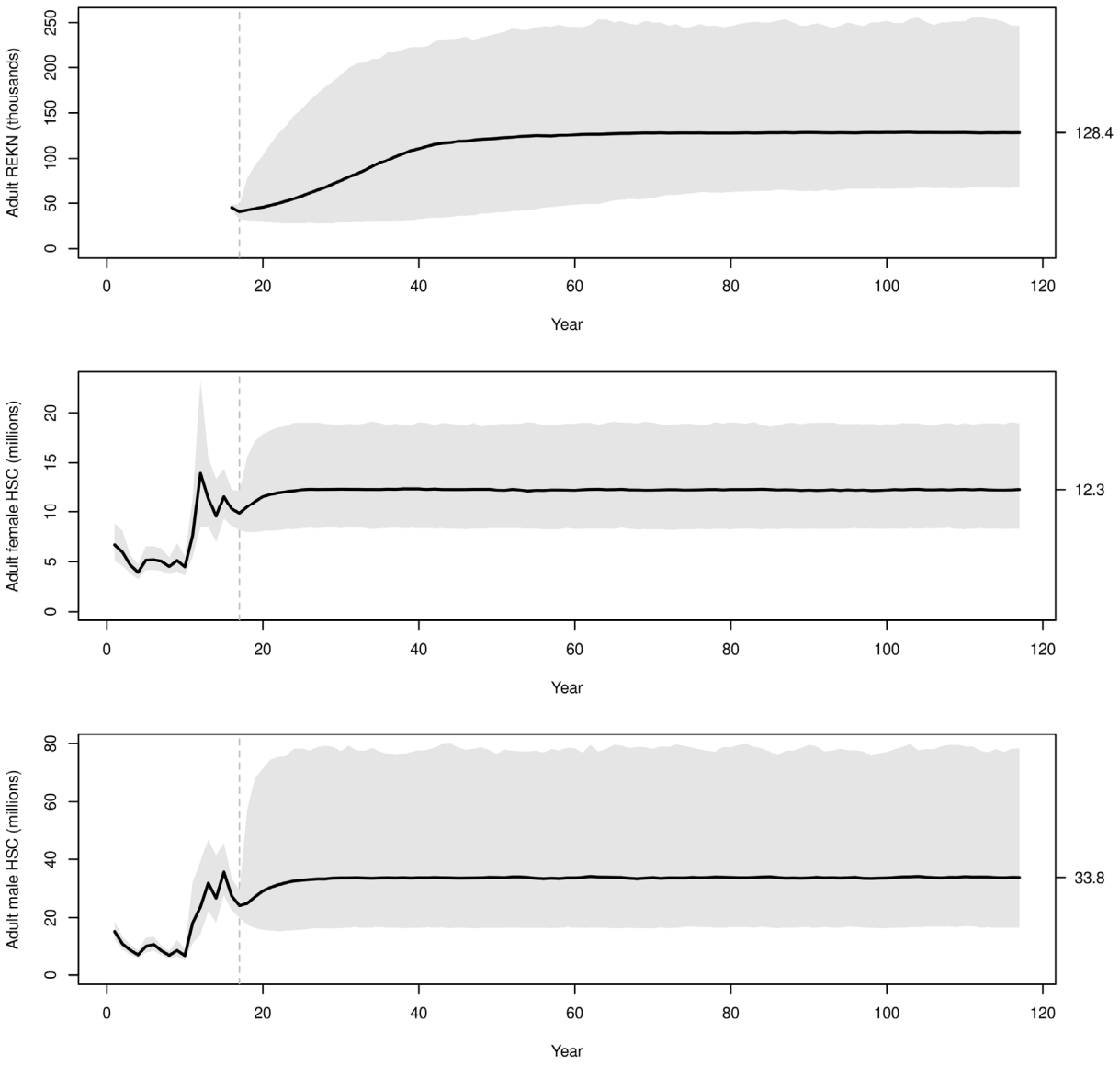


Figure 58. Summary of population trajectories for 10,000 simulated populations of horseshoe crabs and red knots under the optimal harvest policy for the canonical ARM model. Curves to the left of the vertical dashed gray line shows random draws from distributions based on actual estimates; simulated values begin to the right of the line. Black line shows the median; gray region is bounded by the 2.5th and 97.5th percentiles. Value in the right margin is the median at year 100 of the simulation (year 118 of the time series). Year 1 corresponds to 2003; dashed line is at 2019.

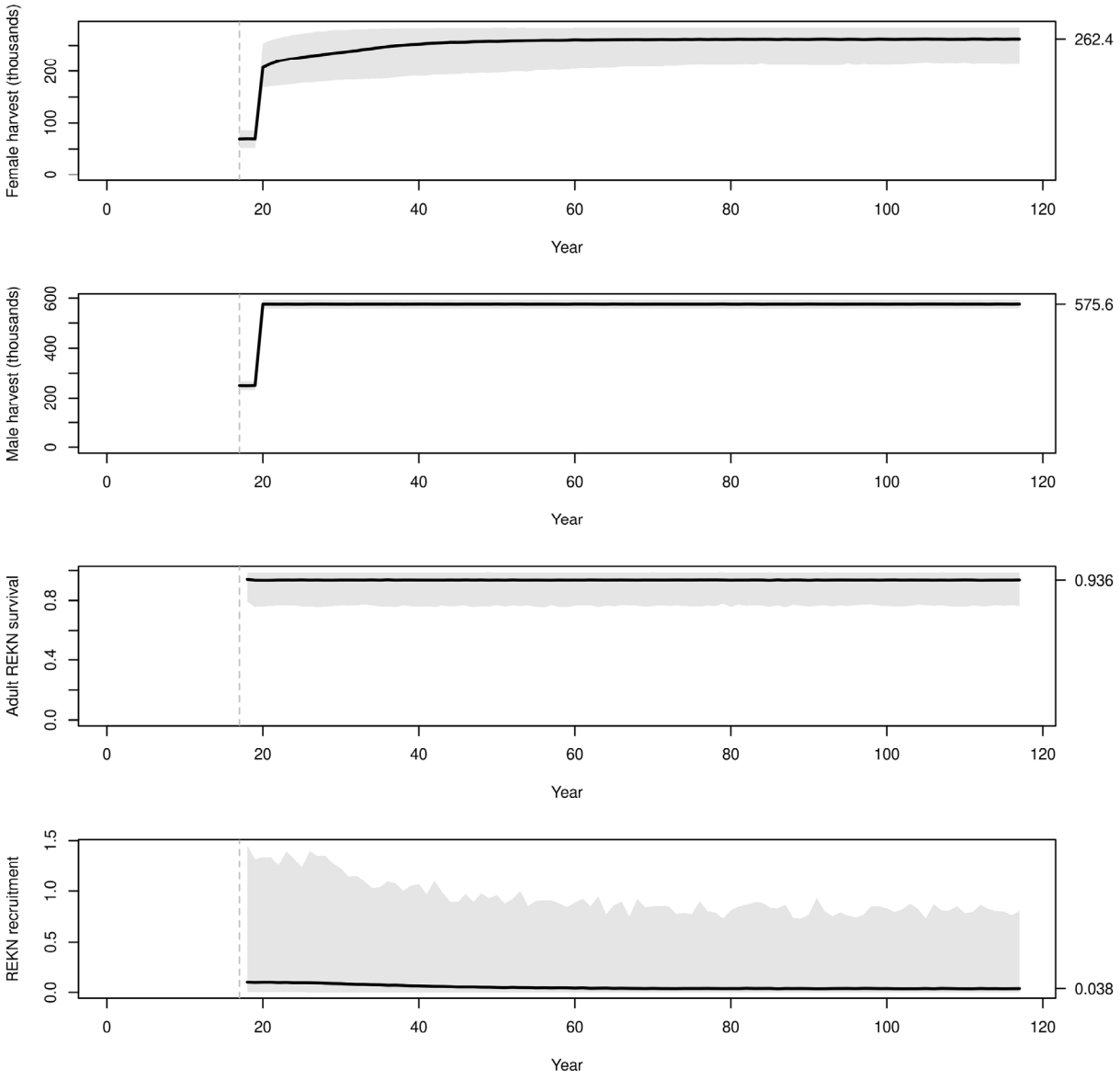


Figure 59. Summary of female and male horseshoe crab bait harvest and red knot (REKN) population parameters for 10,000 simulated populations under the optimal harvest policy for the canonical ARM model. The vertical dashed gray line lies at 2019; year 1 is 2003. Black line shows the median; gray region is bounded by the 2.5th and 97.5th percentiles. Value in the right margin is the median at year 100 of the simulation (year 118 of the time series). Year 1 corresponds to 2003; dashed line is at 2019. Note that female and male harvest here include the 'background harvest' due to biomedical use and bycatch.

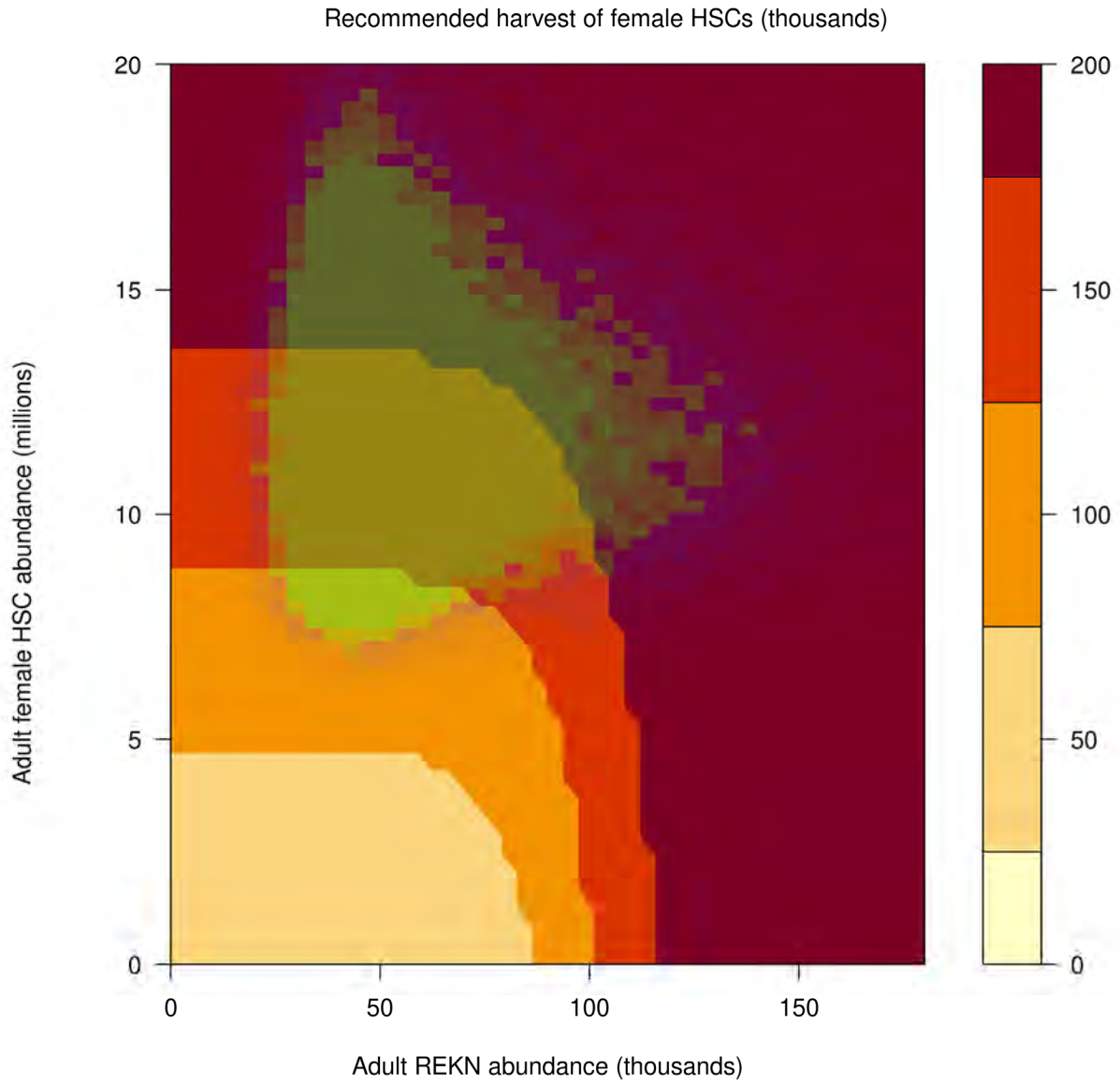


Figure 60. Optimal female bait harvest function for the canonical version of the revised ARM model but with harvest recommendations rounded to the nearest multiple of 50,000. Otherwise, the plot is the same as in Figure 54: non-parametric kernel summarizes the first 10 years of the simulation time period.

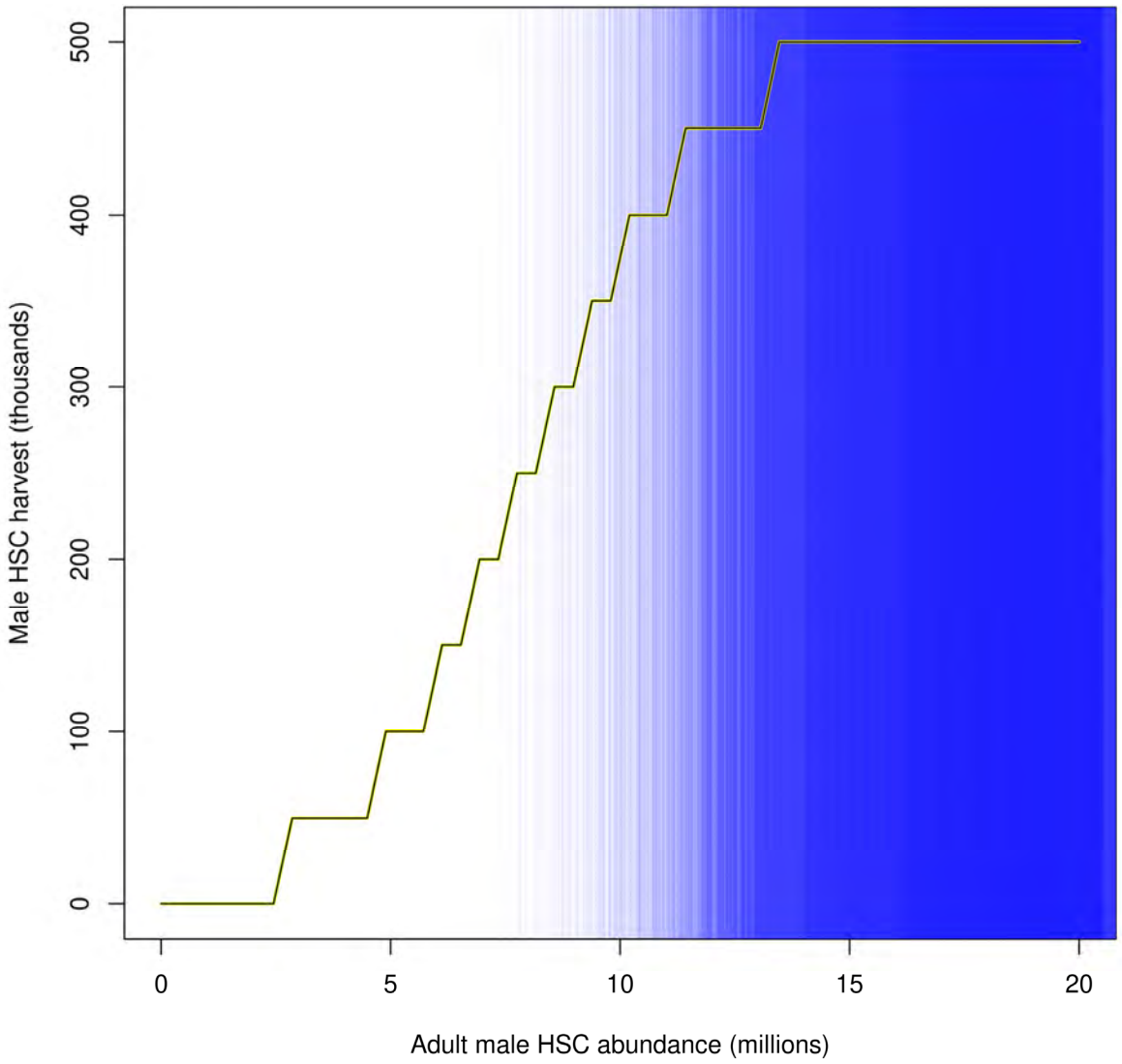


Figure 61. Optimal male bait harvest function for the canonical version of the revised ARM model but with harvest recommendations rounded to the nearest multiple of 50,000. Otherwise, the plot is the same as in Figure 53.

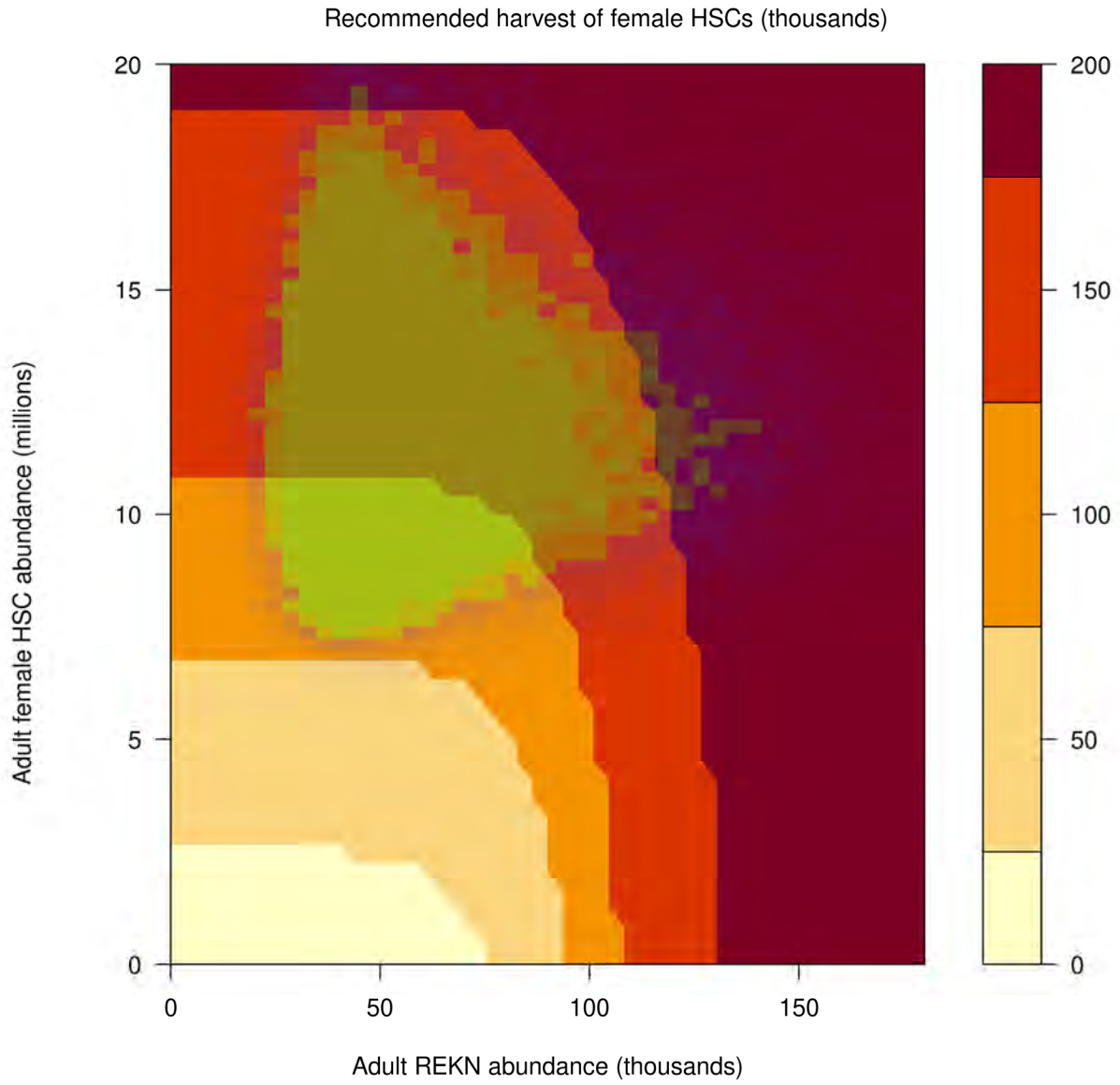


Figure 62. Optimal female bait harvest function for the canonical version of the revised ARM model but with harvest recommendations rounded down to the nearest multiple of 50,000 they exceed. Otherwise, the plot is the same as in Figure 54 and Figure 60: non-parametric kernel summarizes the first 10 years of the simulation time period.

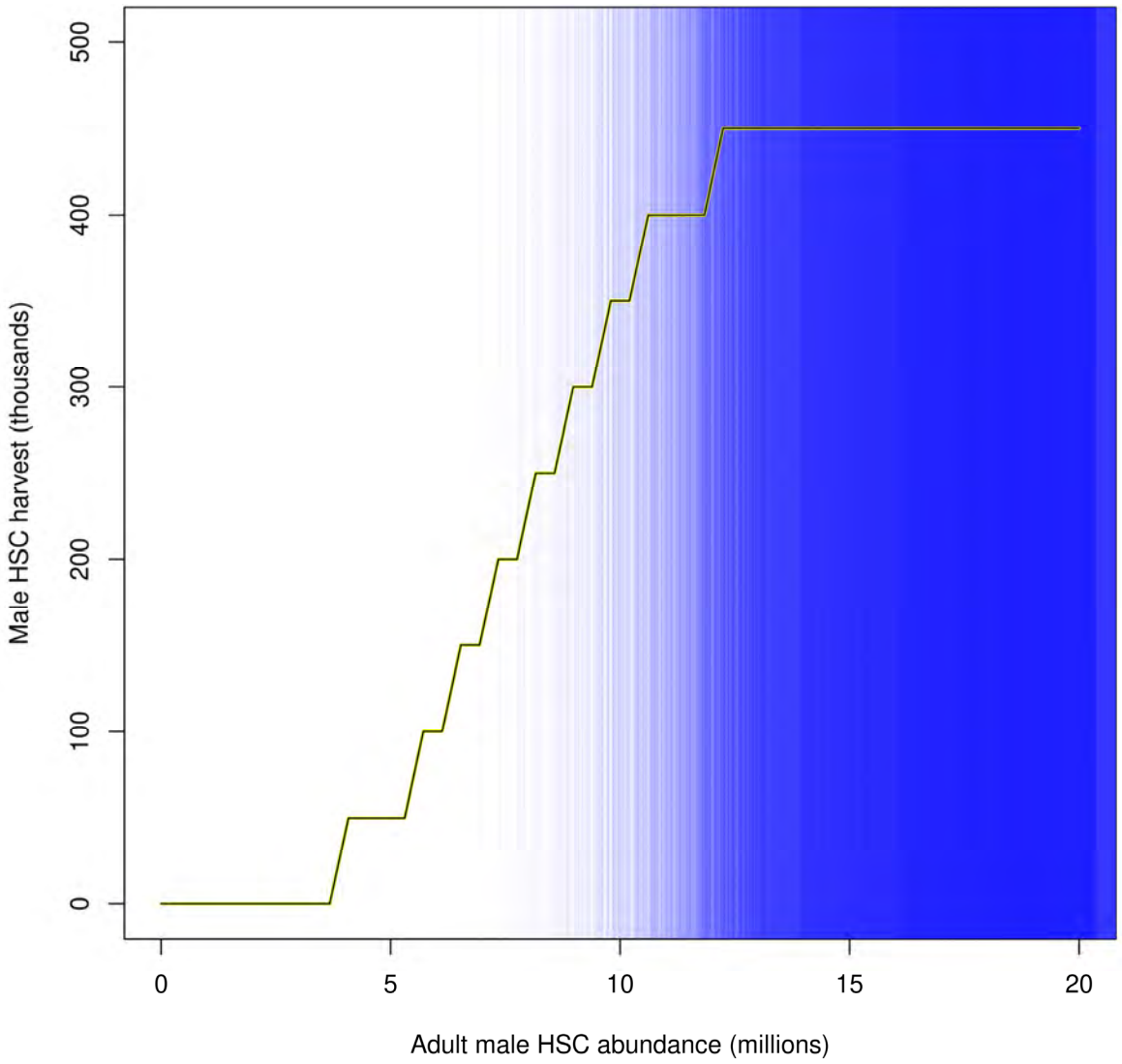


Figure 63. Optimal male bait harvest function for the canonical version of the revised ARM model but with harvest recommendations rounded down to the nearest multiple of 50,000 they exceed. Otherwise, the plot is the same as in Figure 53 and Figure 61.

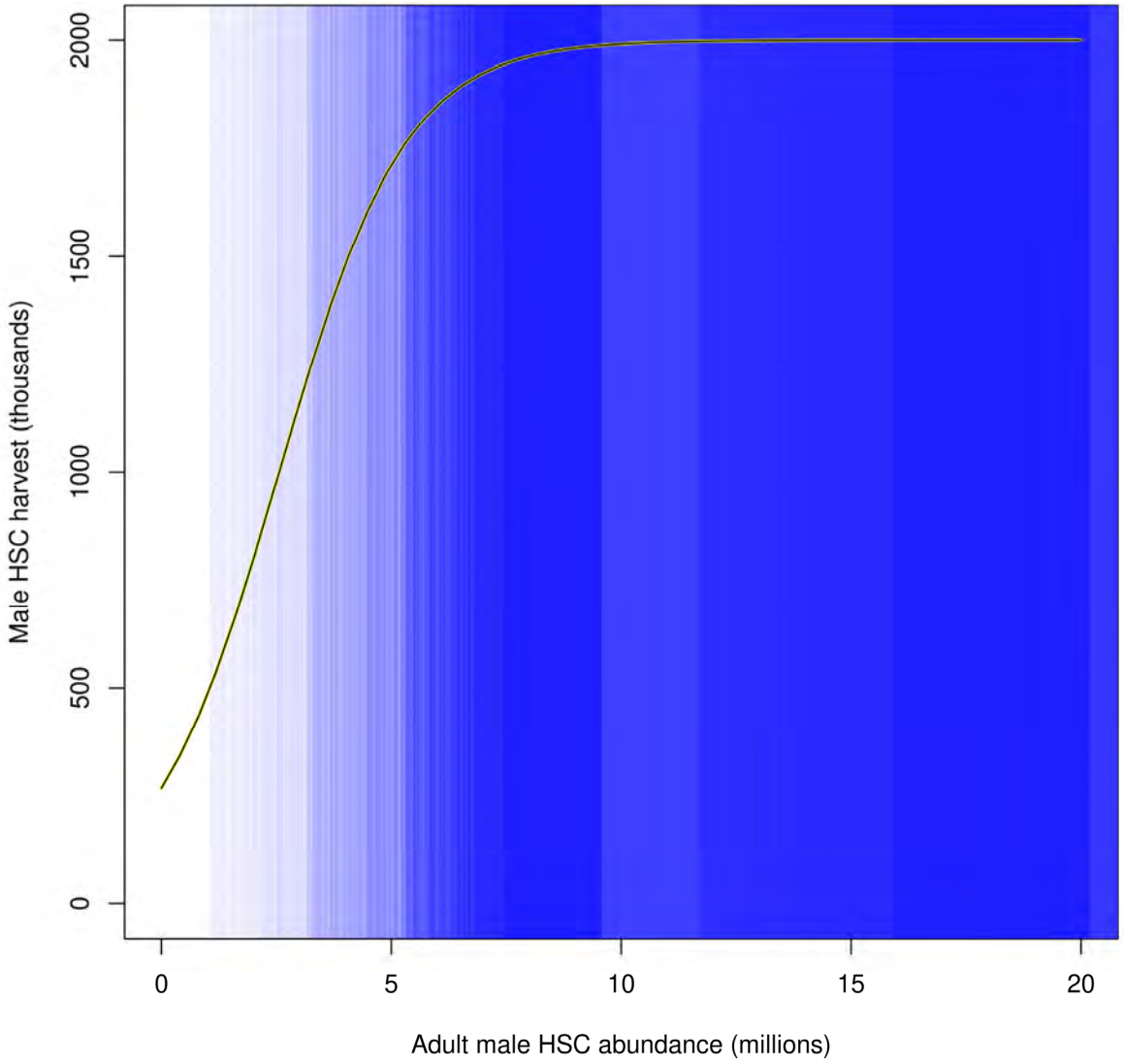


Figure 64. Optimal male bait harvest function for a version of the revised ARM model with $H^{f}_{\max}$ = 2 million and $H^{m}_{\max}$= 2 million. Compare to Figure 53.

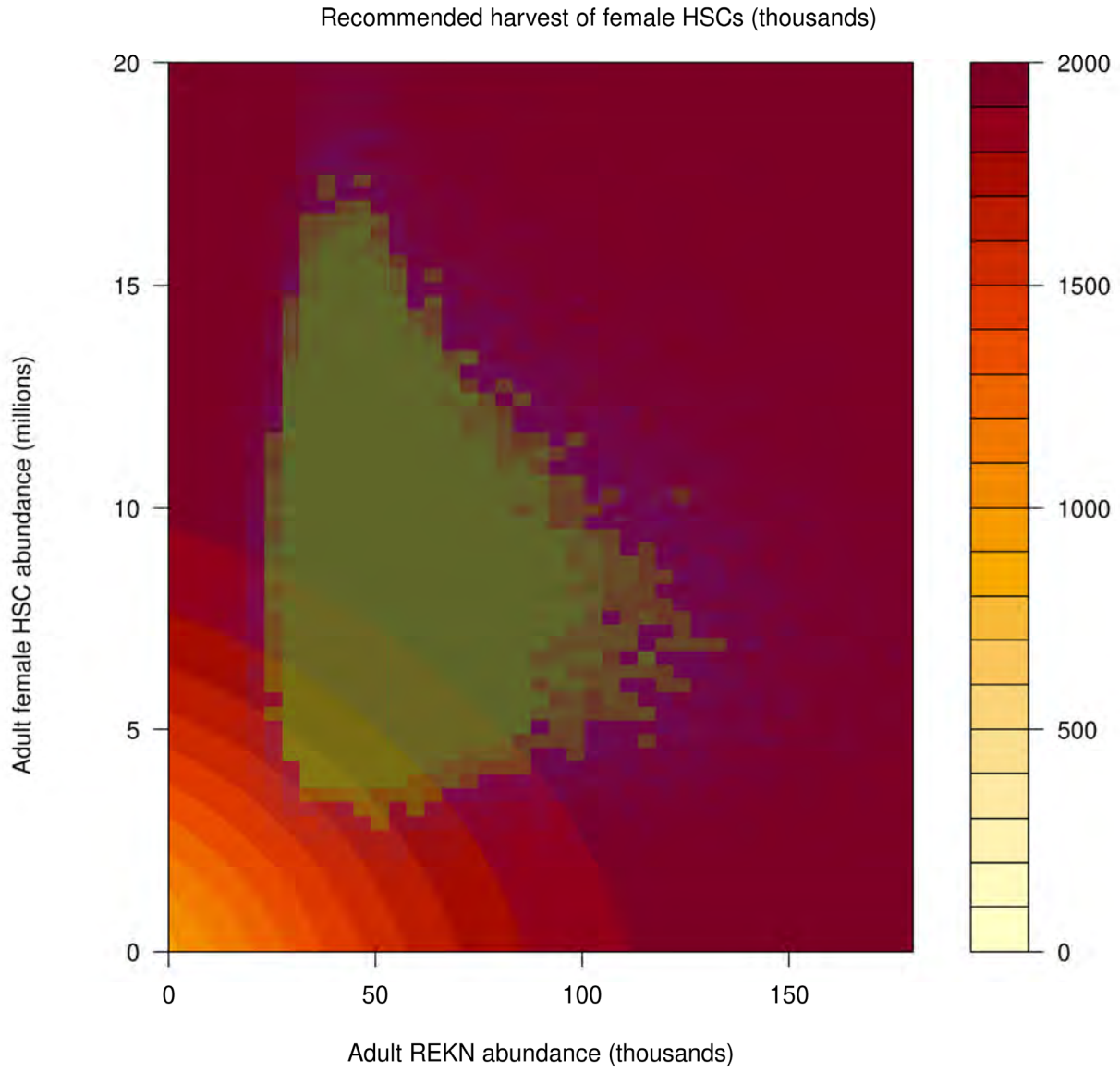


Figure 65. Optimal female bait harvest function for a version of the revised ARM model with $H^{f}_{\max}$ = 2 million and $H^{m}_{\max}$= 2 million. Transparent non-parametric kernel indicates where the bulk of the values of HSC and REKN abundances for the first 10 years of 10,000 simulations over 100 years. Compare to Figure 54.

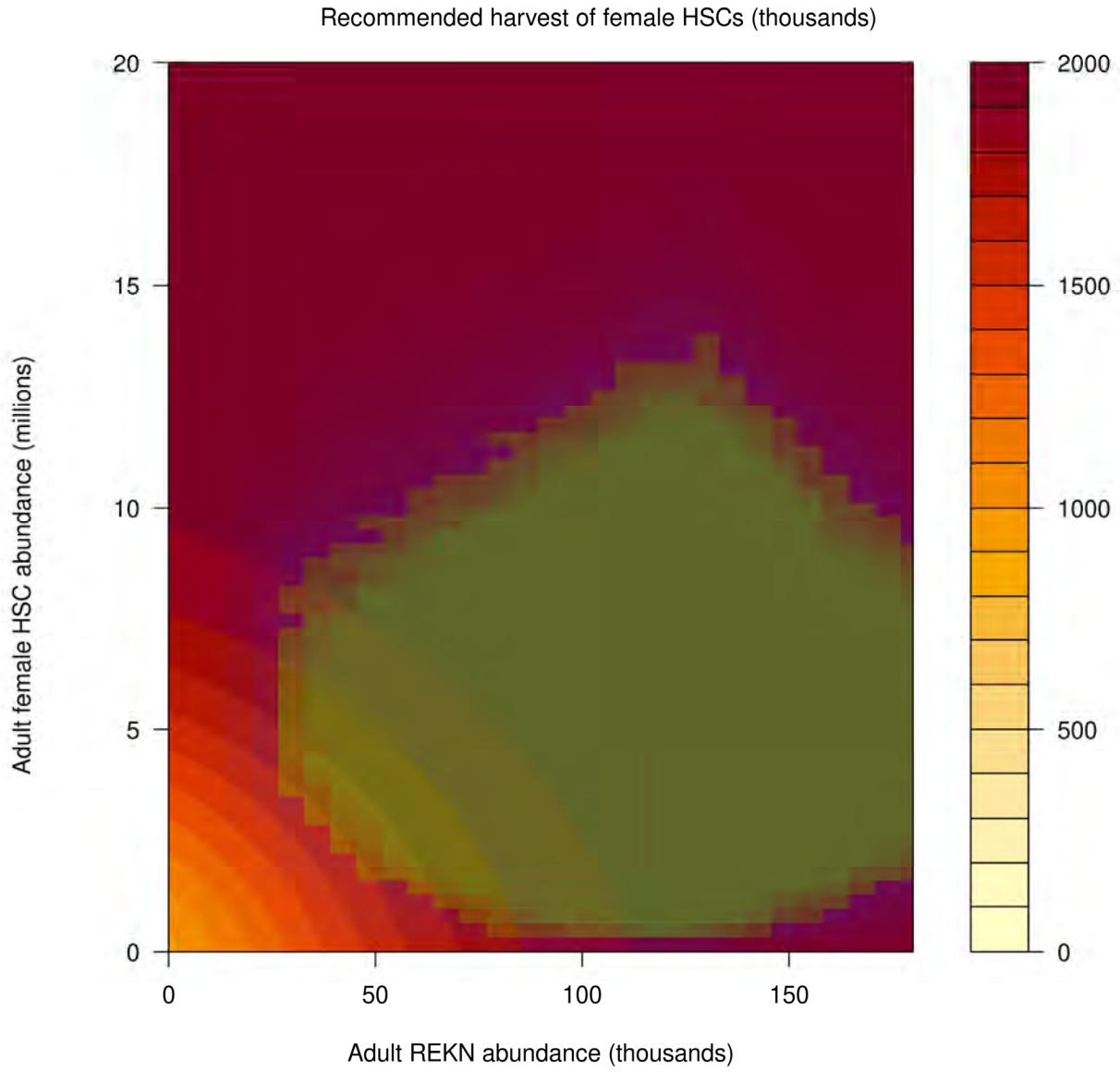


Figure 66. Optimal female bait harvest function for a version of the revised ARM model with $H^{f}_{\max}$ = 2 million and $H^{m}_{\max}$= 2 million. Transparent non-parametric kernel indicates where the bulk of the values of HSC and REKN abundances for years 31-100 of 10,000 simulations over 100 years. Compare to Figure 57.

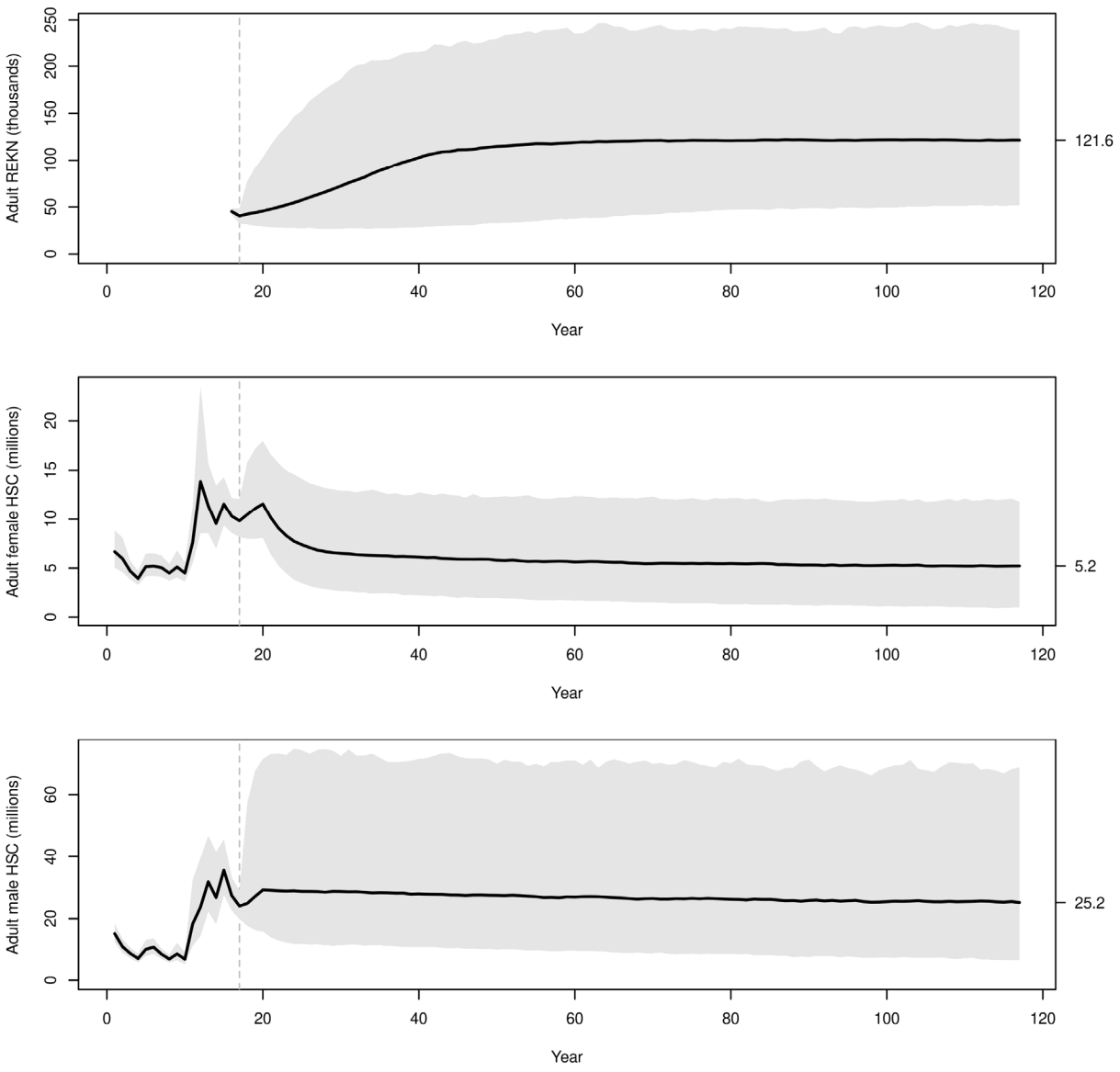


Figure 67. Summary of population trajectories for 10,000 simulated populations of horseshoe crabs and red knots, under the optimal harvest policy for a version of the ARM model with $H^{f}_{\max}$ = 2 million and $H^{m}_{\max}$= 2 million. Compare to Figure 58.

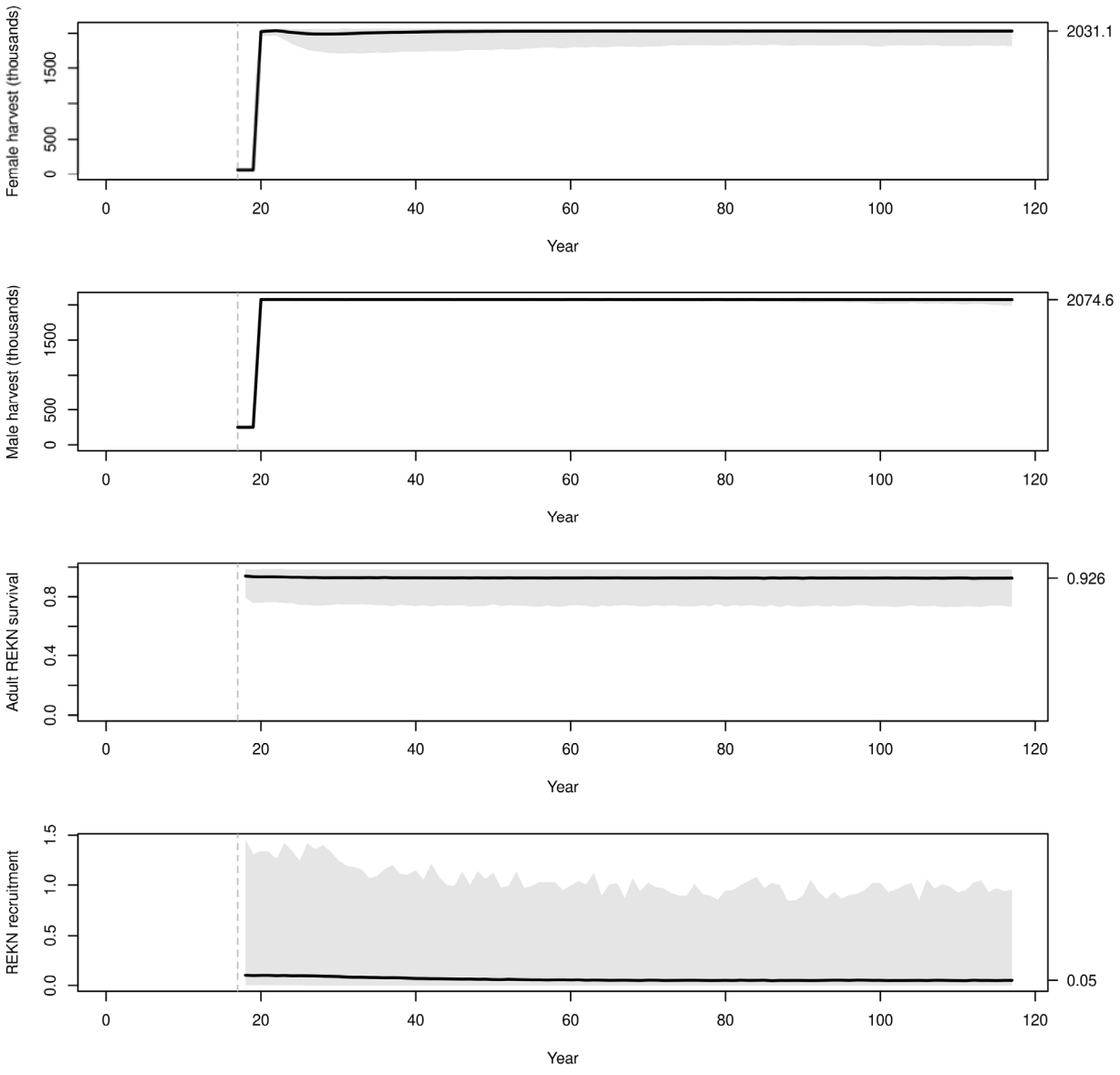


Figure 68. Summary of female and male horseshoe crab bait harvest and red knot (REKN) population parameters for 10,000 simulated populations, under the optimal harvest policy for a version of the ARM model with $H^{f}_{\max}$ = 2 million and $H^{m}_{\max}$= 2 million. Compare to Figure 59.

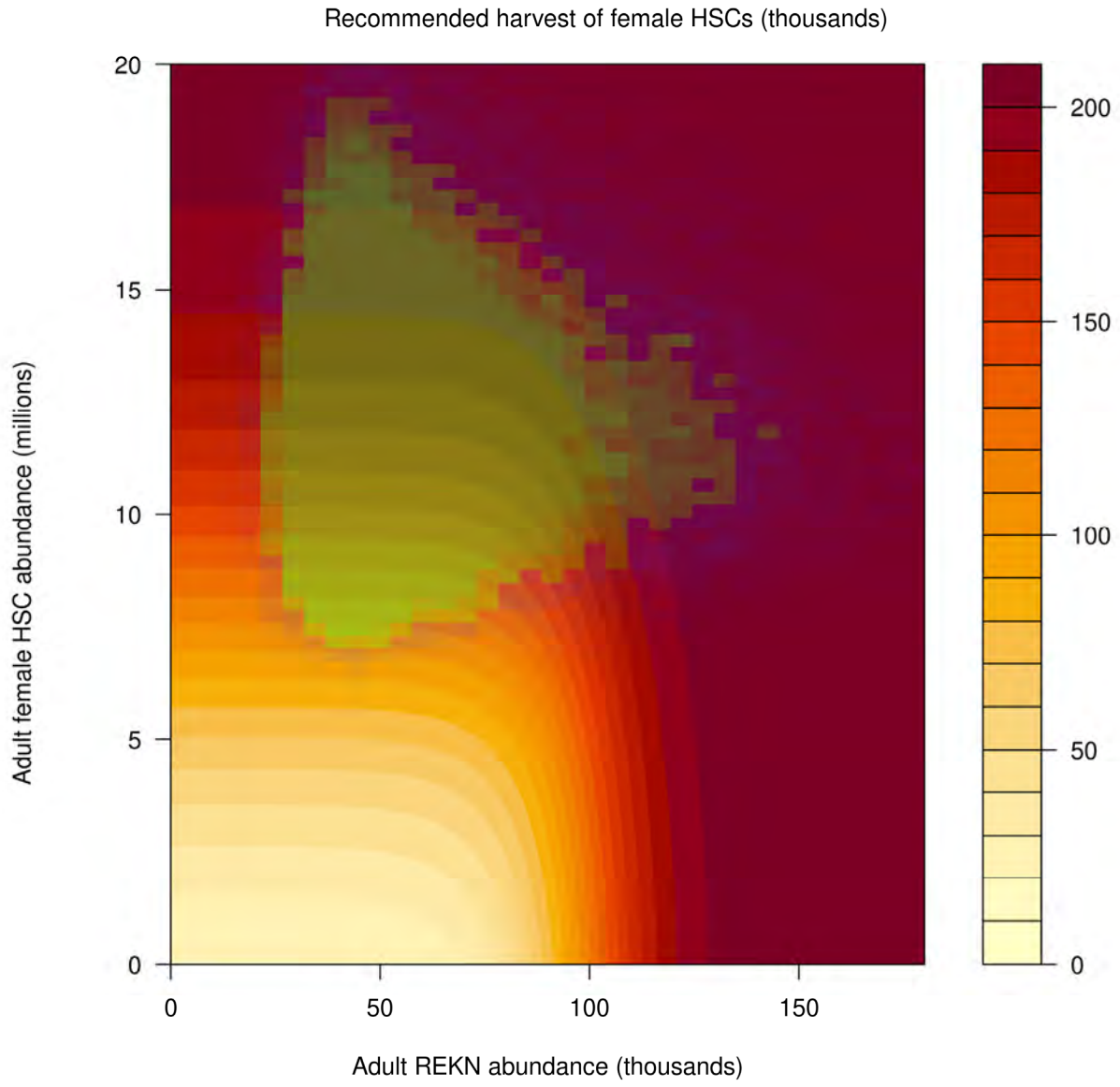


Figure 69. Optimal female bait harvest function for the canonical version of the revised ARM model with added variation in expected recruitment. In this version, median recruitment for males and females is allowed to vary ±5%. Non-parametric kernel depicts simulation values over the first ten years. Compare to Figure 54 and Figure 70.

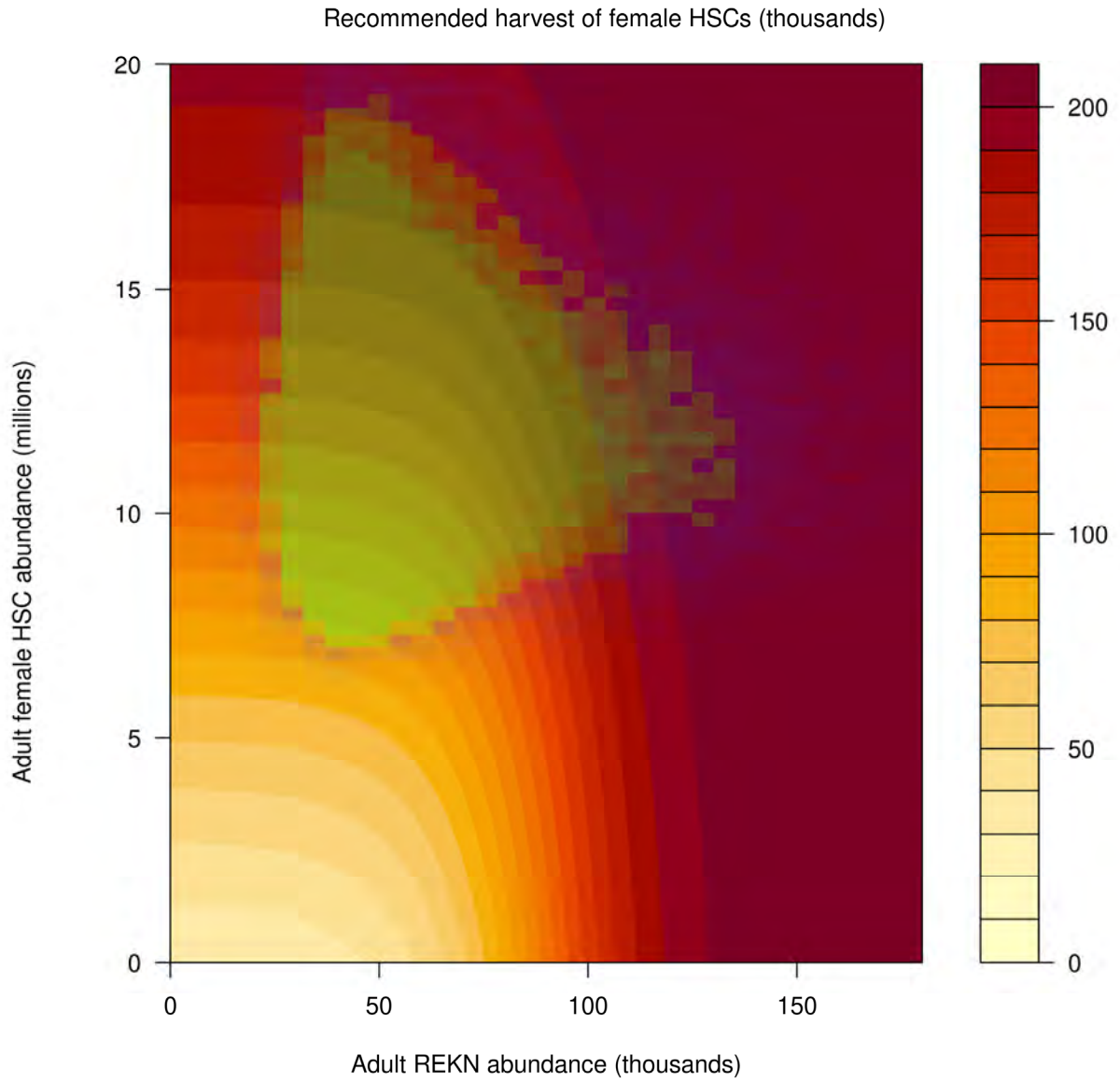


Figure 70. Optimal female bait harvest function for the canonical version of the revised ARM model with added variation in expected recruitment. In this version, median recruitment for males and females is allowed to vary ±10%. Non-parametric kernel depicts simulation values over the first ten years. Compare to Figure 54 and Figure 69.

15 APPENDIX A : A Field Protocol to Estimate Marked Proportion in Mark-resight Studies

A scan sampling protocol (Martin and Bateson 1986) was used to record the ratio of marked to unmarked birds in all areas that are searched for flagged birds, with certain precautions to avoid bias in the scan samples.

For large flocks (e.g. >100 birds):

1. Determine the general area in front of the observer that is visually accessible (i.e. the area within which the birds can be viewed well enough to determine whether birds are marked or not). This is the "scan area" in front of the observer.
2. Visually divide the scan area into four equal segments and number them from one to four, e.g. left to right.
3. Using a table of random numbers between 1 and 4 (see below), randomly select a segment of the scan area.
4. Without looking through the scope, which might bias scan results if the observer begins the scan with a conspicuous (i.e. marked) bird, aim the scope at the selected segment.
5. Looking through the scope and beginning with a bird at the edge of the field of view, scan birds in the flock, and 1) tally the number of marked birds, and 2) tally the number of birds checked for marks. When a predetermined number of birds has been checked for marks, say 50 birds, record the number of birds with alphanumeric flag codes and the number of birds checked for flags. A hand-held tally counter may be helpful here.
6. If the flock flies off before the scan sample is complete (e.g., before you check 50 birds), the data are still useful. Record the number marked and the number checked, as usual.
7. Only those birds whose legs are visible are counted as checked for marks. In some cases, certain individual birds cannot be checked for marks (e.g., when roosting on one leg, with only one leg visible). If it is not possible to clearly determine whether or not a bird has an alphanumeric flag, the bird is not tallied in the total number checked for birds.
8. Only those birds with legible alphanumeric flags should be counted as marked birds.
    a. Birds that are marked with a combination of color bands only, without an alphanumeric flag, are not tallied as "marked" birds. Birds with color band combinations only are not counted as marked birds in this protocol because many color band combinations are not unique to the individual bird and therefore will not be part of the analysis using the resighting data; even birds that are marked with a unique combination of color bands are not included in the analysis with alphanumeric codes.
    b. Similarly, engraved flags that are illegible because they have lost ink (or are otherwise unreadable) should not be counted as marked; they should be counted as unmarked.

For small flocks (i.e., when it is possible to quickly check every bird present in the scan area):

1. Scan the entire flock for marks and recorded the number of birds checked for flags and the number of marked birds.
2. In the case of a small flock, it is unlikely that the observer will require more than one hour to record alphanumeric flags of individual marked birds, but in the event that the resighting session is longer than one hour, it is not necessary to conduct more than one scan-sample of the same small flock.

Random numbers table. Cut on dotted line and place in field notebook.

Random numbers table for use in the field to select birds for scan samples.

1	1	3	4	3	3	2	2	3	4
4	1	2	1	1	1	1	3	4	1
3	2	1	1	3	4	4	3	3	2
2	3	4	4	3	1	1	1	4	4
3	1	3	2	2	1	4	3	2	4
3	2	3	2	1	4	2	1	3	1
4	2	1	3	3	4	2	2	3	4
4	4	1	2	1	2	3	3	1	1
3	1	1	1	1	1	1	1	4	1
1	1	4	1	2	3	4	2	4	4
4	2	3	2	2	2	4	4	3	3
1	2	2	4	4	4	1	3	3	2
3	4	3	3	2	3	2	2	3	3
3	2	2	3	2	1	4	1	1	1
2	1	1	1	1	3	1	2	2	1
3	4	2	4	4	4	1	4	4	4
4	2	2	4	4	3	2	1	1	3
2	3	1	4	3	1	2	2	4	2
4	2	3	3	3	1	1	4	1	3

References

Martin, P., and P. Bateson. 1986. Measuring behaviour: an introductory guide. Cambridge University Press, Cambridge.

Atlantic States Marine Fisheries Commission

Horseshoe Crab Adaptive Resource Management Revision Peer Review Report

Introduction

An independent peer review of the Revision to the Framework for Adaptive Management (ARM) of Horseshoe Crab (HSC; *Limulus polyphemus*) Harvest in the Delaware Bay Inclusive of Red Knot (REKN) Conservation was conducted from November 16-18, 2021. The Review Panel (Panel) comprised Dr. Yong Chen (Stony Brook University, Chair), Dr. Kelly Robinson (Michigan State University), Dr. Erica Nol (Trent University), and Dr. Justin Bopp (Michigan State University). The Panel was assisted by the Atlantic States Marine Fisheries Commission's (ASMFC) Director of Fisheries Science, Patrick Campfield. Supporting information for the ARM assessment was presented by the Adaptive Resource Management Subcommittee Working Group (WG): Dr. John Sweka (Chair, USFWS), Dr. James Lyons (Vice Chair, USGS), Dr. Kristen Anstead (ASMFC), Dr. Bryan Nuse (University of Georgia), and Dr. Anna Tucker (USGS).

The ARM report and supporting appendices were made available to the Panel approximately three weeks prior to the review. The Panel met on November 10, 2021, for introductions, to seek clarifications on materials within the ARM, and highlight areas of the assessment the Panel would like to focus on during the review meeting. The discussions throughout the full review were collegial, and the Panel sincerely appreciates the rapid turnaround of analyses by the WG to address requests from the Panel. The Panel was able to conduct a thorough review of the HSC ARM Revision and thanks the WG and the Science Director for their diligence, patience, and assistance throughout the review.

The purpose of the 2021 ARM Review is to evaluate the work conducted by the WG in relation to the Terms of Reference (TOR). The ARM Revision provided several significant modifications since the original ARM Framework was established in 2009. Notable modifications included projecting sex-specific HSC abundance with a Catch Multiple Survey Analysis (CMSA), modelling red knot population dynamics with an integrated population model (IPM), and changing the reward function and shifting to Approximate Dynamic Programming (ADP) in the ARM model to allow for the evaluation of continuous harvest of both male and female HSC.

The Panel concludes the WG completed their TORs, revised the ARM thoughtfully, and results derived from the ARM Revision are suitable for management advice. The Panel summarizes their findings with respect to the TORs for the review and makes recommendations for further improvement of the ARM and its parameterization for management advice.

Terms of Reference for the Adaptive Resource Management Revision Peer Review

1. Evaluate the adequacy of the proposed models for estimating horseshoe crab population dynamics and projections for use in the ARM Framework, including the definition of Delaware Bay crabs.

The Panel concludes the proposed CMSA model and projection model are appropriate for the ARM Framework. The estimated stock dynamics are suitable for use in the ARM Framework for Delaware Bay Horseshoe Crabs (DB HSC). The Panel considers the CMSA-estimated DB HSC stock dynamics to be robust and appropriate for use in the ARM. The Panel has concerns and questions about the recruitment parameterization in the projection model and definition of DB HSC.

The current weighting of surveys is based on the CVs estimated for the design-based abundance indices. A survey abundance index with a higher CV is considered less precise and is given less weight in the CMSA modeling. The Virginia Tech (VT) Trawl Survey abundance index tends to have similar or higher CVs in some years compared with the other two survey programs, implying the VT Survey index might be considered similar to or less reliable and important in the CMSA model. This may contradict the fact that the VT Survey program is specifically designed for monitoring the DB HSC stock and should be considered more important in estimating HSC stock parameters. The Panel supports the ARM WG decision to remove the weighting scheme based on the inverse Conn variances (Conn 2009) because this weighting scheme may double-count the survey CVs. During the review, the Panel suggested the WG use the survey area coverages to weight the survey programs in the CMSA. A sensitivity analysis was conducted during the review. The estimated stock abundances for both adult females and males are similar to the base case where the three survey programs were given the same weights. The Panel requested the WG evaluate the relationship between abundance indices of the three survey programs for primiparous and multiparous females and males. There were moderate to strong correlations between the different survey indices. The correlations may explain the robustness of the CMSA estimates with respect to different weighting schemes and support the use of equal survey weightings. The Panel concludes the equal weighting of the three survey programs in the CMSA is adequate as long as the three survey abundance indices are moderately correlated. The Panel recommends the sensitivity analysis results be included in Tables 18 and 19 of the ARM Revision Report.

The Panel recommends a habitat suitability index (HSI) model and species distribution model be developed to evaluate spatio-temporal distribution of the suitable habitat and abundance for DB HSC. If the WG plans to further explore different weighting schemes for survey programs in the CMSA, the spatio-temporal coverage of suitable habitats and abundance distribution by a survey program may be more appropriate for use as survey weights. However, if high correlations between survey programs' results persist over time, the resultant CMSA estimates are likely to be robust to different weighting schemes.

The Panel recommends more background be included in the report regarding the methodology and spatial sampling extent used to genetically delineate Delaware Bay-origin crabs. During the

review, the Panel did not have access to the most recent HSC genetic structure report conducted by Dr. Eric Hallerman at Virginia Tech. For example, it was unclear which genetic markers (i.e., microsatellite, Single Nucleotide Polymorphisms, or haplotypes) and statistical approaches were used. During the review, the Panel requested a sensitivity analysis be conducted on the proportion of Delaware Bay-origin horseshoe crabs in Virginia and Maryland in the CMSA. The panel appreciated the Delaware Bay-origin sensitivity analysis in the CMSA in Virginia and Maryland conducted during the review workshop and recommend the sensitivity analysis be included in Tables 18-19 of the ARM Revision Report. Additional detail regarding the definition of DB HSC would be beneficial because it was ambiguous as to whether or not spawning horseshoe crabs that immigrated into Delaware Bay from other regions were designated as Delaware Bay-origin HSC. The Panel agrees with the WG that further efforts should be pursued for classifying the proportion of DB HSC, especially within the New York region given its poor stock status.

The Panel also recommends that greater emphasis be placed on genetic sampling across multiple HSC populations within Long Island's South Shore to ameliorate the proportion of Delaware Bay-origin crabs within the New York area. Recent mark-recapture data indicates there is net movement (16% net annual migration rate) of adult HSC from the Sandy Hook, New Jersey, and Jamaica Bay, New York, region into the eastern adjacent South Shore estuaries of Long Island (Bopp et al. 2019; Bopp et al., *in prep*). Coupling this knowledge of movement with genetics in the New York area could bolster the understanding of metapopulation connectivity among and within stock units (Delaware Bay region vs. New York region). The Panel encourages the WG's research recommendation of exploring the migratory patterns of Delaware Bay-origin crabs, particularly in the New York area.

In addition to different weighting schemes, other major sources of uncertainty in the CMSA include missing years of 2012-2015 data from the VT survey, uncertain VT survey efficiency, possible uncertainty in total removal estimates (most likely under-estimates), the short time period of data, possible temporal changes in life history parameters, and lack of understanding of juvenile and sub-adult life history. The WG conducted a simulation study to evaluate the performance of the CMSA and developed a series of sensitivity analysis runs to evaluate the robustness of the modeling results with respect to select sources of uncertainty. The WG conducted additional analyses during the review to evaluate the sensitivity of the CMSA regarding increased discard mortality. Based on these analyses, the Panel concludes the proposed CMSA can provide robust estimates of DB HSC stock dynamics, and the estimates for the base case scenario are suitable for use in the ARM Framework. The Panel recommends the sensitivity analysis results be included in Tables 18 and 19 of the ARM Revision Report.

The Panel noted the estimated primiparous and multiparous HSC abundances have large uncertainties for 2012-2015 when the VT data are not available. In particular, the primiparous estimates for these years are not reliable, potentially introducing large uncertainties (and biases) in the projection model and ARM. The Panel agrees that such uncertainty will be reduced when more years of survey catch data become available in future.

The Panel noted the Delaware survey follows a fixed station survey design and the current abundance index was derived as if the survey followed a stratified random survey design. This is inappropriate. The Panel suggests the WG apply GLM or GAM to develop a model-based abundance index and relevant CV estimate for the Delaware survey program for use in the CMSA. The current design-based abundance index for the Delaware survey used in the CMSA is inappropriate.

The previous projection model included too many life history processes and was difficult to parameterize. The life history stages prior to maturation incorporated in the previous projection model are not monitored and cannot be measured directly. The previous projection model also cannot incorporate the stock assessment model results directly and has to use HSC life history parameters outside the DB areas, potentially making the stock assessment estimates and projections incomparable. The current CMSA-based simulation model uses the CMSA results for the DB HSC directly and addresses this problem. The Panel concludes the proposed simulation model improves the stock projection compared to the previous simulation model and the current projection model is adequate in projecting the DB HSC stock dynamics for use in the ARM. However, the Panel has concerns about using the time period (i.e., 2013-2019) with high recruitment in the current report and recommends the full time series of recruitment estimates (i.e., 2003-2019) or recruitments in years when the VT HSC Survey data are available be used in the simulation model to project future DB HSC stock dynamics for use in the ARM Framework. The Panel made this recommendation because the HSC is a long-lived animal with a complex life history, subject to low fishing mortality, and environmental factors may be more important in regulating HSC recruitment dynamics. Given the uncertainty in future environments as a result of climate change, it is better to encompass greater variability in recruitment for future projections used in the ARM Framework.

The Panel commends the use of primiparous data to estimate recruitment of newly mature male and female HSCs within the DB system. Identifying primiparous individual crabs is challenging, especially for females, where egg presence needs to be confirmed. With that being said, it appears there is substantial overlap in prosoma width among immature sub-adult crabs and primiparous crabs (Fig. 4, Hallerman and Jiao 2020). The Panel appreciates the use of a prosomal width cutoff of 180mm to delineate immature vs. mature crabs. However, the Panel suggests the size cutoff be re-evaluated for female horseshoe crabs in future assessments given Hallerman and Jiao's (2020) conclusion, "...some error is associated with distinguishing newly mature from immature females.", and there was considerable overlap of immature female sizes with newly mature and mature females. For instance, the newly mature size ranges overlapped completely with immature female horseshoe crabs in some years (Fig. 4 from Hallerman and Jiao 2020). While the Panel understands that data from immature crabs is not incorporated into the CMSA or the revised ARM Framework, the size cutoff is important for estimating the proportion of immature vs. mature crabs in the discard estimates. Therefore, the Panel recommends the WG further explores the proportion of mature female HSC based on egg presence/absence at various size ranges above the 180mm threshold to better understand size-at-maturity for females. The Panel also recommends periodically re-evaluating because climate change and harvesting may exert different selection pressures on HSC for earlier reproduction.

2. Evaluate the proposed changes to the red knot population dynamics model and model weights.

The Panel commended the ARM WG for developing the Integrated Population Model (IPM) that consists of three submodels: mark-resight model, matrix population model, and state-space model for count data. The models use the data collected in the monitoring program in the DB region and quantify the relationships between key red knot (REKN) life history, population dynamics parameters, HSC abundance, and REKN breeding ground snow cover conditions. There is good empirical data to suggest snow cover can impact shorebird reproductive success. Adding snow cover to the models appears appropriate.

The Panel concludes the proposed IPM for REKN is a significant improvement over the previous model for elucidating the relationship between horseshoe crab abundance and red knot survival. The Panel appreciated that numerous inputs of potential uncertainty were incorporated into the IPM, and hence the ARM. Thus, the analyses are appropriate for use in the ARM Framework. While the multi-stage modeling framework was illuminating, and calculated transition probabilities into mass classes that would meet the thresholds for REKN migration, there was model instability and counterintuitive results, while incorporating recent data (post-2009). Additionally, the multi-state model's instability addressed the need to potentially reassess the 180g cutoff weight. During the review, the WG stated that multiple weight thresholds have been previously assessed in the multi-state framework. The WG mentioned they will be evaluating survival across multiple weight classes within a mark-recapture framework. The Panel encourages this endeavor, as it could provide greater insight into the probability of gaining weight and improve the understanding between REKN survival and weight gain. The Panel encourages the WG to continue exploring the multi-state model that can provide useful information for corroboration purposes with IPM moving forward. Additionally, it is recommended that the WG determine whether recent changes in phenology or persistence patterns of REKN in Delaware Bay have a role in the previous model's poor performance.

The IPM uses REKN annual counts from aerial surveys as one of the model inputs. To standardize annual counts due to yearly differences in survey timing and coverage, corrections to the counts were applied that incorporated both the proportion of the total stopover area surveyed from the air, or ground in the case where ground surveys were used as counts, and the time within the migratory phenology when the survey took place. During the two COVID years (2020 and 2021), counts have been low or very low. During the Review Workshop the WG suggested the low counts may have occurred due to differences in observers, differences in numbers of observers, or differences in coverage. As count data are quickly conveyed to stakeholders, the low counts cause significant concern in the broader conservation community. Thus, the Panel urged the WG to incorporate soon the low counts from the last two years into the full IPM model, to reparameterize the models and hence the utility functions used to determine HSC harvests.

The Panel found it interesting that, although counts were low in 2020 and 2021, the passage population was relatively stable. This was reassuring. However, as stated by a minority opinion, persistence times have been lower in recent years. This suggests that use of Delaware Bay by REKN is more transient than it has been in the past. While the Panel acknowledges the stated goal of the DB-HSC-REKN system has been to stabilize the endangered red knot population, lower persistence suggests potential uncoupling of the relationship between HSC and REKN.

The REKN survival estimates from the IPM were nearly 4% points higher than those reported in a previous, but contemporary, analysis (Tucker et al. 2021) that used a portion of the same data, with birds observed only on the Delaware beaches and not New Jersey beaches. Both analyses show significant and positive effects of HSC abundances on REKN survival, a result that confirms the results from an earlier paper (McGowan et al. 2011). REKN adult survival from the mark-recapture model of the IPM (without the influence of recruitment) provides estimates that are even higher (94% versus 93%, Table 5 below) than what is reported in the full IPM. Thus, there are three potential contemporary measurements of adult REKN survival (two of which have non-overlapping credible confidence intervals, Table 5) and across the three estimates, there is a range of 12%. This degree of uncertainty should be modeled to determine the impact on lambda for this population, as adult survival, in long-lived species, is the most important life history characteristic that underlies population trajectories. The Panel suggests the WG consider conducting an analysis of the expected value of perfect information (EVPI) to determine the effects of this uncertainty on the decision (see TOR 3 below).

While the majority opinion argued they had investigated the effects of climate change on REKN populations, the Panel argued they investigated one aspect of climate change - snow coverage during 15-30 June in the presumed breeding area. While snow depth was shown to positively impact REKN survival in McGowan et al. (2011), snow coverage, as measured in the ARM Revision, was a non-significant predictor in the IPM. The Panel's view is that climate change can also impact phenology (Smith et al. 2010), and phenology is often a better predictor of breeding productivity than adult survival (Weiser et al., 2018, McGuire et al. 2020). There are other potential effects of climate change on REKN, including, for example, excessive drying effects that can influence survival at any stage of the annual cycle. While the Panel appreciates that one aspect of the potential effects of climate change was incorporated into the IPM, this was done because snow coverage had significant impacts in earlier data series. The Panel urges the WG to not overstate their investigation of general climate change effects and continue to consider how climate change might affect REKN throughout their life history in potentially unexpected ways.

With respect to model weights used in the original ARM Framework, the previous mark-recapture model and competing hypotheses / models allowed for applying weights to hypotheses describing effects of HSC on REKN survival and weight gain. However, these model weights were not updated. The new IPM framework provides a very clear means to update uncertain parameter estimates through learning as more data are collected, rather than relying on competing model weights. The Panel believes the ability to update parameter estimates (e.g., survival and recruitment) as more data are collected should lead to more frequent

updates, making the best use of the ARM Framework. The Panel suggests the WG strive to update the parameters frequently, particularly in the short term, to reduce uncertainty in the model and the decisions for HSC harvest.

During the review, the Panel asked if tag loss was an issue. The WG stated tag loss is likely minimal. The current mark-recapture models (multi-state open robust design) include multiple resightings of individuals within and across secondary sampling periods within each year. This bolsters the argument that tag loss is relatively not concerning as it applies to calculating apparent survival. The Panel commends the WG for the thorough formulation of the mark-recapture model while minimizing violations of model assumptions.

3. Evaluate the adequacy of the fishery-dependent, fishery-independent, and life history data used in the ARM Framework revisions for both horseshoe crabs and red knots, including the use of biomedical data.

The Panel evaluated the fishery-dependent, fishery-independent, and life history data used in the revised ARM Framework and concluded overall they are adequate for use in the ARM Framework.

The Panel recommends the WG continue to evaluate the relationships among the inter-annual variability in timing of the surveys and environmental variables, such as temperature, photoperiod, and salinity, to determine how environmental parameters may influence catchability, and subsequently, influence abundance indices. The Panel recommends the evaluation because a recent acoustic telemetry study demonstrated the timing of horseshoe crab migration between the continental shelf and local estuaries is strongly influenced by the photoperiod and temperature (Bopp et al. 2021). Additionally, the 2020 Virginia Tech Trawl Survey Report indicated catch may be related to the sampling date and temperature (Hallerman and Jiao 2020). Given this information, the Panel recommends the continued evaluation of how the timing of sampling and environmental covariates for all trawl surveys may affect horseshoe crab catch from fisheries-independent data sources through modeling frameworks, such as generalized linear models (GLMs) or generalized additive models (GAMs). The Panel encourages the WG's research recommendation of continued evaluation of potential factors that may be influencing HSC catchability in the VT Survey and other trawl surveys (New Jersey and Delaware).

The Delaware trawl survey has a fixed-station design. The current use of a design-based abundance index is inappropriate for this program. A model-based abundance index needs to be developed for use in the CMSA.

The previous HSC stock assessment and projection models have to rely on some life history parameters from the literature and/or other areas outside of Delaware Bay. The current HSC models remove the need to borrow information from areas outside of Delaware Bay. Use of the local life history information directly from DB improves the stock assessment and projection, making them more reliable and relevant to the DB HSC.

The Panel agreed with an improved new natural mortality estimate (i.e., from 0.27 to now 0.30). The Panel noted both population and operational sex ratios continue to be skewed towards males over time even though it is a male-only fishery and sex ratio is considered 1:1 for juveniles. This may imply possible differences in natural mortality between females and males. The Panel recommends examining individual stations data in the VT survey to examine the spatio-temporal distribution of M:F ratios. The Panel also recommends examining New Jersey survey stations and Delaware survey (fixed) stations sex ratios to evaluate possible shifts of crabs from the New Jersey side of the Bay to the Delaware side. The Panel recommends evaluating possible differences in natural mortality for primiparous and multiparous HSC between females and males.

The Panel asked if there are different habitat usage between females and males, and the WG suggests generally no differences, although males tend to arrive earlier and stay longer than females on spawning beaches.

During the review the Panel asked the WG to conduct a correlation analysis to evaluate relationships between abundance indices derived from different surveys. Moderately strong correlations were found between survey programs, which explains why the CSMA estimates are robust to different weighting schemes for the three programs.

The WG provided information about the proportion of positive tows for the three survey programs. The plots show no obvious temporal patterns, suggesting no large shifts in the spatial distribution of the DB-origin HSC over the study time. This suggests the current survey coverage and design may be adequate.

The Panel commends the WG on the efforts to identify variables influencing HSC fishery discards and develop models to yield the HSC discard estimates. The Panel considers the discard estimates used in the current assessment to be greatly improved from previous assessments.

The Panel evaluated the revised HSC-REKN ARM Decision Model, including the estimation and projections models for both HSC and red knots, harvest functions and reward function, and its parameterization and optimization. The Panel concludes the revised ARM Framework is suitable for use in making HSC management recommendations.

The original ARM Framework for HSC-REKN (2009) was based on an objective statement that included objectives related to HSC harvest and maintaining adequate stopover habitat for shorebirds. The Panel commends the WG on updating the objective statement to reflect concerns specifically related to ensuring that HSC management does not affect the recovery of the REKN population. This provides specific guidance for building the utility and reward functions and also maintains an explicit link to the modeling efforts conducted for both species.

In the ARM Revision, the WG decided to abandon the use of the Adaptive Stochastic Dynamic Programming (ASDP) software because it was antiquated and constrained the use of an HSC projection model that mirrors the CMSA assessment model. The Panel agrees the ASDP

software should no longer be used because of these concerns. As a replacement, the WG is now using Approximate Dynamic Programming (ADP), coded in R software. ADP appears to be an excellent choice. The method does not constrain the optimization to competing REKN models, and it allows the user to create a projection model for HSC that makes use of the same framework as the assessment model, accounting for the time lag between birth and recruitment to the spawning population. Importantly, this new approach to optimization allows for the evaluation of a continuous range of harvest recommendations for both male and female HSC, much preferred to the five previous harvest packages from the original ARM. During the review, the WG elaborated on the choice of ADP and described the conversations that were held with an expert in optimization methods. The Panel believes the change from ASDP to ADP will provide the WG with more flexibility in optimization and evaluation of the effects of uncertainty in demographic parameters for both species.

The results of sensitivity analyses provided in the ARM Revision Report, as well as additional analyses conducted during the review workshop, suggest that decisions for HSC harvest management are affected by uncertainties in demographics of both species. As described above, the projection of HSC abundance into the future appears to be affected a great deal by the value and associated uncertainty around the recruitment parameter. In addition, uncertainty exists in the estimates of survival and recruitment for REKN, as well as the effects of HSC abundance on these parameters. The Panel therefore suggests the WG explore the use of expected value of perfect information (EVPI) to evaluate the implications of uncertainties on decisions for HSC harvest, especially as it pertains to REKN survival and recruitment. The Panel and WG discussed potential methods for applying EVPI to continuous parameters, such as breaking the distribution up into ranges representing “high” and “low” values, similar to a multi-model approach. Ultimately, the Panel’s concern relates to ensuring that harvest decisions for HSC truly account for uncertainties in the input parameters for the projection models. The Panel recommends exploration of EVPI as a long term task for WG consideration.

In addition to sensitivity and EVPI analyses, the Panel suggests the new reward and utility functions be fully considered in terms of the values they represent. The Walsh minority report suggested the new utility function for REKN does not reflect the values of the original stakeholder group from the 2009 ARM process, arguing the new utility function will allow for the immediate resumption of harvest of female HSC. In the original ARM Framework, REKN concerns were incorporated as a constraint within the utility function for harvest of female HSC, effectively setting harvest to zero if the REKN population was predicted to be less than 81,900 or HSC abundance was less than 11.2 million. This has led to no harvest of female HSC since implementation of the Framework. There are two components to the new reward and utility functions that are different and lead to increased harvest of female HSC. First, the new reward function includes an explicit utility function for REKN (u^k). The utility function remains at zero until REKN abundance reaches 90% of the threshold value established for REKN. At this point, the utility score increases linearly until it reaches one when REKN abundance reaches the threshold value. The Panel agrees with the WG that the knife-edge effect of the constraint from the prior version of the ARM was not preferable, and including the new utility function that allows for an increase in female HSC harvest with an increase in REKN abundance makes more

sense. The Panel believes the change is helpful and the new utility function for REKN does not in itself lead to the immediate resumption of female HSC harvest, as suggested in the minority report.

The second component that differs from the original ARM Framework is the reward function, which now leads to immediate resumption of female HSC harvest. The new reward function includes a combined utility for male and female HSC harvest (similar to the original reward function), as well as a utility for REKN abundance, and leads to greater rewards when HSC harvest and REKN abundance are both high. However, this new reward function also allows for female harvest even when the REKN utility is zero. Because the changes would lead to harvest of female HSC, which has been restricted since the implementation of the original ARM Framework, the Panel cautions the WG to fully consider if the new reward function truly represents the values articulated by stakeholders in the 2009 ARM Framework. The previous reward function was a knife-edge function, and effectively acted as a harvest control rule. Therefore, the Panel believes a change in the reward function to allow for gradual increases in female harvest is likely preferable. Furthermore, the Panel recognizes the form of the reward and utility functions are value judgements, and for this ARM revision the WG was not able to convene a group of stakeholders that would represent all interests (e.g., HSC harvesters, biomedical industry, conservationists, etc.). Therefore, the Panel believes the aforementioned EVPI analyses will allow the WG to more fully consider the implications of the changes and weigh the opinions of stakeholders of different interests. Overall, the Panel does not disagree with the WG's approach to revising the functions, as long as they truly reflect the objectives related to HSC harvest and REKN recovery and the risk associated with HSC harvest.

The Panel recommends the WG strive to update the assessment models for both species on an annual basis in the near term, particularly in light of the low REKN counts during the recent COVID years, with updates carried through the decision model. Given the sensitivity of the projection models for both species to estimates of sex-specific recruitment, frequent updates will allow for immediate incorporation of new data that likely can reduce uncertainty around the estimates. In addition, the Panel recommends updating the optimization model every 5 to 10 years after the initial short term updates.

The Panel agrees with the WG that egg survey measures conducted on the New Jersey shoreline of DB may not accurately capture the number of available eggs for REKN because of high-quality habitat loss confounding egg-density comparisons (WG rebuttal to Niles comment #4; Botton et al. 2021). The Panel also agrees with the WG that quality of spawning beaches changes over time due natural processes (i.e., longshore drift, erosion, sand migration) and hence, may potentially result in low interannual site fidelity and/or shifting distributions of spawning horseshoe crabs. In a previous study, interannual site fidelity was low, as most crabs did not return to their original tagging beach within Pleasant Bay, Massachusetts, but most crabs returned within 2.5 km of their original release location in subsequent years (James-Pirri 2010).

Another complication of relating HSC egg densities to HSC abundance is due to differences in temporal sampling that may not completely capture peak egg densities as discussed by the WG in rebuttal to Niles comment #4. Given these nuances and implications, the Panel understands the challenge of incorporating egg data into the IPM framework. However, the Panel recommends additional work examining the temporal and spatial link between egg densities and REKN (survival and abundance). HSC egg density should be explored further with existing and future data given these linkages are strong and HSC egg availability directly impacts REKN population dynamics (Michael-Haramis et al. 2007; Takahashi et al. 2021). The Panel recommends that interannual site fidelity of tagged horseshoe crabs be evaluated in both the Delaware and New Jersey shorelines in the long-term. Understanding interannual site fidelity could facilitate the identification of high-quality spawning habitats (James-Pirri 2005) and in turn, can prioritize spawning beaches to sample on an annual basis for egg surveys despite ongoing habitat loss. Furthermore, the Panel acknowledges that changing beach characteristics can affect where HSC spawning occurs (Jackson et al 2005; Smith et al. 2011) and therefore, may affect the distribution of egg densities. However, the Panel is not aware of the impact of beach migration on the spatial distribution of HSC eggs. The WG mentioned this in its rebuttal to Niles comment #4 as a potential challenge of adequately accounting for spatial variability in egg densities. The Panel recommends the relationship between beach migration and the spatial distribution of HSC egg densities be evaluated in the long-term.

4. Develop recommendations for improving assessment methodology and data collection.

<u>Short term</u>

- The ARM Revision is greatly improved, including: refinement of the objective statement, the new DB HSC stock assessment and projection models, and the new REKN IPM model, that allows for easier and more frequent updating. The Panel recommends the WG regularly update the assessment and projection models to further reduce uncertainties with additional data and information. The Panel recommends the ARM data be updated sooner than later (3 years or less) as new data become available, notably when the Delaware and New Jersey trawl surveys collect new stage data to improve the estimation of HSC recruitment dynamics. The Panel also recommends the ARM Framework be revisited every 5-10 years for possible revision to account for dynamic changes in the ecosystem.
- The Panel recommends the full time series of recruitment estimates (i.e., 2003-2019) or recruitment estimates in years when the VT HSC survey data are available be used in the simulation model to project future DB HSC stock dynamics for use in the ARM Framework. The Panel suggests the WG re-run the model and incorporate the new results in the ARM Revision report.
- The Panel highlights the importance of the VT HSC survey for monitoring the population dynamics of the DB HSC stock and for providing reliable estimates of recruitment for projections in the ARM Framework. The Panel recommends continuing funding the VT HSC survey. However, with more data available, the Panel encourages a simulation study be done to evaluate the performance of current survey design in capturing the DB

HSC stock dynamics. A simulation could also potentially identify a more cost-effective survey program to ensure the quality of the survey abundance indices.

- The Panel considers it is necessary to develop a model-based abundance index for the DB Trawl survey because it follows a fixed station design. A design-based abundance index is inappropriate.
- The Panel recommends the WG expand on the HSC spawning survey methodology and briefly explain how percent female spawning was estimated in the main text of the revised ARM report to provide readers with greater transparency and clarity. The Panel knows the estimation of the proportion of spawning female HSCs was obtained through indices of spawning abundance from HSC spawning surveys, but little information is presented on how these data were obtained. The Panel also desires clarification on differences in the duration cutoffs and methodologies between the revised ARM Framework and Tucker et al. (2019) for defining the proportion of female HSCs available to REKN. The revised ARM Framework estimates the proportion of available spawning HSCs based on cumulative spawning density by the end of May divided by the total female density for that given year. Whereas, Tucker et al. (2019) defined HSC egg availability to shorebirds as the proportion of total spawning activity that occurred by the 95% arrival cutoff date for each species (HSC and REKN) in each year. The Panel also recommends that data for the proportion of HSC availability and REKN cumulative arrival be presented in either a table or figure from 2003-2019 (i.e., Figure 2 from Tucker et al. 2019) in the revised ARM report to provide context of interannual differences in REKN arrival and HSC spawning availability.
- The new utility and harvest functions are a representation of values, and the Panel understands that convening a group of stakeholders for this revision was not possible. Therefore, the Panel recommends the WG fully consider whether the new utility and harvest functions represent stakeholder values as articulated in 2009.

<u>Long term</u>

- The ARM Framework tends to be most sensitive to recruitment dynamics for both species. Although the recruitment dynamics are currently quantified with large uncertainty because of the short time period and missing years of data, the interannual variability in recruitment will be better understood when more data become available. The Panel encourages the WG to regularly update the model runs and new information when it becomes available to continue improving the estimates of recruitment dynamics for both species in the ARM Framework.
- Continue monitoring natural mortality from tagging data within the Delaware Bay region. The Panel appreciates and commends the WG for updating the natural mortality estimate for adult horseshoe crabs. However, it is unlikely that natural mortality is constant across all age stages post-maturation. The WG should consider recording post-maturation age group data based on carapace wear, epibionts, and mating scar criteria defined by Botton et al. (2021) in order to estimate age group-specific mortality estimates. Preliminary mark-recapture results from Cormack-Jolly-Seber and multi-state models indicate the oldest age group has 25% lower average survival compared to the

youngest adult age group in Massachusetts (Bopp et al., in prep). In the more immediate future, exploring differences in natural mortality among primiparous and multiparous crabs would be beneficial for obtaining age-group specific mortality estimates that could be incorporated into the CMSA model to obtain more accurate abundance estimates.

- Conduct habitat suitability index modeling for primiparous and multiparous HSC for both males and females to examine spatio-temporal variability in suitable habitat
- Conduct species distribution modeling to examine spatio-temporal changes in distributions of primiparous and multiparous female and male HSC.
- The Panel agrees the amount of suitable spawning habitat should be quantified and monitored over time. The Panel encourages the monitoring of available fringe marsh habitat, in addition to spawning habitats, throughout DB. Over the past two decades, there is increasing evidence that juvenile horseshoe crabs heavily depend on salt marsh food webs for nutritional needs (Carmichael et al. 2004; Bopp et al., in prep) and often occupy salt marsh fringe habitats adjacent to spawning beaches (Bopp, personal communication). Therefore, changes in the availability of salt marsh fringe habitat in the future may affect HSC recruitment dynamics, especially with sea-level rise impacts associated with climate change.
- The Panel suggests the WG consider future HSC spawning habitat availability, its temporal dynamics, and how it may be associated with SLR and effects on recruitment.
- Evaluate phenology of horseshoe crab migration into Delaware Bay with more contemporary tools, such as satellite tags or acoustic telemetry. Understanding migration timing could improve understanding of temporal implications of trawl survey timing and HSC abundance index inference, as well as the timing of HSC spawning migrations relative to REKN arrival. Acoustic receiver arrays are currently operational within Delaware Bay (Delaware F&W; David Secor, UMCES; Secor et al. 2020).
- The Panel recommends the WG further explore the proportion of mature female HSCs based on egg presence/absence at various size ranges above the 180mm threshold to better understand size-at-maturity for females. The Panel also recommends periodic evaluation because climate change and harvesting may exert different selection pressures on HSC for earlier reproduction.
- The Panel recommends that the WG explore the use of expected value of perfect information (EVPI) to evaluate the effects of uncertainties in REKN and HSC dynamics on harvest decisions.

<u>Data collection</u>

- Develop a survey targeting older juvenile horseshoe crabs within the subtidal zone to enhance the understanding of HSC recruitment. The population dynamics and habitat use of juveniles (age 5-9) remains elusive within the literature, with the exception of the population in Pleasant Bay, MA.
- Expand horseshoe crab tagging efforts throughout the US East Coast, particularly in North Carolina, to ameliorate movement and population exchange patterns adjacent to DB. North Carolina has the lowest tagging effort (by tagged individuals and resighting effort) out of any U.S. state on the East Coast. There is limited information regarding the

migratory exchange between North Carolina and Delaware Bay that is also the boundary between stock units (ASMFC 2019). A greater understanding of movement to/from North Carolina would be useful to understand the origin of Delaware Bay crabs.

- The Panel encourages the WG to continue exploring the apparent lack of relationship between HSC egg densities measured by beach surveys and REKN survival. In a recent study by Takahashi et al. (2021), a positive correlation between number of foraging shorebirds (including red knot) and HSC eggs were found in the Cape Romain-Santee Delta Region, South Carolina. The authors found 95% of the samples tested had DNA from HSC eggs in a molecular analysis of shorebird fecal samples. Similar work can be done for the DB area to evaluate the spatio-temporal overlap between HSC and REKN, and analyze fecal samples. In New Jersey, there is also ongoing work evaluating the spatial (cross-shore and along-shore) and temporal patterns in shorebird distribution in relation to horseshoe crab eggs (Daphne Munroe, Rutgers, https://njseagrant.org/research/research-projects/). The Panel recommends the WG evaluate the results and methodologies of this project to determine if the sampling design could be feasible for a large-scale implementation of HSC egg sampling throughout DB.

5. If a minority report has been submitted, review minority opinion(s) and associated analyses. If possible, make recommendations on current or future use of alternative approaches presented in minority report(s).

The Panel evaluated two minority opinions.

Niles minority opinion

Niles argued egg densities in New Jersey have not increased over the past two decades and currently remain below historic abundances. The WG majority stated incorporating egg densities would be inappropriate at this time given the difficulty of addressing spatial and temporal variability of eggs and inconsistent methodologies between the New Jersey and Delaware egg density surveys. Additionally, the WG majority stated the New Jersey shoreline areas sampled in egg surveys have experienced habitat loss since the 1980s and may not be representative of available habitat elsewhere in the Delaware Bay. The Panel agrees with the WG majority that the lack of interannual site fidelity at spawning beaches (James-Pirri 2005) and shifts in habitat use based on geomorphology makes comparing the relationship between egg densities and HSC densities difficult. Recent work conducted by Botton et al. (2021) demonstrated there was a weak relationship among egg densities sampled from short (5cm) and long (20cm) cores and HSC spawning indices on spawning beaches in Jamaica Bay, New York. James-Pirri (2005) also found a weak relationship between HSC spawning indices and egg densities in Cape Cod, MA. Given these implications, spatial patchiness of egg densities, weak relationships, and high uncertainty the Panel understands why the WG did not incorporate egg densities into the ARM Framework. However, the Panel recommends the mismatch between egg sampling (i.e. short vs. deep sediment cores) and horseshoe crab spawning abundance be explored further because HSC eggs are a crucial food source for REKN. A recent study

(Takahashi et al. 2021) found a strong correlation between REKN abundance and HSC egg densities in South Carolina.

Niles stated the inclusion of the Delaware and New Jersey trawl surveys are not directed at HSC and argued the use of only five years of data introduced bias into the CMSA (concern #6). The WG majority re-evaluated the surveys and argued they reliably catch HSC and are important to include during years when the VT trawl survey did not occur (2012-2015). The WG group also used the full time-series of the New Jersey and Delaware trawl survey (2003-2019) that is much longer than five years. For the most part, the Panel agrees with the WG that the New Jersey and Delaware surveys can reliably track HSC abundance. However, the Panel recommends the Delaware trawl survey transition from a fixed-station to design based (random stratified sampling) survey because fixed-station surveys may not be adequately accounting for shifts in HSC spatial distribution across habitats or strata (i.e., depth).

Walsh minority opinion

The Walsh minority opinion described three concerns with the majority report: 1) the VT survey should be more heavily weighted in the CMSA, 2) the new utility function does not accurately represent the original intentions of the ARM process, and 3) given the desire to change the utility function, the WG should include broader stakeholder engagement and input to develop the utility and reward functions.

On point number 1, the Panel described for TOR 1 that applying equal weights to the three surveys is acceptable for the HSC CMSA. The Panel agreed with the WG that the Conn method would be inappropriate for devising survey weights, and furthermore requested the WG provide results for HSC estimates when weighting the surveys according to spatial coverage. The WG provided results of such a weighting scheme (Table 1) that indicated CMSA results were robust to such changes in survey weight. Based on the sensitivity analyses, the Panel concludes that equal weighting of the three survey programs in the CMSA is adequate.

Points 2 and 3 of the Walsh minority report describe concerns related to the utility function and whether the function accurately represents stakeholder desires. Walsh describes a number of concerns with the change in terms of structured decision making and risk related to REKN abundance. The ARM revision includes a change to the harvest function such that REKN population abundance has its own utility function, rather than being treated as a constraint to female HSC harvest. This utility function leads to less of a knife-edge outcome for female harvest that was all or nothing in the prior ARM Framework, although female harvest has never been recommended. The majority response describes in more detail the reasons for discontinuing the use of the original reward function, notably that the original function was deemed inappropriate. The Panel suggests the utility function itself does not lead to immediate resumption of female HSC harvest, as suggested in the minority report, but rather the new harvest function that includes utilities for HSC harvest and REKN abundance does lead to female HSC harvest.

The minority report suggests there are uncertainties that still plague the system that would potentially affect harvest management outcomes, such as recruitment of HSC. The Panel did suggest to the WG to use the entire time series of data for recruitment in the projection model for HSC because it encompasses a broader range of values and uncertainty (TOR 1 above). The Panel agrees uncertainty can affect harvest management outcomes, and therefore in TOR 3 suggested the WG evaluate the effects of key uncertainties through EVPI or sensitivity analyses. However, the Panel also understands the inability of the WG to convene a truly representative group of stakeholders for this revision, and therefore also recommended the WG use the outcomes of the sensitivity analyses to confirm the harvest function itself does truly represent the previously-articulated desires of stakeholders from the original ARM Framework (2009). Overall, the Panel agrees with the majority response that reformulating the utility and harvest functions was necessary, given other updates to the modeling framework, and that the new models will lead to faster updates to reduce uncertainty than in the previous ARM Framework. The Panel simply cautions the WG to consider the effects of uncertainties on HSC management recommendations to ensure the current functions do adequately represent stakeholder concerns.

6. Prepare a Review Panel Report summarizing the Panel's evaluation of the ARM revision and addressing each review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within four weeks of workshop conclusion.

The Panel reviewed all materials provided by the WG and was given 13 presentations during the review. The Panel had a constructive discussion after each presentation with the WG. Based on the review and all the discussions, the Panel prepares this Review Panel Report summarizing the Panel's evaluation of the ARM revision with respect to a set of TORs predefined for the Panel.

<u>The Panel recommends the following tasks for the WG to consider before the January 2021 horseshoe crab fishery management board meeting:</u>

- The full time series of recruitment estimates (i.e., 2003-2019) or recruitments for years when the VT HSC survey data are available are used in the simulation model to project future DB HSC stock dynamics for use in the ARM Framework and update the report accordingly.
- A model-based abundance index is developed for the Delaware trawl survey.
- The results of sensitivity analysis conducted during the review for different weighting schemes, increased discard mortality, and different proportions of DB-origin HSC in Virginia and Maryland are included in Tables 18 and 19 of the ARM Revision Report.
- The Panel encourages the WG to review the research recommendations (ToR 4) to develop a list of tasks to be included in the final report for further improvement of the ARM Revision parameterization.

Advisory Section

Status of Stocks: Current and projected

A Catch Multiple Survey Analysis (CMSA) model was used to assess the Delaware Bay HSC stock in the 2021 ARM Revision. The stock assessment covers the time duration from 2003 to 2019 and was done separately for females and males. The adult HSC abundance in 2019 is in high and stable condition for both females (Table 1) and males (Table 2). Fishing mortality is low (< = 1%) for both females (Table 1) and males. No limit biological reference points have been developed for stock abundance and fishing mortality. Thus, no conclusion can be made about "overfishing" and "overfished" status. However, given the stock abundance being much higher and fishing mortality lower in 2019 than in 2003, the 2019 Delaware HSC stock is unlikely to have a status of "overfished" and "overfishing" for both females and males. The CMSA-estimated abundance and fishing mortality tend to be robust with different model parameterizations (Table 3), suggesting the derived stock status is robust to uncertainty.

A new HSC projection model, parameterized with the information derived from the CMSA stock assessment and studies of the Delaware Bay HSC stock, was developed in the 2021 ARM Revision. The projected future HSC stock abundance tends to be sensitive to the assumed future recruitment dynamics. There is large uncertainty for the years of 2013-2016 when the VT survey was not conducted, leading to large uncertainty in stock abundance estimates in the CMSA assessment (Figure 3), resulting in large variability in the projected HSC stock abundance for both females and males. The uncertainty associated with the projection will become smaller when more years of data become available to the CMSA stock assessment.

Stock Identification and Distribution

The ASMFC manages HSC from Maine to eastern Florida. Genetics, isotope analyses, and tagging data suggest the horseshoe crab population is composed of multiple units, some distributed across multiple states and others embayment-specific that are linked to varying degrees. This ARM Revision focuses on the Delaware Bay Region, although more studies are needed to better define the Delaware Bay stock, in particular, the HSC in the New York region.

Management Unit

The ARM Revision focuses on the Delaware Bay stock, including all of the catch in Delaware Bay and portions of the catch in Maryland and Virginia.

Landings

The commercial bait fishery consists primarily of trawl, hand harvest, and dredge fisheries. Since 1998, ASMFC has compiled landings by state in the annual FMP review report. The horseshoe crab fishery supplies bait for the American eel (*Anguilla rostrata*), conch (Buccinidae) and, to a lesser degree, catfish (Ictaluridae) fisheries. The American eel pot fishery prefers female horseshoe crabs to males, while the conch pot fishery uses both male and female

horseshoe crabs. Most fishing effort for horseshoe crabs is concentrated within the mid-Atlantic coastal waters and adjacent federal waters. Since 1998, states have been required to report annual landings to ASMFC through the compliance reporting process. Landings used in this assessment for 2003 through 2019 were validated by state agencies through the Atlantic Coastal Cooperative Statistics Program (ACCSP). Harvest levels for the Delaware Bay region states have been set using the ARM Framework since Addendum VII (ASMFC 2012) and have constrained harvest in the region to 500,000 male-only crabs since its implementation.

The current ASMFC state quota for New Jersey is 162,136 male horseshoe crabs. However, since 2006 a moratorium has been in place on the harvest of horseshoe crabs and horseshoe crab eggs in the state. Delaware's annual horseshoe crab harvest is determined in accordance with the annual sex-specific allocations identified in Addendum VII to the FMP. The current quota for the state of Delaware is 162,136 male horseshoe crabs. The annual quota of horseshoe crabs for the commercial fishery in Maryland currently is 255,980 male crabs. There is no female harvest permitted. The current quota for Virginia is 172,828 horseshoe crabs, although the harvest is male-only east of the COLREGS line and limited to 81,331 horseshoe crabs.

Total bait landings in the Delaware Bay were relatively high in the late-1990s, decreased through the early-2000s, and have remained relatively stable through 2019 (Figure 1). Horseshoe crab harvest by sex has varied through time, reflecting the management shift to male-only harvest in the region with the implementation of the ARM model in 2013 (Figure 1).

Bait landings for the Delaware Bay states were developed to support the CMSA model for that region using only Delaware Bay-origin crabs. Horseshoe crab landings from New Jersey and Delaware are considered to be 100% Delaware Bay-origin (i.e., spawned at least once in Delaware Bay) whereas 45% of Maryland's harvest and 20% of Virginia's are believed to be Delaware Bay-origin based on genetic data and analysis. These percentages were applied to the Delaware Bay states' bait harvest.

Data and Assessment

The CMSA model was used for the Delaware Bay HSC stock. The stock assessment covers the time period from 2003 to 2019. The CMSA model uses catch data (commercial landings, bycatch mortality, and biomedical mortality) and abundance indices derived from the three fishery-independent survey programs (i.e., Virginia Tech HSC Trawl Survey, New Jersey Ocean Trawl Survey, and Delaware Adult Trawl Survey) to estimate the primiparous and multiparous abundances for both females and males. The results were not used for stock status determination but are recommended for use in the HSC projection model in the ARM Revision for providing management advice.

Biological Reference Points

There are no model-based biological reference points accepted for management use for horseshoe crab. There is no specific information in this ARM Revision on biological reference points for the Delaware Bay HSC stock.

Fishing Mortality

CMSA results indicate reduced fishing mortality from 2003 to 2019 and low fishing mortality for both female and male horseshoe crabs in Delaware Bay in recent years (Figure 2).

Recruitment

CMSA model estimates for both female and male primiparous horseshoe crabs indicate slightly higher recruitment than the average recruitment during 2017-2019 but the estimates are uncertain due to missing Virginia Tech survey data for 2013-2016 (Figure 3). No other direct information about recruitment is available.

Spawning Stock Biomass

CMSA-estimated primiparous and multiparous female abundance in Delaware Bay increases over time and is at a relatively high level in recent years (Figure 3).

Bycatch

The commercial dead discard estimates were updated following the previous peer review panel's comments and the revised values were used in this CMSA in addition to coastwide biomedical data, not Delaware Bay-specific biomedical data. After examining the NEFOP and ACCSP data in finer detail as recommended by the 2019 peer review panel, the data used in the analysis were filtered to include six statistical areas, and more specific gear categories generalized into trawl, gill nets, and dredges, and limited to fishery species targeted and landed. Calculating discard ratios annually by gear resulted in the best discard estimates. Following data filtering, NEFOP observer data were used to develop annual ratios of observed discarded horseshoe crab to observed landings of all species by gill nets, bottom trawls, and dredges from the statistical areas within for 2004-2019. Ratios were then applied to reported gill net, bottom trawl, and dredge landings of all species from those areas for 2004-2019 as queried from the ACCSP warehouse to estimate total discards of horseshoe crab.

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Table 1. Catch multiple survey analysis female horseshoe crab model outputs: *q*=catchability coefficients; *R*=primiparous abundance; *N*=multiparous abundance; *μ*=exploitation rate; *Z*= instantaneous total mortality rate; *A*=annual mortality rate; and *F*=instantaneous fishing mortality rate.

Year	*R*	*N*	*R+N*	*μ*	*Z*	*A*	*F*
2003	1,544,840	5,070,510	6,615,350	0.035	0.341	0.289	0.041
2004	1,177,750	4,703,120	5,880,870	0.023	0.327	0.279	0.027
2005	413,385	4,240,680	4,654,065	0.028	0.333	0.283	0.033
2006	579,474	3,336,020	3,915,494	0.030	0.336	0.285	0.035
2007	2,334,590	2,799,440	5,134,030	0.018	0.321	0.274	0.021
2008	1,430,330	3,725,280	5,155,610	0.014	0.316	0.271	0.016
2009	1,249,240	3,759,070	5,008,310	0.015	0.317	0.272	0.017
2010	832,049	3,646,940	4,478,989	0.017	0.320	0.274	0.020
2011	1,834,400	3,253,520	5,087,920	0.016	0.319	0.273	0.019
2012	761,074	3,699,160	4,460,234	0.018	0.322	0.275	0.022
2013	9,366,720	3,233,560	12,600,280	0.005	0.306	0.263	0.006
2014	162,355	9,283,060	9,445,415	0.006	0.307	0.264	0.007
2015	3	6,950,580	6,950,583	0.008	0.309	0.266	0.009
2016	7,837,230	5,104,220	12,941,450	0.007	0.308	0.265	0.008
2017	2,004,180	9,513,410	11,517,590	0.006	0.307	0.265	0.007
2018	1,757,930	8,471,280	10,229,210	0.005	0.306	0.264	0.006
2019	2,247,290	7,533,500	9,780,790				
Average	2,090,167	5,195,491	7,285,658	0.016	0.318	0.273	0.018

q_DE	1.44E-07
q_NJ	3.81E-07

Table 2. Catch multiple survey analysis male horseshoe crab model outputs: *q*=catchability coefficients; *R*=primiparous abundance; *N*=multiparous abundance; *μ*=exploitation rate; *Z*= instantaneous total mortality rate; *A*=annual mortality rate; and *F*=instantaneous fishing mortality rate.

Year	*R*	*N*	*R+N*	*μ*	*Z*	*A*	*F*
2003	554,656	14,640,000	15,194,656	0.026	0.331	0.282	0.031
2004	81,794	10,915,400	10,997,194	0.017	0.320	0.274	0.020
2005	879,707	7,981,570	8,861,277	0.028	0.333	0.283	0.032
2006	841,100	6,353,920	7,195,020	0.025	0.329	0.280	0.029
2007	4,949,330	5,177,700	10,127,030	0.017	0.320	0.274	0.020
2008	3,433,970	7,350,140	10,784,110	0.018	0.322	0.275	0.021
2009	778,775	7,819,010	8,597,785	0.028	0.333	0.283	0.033
2010	870,926	6,161,840	7,032,766	0.026	0.331	0.282	0.031
2011	3,644,500	5,050,080	8,694,580	0.030	0.335	0.285	0.035
2012	739,524	6,219,030	6,958,554	0.032	0.337	0.286	0.037
2013	8,581,000	4,965,740	13,546,740	0.025	0.330	0.281	0.030
2014	14,922,600	9,742,110	24,664,710	0.013	0.315	0.270	0.015
2015	29	17,997,700	17,997,729	0.013	0.315	0.271	0.015
2016	29,623,200	13,128,900	42,752,100	0.007	0.308	0.265	0.008
2017	3,707,470	31,420,800	35,128,270	0.012	0.314	0.269	0.014
2018	1,645,680	25,665,300	27,310,980	0.009	0.310	0.267	0.010
2019	3,901,880	20,031,800	23,933,680				
Average	4,656,244	11,801,238	16,457,481	0.020	0.324	0.277	0.024

q_DE	6.97E-08
q_NJ	1.89E-07

Table 3. Sensitivity runs for the catch multiple survey analysis model for female horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.9	2,247,290	7,533,500	0.006
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	86.5	2,204,475	7,834,127	0.006
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.1	15.5	-15.3	-14.3	87.9	2,247,210	7,533,130	0.006
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.1	15.5	-15.3	-14.3	88.1	2,251,259	7,511,908	0.007
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.1	15.5	-15.3	-14.3	89.3	2,278,436	7,385,285	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	66.8	2,039,061	7,572,244	0.006
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.1	15.5	-15.3	-14.3	87.6	2,242,272	7,564,675	0.002
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.1	15.5	-15.3	-14.3	Confidential			

Table 4. Sensitivity runs for the catch multiple survey analysis model for male horseshoe crabs. All runs that included CONFIDENTIAL biomedical data have been removed.

Name	M	λ			Biomed	Discard Mortality			Starting Values				Terminal Output Values			
		VT	DE	NJ		Dredge	Trawl	Gill Nets	*R*	*N*	*q_de*	*q_nj*	*NegLL*	*R*	*N*	*F*
Modeling Base Run	0.3	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	131.3	3,901,880	20,031,800	0.010
M	0.274	1	1	1	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	127.8	3,863,175	20,707,365	0.010
Discard	0.3	1	1	1	Coastwide 15%	5%	5%	5%	14.2	16.4	-15.8	-15.2	131.3	3,902,001	20,035,174	0.010
Discard	0.3	1	1	1	Coastwide 15%	12%	12%	12%	14.2	16.4	-15.8	-15.2	131.6	3,902,001	20,015,149	0.011
Discard	0.3	1	1	1	Coastwide 15%	50%	50%	50%	14.2	16.4	-15.8	-15.2	132.9	3,913,724	19,955,194	0.015
No NJ OT	0.3	1	1	0	Coastwide 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	105.7	3,741,511	20,957,350	0.009
Biomed	0.3	1	1	1	0% mortality	5%	5%	12%	14.2	16.4	-15.8	-15.2	130.8	3,898,101	20,055,219	0.008
Real (DB) Base Run	0.3	1	1	1	Delaware Bay 15%	5%	5%	12%	14.2	16.4	-15.8	-15.2	Confidential			

Table 5. Three estimates of apparent adult survival plus credible confidence intervals derived from contemporary studies (2005-2018) of resighting Red Knot in the Delaware Bay region.

Data	Apparent survival	Source (method)
Adult encounter histories from Delaware beaches, N = 10,058	0.89 (0.84-0.92)	Tucker et al. 2021 (Open robust design)
Adult encounter histories from all Delaware Bay beaches, N = 12,134	0.93 (0.90-0.96)	Sweka et al. 2021 (IPM, integrating robust design with aerial and ground counts for use as fecundity measures)
Adult encounter histories from all Delaware Bay beaches, N = 12,134	0.94 (0.92, 0.97)	A. Tucker additional analyses (Open robust design)

Figure 1. Commercial bait harvest of horseshoe crabs in the Delaware Bay region by sex (Source: ACCSP).

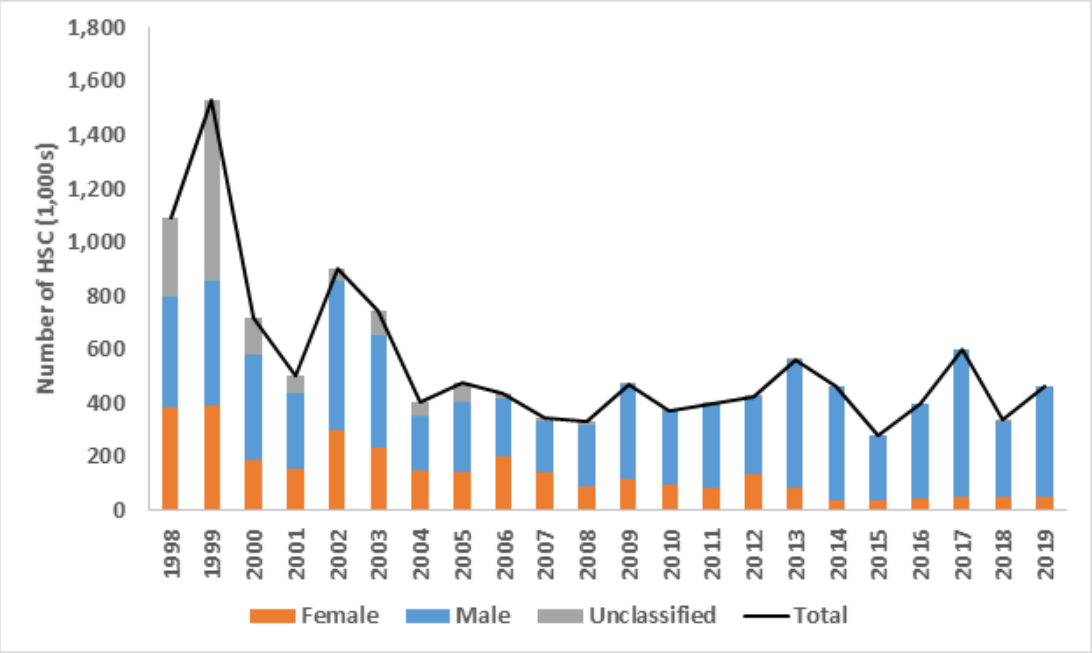
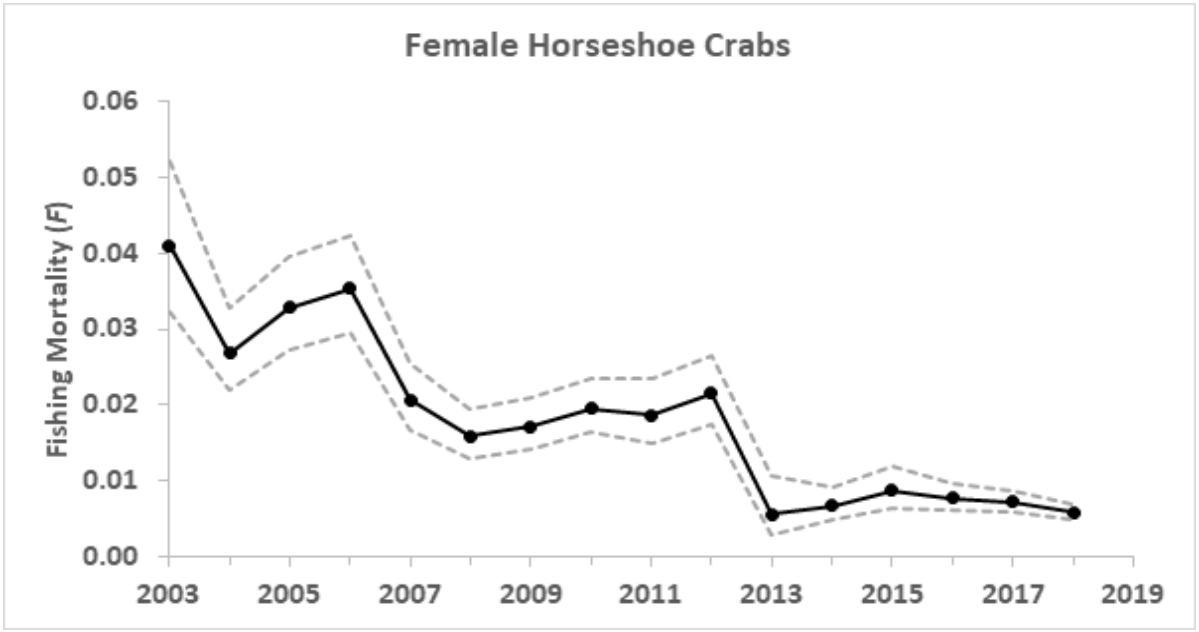


Figure 2. CMSA model estimates instantaneous fishing mortality rate (*F*) with lower and upper 95% confidence limits.



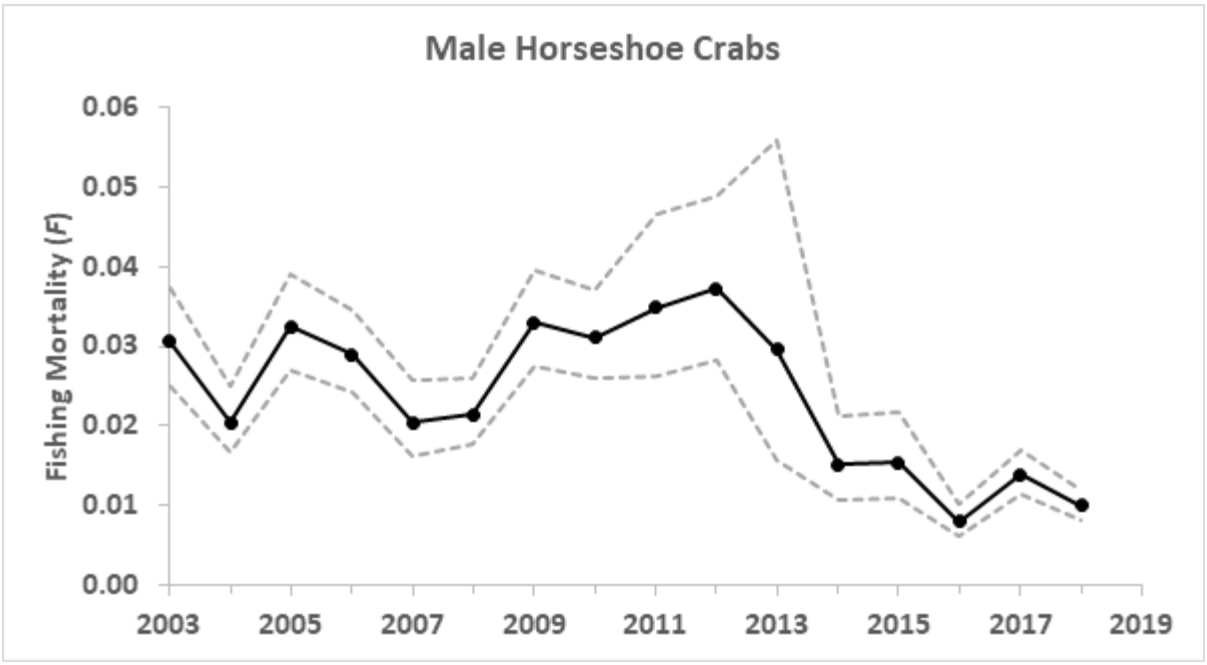
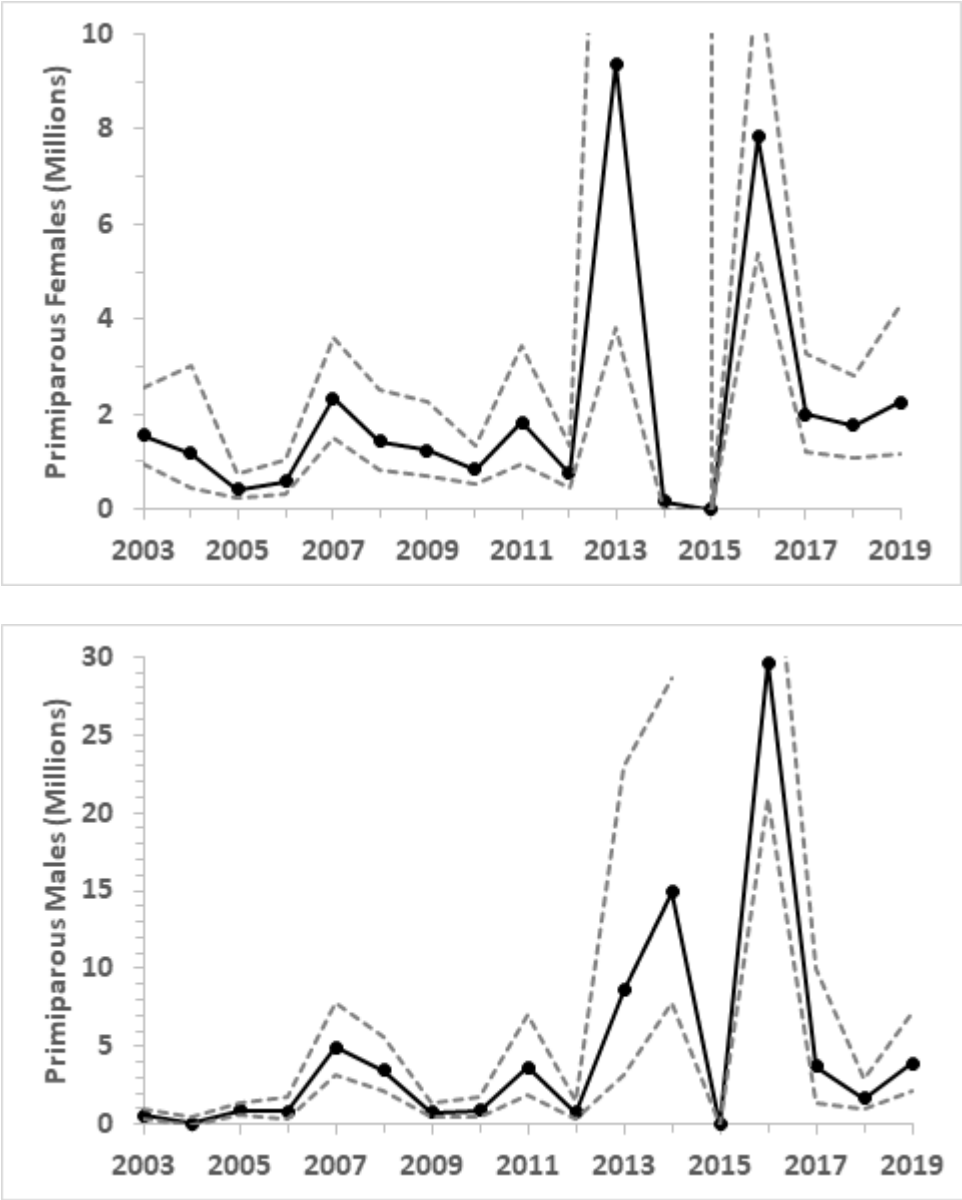


Figure 3. CMSA model estimated primiparous female (Top) and male (Bottom) abundance with lower and upper 95% confidence limits. Upper confidence limits for 2013-2016 extend beyond y-axis due to missing years of data from the Virginia Tech Trawl Survey.



NOAA FISHERIES PROTECTED RESOURCES DIVISION
SEA TURTLE BYCATCH IN TRAWL FISHERIES – SUMMARY OF ISSUES
January 2022

BYCATCH ISSUE: Fisheries bycatch is the primary threat to sea turtles in the Greater Atlantic Region and occurs at high levels in several regional trawl fisheries. There have been 274 observed takes in bottom otter trawl trips from 2000-2019, and 73 percent were on trips where croaker, longfin squid, or summer flounder was the top landed species by hail weight. Since approximately 2000, we have been investigating gear modifications to reduce mortality of incidentally bycaught sea turtles, and our focus has been on the trawl fisheries with the highest bycatch of sea turtles in our region.

POTENTIAL MITIGATION: While final operational feasibility research is completed, NMFS is gathering early input and information from the public, fishing industry, and other stakeholder groups to inform any future measures. We are not at the proposed rule stage. However, given the results of previous research, we are considering:

1) Requiring Turtle Excluder Devices (TEDs) with a large escape opening in trawls that target Atlantic croaker, weakfish, and longfin squid to reduce injury and mortality resulting from accidental capture in these fisheries;
2) Moving the current northern boundary of the TED requirements in the summer flounder fishery (i.e., the Summer Flounder Fishery-Sea Turtle Protection Area) to a point farther north to more comprehensively address capture in this fishery;
3) Amending the TED requirements for the summer flounder fishery to require a larger escape opening to allow the release of larger hard-shelled and leatherback sea turtles; and
4) Adding an option requiring limited tow durations, if feasible and enforceable, in lieu of TEDs in these fisheries to provide flexibility to the fisheries.

GEAR TESTING: In 2007 and 2010, NMFS hosted workshops with the fishing industry, scientists, and other members of the public to discuss bycatch reduction technologies in New England and Mid-Atlantic trawl fisheries. NMFS has been exploring and testing several of the ideas generated at these workshops. Bycatch reduction measures (e.g., TEDs) have been tested in the croaker, longfin squid, and summer flounder trawl fisheries (see some results on the Northeast Fisheries Science Center gear research website: fisheries.noaa.gov/new-england-mid-atlantic/science-data/protected-species-gear-research). Data loggers that document tow durations have also been developed and tested and would allow fishermen to demonstrate compliance with limited tow times. Observer data show that tows of less than one hour reduce mortality of incidentally captured sea turtles.

We have created a website (https://www.fisheries.noaa.gov/sea-turtle-bycatch-reduction-trawl-fisheries) that provides background information, descriptions of TED designs, measures under consideration, the type of information needed (below), and how to comment and participate in public webinars (below).

OPPORTUNITIES FOR INPUT:

- **Opportunities**
  - Virtual stakeholder webinars (February 16, March 1, March 14, 6:30-8:30 p.m.)
  - Email address to accept comments (nmfs.gar.turtletrawl@noaa.gov)
  - Staffed phone line with open comment times (978-281-9276 on March 4, 8 a.m. to 3 p.m. and March 22, noon to 6 p.m.)

- **Information that would be helpful**
  We are seeking input on the potential measures and welcome all feedback. The following questions include the type of information that would be helpful to shape potential management measures.

Mitigation Measures

1) Should we consider any other mitigation measures (e.g., other TED designs, time/area management) at this time?
2) What temporal and geographic scope is appropriate? Other sea turtle/fishery conservation measures in the Greater Atlantic Region (e.g., scallop dredges) occur from May 1 to November 30 west of 71° W longitude.
3) Should we consider limited tow durations in the Atlantic croaker/weakfish, longfin squid, and summer flounder fisheries, a subset of these fisheries, or not at all?
4) How should we define the Atlantic croaker/weakfish, summer flounder, and longfin squid fisheries for sea turtle conservation measures? Fisheries may be defined in a variety of ways including by geographic area, gear, and mesh size; target species; or permitted vessels, among others. Are the current definitions (see below) appropriate or are there other definitions that should be considered? Current definitions used in these fisheries include:
   a) Fisheries regulations (50 CFR 697.2) define flynet (which is the type of net used in the croaker/weakfish trawl fisheries) as any trawl net, except shrimp trawl nets containing certified BRDs and approved TEDs and trawl nets that comply with the gear restrictions for the summer flounder fishery and contain an approved TED.
   b) For fishery specifications and analytical purposes, NOAA fisheries defines a longfin squid trip as a trip with longfin squid comprising 40 percent of the total weight of retained species (e.g., 40 percent of landings), but for regulatory purposes, a directed longfin squid trip is anything over 2,500 lbs.
   c) Summer flounder trawler is defined under the current TED requirements (50 CFR 222.102) as a vessel equipped with one or more bottom trawl nets and that is capable of, or used for, fishing for flounder or whose on-board or landed catch of flounder is more than 100 lb (45.4 kg).

Operational Considerations

5) Do you foresee any operational issues with the TEDs under consideration in your fishery?
6) Are there any considerations to indicate that the weakfish fishery should not be considered in conjunction with the Atlantic croaker fishery?
7) If data loggers are required in a fishery, they can also collect environmental data (e.g., bottom temperature) that could be accessed by fishermen at sea. Are there environmental parameters that would be informative to your fishing operations?

Economic Considerations

8) If you had an option to use limited tow durations (likely limited to approximately 1 hour), use a TED, or fish in a different area, which option would you choose? Please indicate the fishery or fisheries you participate in. With regards to fishing in a different area, please note that we are not yet specifying a particular area (or season) to be regulated. For instance, the range could extend from Massachusetts south or be focused on a more narrow area like south of New Jersey, and be in effect from May to November or some other shorter temporal window, so please consider how your response may be different given this.
9) Please describe any additional costs that you would experience if required to use a TED. This can include costs related to extra fuel, extra time due to added tows to compensate for potential catch loss, labor to install/maintain the TED, and/or other operational and catch considerations.

10) Some of the testing indicates that the TEDs will reduce unwanted bycatch (e.g., skates, rays) in some situations. Is the capture of these species an issue in your fishery and, if so, would reducing the bycatch have an economic impact or benefit?
11) If you were required to use a TED, would you tow longer, complete additional tows, or engage in another strategy to compensate for any reduction in landed catch?
12) Please help us to better understand the potential impacts of limited tow durations.
    a) What are the range of tow durations that may be used from May through November?
    b) What is a typical trip length, and how many tows do you complete in 24 hours?
    c) If your tow durations were limited, would you complete additional tows to compensate for potential lost catch? What would be the impacts of those additional tows (e.g., gas, crew time, etc.)?

Atlantic States Marine Fisheries Commission

Atlantic Striped Bass Management Board

January 26, 2022
1:30 – 5:00 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 *(M. Gary)*	1:30 p.m.
2. Board Consent • Approval of Agenda • Approval of Proceedings from October 2021	1:30 p.m.
3. Public Comment	1:35 p.m.
4. Consider Draft Amendment 7 for Public Comment *(E. Franke)* **Action** (includes a 15 minute break at 3:30 p.m.)	1:45 p.m.
5. Elect Vice-Chair *(M. Gary)* **Action**	4:55 p.m.
6. Other Business/Adjourn	5:00 p.m.

The meeting will be held via webinar, click here for details
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEETING OVERVIEW

Atlantic Striped Bass Management Board
January 26, 2022
1:30 p.m. – 5:00 p.m.
Arlington, VA

Chair: Marty Gary (PRFC) Assumed Chairmanship: 01/22	Technical Committee Chair: Kevin Sullivan (NH)	Law Enforcement Committee Rep: Kurt Blanchard (RI)
Vice Chair: Vacant	Advisory Panel Chair: Louis Bassano (NJ)	Previous Board Meeting: October 20, 2021
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, NMFS, USFWS (16 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 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. Draft Amendment 7 (1:45 – 4:55 p.m.) Action
(includes a 15-min break at 3:30 p.m.)

Background

- The status and understanding of the striped bass stock and fishery has changed considerably since implementation of Amendment 6 in 2003, which has raised concerns that the existing management program may no longer reflect current fishery needs and priorities.
- Accordingly, the Board initiated development of Draft Amendment 7 to consider addressing a number of important issues facing striped bass management and build upon the Addendum VI action to end overfishing and initiate rebuilding.
- In May 2021, the Board approved the following four issues for development in Draft Amendment 7: recreational release mortality, conservation equivalency, management triggers, and measures to protect the 2015 year class.
- In October 2021, the Board tasked the PDT with the developing additional options for Draft Amendment 7, including options for Chesapeake Bay recreational measures to protect year classes, options considering recruitment assumptions for stock rebuilding, and an additional option for the fishing mortality threshold trigger.
- The Plan Development Team and the Technical Committee met multiple times between May 2021 and January 2022 to develop Draft Amendment 7 **(Briefing Materials).**

• The Advisory Panel met in September 2021 and January 2022 to discuss the scope and clarity of options presented in Draft Amendment 7 **(Supplemental Materials)**.
Presentations • Overview of Draft Amendment 7 for public comment by E. Franke
Board Actions for Consideration • Approve Draft Amendment 7 for public comment.

5. Elect Vice Chair (4:55 -5:00p.m.) Action
Background • The vice chair seat is empty since Marty Gary (PRFC) has become the new chair.
Board actions for consideration at this meeting • Elect Vice Chair

6. Other Business/Adjourn (5:00 p.m.)

Atlantic Striped Bass

Activity level: High

Committee Overlap Score: Medium (TC/SAS/TSC overlaps with BERP, Atlantic menhaden, American eel, horseshoe crab, shad/river herring)

Committee Task List

- PDT – develop all documentation for the development of Draft Amendment 7
- SAS/TC – various tasks relating to development of Draft Amendment 7 and preparing for the 2022 stock assessment update
- TC – June 15th: Annual compliance reports due

TC Members: Kevin Sullivan (NH, Chair), Carol Hoffman (NY, Vice Chair), Nicole Lengyel Costa (RI), Alexei Sharov (MD), Charlton Godwin (NC), Ellen Cosby (PRFC), Brooke Lowman (VA), Gail Wippelhauser (ME), Gary Nelson (MA), Brendan Harrison (NJ), Jeremy McCargo (NC), Kurt Gottschall (CT), Margaret Conroy (DE), Luke Lyon (DC), Tyler Grabowski (PA), Peter Schuhmann (UNCW), Tony Wood (NMFS), Steve Minkkinen (USFWS), John Ellis (USFWS), Katie Drew (ASMFC), Emilie Franke (ASMFC)

SAS Members: Michael Celestino (NJ, Chair), Gary Nelson (MA), Alexei Sharov (MD), Hank Liao (ODU), John Sweka (USFWS), Tony Wood (NMFS), Katie Drew (ASMFC), Emilie Franke (ASMFC)

PDT Members: Nichola Meserve (MA), Nicole Lengyel Costa (RI), Brendan Harrison (NJ), Simon Brown (MD), Max Appelman (NMFS), Greg Wojcik (CT), Emilie Franke (ASMFC)

Tagging Subcommittee (TSC) Members: Stuart Welsh (WVU, Chair), Heather Corbett (NJ, Vice Chair), Angela Giuliano (MD), Beth Versak (MD), Chris Bonzek (VIMS), Gary Nelson (MA), Ian Park (DE), Jessica Best (NY), Carol Hoffman (NY), Tony Wood (NMFS), Josh Newhard (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Emilie Franke (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC STRIPED BASS MANAGEMENT BOARD

Webinar
October 20, 2021

These minutes are draft and subject to approval by the Atlantic Striped Bass Management Board.
The Board will review the minutes during its next meeting.

TABLE OF CONTENTS

INDEX OF MOTIONS

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
MikeArmstrong, MA, proxy for Dan McKiernan (AA)
Raymond Kane, MA (GA)
Rep. Sarah Peake, MA LA)
Jason McNamee (AA)
DavidBorden, RI (GA)
Nicole Lengyel Costa, RI
DEMJustin Davis, CT (AA)
Bill Hyatt, CT (GA)
Sen. Craig Miner, CT (LA)
John Maniscalco, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
G. Warren Elliott, PA (LA
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
David Sikorski, MD, proxy for Del. Stein (LA)
Pat Geer, VA, proxy for S. Bowman (AA)
Shanna Madsen, VA, proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Bill Gorham, NC proxy for Rep. Steinberg (LA)
Marty Gary, PRFC
Dan Ryan, DC, proxy for J. Seltzer
Max Appelman, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Kevin Sullivan, Technical Committee Chair
Mike Celestino, Stock Assmnt Subcommittee Chair
Kurt Blanchard, Law Enforcement Representative

Staff

Bob Beal
Toni Kerns
Laura Leach
Lisa Carty
Tina Berger
Pat Campfield
Katie Drew
Maya Drzewicki
Emilie Franke
Lisa Havel
Chris Jacobs
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Caitlin Starks
Deke Tompkins
Geoff White

Guests

Karen Abrams, NOAA
Patrick Adamitis
Robert Andersen
Dave Anderson
Bill Anderson, MD (AA)
Josh Antunes
Jerry Audet
Pat Augustine, Coram, NY
Christopher Ballerini
Alan Battista
Peter Benoit, Ofc. Sen. King
Susan Bertoline
Alan Bianchi, NC DENR
Kevin Blinkoff
Frederick Bogue
Christopher Borgatti
Rob Bourdon, MD DNR
Michael Bryand
Simon Brown, MD DNR
Delayne Brown, NH FGD
Jeff Brust, NJ DEP

These minutes are draft and subject to approval by the Atlantic Striped Bass Management Board.
The Board will review the minutes during its next meeting.

Guests (continued)

George Bucci
Allen Burgenson, Lonza Inc
Craig Cantelmo
Benson Chiles
Bryan Choquette
Drew Ciok
Adam Clark
Tyler Clark
Will Clark
Allison Colden, CBF
Margaret Conroy, DE DFW
Heather Corbett, NJ DEP
Nathan Cowen
Derek Cox, FL FWS
Caitlin Craig, NYS DEC
Derek Cummings
Jessica Daher, NJ DEP
John Dameron
Dean Danenhower
Lennie Day
Rachel Dean
Jeff Deem
Patrick Denno
Greg DiDomenico
Evan Dintaman
Joshua Dionne
Kurt Doherty
Eric Durell, MD DNR
Jason Dutremble
Michael Eveland
Fred Everett
Mike Faulkingham, Portland, ME
Lynn Fegley, MD DNR
Michael Feldman
Julien Frank
Anthony Friedrich, SGA
Tom Fuda
John Gans, TRCP
Dominic Genovese
Lacie Gaskins, Omega Protein
Daniel Gayer
Dominic Genovese
Lewis Gillingham, VMRC
Bob Giordano
Thomas Girdwood
Angela Giuliano, MD DNR
Willy Goldsmith
Frank Goncalves
Tyler Grabowski, PA F&B
Sam Greene
Charles Gregorski
Pam Lyons Gromen
Robert Groskin
Brandon Hamilton
Brenden Harrison, NJ DEP
Eric Harrison
Hannah Hart, FL FWC
Tom Hesford
Rebecca Heuss, NH FGD
Jaclyn Higgins, TRCP
Nicholas Hill
Peter Himchak, Cooke Aqua
Carol Hoffman, NYS DEC
Mac Hoggan
Jeffrey Horne, MD DNR
Jesse Hornstein, NYS DEC
Chris Horton
Asm. Eric Houghtaling, CT (LA)
Bob Humphrey
Noah Iaongo
Stephen Jackson, FL FWS
James Jewkes
Michael Kapareiko
Dimitri Karandrikas
Pat Keliher, ME (AA)
Carrie Kennedy, MD DNR
Adam Kenyon, VMRC
Josh Kiggans
Dale Kirkendall
Thomas Kosinski
Aaron Landry
Wilson Laney
Toby Lapinski
Josh Lashley
Peter Leary
Kevin Lesser
Carl Lobue, TNC
Michael Louie
Chip Lynch, NOAA
James Lynch
Ethan Magun
Eric Malone
Bob Mazzola
Genine McClair, MD DNR
Dan McKiernan, MA (AA)
Conor McManus, RI DEM
Kevin McMenamin
Nichola Meserve, MA DMF
Steve Meyers
Steve Minkkinen, FL FWS
Billy Mitchell
Chris Moore, CBF
Patrick Moran, MA DMF
Jerry Morgan
Brandon Muffley, MAFMC
Matthew Murphy
Allison Murphy, NOAA
Lindsey Nelson, NOAA
Robert Newberry
Travis O'Neal
Gerry O'Neill, Cape Seafoods
Tyler O'Neill
Tamara O'Connell, MD DNR
Zane Oliver
Derek Orner, NOAA
Patrick Paquette
Willow Patten, NC DENR
Derek Peters
Chad Pfeiffer
Michael Piper
Anthony Pizzella
Kelly Place
Michael Plaia
Anthony Poirier
Nick Popoff, FL FWS
Will Poston, SGA
Even Priovolos
Daniel Putnam
Michael Quinan
Jill Ramsey, VMRC
Stephanie Richards, MD DNR
Harry Rickabaugh, MD DNR
Courtney Roberts
Gaelin Rosenwaks
Cody Rubner

Guests (continued)

Patrick Rudman
Jacob Rushing
Randy Scheule
Austin Schofield
Tara Scott, NOAA
Chris Scott, NYS DEC
Alexei Sharov, MD DNR
Conor Sheridan
James Simmons
Zento Slinger
Richard Small
Somers Smott, VMRC
Joey Solomon
Mike Spinney
Ross Squire
Sam Stavis
David Stormer, DE DF
WJess Swaringen
Grant Thompson
Luis Tirado
Michael Toole
Marek Topolski, MD DNR
Jeremiah Treanor
Troy Tuckey VIMS
Edward Tully
Jim Uphoff, MD DNR
Taylor Vavra, Stripers Forever
Owen Ventura
Beth Versak, MD DNR
Ralph Vigmostad
Mike Waine, ASA
Peter Whelan
Kate Wilke, TNC
Angel Willey, MD DNR
Brian Williams
John Page Williams
Jim Williams
Nicholas Whitbeck
Kyle Wightman
Logan Williams
Phil Zalesak
Renee Zobel, NH FGD

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Wednesday, October 20, 2021, and was called to order at 1:00 p.m. by Chair David V. Borden.

CALL TO ORDER

CHAIR DAVID V. BORDEN: Before I start the formal meeting, I would like to recognize and applaud the professional conduct of Emilie during the last couple of weeks. She's done a fabulous job working on Amendment 7. The reason I'm doing this, most of you don't know, but she just got married within the last few days, and kept working and kept getting the job done.

I think that deserves some special recognition, so on behalf of the Board, Emilie, I wish you and your spouse well on your new adventure. I'm sure everybody applauds you.

APPROVAL OF AGENDA

CHAIR BORDEN: With that, we will move on to the agenda for the October 20th Board meeting. We've had an agenda that's been distributed. Are there any additions, deletions or changes to that agenda? Any hands up, Toni?

MS. TONI KERNS: I have no hands.

CHAIR BORDEN: Okay, so the agenda stands approved as submitted. The one thing I would note on the agenda, we have a really full afternoon of activity. It's my intent to take Amendment 7, which is the primary issue, and dedicate most of the agenda to that issue. But I also intend, if we have not gotten through Amendment 7 by five o'clock, I'm going to stop the discussion on Amendment 7, and move to Addendum VII, and see if we can at least finalize one issue today.

APPROVAL OF PROCEEDINGS

CHAIR BORDEN: The proceedings have been distributed, are there any comments, corrections, objections to those? Any hands up, Toni?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so the proceedings stand approved without objection.

PUBLIC COMMENT

CHAIR BORDEN: Public comments, this is for items that are not on the agenda. Did anyone request an opportunity to speak to the Board at this point?

MS. KERNS: Right now, I have one hand up, Phil Zalesak.

CHAIR BORDEN: Okay, so this is for items that are not on the agenda. We'll allow you a minute to address the Board.

MR. PHIL ZALESAK: One minutes, I thought we had three.

CHAIR BORDEN: One minute, please.

MR. ZALESAK: All right, Chairman Borden, quoting another documentation, 60 percent of the Atlantic coast ocean going striped bass began its spawn in the Chesapeake Bay. The Atlantic Menhaden Management Board has determined that striped bass are dependent on Atlantic menhaden for their survival.

Though Atlantic menhaden are neither overfished nor overfishing is occurring, the Atlantic Menhaden Board has concluded there are not enough Atlantic menhaden along the Atlantic coast to ensure the survivability of key predator fish, such as striped bass, bluefish, and weakfish. I see no signs which support removing 26 percent of the Atlantic coast total allowable catch of Atlantic menhaden from the Virginia portion of the Chesapeake Bay.

That is 51,000 metric tons out of a little over 192,000 metric tons. Clearly, overharvesting is occurring in the Chesapeake Bay. Just let me jump to the very end of this. I strongly recommend, Chairman Borden, that you advise Mr. Spud Woodward, the Atlantic Menhaden Board Chairman, to end the Atlantic menhaden reduction

fishery in the Virginia waters, as this is adversely impacting the striped bass fishery along the entire Atlantic coast.

Omega Protein, the last remaining Atlantic menhaden reduction fishery on the Atlantic coast, doesn't have to lose one fish from its quota of 160,800 metric tons. They just need to catch the Chesapeake Bay cap at 51,000 metric tons of Atlantic menhaden outside the Virginia waters, where the majority of their allocation is now anyway.

Implementing this solution will allow Atlantic menhaden to recover in the Chesapeake Bay, to the benefit of predator fish, the commercial and recreational fishing industries, osprey in the marine environment. Any reduction fishery in the Virginia waters, as other states have done, will be an enormous benefit to the Chesapeake Bay region. All this is documented with links to Commission data or Maryland, Virginia or Potomac River Fishery Commission data. That's it, thank you.

CHAIR BORDEN: Thank you for being brief. I'm sure that Spud will take that recommendation under advisement. In terms of public participation during this meeting, I may or may not take public comments when we get to motions. But in any event, if I do decide to take public comments on issues, I'm going to ask the public to really limit themselves.

We've had substantial opportunity for the public to provide input to the Board, and I'm sure the members of the public have been discussing issues directly with their commissioners, at least I hope so. I would also ask that members of the public not raise your hands when we're calling on Board members.

If we get to a point where I'm going to solicit public input, that will be the time for you to raise your hand, and then we'll call on you in order. In terms of Amendment 7, this is potentially an action item. We're going to start with a series of reports by staff on various issues, in order to provide the Board with comprehensive updates on our last steps of the subject. The path today is to approve the document for public hearing, and if we can't do that for some reason, then we need to provide sufficient guidance to the PDT to reefer out specific elements in the documents. In the case of the latter, we will approve any of those changes at a subsequent meeting. At this point, according to what Emilie has told me the likely implementation date is 2023, regardless if the action gets taken today or it gets taken at a subsequent meeting.

In terms of the process that I intend to follow today. Emilie is going to go, or at least she's going to start with an overview of the draft document and timeline. Since the draft amendment is separated into four parts or elements, as I call them, we will present those separately. We're going to take questions on those first, and then we will ask for comments and changes.

I would prefer doing as Spud Woodward did on menhaden, to try to operate by consensus, if that is possible. But if it's not possible, then I think motions are in order. I would also like to recognize, so that some of you don't have to point this out. There is a linkage between some of those elements and subsequent elements in the document.

Staff will be prepared to note changes that we make, and basically point those relationships out when we get to the specific item. I'm almost done. In terms of my own thoughts on this Amendment, I'm very concerned about the level of complexity in the document. I've spoken to a number of you and said the same thing to you.

I'm also very concerned about the ability of the public to digest this many issues and alternatives during the hearing process. During Emilie's report, she's going to note that a lot of those concerns are shared by some of the members of the AP. My takeaway is that I think we need to prioritize some of these issues, simplify others, and possibly defer some to allow further refinement.

There is nothing that would stop us, for instance, from selecting a few of these items, move forward with those as Amendment 7, and continue to refine issues over the next few months, and start another action. I guess my final point is, we're likely to have considerable discussion on some of these issues, and I urge each of you to be brief and to the point, non-repetitive.

If a large number of individuals want to comment, you are likely to only get one opportunity to speak, but that all depends on the number of speakers on different issues. I mean the issues that we're dealing with are very complex. There are a lot of people that it's an important subject, not only to our collective constituents, but to those of you that are on this call that represent your constituents.

Toni has been asked to select speakers in the order that they appear, and I've asked her to refrain from calling on Board members a second time until everyone has had an opportunity to speak. The last point I would like to make, in terms of just telegraphing where this is going. I intend to take a break at some point in the meeting. I would ask, are there any questions on the process that I intend to follow today? Any hands up, Toni?

MS. KERNS: David, I just wanted to note. You had two members of the public raise their hand just right after Phil did, so there were two additional people that wanted to make public comment again, and to let you know. I don't have any hands up, in terms of questions on the process.

CHAIR BORDEN: Okay, I'll take those two individuals, and then we're going to move on with the presentation. Toni, if you would call on each of those individuals. You have one minute each, please.

MS. KERNS: First is Tom Lilly, and then it will be Jeff Dean. Go ahead, Tom.

MR. TOM LILLY: Yes, I would like to speak to you about you all getting more linkage between the food supply of the striped bass and what you're doing. Fishermen, I would like you to look at the Rhode Island plan for menhaden, in effect for ten years. If you move their forage baseline over the Chesapeake Bay, you will see that we should have about 1,500 to 2,000 schools of adult menhaden in Maryland Bay at all times, for our striped bass and bluefish only.

How many are you seeing, folks? On the average fishing trip, you should see (faded out). If you spend hours on the Bay, you should see a lot of adult menhaden schools. You need to let Secretary Riccio know if they're not there, and the same with the Board members. The menhaden simply are not there in the Maryland Bay. Thank you.

CHAIR BORDEN: Thank you, next speaker, Toni.

MS. KERNS: Jeff Dean, go ahead, Jeff. Jeff, if you'll put your hand up, I'll make sure you are unmuted.

MR. JEFF DEAN: I didn't mean to have my hand up.

MS. KERNS: All right, then you're good to go.

CHAIR BORDEN: Emilie, you're on, and congratulations on getting married!

CONSIDER DRAFT AMENDMENT 7 FOR PUBLIC COMMENT

MS. EMILIE FRANKE: Thanks so much, Mr. Chair, I really appreciate it. I will be taking over the presenter role at this time. As the Chair mentioned, I will start today's presentation on Draft Amendment 7 with just a brief background, the timeline, and overview of what's in the draft amendment document, and then I will transition to reviewing the draft options issue by issue, for the four main elements, and we'll pause for Board questions and discussion after each issue.

Throughout my presentation today, I'll note comments from the Advisory Panel on the scope of the draft options. As a reminder, as Mr. Chair mentioned, the Board action for consideration today is to consider approving Draft Amendment 7

for public comment. First, I would like to thank the PDT for all their time developing this draft document.

We've had numerous meetings and e-mails over the past few months, so again, I just want to thank all the PDT Members. Starting with a recap of the background here. Since Amendment 6 was adopted in 2003, the status and understanding of the striped bass stock and fishery has changed considerably.

The results of the 2018 benchmark stock assessment in particular led the Board to discuss a number of issues facing management. That stock assessment indicated the striped bass stock has been overfished since 2013, and is experiencing overfishing. In August, 2020, the Board initiated the development of Amendment 7, to update the management program to better align with current fishery needs and priorities, and to build on the Addendum VI action to end overfishing, and initiate rebuilding.

In February of this year, the Board approved for public comment the Public Information Document or PID for Draft Amendment 7, and following public comment in February through April, the Board approved four issues for development in the Draft Amendment at the May, 2021 Board meeting.

Those four issues are management triggers, measures to protect the 2015-year class, recreational release mortality, and conservation equivalency. Here on the screen is the current timeline for Amendment 7. As I mentioned, the Board started this process back in August of last year. The PID would approve public comment in February, and after the Board approved the four issues for development in May, the PDT started developing the draft options.

At the last Board meeting in August, the Board provided some additional guidance to the PDT, and today we're here at this current step of reviewing the Draft Amendment to consider approving it for public comment. If the document is approved today, public comment would take place over the next few months, and the final Amendment could be approved as early as January, 2022, with an expected implementation date of 2023.

This timeline is subject to change per the direction of the Board. If the Board does not approve the Draft Amendment for public comment today, but instead waits until January, this timeline would shift back a few months. However, the expected implementation date of 2023 would likely stay the same.

As a reminder, also listed here, the next stock assessment update for striped bass is expected to be complete about a year from now in October, 2022. Listed here on the slides are the components of the draft amendment document. It's a pretty comprehensive document. Section 1 is the introduction and background section, and includes the statement of the problem, benefits of implementation, description of the resource and the fishery, as well as habitat considerations.

Section 2 includes the history of management, the goals and objectives of the Amendment, the management unit, a description of the reference points, and the stock rebuilding program. One note for the Board in Section 2 is that the state of North Carolina has requested some additional clarifying language be added to the draft, to further describe the Albemarle Sound Roanoke River stock. Staff will work with North Carolina to add that clarifying language. Moving on to Section 3.

Section 3 specifies the monitoring program information, including catch and landings information, socioeconomic information, biological data, and the overview of stock assessment. I just want to thank the Habitat Committee and the Committee on Economics and Social Sciences for their work to update those sections for the Draft Amendment. Section 4 of the Draft Amendment is the management program section, which includes the four-issue section, management triggers, recreational and commercial measures, habitat recommendations, as well as alternative state management regimes, which include conservation

equivalency, as well as adaptive management and a few other sections listed on the screen. Draft Amendment 7 maintains the same FMP standard from previous management documents, except for those FMP standards related to the four Amendment 7 issues. Again, those are management triggers, year class protection, recreational release mortality, and conservation equivalency, highlighted in red.

One clarification for the Board to discuss is a clarification on how the Chesapeake Bay trophy fishery is characterized in the Draft Amendment, which I will note later on in the presentation. Continuing on, Section 5 is the compliance section, and includes the mandatory compliance element, and outlines the compliance reports and procedures.

Section 6 describes the management and research needs, and Section 7 reviews potential interactions with protected species. As Mr. Chair mentioned, the next part of my presentation will be to review the draft options for each issue. After I review the options for each issue, I will pause, and have this question up on the screen for Board questions and discussion, or any proposed modifications to those draft options.

Again, I'll be going through the four issue sections listed here, as well as touching on the need for Board clarification on the Chesapeake Bay trophy fishery. In addition, I want to note that the Advisory Panel met on September 29th, to provide feedback on the scope of the draft options. I'll include the AP feedback throughout my presentation today.

The full AP meeting summary was included in supplemental materials. As far as general comments from the AP, the AP did note overall concern about the complexity of Draft Amendment 7, and the large number of options that are presented in the draft. The AP noted that this would be difficult to present at public hearings, and it would make the public comment process challenging.

With that I will move into the first issue today, which is management triggers, which is Section 4.1 of Draft Amendment 7. I'll start with the statement of the problem briefly for each issue. For management triggers, as stock status and fishery performance have changed over time, there are some shortfalls with how the triggers are designed that have emerged.

First, when female spawning stock biomass is below the target level, the variable nature of fishing mortality can result in a continued need for management actions. These shorter time tables for corrective actions are also in conflict with the Board's desire for management stability. The Board is sometimes criticized for considering management changes before the stock has had a chance to respond to the previous changes. Additionally, the use of point estimates for management triggers does not account for an inherent level of uncertainty.

Finally, the long periods of below average recruitment have raised questions about the current recruitment trigger. The Plan Development Team divided the trigger option into four tiers. The first tier outlined the fishing mortality trigger option, second tier outlines the female spawning stock biomass trigger options, the third tier outlines the recruitment trigger option, and the fourth-tier outlines options for deferred management action if certain criteria are met. Within each tier is a set of primary options and a set of sub-options to consider. This tiered framework is really designed to provide the Board with the option to consider each individual existing management trigger individually. Starting with Tier 1, which is fishing mortality triggers. The Board must choose one sub-option within each of these primary options. Starting with Option A, that is the timeline to reduce fishing mortality to the target.

Sub-option A1 is the status quo option being required to reduce fishing mortality to the target within one year. A2 would be requiring to reduce to the target within two years, and A3 would require a reduction to the target within three years.

Moving on to Option B, which covers the fishing mortality threshold trigger. Option B1 is the status quo option, where that trigger is tripped if F is above the threshold for one year. For the alternative sub-option B2, that trigger would instead be tripped if the three-year average of F is above the threshold.

Those are the two options for the F threshold trigger. Moving on to Option C, which is the fishing mortality target trigger. Option C1 is the status quo option, where the trigger trips if F is above the target for two years, and spawning stock biomass is below the target in either year. Option C2 would trip if F is above the target for two years, but spawning stock biomass is less than the target in both years.

Option C3 would trip if F is above the target for three years. Option C4 would trip if the five-year average of F is above the target, and C5 would eliminate the trigger related to F target. Moving on to Tier 2, which are the female spawning stock biomass triggers. Again, the Board must choose one sub-option within each of these three main option categories.

Starting with Option A, which considers the deadline to implement a rebuilding plan once a spawning stock biomass trigger is tripped. The status quo option A1, is that there is no deadline for when a rebuilding plan must be implemented. Again, the rebuilding timeline is the stock must be rebuilt within ten years.

But currently there is no deadline for when a rebuilding plan itself must be implemented. Option A2 would require that the Board implement a rebuilding plan within two years from when the trigger is tripped. Moving on to Option B, which is the spawning stock biomass threshold trigger. B1 is the status quo option where the trigger is tripped if spawning stock biomass is less than the threshold for one year.

Sub-option B2 would eliminate the trigger related to the spawning stock biomass threshold. This option to eliminate this trigger recognizes that there does not necessarily have to be a trigger for both the SSB target and the SSB threshold, since managing to the SSB target is already more conservative, and there is the same management response for both triggers, which is rebuilding within ten years.

Moving on to Option C. Option C considers the SSB target trigger. B1 is the status quo option, where the trigger trips if SSB is less than the target for two years, and F is above the target in either year. C2 would also trip if SSB is below the target for two years, but the three-year average of F would need to be above the target. C3 would trip if SSB is below the target for three years. C4 would trip if SSB is below the target, and there is at least a 50 percent probability that SSB will be below the threshold within three years. C5 would eliminate a trigger related to the SSB target. Just note that there must be at least one SSB trigger, so the Board could not eliminate both the SSB target and the SSB threshold trigger. There has to be at least one of those in place. Then finally, I just wanted to note some AP feedback here. The AP noted some concern about these options that would eliminate either one of the SSB triggers, given the importance of these triggers in the management program. I'll move on to Tier 3, which is the recruitment trigger.

The first component here for consideration is the definition of the recruitment trigger. The status quo Option A1 was designed to identify true recruitment failure, and would trip if any of the six juvenile abundance indices, so that would be for Maine, New York, New Jersey, Maryland, Virginia or North Carolina is below the 25th percentile of the reference period established by Addendum II for three consecutive years.

As requested by the Board, the recruitment trigger alternatives developed by the Technical Committee would be more sensitive in the status quo trigger, in order to alert the Board to periods of low recruitment. Those alternatives are designed to be an early warning sign of reduced productivity of the

stock, following multiple weak year classes entering the population.

Starting with Sub-option A2. A2 would have a moderate sensitivity and would trip if any of the four core JAIs is below the 25th percentile of values from a reference period of 1992 through 2006 for three consecutive years. The term core JAIs refers to the four JAIs used in the stock assessment model, so that is New York, New Jersey, Maryland and Virginia.

Sub-option A3 would have a high sensitivity, and that would trip if any of the four core JAIs is below the median of values from that reference period of 1992 to 2006, or three consecutive years. That reference period for these alternatives, 1992 to 2006 was identified as a period of high recruitment by the Technical Committee, and changing that reference period results in these more sensitive trigger options.

This is Table 2 from the Draft Amendment, which shows when the status quo option, A1 and the alternative trigger options would have tripped, those are the black shaded cells. The running green cells offer a comparison of whether the model estimate of recruitment was above or below the average each year.

You can see that the status quo option, in discussing columns here, tripped only once since 2003. Option A2, which is the moderate sensitivity option, would have tripped three times in that time period, and Option A3, which is the higher sensitivity option, would have tripped six times during this time period. The second component of the recruitment trigger is the management response. The status quo option B1 requires the Board to review the cause of recruitment, and determine appropriate action if the trigger is tripped.

Sub-option B2 would require the Board to manage the stock under a lower interim F target, calculated based on the low recruitment regime. This would include reducing fishing mortality to that new interim F target if F was above that interim target. That interim target would remain in place at least until the next stock assessment update, or a benchmark assessment is approved for management use. B3 would require the Board to adjust to an interim F target if SSB is below the target, and this interim F target would be calculated again using that low recruitment assumption, but it would be calculated specifically to rebuild the stock within ten years. These Sub-options B2 and B3 are intended to reduce fishing pressure as those weak year classes enter the population. Just to recap for the recruitment trigger. There are two components, and the Board would have to select one sub-option for Option A to actually define the trigger, as well as an option from Option B to define the management response.

Now I'm moving into the final tier for the management triggers, which is deferred management action. Option A in this tier is the status quo, which is no deferred management action. That is, if a management trigger is tripped at any time, the Board must take the corresponding action. The following alternative options would provide the Board the flexibility to defer action until the next stock assessment if certain criteria are met.

These options were developed in response to the Board's concern about the frequent need for management action. Option D here would allow management action to be deferred until the next assessment, if it's been less than three years since the last action was taken in response to a trigger. Option C would allow action to be deferred if the F target trigger is tripped, and SSB is above the target.

Option D would allow management action to be deferred if F target trigger is tripped, and SSB is projected to increase or remain stable over the next five years. Option E would allow action to be deferred if F target trigger is tripped and there is at least a 50 percent probability that SSB will be above the threshold.

Finally, Option F would allow action to be deferred if a management trigger trips after the Board has already initiated action in response to a different

trigger. For example, this scenario might occur if the Board selects a new recruitment trigger that might be tripping on a different timeframe than the other triggers.

Just a note here from the Advisory Panel. AP members noted general concern about this suite of options. The AP noted that there is already public concern about the Board not responding quickly enough to management triggers, and that these options might delay the timeline for a response even further.

That covers the draft management trigger options. Again, as the Chair mentioned, here on the screen is that question for the Board, as well as a couple other discussion questions related to the range and clarity of options, and the viability of implementation for the Board's discussion. Mr. Chair, I'm happy to take any questions on the management trigger options.

CHAIR BORDEN: Thanks, Emilie, any questions for Emilie? Toni?

MS. KERNS: Giving the hands a second. I just have John McMurray.

CHAIR BORDEN: John.

MR. JOHN G. McMURRAY: Emilie just mentioned that the public seemed to overwhelmingly support less delay not more. I'm trying to understand how Sub-option A2 and A3, as well as the deferred management options. I'm trying to understand the rationale. I understand that we're trying to avoid a continuing need for management action, and shorter time tables for correction and action are in conflict with stability.

But I'm not sure where all that concern is coming from, because in the last 15 years between 2003 when Amendment 6 was adopted and today, those management triggers were tripped only twice, and both of those times we were overfishing or the stock was overfished or both. I would like to hear the PDTs rationale. I'm not going to move to have them taken out. I think we should probably include them for public comment. But I'm not quite where that concern is coming from, and I would like some clarity on that.

MS. FRANKE: As you mentioned, these options for deferred management action were developed to address the Board's concern about the continuous need for management action and the criticism the Board has received in the past for taking management action before the stock had had a chance to respond to previous management action. That was really the motivation for these options to try to address that concern as outlined by the Board. Again, the PDT tried to be very specific with what criteria needed to be met, or these options to be implemented.

MS. KERNS: I have no additional hands. I'm sorry, Mike Luisi.

CHAIR BORDEN: Mike.

MR. MIKE LUISI: Just one question about Tier 1, which is the F trigger, and under Option A there are three sub-alternatives. The first one is one year, to reduce F to the target in one year, two years or three years. Did the PDT discuss, let's just say that two or three years were determined to be the timeline for F to be reduced to the target?

Was there an expectation by the PDT that a state would implement measures over those three years to achieve reducing F to the target, or would it be more so in just one? I look at that and I think, if we had three years to reduce F to the target, are we taking consecutive actions over three years to get our fishery there, or are we going to work on something and implement it within those three years as a means to getting the F down to the target?

Because in the first example, it almost would seem as if it goes against the goals and objectives for stability. But if the PDT was thinking more along the lines of allowing the Board and the states additional time to reduce F to the target, that would

make more sense to me. That is just a quick question. I've got a few comments along the way, Mr. Chairman, but I'll hold those for now. Thanks.

MS. FRANKE: Thanks, Mike. The PDT did not discuss how that action would be taken, whether it was one action in Year 3 or more of a gradual action over those three years. I think that would be a decision for the Board at the time the trigger is tripped.

MR. LUISI: Okay, thanks, Emilie.

MS. KERNS: Mr. Chair, you have one other hand, John Maniscalco.

CHAIR BORDEN: John.

MR. JOHN MANISCALCO: I guess I have a little bit of concern about how Option B and C, the F threshold and F target triggers work, when you kind of consider the timeline of assessments and management response. When you have to start considering longer periods, you know three-year averages of F, for example.

Could you please go over, for example, the timeline of receiving that assessment from 2019, the data that assessment included when the Board took management action, and how many years of fishing mortality we would be kind of basing our next decision on that reflects the current regime versus before the Board took action, and I hope my question is clear. Thank you.

MS. FRANKE: Thanks, John. If my response doesn't address your question, just let me know. But the triggers would trip when the Board accepts an assessment for management use, or in the case of an assessment update, the Board does not have to adopt that for management use, so when those results are presented to the Board.

In the case of the 2018 benchmark stock assessment, the triggers were tripped in spring of 2019, when the Board approved that assessment for management use. I'm assuming, Katie, please jump in here, that if for example we're looking at this three-year average of F, these two options. Then in that case the terminal year of the assessment was 2017, so the trigger would be looking at a three-year average of 2015, 2016, and 2017 to determine whether that fishing mortality trigger was tripped.

DR. KATIE DREW: Yes, that is correct.

CHAIR BORDEN: John, do you want to follow on that?

MR. MANISCALCO: Yes, please. I understand that okay, we're going to use the last two years of the assessment Fs to gauge whether or not we trip a three-year average at the threshold. I guess maybe I'm trying to think about the future. We're going to get an assessment in 2022, and I believe that's what was said.

I think we took management action, put the new slot limits for example, and those were implemented in 2020, so you would have 2020 and maybe 2021 under new management. But we might be taking action on the three-year F that doesn't reflect the fact that we had management like, you know scheme 1 for one year, and then we had management on scheme 2 for two years. Is that clear?

MS. FRANKE: Yes, and I think again, Katie, jump in here, but I think that's just without, we only have the most recent assessment, in terms of knowing what the fishing mortality was, so we're still going to be working off whatever the terminal year is for the stock assessment. Depending on you know how close we are to the next assessment, and that kind of thing, we're only working off of what we have in the assessment.

CHAIR BORDEN: Any other questions, Toni?

MS. KERNS: No other hands.

CHAIR BORDEN: Okay, so at this stage we're going to move on to the issue of comments. I would like

to hear a few comments from Board members. Are you happy with the way this is structured? Do you think it should be changed or not changed? If you want to change it, then propose a specific course of action. Those individuals who would like to speak to the point, please raise your hand. Toni.

MS. KERNS: Yes, just writing down names. Justin Davis followed by Mike Armstrong.

CHAIR BORDEN: Justin and then Mike.

DR. JUSTIN DAVIS: I was one of the proponents of keeping management triggers in this document, because I thought it was worth taking a look at developing some additional alternatives and evaluating them, and sending those out to the public. I'm concerned with what is currently in the document.

I agree with the general sentiment that this document as a whole is really complex, and has a lot of options. I'm concerned about effectively conveying all those options to the public in a hearing environment. I also just sort of worry about a general perception that by building all these options into this, it will create that perception that the Board is trying to find a way to sort of wiggle out of having to take conservative action for striped bass when necessary.

I feel like it would be in the Board's best interest to consider narrowing these lists of options down a bit. But I'm not prepared at this point to make a motion, because I would like to hear more of the discussion around the table. But that is sort of where I'm at this point, is I would favor taking some time at this point to try to narrow this list of options down a bit. Thanks.

CHAIR BORDEN: Justin, I don't want to put you on the spot, but it would be helpful without making a motion, as I indicated before. I would like to deal with this by consensus if it's possible. I think it would be illuminating if we could ask Emilie to put up the list, and then you could just suggest what you think would be appropriate to remove. I think that would be helpful. You don't need to talk on each one of them, but just identify the issues that you think should be removed.

DR. DAVIS: Okay, I could take a shot at that. Under the F trigger options. I would be in favor of removing Sub-option A3, the three-year timeline to reduce F to target. Sub-option C4, the five-year average F above target. C5, no trigger for F target, and under SSB triggers, I would be in favor of removing B2, no trigger for SSB threshold, the C4 Sub-option, SSB less than target and greater than 50 percent probability of SSB being less than threshold in three years, and C5, no trigger for SSB target.

CHAIR BORDEN: Thank you for doing that. Mike Armstrong.

DR. MIKE ARMSTRONG: I could segue from what Justin said. I think Option A, I think in the interest of provisioning this down, this Board just needs to make some hard decisions, and put it in the document, rather than bringing it to public hearing. I think there is too much to bring here. Under that, I would get rid of Option A.

I think you've shown it clear that what's in Amendment 6, I guess it's in is with one year. We've heard it from the public before. I think most people on this Board probably feel, especially given the light that we've all been informed that the stock status is looking different in the last week, another bad recruitment year. I would say get rid of Option A, keep it a one-year response.

Under B and C, the problem is, you know the threshold and the target are 0.04 apart, and someone correct me if I'm wrong on that. I think the target 0.2, the threshold 0.24. That is measurement error in a stock assessment, and so we're doing a lot to put out a bunch of options around the target.

I'm not going to suggest it now, but I'm going to throw it out there. Maybe we get rid of Option C, and we just go with the threshold, because it's really not much different than the target. That

would simplify things a great amount. That is about as far as I've gotten so far, so I'll leave it at that.

CHAIR BORDEN: All right, thanks, Mike. Toni, anyone else with their hands up? We can go back to these comments later. I would just like to get the ideas on the board, so that people understand where other members are coming from. What other hand?

MS. KERNS: Mike Luisi.

CHAIR BORDEN: Mike.

MR. LUISI: Yes, thanks, Mr. Chairman. In line with Justin and Mike Armstrong's comments. I thought I would provide a comment regarding Tier 1 and Tier 2. I do agree, maybe not entirely with Mr. Armstrong, but more with Dr. Davis that A3 under Option A is probably too long of a time period for the public to be supportive of, in the event that it takes three years to get F down to the target.

In my mind that shows too much delay. I can agree though with the two-year time period, just given the new information as it becomes available. There are times when it's difficult within a year to make changes, and it could actually be the follow up year or the future year, when changes would likely be made at the state level.

I'll leave that Option A comment there. I also have concerns in Tier 1 and in Tier 2, both Option Cs in those cases, where there is a combination of fishing mortality and spawning stock biomass as it relates to a trigger. You know we're calling Tier 1 an F trigger, yet C1 and C2 combine spawning stock biomass as it stands in comparison with the target, as an indicator along with fishing mortality, as to tripping the trigger, as well as in Option C under Tier 2 for spawning stock biomass. We discussed spawning stock biomass being below the target for a number of years. But then again, we're adding in fishing mortality as well. I didn't like it in the previous amendment, and I don't like it here. I think it just adds more complexity than necessary. In my opinion fishing mortality is what you have ultimate control over, and if fishing mortality and spawning stock biomass are continue to be linked, based on the modeling and the actions that we take.

By focusing on fishing mortality we will achieve spawning stock biomass if we can maintain that fishing mortality at the target. I think we should consider eliminating C1 and C2 from both Tier 1 and Tier 2, to simplify that and not confuse the public any more than they would be if they had to look at all these options at the same time.

CHAIR BORDEN: Toni, anyone else?

MS. KERNS: No other hands at this time.

CHAIR BORDEN: Okay, so there are some similarities between the comments that were made. Let's deal with the Tier 1A. The suggestion was, I mean there were a couple of suggestions, and they're different. But the suggestion was to remove A3, three years. Any objection to doing this?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so three years is out. Then on Option B, anyone proposing any additional changes on that?

MS. KERNS: I don't have any hands.

CHAIR BORDEN: That stays the same. Then we're down to Option C. If I understand the comments that both Mike and Justin made, I think one of them recommended, correct this, Emilie, if I have it wrong, eliminating C4 and C5, and then I think the other one made comments on C1 and C2. Is that correct?

MS. FRANKE: Mike suggested removing C1 and C2. However, C1 is the status quo, so in that case I think that would still have to go to public comment to look at alternatives to that status quo. But he did recommend removing C2. I think it was Justin recommended removing C4 and C5, and Mike, I was wondering if you could clarify if you meant to

eliminate the F target trigger altogether, or to just keep a status quo for the F target trigger.
MS. KERNS: I think she meant Armstrong there.

MS. FRANKE: Sorry, Mike Armstrong, yes.

DR. ARMSTRONG: I guess I was thinking of eliminating it, only because we have set a threshold and a target so close, I don't think it's meaningful.

MS. FRANKE: Thanks, Mike.

CHAIR BORDEN: Okay, so we have to keep Emilie, what you said, we have to keep C1, is that correct?

MS. FRANKE: Right, that's the status quo option.

CHAIR BORDEN: Does anybody object to removing C2?

MS. KERNS: I have no hands raised. I think John Maniscalco wants to make a comment though.

CHAIR BORDEN: John.

MR. MANISCALCO: Not to derail from the F target conversation. I do think the F threshold for the trigger is really crucial. Kind of going back to where I was going with my earlier questions, could we modify B2 so that it's a three-year average or two-year average if that reflects the most recent management action, something to that effect.

CHAIR BORDEN: I'm still on the issue of C2. The suggestion has been to take it out, does anyone object?

MS. KERNS: No hands in objection.

CHAIR BORDEN: Okay, so it's out of the document. On C3, John, you want that changed to two years, or do you want to add a statement that says you can use two years under certain conditions?

MR. MANISCALCO: I guess my comment could apply to both B and C, but my issue is that we take action on current management not take some kind of action on a split management that represents a prior management scenario. That could apply for any time we're using a three-year average if we took management action, and the assessment only incorporates two years of the fishery under that most recent management.

CHAIR BORDEN: Any objections to doing that?

MS. KERNS: I have no hands.

CHAIR BORDEN: Emilie, if you can perfect the language that would be very helpful.

MS. FRANKE: Sounds good. John, I think what you're saying here is for B2 for the F threshold trigger that it would be looking at a three-year average of F, or in some cases a two-year average if there has been less than three years of a management action.

MR. MANISCALCO: That is correct, thank you.

CHAIR BORDEN: Then John, your suggestion was to modify C3 in a similar manner?

MR. MANISCALCO: It could apply to C3, I'm not sure I feel strongly about the target trigger, given Armstrong's comment.

CHAIR BORDEN: Okay, any changes on C3? If not, no hands up, we'll move on to C4. The suggestion is to take C4 out.

MS. KERNS: One second, Adam Nowalsky has a suggestion.

CHAIR BORDEN: Adam.

MR. ADAM NOWALSKY: I think the fact that B2 is still in blue, Mr. Chairman, do you intend to come back to that discussion more, because I'm not fully resolved on that item?

CHAIR BORDEN: We can do that right now if you would like.

MR. NOWALSKY: Specifically, I think I would prefer to see these either as two separate options, or have it broken down as some type of sub-option associated with B2, as to whether or not we're going to apply that. Because in my mind, to have an either/or in here, I think those really are, or the ability to select both. Maybe if we have them as two separate options here.

But for this particular section we have the ability to select multiple ones. I think in the interest of clarity, I would rather see these as separate options, and then again either language added that we could select both of them. But I just think this "or" aspect is going to add more confusion for the public, as we seek to whittle down options to add clarity.

CHAIR BORDEN: Adam, does that do it?

MR. NOWALSKY: It's awfully hard right to just take the words. I think staff is doing a tremendous job, quite frankly. I love this idea of putting some sort of white board in front of us, and erasing and doing it. All we need are some post-it notes around the screen here, and we'll have a real live conference room. I think staff's doing a great job. I think there is just enough there, welcome to other comments, wouldn't oppose if there needs to be some other wordsmithing moving forward. But I think this helps address my concern.

CHAIR BORDEN: Okay, so I'm going to leave that the way it is, and then move back to C4. The suggestion is to take C4 out. Any hands up, Toni?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so C4 is out. Any other changes on this slide? If not, let's move on to the next comment.

MS. KERNS: Justin Davis has his hand up.

CHAIR BORDEN: Justin.

DR. DAVIS: I just wanted to reiterate that I was suggesting removing C5 as well, and I don't think we reached a decision point on that.

CHAIR BORDEN: Okay, to Justin's point. Any objections to taking C5 out?

MS. KERNS: I have one hand up, or I have a couple hands up, Jason McNamee.

CHAIR BORDEN: Jason.

DR. JASON McNAMEE: Not necessarily an objection, just wondering, you know there was this notion of not having hard triggers at all. Per Emilie, we need to have the status quo option in there, so I wonder if we didn't want an F target trigger, if we need C5 in there or if it just defaults to C1 or C3? I wonder about, I'm just curious as to whether it's wise to remove C5. I'm fine if we do, I'm just wondering if that kind of, sorry for the pun, triggers us into one of the other options just by default.

CHAIR BORDEN: Emilie, to that point, please.

MS. FRANKE: If the Board's intent is to eliminate the F target trigger, which is Option C5. C5 needs to be in there as something that the public and Board would consider, which is eliminating this trigger altogether.

CHAIR BORDEN: Jason, have you got a follow up?

DR. McNAMEE: No, I'm good, thank you for that.

CHAIR BORDEN: Okay, so Toni, you had one more hand.

MS. KERNS: I'm not sure if this is residual or not, John Maniscalco.

MR. MANISCALCO: Thank you, it is not residual. I guess this is a question for the stock assessment scientists. A comment was made about measurement error, in terms of our ability to distinguish between F threshold and F target. I was wondering if anyone can comment on that, as to

how much uncertainty there is in our F, and if there is overlap between F threshold and F target.

CHAIR BORDEN: Katie.

DR. DREW: Sure. I don't want to over promise, based on, you know we'll have to see what this next coming year of data says. But I would say they are distinguishable, depending on how much uncertainty or error you want to see in that last terminal year. I would say it's not that we can't, if you say okay, we're between the target and the threshold, we could be anywhere in there is not quite true.

I do think we have a fairly decent handle on the uncertainty, but it is true that there is some uncertainty about that stock status determination. But it depends on kind of where you are relative to those reference points, and how you're quantifying that uncertainty. I would not say it's that we can't tell them apart, but there definitely is uncertainty on that one.

CHAIR BORDEN: Toni, have you got any other hands up on this?

MS. KERNS: No other hands.

CHAIR BORDEN: Okay, so is there any objection to making the changes that are noted?

MS. KERNS: I have one hand up, Justin Davis.

CHAIR BORDEN: Justin.

DR. DAVIS: I just wanted to clarify. Did we make a decision about C5?

CHAIR BORDEN: I think you were recommending taking it out, and I did not hear a lot of objections to taking it out.

MS. KERNS: I had one hand up, Mike Luisi.

CHAIR BORDEN: Mike.

MR. LUISI: I was waiting for you to ask if there was any objection to taking out C5. I think in my opinion, based on the comments that we've heard so far, Mike Armstrong's comments and John Maniscalco's comments that I would prefer leaving in C5, which would then with further understanding about the statistical difference, and the ability of the assessment to really differentiate between threshold and target,

I would prefer to leave that in, so that there is an opportunity for us as a Board to select C5, if we agree down the road that a trigger on F target is not necessary. I would hate to be bound by either C1 or C3 if it's ultimately determined that no F target trigger is needed. That's just my comment on taking that in or out, leaving it in or taking it out.

CHAIR BORDEN: Do we want to have both options in the document? In other words, take it in or take it out, would that do it?

MS. FRANKE: Mr. Chair, so I think if we leave it in that provides the option to keep enough target trigger or eliminate it.

CHAIR BORDEN: Okay, that's fine. Justin, does that address your point?

DR. DAVIS: Yes, thanks, Mr. Chairman. After hearing what John and Mike and Jay had to say, at this point I would support leaving it in the document. We've already managed to eliminate some options here, reduce the complexity a bit. I think it's fair to leave this in and send it out to the public to get their thoughts on it.

CHAIR BORDEN: All right, so Emilie, could you go to, I think this was all of the comments that were made on changes to this document.

MS. FRANKE: Yes, that's all I have.

CHAIR BORDEN: Does anyone else want to suggest changes to what Emilie presented?

MS. FRANKE: Mr. Chair, I do have a few changes for Tier 2, sorry.

MS. KERNS: I have Megan Ware with her hand up, and Mike Luisi, is that residual?

CHAIR BORDEN: Megan, on Tier 2.

MS. MEGAN WARE: Yes, on Tier 2 I would remove B2, which I think someone else suggested, the no trigger for SSB. I would put that forward. I assume we'll get to the other tiers on subsequent slides. I'll hold on that.

CHAIR BORDEN: All right, any other suggestions before we discuss removing it or not removing it? Any other changes, C2, C4, C5?

MS. KERNS: I have no hands.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: Yes, Mr. Chairman, my hand was up from before, but I'm happy to make a quick comment. I think my comment would be the same regarding C5 here. Leaving something in to allow the Board a decision on, well I guess it would be for B2 and C5. I think the Board would need to decide which triggers would be the most important.

I don't know, I would like to hear some other thoughts about having options in here for no triggers for threshold or target. I know we can't select both of them, but in my mind at least, it gives us an option, rather than being bound by the status quo, at least for B. For C, if we remove C5, we're going to be bound by either the status quo or C3. But thanks for calling on me again, I'll make sure to put my hand down this time.

CHAIR BORDEN: All right, so other comments on the suggested. The suggestions in red, it has been suggested to remove those. Comments on that.

MS. KERNS: I have no hands.

CHAIR BORDEN: Okay, any objections to removing those?

MS. KERNS: I have one hand, Adam Nowalsky.

CHAIR BORDEN: Adam.

MR. NOWALSKY: If I just understood Mr. Luisi's comment, I believe he was suggesting that B2 and C5 should stay in, if I understood him correctly. I would support leaving B2 and B5 in as well. If that was not his comment, then I think I need a little bit more clarification, and I might reconsider my position. But if again, his comment was that he supported keeping B2 and C5 in, then I would offer that as another voice of support for keeping those in.

CHAIR BORDEN: All right, let's see if we can make some progress on the points that I think we have common ground. Does anyone object to taking C2 and C4 out? Any hands, Toni?

MS. KERNS: I have no hands in objection.

CHAIR BORDEN: All right, those two items are taken out of the document. We have a difference of opinion on whether or not B2 and C5 should be removed. We've got recommendations on both sides. Does anyone want to comment on that who has not commented?

MS. KERNS: I have John Clark followed by Roy Miller.

CHAIR BORDEN: John and then Roy.

MR. JOHN CLARK: I just want to agree with Mike Luisi and Adam Nowalsky that I think it's a good idea to keep those in there. That way we could choose one or the other, as is noted down there. There has to be one SSB trigger, but we may not want both, so that would be helpful.

CHAIR BORDEN: All right, Roy.

MR. ROY W. MILLER: John expressed my concern, thank you.

CHAIR BORDEN: Okay, so we had four speakers that have basically recommended leaving those in, and two that have recommended taking them out. Now that you've heard the discussion, both pro and con, is there any objection to leaving them in? Does anyone want to object?

MS. KERNS: I have John McMurray.

CHAIR BORDEN: John McMurray.

MR. McMURRAY: I'm not sure I'm objecting to leaving them in, but I have a clarification question. I understand the rationale for wanting to leave these in, particularly Mr. Armstrong's rationale that target and threshold are very close to each other. That changes if we get new reference points, correct? I could be wrong, but we may have those with a new stock assessment. Is that a right way to think about this?

CHAIR BORDEN: Emilie or Katie to that point.

DR. DREW: I think the assessment update would provide new values for the SSB triggers and the F, but we don't expect those to change significantly, and probably the uncertainty around them would not change very much with the assessment update. If down the road the Board wanted to create a new definition for the reference points.

Maybe regional reference points or reference points that are more based on SPR or something like that through a benchmark assessment. That may also affect the precision or the confidence intervals around those reference points. But for the assessment updates in the near term, it's not likely to change kind of those confidence intervals or the level of uncertainty that we have around them.

MR. McMURRAY: That was helpful, thank you.

CHAIR BORDEN: John, not to put you on the spot, do you now have a position on that?

MR. McMURRAY: I see no reason to take it out at this point. But I will likely oppose it if it stays in.

CHAIR BORDEN: I think we've basically got a consensus to leave those two in.

MS. KERNS: I have Mike Armstrong with his hand up.

CHAIR BORDEN: Mike.

DR. ARMSTRONG: Yes. I'm okay with that, but I do think we need under C3. I think that language could be under B also. I think we should have an option to take a running need. I'm curious why that wasn't put in by the PDT.

CHAIR BORDEN: Emilie to that point.

MS. FRANKE: I think there you have the potential for overlap. For example, if we had that same trigger for both Option B and Option C, it's essentially the same trigger for both. I think the PDT was trying not to overlap, considering you might have both of these triggers.

DR. ARMSTRONG: Yes, to that point. I go back to the first one. Target is redundant to threshold. We should have triggered the threshold before the target, and if we get to the target triggers, we've done something wrong, because we should have done something at the threshold triggers. It's almost like we could throw out Option C. If we don't, we put in thresholds for these things and then we don't use them, by putting in a bunch of options that go for the target. I'm fine going to public hearing with this one, I'm just thinking it could be simpler.

CHAIR BORDEN: All right, are there any other changes to this? The items in red come out.

MS. KERNS: I have no hands.

CHAIR BORDEN: Okay, so we're going to move on to the next slide, Emilie, if you would please.

MS. FRANKE: Yes, Mr. Chair, here we have the summary of the recruitment trigger options.

CHAIR BORDEN: Thank you, are there any changes to this?

MS. KERNS: I don't have any hands. One hand, Megan Ware.

CHAIR BORDEN: Megan.

MS. WARE: Mr. Chair, I guess I'm looking for guidance here. I had sent a motion to staff that speaks in some ways to the management response, although it's a separate issue. If you feel it's appropriate to make that motion now, I can or I can wait until we get through the management trigger slides and then make it. But I do think it's most related to the management response options.

CHAIR BORDEN: Megan, let's take that up as a separate motion at the end of this, just keep going. I'll come back to you. Anything else on Tier 3 changes? If not, we're going to move on.

MS. KERNS: I have Mike Luisi.

CHAIR BORDEN: Mike.

MR. LUISI: I guess this is maybe for Emilie. Is there a way that we could quantify in some way this moderate sensitivity and high sensitivity under the recruitment trigger definition, rather than? In my mind, I mean correct me if I'm wrong, it establishes a new line based on periods of high recruitment and higher recruitment. It's going to draw the line that we currently use at the 25th percentile of the reference period.

It's going to draw it up. I just wondered if there is a way for the public, so that they can see how this relates to our current JAIs. I know you had that one table there, right. I guess maybe that is enough. Maybe I'm just speaking. I kind of had a question there about trying to quantify it, but maybe that table just speaks for itself.

I'll see if anybody else has any other thought. The whole concept of an interim or a new target, not a target. But the whole idea of adjusting that baseline for the JAI is just a little confusing, as to how high it really would go. Do you have any thoughts on that or not? I was confused by this a bit.

CHAIR BORDEN: All right, any other comments on this section? Any hands up, Toni?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, we're going to move on, unless somebody wants to propose something different here. Okay, Emilie, if you could go to the next one, deferred management action, changes on this slide. We had general comments on this before, but are there specific recommendations to either add something or delete some of these?

MS. KERNS: No hands so far.

CHAIR BORDEN: Okay, let me ask one more time. Do we have any suggested changes? If not, they're going to stay like this.

MS. KERNS: No hands.

CHAIR BORDEN: Okay then we'll move on, Emilie.

MS. FRANKE: Thanks, Mr. Chair, that's all I have for management triggers.

CHAIR BORDEN: Okay, so I'm going to go back to Megan. Megan, would you like to make your motion?

MS. WARE: Thank you, Mr. Chair. I'll read it, and then if I get a second, I'll provide my rationale. **Move to consider a formal rebuilding plan for striped bass in Amendment 7 using methods described under "Management Response to Recruitment Trigger". Option 1 would be status quo F target. Option 2 would establish a F(rebuild) calculated at the F value projected to achieve SSB**

(rebuild) by 2029 under the assumption of the lower recruitment regime.

CHAIR BORDEN: That's a motion, is there a second to that motion?

MS. KERNS: I have John McMurray.

CHAIR BORDEN: John McMurray, so Megan, do you want to offer any thoughts on why you want to suggest this?

MS. WARE: Yes, I think that would be good. We have this ten-year timeframe to rebuild the striped bass stock. But as a Board we really haven't formally developed an approach about how we plan to get there. Seeing some of the information about the lower recruitment values is making me nervous, in our ability to maintain the current F target and also achieve a rebuilt stock in ten years.

The current F target is based on average recruitment, and if we're experiencing recruitment that is lower than that, then that F target is not going to get us where we need to be.
We've seen this challenge with other species like herring or mackerel, kind of the challenges that recruitment assumptions can have on a rebuilding plan.

I do think it's a fair question to ask, you know is this an issue that gets included in this Amendment, or do we wait to trip one of the JAI triggers, and then consider action? My concern is that the longer we wait to address the recruitment assumptions underlying our F target, the more drastic our reductions may need to be in the future to meet that ten-year timeline. I would rather wait, rather than waiting for a JAI trigger to trip, and then adjusting F. I think it's a prudent choice to establish this rebuilding structure now in the Amendment. I also think taking action now would align will with the upcoming assessment, as this would allow the TC to calculate that F rebuild in the 2022 assessment. I'll just close by saying, you know I completely understand that this is adding some complexity to the document, but in my opinion, I think this marginal increase in complexity is well worth it for the Board to signal to the public that we have a rebuilding plan for striped bass.

I also think that establishing a rebuilding structure could address some of the confusion that at least I had, regarding with how we deal with triggers under a poor stock status. I would envision our goal of maintaining F at F(rebuild) kind of taking precedence over triggers associated with an F target.

CHAIR BORDEN: Thanks, Megan. John, as the seconder do you want to offer any comments, and then I'll go to the Board.

MR. McMURRAY: Thank you, Mr. Chairman. I think Megan did a very, very good job of providing rationale on this motion. I would just add that the public has been very vocal on the need to initiate a rebuilding plan, and there has been some disappointment that thus far we haven't. I think it's time that we do.

CHAIR BORDEN: All right, so comments on the motion from the Board. Toni.

MS. KERNS: I have Mike Armstrong, Adam Nowalsky, Ritchie White, Jason McNamee.

CHAIR BORDEN: Mike Armstrong.

DR. ARMSTRONG: I think this is necessary and I support it, and I think a lot of it comes out what we learned in the last week that F at three years in a row now, I'm sorry, recruitment is low. We could have a scenario where we go through this process, and the moment we pass this Amendment we're going to have to start an addendum to start rebuilding, based on lower recruitment.

It's questionable whether we could get it all done and get it in by 2023. If we can't get it by 2023, we are way too late on getting it in. I support getting in it now. It does increase the complexity, and adds a whole other element to this Amendment, but I think we ought to do it. In fact, I think this is

probably a lot more important than some of the other things that are in this Amendment.

CHAIR BORDEN: Okay, thanks, Mike. Adam.

MR. NOWALSKY: Building on Mr. Armstrong's comment about this adding complexity and adds a whole new item here. Where would this leave us on voting this out today? I think I would want to have the PDT to take some time to digest it, to see if these are the only options that are appropriate here to develop some content for the document that would go around it. What would be the intentions if we were to add this here with regards to actually voting it out for public comment today. Does including this offer an inherent element of delay until we can develop this to the point that we want? I almost think we're better served if we have interest in this as a Board. I feel like the motion today would be to consider a formal rebuilding plan for inclusion in Amendment 7, stop there, give the PDT time to work on it, bring another revised document out. But I would be interested to hear other thoughts on if this motion were to stand exactly as it was introduced, and if it was passed where that would leave us on our planned schedule.

CHAIR BORDEN: Yes, I guess my response to that, Adam is that to some extent how we treat this will depend on where we end up today. If we end up in the position that there are going to be a number of issues that may get referred back to the PDT for work, we certainly could do what you are recommending. As an alternative, if the Board wants to vote it out, then I think we still could ask for comments from the PDT. But it's a question of how we handle it, in terms of the document. Let me move on to Ritchie White.

MR. G. RITCHIE WHITE: I strongly support this motion, and the herring example is a perfect example. We certainly do not want to do what has happened to herring, and it certainly is recruitment. We have to pay attention to the low recruitment, and we have to be prepared to take the necessary action to make sure this stock does not get in a very bad situation.

CHAIR BORDEN: I've got Jason McNamee next.

DR. McNAMEE: I also really like the idea behind this motion. I have a couple of questions though. The first is just to clarify whether the lower recruitment regime would be defined, you know per the way it's defined in the document. I just wanted to clarify that, because the notion of lower recruitment regimes is a topic of discussion across species, and can be a pretty hot topic. I think it's something we need to be very specific about what we're talking about.

Then if the answer to that is yes, the issue that I see with the way that this is worded is, you know we're thinking about, this is an amendment so something that will persist for a while. A low recruitment regime, I think it's identified with a change point analysis, and it's a specific set of years. That's my concern is that we sort of have locked in on a new set of years, and it's kind of a notion of low recruitment is dynamic, so it could change.

I guess I like the concept here a lot. I wonder though if it needs a little more work, to avoid any sort of unintended consequences by adopting it at this point. Maybe Megan has already thought about this, and so I would be interested in hearing a little more about those two questions, so thanks for the time, Mr. Chair.

CHAIR BORDEN: Megan, do you want to respond to Jason's point?

MS. WARE: Sure. I think at this point, Jason, I would use the regimes that are identified on Page 51, so it looks like it was, I think it's 2008 to 2007 was the regime for the low recruitment period. But I will note on Page 51, and Emilie can correct me if I'm reading this wrong.

But it sounds like during benchmark stock assessment, the TC would update that change point analysis to evaluate the definition of the

recruitment regime. I would assume that whatever our next benchmark assessment is, which I don't believe is 2022, I think that's just an update. But that that change point analysis would be evaluated at a subsequent benchmark.

CHAIR BORDEN: Jason, have you got a follow up?

DR. McNAMEE: Maybe just quickly to say, maybe it is safe or not, in the short term to adopt this in the way that it kind of stands. I do think there are additional questions that could come up. For instance, you may need to rebuild during the period of time when we don't have low recruitment potentially.

You know depending on if there is some other dynamic pathway. I think it's safe enough to adopt this in the short term, but probably would need to be revisited at some point, and maybe through an addendum process, to kind of perfect it a little bit. But in the short term I think it could work.

CHAIR BORDEN: Toni, do you have any other hands up from individuals that have not spoken?

MS. KERNS: I have on the list Dave Sikorski, Tom Fote, Max Appelman, Justin Davis, and Mike Luisi.

CHAIR BORDEN: Okay, the first one, I can't read my own handwriting. The first one was.

MS. KERNS: David Sikorski.

CHAIR BORDEN: David, excuse me.

MR. DAVID SIKORSKI: I will say, me too, to Mr. Armstrong's comments and Ms. Ware's comments, and just highlight from the Chesapeake Bay perspective that in 2018 we had an unprecedented freshet, and saw the spread of blue catfish throughout the watershed, especially to the upper Bay, where key spawning happens in breaches of the spawning rivers.

I'm very supportive of this motion, and I just want to raise the issue that these invasive species which were first noted by Maryland's team in the upper Bay this year, and is reproducing, is a key factor here. Whether it be competing for forage and places to live, or simply eating juvenile striped bass.

It's something that's been on my mind and on the mind of a lot of anglers here in Maryland, as we continue to interact with blue catfish in areas of even moderate salinity. This is of the upmost importance to me, and I look forward to seeing the results, and really just flag that if there is a way to also consider natural mortality changes, I think it's really important to consider.

CHAIR BORDEN: Thanks, David, Tom Fote and then Max.

MR. THOMAS P. FOTE: My concern is when we look at recruitment in spawning stock biomass. You know we had some high recruitment in a couple years, with a spawning stock biomass not much different than it is now. It might be a little low, but not dramatically low. What we're seeing is there are other factors. I mean I just look at species like winter flounder, weakfish, where we basically are down to one fish, and we've been down there for about 15 years, and it hasn't done anything on the stock. We are dealing with other problems such as recruitment. The same thing with summer flounder, because summer flounder comes in and striped bass, when they're smaller, yes spawn offshore.

But they come in and survive in the bays and estuaries when they're very juvenile. They don't seem to be surviving the way they used to. Even with the highest spawning stock biomass that we had when we had good recruitment with lowest spawning stock biomass. I don't know how you basically correct the problems, when there is no relationship or no proved relationship on the size of the spawning stock biomass based on the recruitment.

The environmental factors and the other factors like forage, becoming forage species for other species is affecting them. To try to say this, and we're

actually going to do something like basic with the options, because the recruitment is low. It might have no effect at all on what the population does, as far as recruitment goes, and I hate spinning my wheels.

CHAIR BORDEN: Thanks, Tom. Max.

MR. MAX APPELMAN: I'm hearing a lot of support for this concept, and I think I support it too. But I'm a little uncomfortable with putting this out for public comment without the PDT giving it a fair scrub. I think we've heard some concerns or possible challenges of how this F (rebuild) would be used in the future.

I think that's a place where the PDT could really help out and just flesh out sort of the process for when this sort of F(rebuild) with the lower recruitment assumptions, you know when that would be needed versus if we're not in a low recruitment regime, for example. Just thinking that this is something we would consider codifying in an amendment. I would be uncomfortable putting this in the document at this step, without letting the PDT give it a good look.

CHAIR BORDEN: Justin.

DR. DAVIS: I appreciate the intent here. I all along have felt like the Board in retrospect we missed the boat a bit by not addressing that management trigger and formalizing a rebuilding plan back during the Addendum VI process. I also really like the attention here to acknowledging the reality that we're in a low recruitment regime for this stock right now, and we need to acknowledge that. I have a couple of questions, which maybe might be clarifying, I don't know.

The first would be that Option 2 here talks about establishing an F(rebuild) that essentially acknowledges a low recruitment regime. My question is whether Option 1, the status quo F target. I don't know if the current F target we have could be considered as an F(rebuild) under an average recruitment regime, because I don't know if that F target was calculated such that it was determined to rebuild the stock by 2029. I don't know if that is the right timeline. That would be my first question is whether it's safe to assume that the status quo F target is synonymous with an F(rebuild) under an average recruitment regime. The other thing I'm trying to figure out is exactly how this would interface with the other section of this document, where we're considering potential changes to the ocean recreational fishery, to be implemented potentially in 2023.

We've got some regulation options in there that are intended to protect the 2015-year class. I think what I heard is the F values that come out of this assessment of a rebuilding plan, would be used following the 2022 stock assessment, to determine measures that we might need to implement under different recruitment regimes to rebuild the stock.

How would that work out if we approved the Amendment with some recreational measures to implement to 2023, but then we also go through this exercise with the assessment and these F(rebuilds) and determine some measures there. I guess I'm just trying to figure out how those two different processes would mate up.

CHAIR BORDEN: Megan, do you want to take any of those?

MS. WARE: Sure, I'll try to take both, and people can correct me if I misspeak. I think the first question is basically, does F target equal F(rebuild) under average recruitment. I guess I would say I don't know, we would need updated projections to know that. My understanding is that the F target it's set that if you held it there you should get to the SSB target.

I just don't know if you get there within ten years or a longer timeframe. I guess that would be a question for projections. The second question was, what happens if we take action in 2023? What does it do with this? I'll say, I have also struggled, Justin, with kind of how this Amendment and the assessment in 2022 align, because I think we're

scheduled to take final action on the Amendment before we're going to see results of the 2022 assessment, which is kind of a weird position to be in.

But I think what we want to see in that 2022 assessment is what our F rate is at present. Then compare that to where that F (rebuild) is, and see what the difference is, right. It's kind of hard to speak without knowing what those two values are. If there is a difference and we needed to take a reduction, maybe we get there with that action we've considered in the Amendment or not. But I hear you on the timing part of that.

CHAIR BORDEN: All right, next person on the list is Mike Luisi.

MR. LUISI: I'll be very brief. I agree with just about everything that I've heard. I really like the idea of adding a rebuilding plan into Amendment 7. However, I do agree that this is something that I believe. I think Max and Adam Nowalsky and others made the comment that this is something that we should direct the PDT to help develop.

Possibly with additional options for F(rebuild) calculated as using lower recruitment, in addition to possible timeframe differences for that rebuild. While I support the overall concept, I think that we're at the point here that yes, the PDT did an amazing job getting us to this point here in this draft document. But I do think that additional work needs to be done, especially based on some of the questions that have been asked. I think we need to have a more full understanding and appreciation for what this means, before we send it to the public. I was thinking about possibly an amended motion here. But I don't have anything drafted yet. Maybe there will be some others that are thinking along the same lines. I do want to see this develop, but I think the PDT needs to spend some time with it before we see it again.

CHAIR BORDEN: One option I think we have here is that almost all of the comments have been positive, with qualifiers, and the qualifiers revolve around the issue of having the PDT review it, and basically look at it and possibly work on it a little bit. That would not be problematic, if in fact we end up in the position where this Amendment doesn't move forward.

In other words, the issues are going to continue to get worked on for a few months until the next meeting. Then clearly, we have the time to have the PDT do that, which it sounds like there is a consensus that that would be desirable. We could temporarily table this, or table this to a time certain to the end of the meeting, when we know which avenue this is going to go, in terms of either moving forward for public hearing or basically continuing to work on it.

We will know that at the end of the meeting. I don't have any other suggestions, other than doing that, which would temporarily lay this issue on the side until the end of the meeting. Are there any objections to doing that at this point? Toni, do we have any objections?

MS. KERNS: I don't have any hands.

CHAIR BORDEN: Okay, without objections, we'll postpone the vote on this until the end of today's session.

MS. KERNS: If we could just get a motion on this on the screen, David, that would be helpful. We would need a maker and a seconder.

CHAIR BORDEN: Does someone care to make that as a motion?

MS. KERNS: I have Justin Davis with his hand up.

CHAIR BORDEN: All right, can the staff prepare the motion, please?

MS. KERNS: I think you need to clarify it's not the end of the meeting but until the end of the.

CHAIR BORDEN: Striped Bass Board meeting.

MS. KERNS: No, well David, because you would have to make it, it needs to be a part of the Amendment discussion. You don't want to end the meeting.

CHAIR BORDEN: It's Amendment 7.
MS. KERNS: Thank you, Emilie. Justin, are you making that motion?

DR. DAVIS: Sure, do you want me to read it into the record?

MS. KERNS: That would be great.

DR. DAVIS: Motion to table until the end of the Draft Amendment 7 agenda item.

MS. KERNS: I have a second from Marty Gary.

CHAIR BORDEN: Any comments on the motion? Any objections to the motion?

MS. KERNS: I see no hands.

CHAIR BORDEN: Okay, so the motion is adopted by consensus.

MS. KERNS: Roy Miller has his hand up.

CHAIR BORDEN: Roy.

MR. MILLER: Mr. Chair, one clarification for when we come back to this item. I may have missed this, but we're defining the recruitment regime as the Maryland JAI, am I correct in that assumption that we're ignoring the Hudson Index and the Delaware Index?

CHAIR BORDEN: Megan, do you want to comment on that?

MS. WARE: Sure, I may need to lean on others. But my understanding is the regime is more about the timeframe. I look to Emilie as to what defines that timeframe, but the low recruitment regime is 2008 to 2017, actually.

CHAIR BORDEN: Emilie, do you want to follow up on that?

MS. FRANKE: Thanks, Megan. Yes, the recruitment regimes, as noted in the Draft Amendment, are based on a change point analysis of the Maryland Juvenile Abundance Index, and that index is most closely correlated with the Age 1 recruitment estimate coming out of the stock assessment. I will also lean on Katie, if she has anything to add on this analysis.

CHAIR BORDEN: Katie.

DR. DREW: Yes, Emilie is correct, we based it on the Maryland JAI because of that strong correlation that is informing the models the best about overall coastwise recruitment. Then also, it had the longest time series out of any of our indices, so we're able to see more contrast in that series going back in time, prior to the 1980s, and get a better handle on what really is low versus high recruitment over the entire time series. That's why the index was used to develop that time period for this analysis.

CHAIR BORDEN: Roy, do you need a follow up?

MR. MILLER: Just a quick comment if I may, Mr. Chair.

CHAIR BORDEN: Certainly.

MR. MILLER: I understand that the Maryland Index best informs our analysis in this regard. However, I still think that it's possible during a period of low recruitment in the Maryland Index. It's possible that there may be some buffering offered by Delaware JAI and/or Hudson JAI. I wouldn't rule them out necessarily, and put all the reliance on the Maryland Index.

DR. DREW: Just to follow up on that real quick. I will say, so we're using the Maryland Index to develop that time period. But for this type of an analysis, we would be using the model estimate of recruitment, which would include information on year classes in this other producer areas. Even if

the Maryland Index is way below average from these years, the model may be able to buffer up some of that.

It may bring the average or the observed recruitment going into that SSB and that F(rebuild) calculation will have some of that information on those other recruitment indices when it calculates recruitment. The Maryland data is only informing the time period. Those other indices are informing the estimates of recruitment used to develop the F(rebuild).

MR. MILLER: Thank you for that clarification.

CHAIR BORDEN: All right, Emilie, do we have anything more on this portion of the discussion?

MS. FRANKE: I do not.

CHAIR BORDEN: Okay, so what I'm going to do is declare a five-minute break. It's almost three o'clock, so that you can get up and stretch your legs, and we will reconvene according to my watch at three o'clock.

(Whereupon a recess was taken.)

CHAIR BORDEN: All right, I would like to call the meeting to order again. Toni, are we all connected?

MS. KERNS: We are connected, David, ready to go.

CHAIR BORDEN: Okay, so Emilie, you're back on with the second element/issue to talk about.

MS. FRANKE: Sounds good, thank you, Mr. Chair. If okay with you before I get into that second element, I would like to briefly address this Board clarification for the Chesapeake Bay trophy fishery.

CHAIR BORDEN: Yes.

MS. FRANKE: As I indicated at the beginning of my presentation, the PDT noted an area requiring some Board clarification related to the Chesapeake Bay trophy fishery. Addendum VI specified that the Chesapeake Bay fishery is defined as all fisheries operating within Chesapeake Bay. However, Addendum IV specifies that the Chesapeake Bay spring trophy fishery specifically is considered part of the coastal fishery or ocean fishery, for management purposes.

Addendum IV, just as a reminder, implemented measures to reduce harvest by 25 percent for the ocean fisheries and 20.5 percent for the Chesapeake Bay fisheries. The Addendum IV implementation plan for the Chesapeake Bay states were developed to reduce the Chesapeake Bay trophy harvest by 25 percent, consistent with this characterization of the trophy fishery as part of the coastal fishery for management purposes, since the trophy fishery targets large migratory coastal fish.

The PDT noted that some clarification is needed from the Board on how to characterize the trophy fishery for Draft Amendment 7, just because that language in Addendum VI was not as specific as the language in Addendum IV, so there was a little bit of uncertainty in how to characterize the trophy fishery. That's all I have, Mr. Chair, if there are any questions.

CHAIR BORDEN: Comments on that issue. Toni, any hands?

MS. KERNS: Giving it a moment to see if I get any hands here. I have Mike Armstrong followed by Max Appelman.

CHAIR BORDEN: Mike and then Max.

DR. ARMSTRONG: Just a quick question. If we were to return to the Addendum IV definition, what would we have to do in this document?

MS. FRANKE: I think the Draft Amendment 7 would just include that language from Addendum IV, specifying that the trophy fishery is considered part of the coastal fishery for management purposes.

DR. ARMSTRONG: Okay, it wouldn't go out as an option, it would simply be in the verbiage, and I'm

going to throw that on the end as something we should probably do.

CHAIR BORDEN: All right, Max.

MR. APPELMAN: Maybe it will help me understand what makes the most sense if I knew where, if a fish was caught in the trophy fishery in the Chesapeake Bay, and was for example intercepted by an APAIS member. Would that fish be reported as being caught in Chesapeake Bay, or would it be part of the ocean, I think? Like, how is the catch of that fish used in assessment? I think that to me would sort of explain how we should be handling the trophy fishery, in terms of management.

CHAIR BORDEN: Any response?

DR. DREW: I guess I could take the first stab at it and say that yes, from the MRIP data alone. You know if we said a fish that was reported as being caught in inland Chesapeake Bay, i.e., inland Maryland or Virginia waters, would be recorded as part of the Chesapeake Bay catch, and a fish that was reported as being caught in state or federal waters would be reported as being from those two states, would be reported as being part of the ocean population.

I think previously the Chesapeake Bay states have gone through and sort of cleaned their data on the basis of timing and size of fish that are caught, in order to separate the sort of those spawning fish or those trophy fish out from the rest of the population, which could be an option if the Bay states wanted to continue that approach. But I don't think it's something we've done in recent years for the most recent assessment.

CHAIR BORDEN: We're back to the Board. Which language do you want in the document?

MS. KERNS: I have Tom Fote.

CHAIR BORDEN: Tom.

MR. FOTE: Yes, if I remember those right, it gave you a rattle when we did this. We basically awarded Maryland and Virginia in public river, 25 percent of the coastal migratory stock, so they figured that they spent that much time in Chesapeake Bay. That is where the trophy tag program came out of. It's in Amendment 4, we have done nothing to change that, and since that's historically what it was, unless we do an amendment to basically take it away, that should be where we are doing, if I got this right.

CHAIR BORDEN: Anyone else?

MS. KERNS: I have no other hands. Mike Luisi.

CHAIR BORDEN: Mike.

MR. LUISI: I'll just clarify what we've done. I am interested in what the Board thinks about how we use the trophy fishery as a follow up for any management action. But when Addendum VI came out and reductions were needed. We used modifications to the trophy fishery as part of our overall reduction in Chesapeake Bay.

We shortened the season and we closed other periods of the early pre-trophy fishery to targeting, which added to our total reduction necessary within our conservation equivalency plan that year. We did it because it was specified in Addendum VI that those fish were considered a Chesapeake Bay fish.

I do understand that we went from Addendum IV to Addendum VI, and there was a change in the definition of that trophy season. The trophy fishery is targeting the migratory stock, so I'm just interested in what others have to say about how we move forward in Amendment 7. But I just wanted to give you a little background as to how we applied the necessary reductions needed under Addendum VI for the Chesapeake Bay.

CHAIR BORDEN: We're back on the same question. Which language do you want to include in the Amendment?

MS. KERNS: Pat Geer.

CHAIR BORDEN: Pat.

MR. PAT GEER: I wasn't going to speak to the definition, but I just wanted to say in Virginia we did away with our spring trophy fishery in 2019, as a result of the Addendum that was coming up. It was a pretty small fishery. We only got about 0.25 percent savings out of that 18 percent that we had to come up with. But I'll concede to Mike and Marty about what they feel is the best definition to use.

CHAIR BORDEN: Does anyone else want to comment?

MS. KERNS: I'm waiting for hands. Mike Armstrong.

CHAIR BORDEN: Mike. I'm giving you a second bite of the apple.

DR. ARMSTRONG: Yes, very quickly. I mean it comes down to the trophy fishery, will it be subject to whatever rules they want to apply, or will it be subject to whatever we pick for the coastal slot limit or whatever it comes out to be? Because they are the same fish, coastal migratory, I think they should be treated as coastal migratory fish, have to follow the rules that we put in in this Amendment.

CHAIR BORDEN: You're recommending Addendum IV then.

DR. ARMSTRONG: Correct.

CHAIR BORDEN: Okay. Anyone object to that?

MS. KERNS: We have Mike Luisi with his hand up.

CHAIR BORDEN: Mike.

MR. LUISI: No so much in principal that I object, but the trophy fishery in our state is a two-week period of time, and we tried to do what Mike Armstrong suggested years ago, which is to have a slot limit for that trophy fishery, and it was a disaster. Right now, we have a minimum size, I think of 35 inches maybe, 36. I can't remember off the top of my head. But applying the coastal fishery regulations to that spring trophy season, without any flexibility, was a major problem for us in the Bay.

I would hope that there would be some tolerance for some flexibility, even if the definition is that those fish are considered part of the coastal fishery. I just can't imagine going back and putting a slot limit in. People see a trophy season as being something where, you know you're throwing back the largest fish during a trophy season, which a trophy is defined as a certain size limit. It makes it really difficult for us to maintain that season, maintain that fishery, if we had to go back to what we have on the coast with a slot limit. I'll leave it there. It's more of a management concern than the definition, which makes sense. They are coastal migratory stock, but it's a management issue on our end.

CHAIR BORDEN: Anyone else?

MS. KERNS: You have Tom Fote.

CHAIR BORDEN: Tom Fote.

MR. FOTE: Mike, I understand your point. But do you understand that a lot of fishermen up and down the coast, some of them stopped fishing for striped bass, because they really fished for a trophy fish, and since they did that, they moved on to other fisheries. That was important to a lot of the coastal migratory tournaments and everything else. We all had to bite the bullet, because these men move fast. If you're going to treat it as a coastal migratory, we need to consider that. They probably need to be under the same regulations that we're all suffering with.

CHAIR BORDEN: My suggestion is we use the Addendum IV language and, in the minutes, note the concern voiced by Michael Luisi. Any objections?

MS. KERNS: I see no hands.

CHAIR BORDEN: Okay, so next issue, Emilie.

MS. FRANKE: Moving on to this next set of draft options, and these options address protecting the 2015-year class. These options are listed in Section 4.2.2 of Draft Amendment 7, which is the ocean recreational fishery section. Starting with the statement of the problem here. It was raised by stakeholders and the Board that protecting emerging strong year classes is important for stock rebuilding.

There is some specific concern that the 2015-year class, which is the strongest year class observed since 2003, is entering the recreational ocean slot limit of 28 inches to less than 35 inches. That was implemented by the majority of states under Addendum VI in 2020. If that slot limit is maintained, the 2015-year class may be subject to high recreational harvest for the next several years while that year class is within the slot.

That potentially reduces its ability to help rebuild the stock. Then also, while outside the slot limit, the 2015-year class would still also be subject to recreational release mortality. The following options in this section consider whether to change the ocean recreational fishery measures to protect these strong year classes.

The status quo option of 28 inches to less than 35 inches with a one-fish bag limit, as I mentioned was adopted under Addendum VI, to achieve that 18 percent reduction. That is Option A, the status quo option. Option B and C were also actually considered as part of Draft Addendum VI. They were also projected to achieve at least an 18 percent reduction. They were considered here as part of Draft Amendment 7, in the context of providing some protection for the 2015-year class. Option B would implement a 35-inch minimum size limit with a one-fish bag limit. Option C would implement a 32-inch to less than 40-inch slot with a one-fish bag limit. Then the final two options here are Option B, which would implement a narrower slot limit of 28 to less than 32 inches, and Option E, which would implement a coastwide moratorium on recreational harvest.

This needs to be clarified in the document, but the PDTs intent is that this moratorium would apply both to the ocean region and to the Chesapeake Bay, so it would be a moratorium on all recreational harvest. I just wanted to note some feedback from the AP, just some general concerns about considering these size and slot limit options.

Some AP members noted some concern from the for-hire industry about these larger minimum size options, and these larger slot options. There was some support for the simplicity regarding compliance and enforcement, when considering a larger minimum size option, and some AP members also noted some concern about higher discards associated with slot limits.

Just a little bit more detail on Option E, which is the coastwide harvest moratorium option. There were a few different sub-options for how long the moratorium would be in place. When the moratorium ends, the status quo recreational measures would be re-implemented. For Sub-option E1, the moratorium would be implemented through 2024.

If Amendment 7 is implemented in 2023, that would be a two-year moratorium, continuing on with that 2023 implementation assumption, E2 would be a three-year moratorium, E3 would be a four-year moratorium, and E4 would be a five-year moratorium on all recreational harvest both in the ocean and the Chesapeake Bay. The longer the moratorium is in place, as noted in the draft options, a higher percentage of the 2015-year class would be protected from harvest once that status quo options are implemented at the end of the moratorium.

In their discussion for this issue, the PDT noted that both the 2017- and 2018-year classes were also above average in multiple JAIs, and so the TC recommended including those two-year classes in

this analysis as well. Each of the alternative size and slot limit options that I just reviewed were analyzed in terms of the protection from harvest provided each year class.

That is indicated by the percent of each year class that is estimated to be outside the size of a slot limit, so the percent of fish that could not be harvested. The TC noted that while changing the size of slot limit might protect a year class from harvest in the near term, it's important to develop soft reductions to look at the potential impact on total SSB and stock productivity over time.

This is Table 4 from the Draft Amendment, and this shows the estimated mean, striped bass size at age based on age data compiled from the last stock assessment. It's important to note here that this is just a mean size at age, and the size is highly variable along the coast, and there is a lot of overlap among the age classes. This is the table, Table 5 from the Draft Amendment that shows the percent of fish in each year class that would be protected from harvest for these various size and slot limit options. Again, this is the percent of fish that cannot be harvested for each option. It's important to note here that this level of protection from harvest will change over time, as the fish age. For example, looking at Option B, 35 is minimum size limit. This would provide the 2015-year class that column circled in red here. There is more protection from harvest in 2023, with about 83 percent of the surviving 2015 protected from harvest in the ocean, as compared to only 33 percent protected from harvest under the status quo option in 2023.

But again, this level of protection will change over time as those fish age. That level of protection from the large minimum size limit will decrease as those fish get larger and larger, and reach that minimum size. The projections that were developed for each size and slot limit option, estimate the change in total female SSB for all year classes, as compared to the status quo.

This is again to target just that question of how the size or slot limit options might affect overall stock productivity. These projections assume that the stock is fished at the target fishing mortality rate over time. The projected change in total SSB looking at each of these options, as compared to the status quo, only range as a small amount, seeing only about a 2-4 percent change, depending on the option.

These projections indicate that the stock recovery timeline for each of these size or slot options would be the same as the recovery timeline for the status quo option. Again, it's important to note for all the options that there is some uncertainty around how angler behavior and effort would change in response to a change in the size in the slot limit. If the Board selected an alternative size or slot limit, Options B through D that I just reviewed, the Board would have to consider whether or not conservation equivalency would be permitted.

That is captured here in this Tier 1 set of options that the Board would need to consider. Under Option A CE would be permitted. Considering any other CE restrictions that we'll discuss later in the CE section, and under Option D, CE would not be permitted for any of these alternative size or slot limit options. As noted in the Draft Amendment, these options do not apply to the moratorium option, as drafted that option would not allow CE for a recreational moratorium.

Another consideration for this section under Tier 2 here, is considering how Addendum VI conservation equivalency program that split the 18 percent reduction between sectors would be affected by changing the recreational status quo. If the Board selected either a different ocean size or slot limit, or if the Board selected a coastwide moratorium, the Board would need to consider how it would impact those CE programs that combine recreational and commercial measures to achieve the 18 percent reduction.

Specifically, those CE programs that implemented a less than 18 percent reduction in commercial quota,

which was offset by a larger reduction in recreational removals. If the recreational status quo changes, the Board needs to consider whether those commercial quota reductions implemented for those CE programs would carry forward.

Under Tier 2 here, Option A is that the commercial quota levels implemented through those CE programs would carry forward for the commercial quota levels implemented through those Addendum VI CE programs would be continued forward, and this would result in some commercial quota levels that should be less than an 18 percent reduction from Addendum IV quotas. Then Option D here is that the commercial quota levels implemented through those CE programs would not carry forward. Under this option those states would be subject to the quotas outlined in the commercial quota section.

This is Table 6, associated with those Tier 2 options, just showing the base quotas and the CE adjusted quotas. Again, if the recreational size limit status quo changes, or the Board selects a moratorium, the Board would need to consider which of these CE adjusted quotas would carry forward. That's all I have for this issue, Mr. Chair. I have the discussion questions up here on the slide again.

CHAIR BORDEN: Okay, thank you, Emilie. Comments on this section.

MS. KERNS: I have Justin Davis, John McMurray, Tom Fote, David Sikorsky, and Megan Ware.

CHAIR BORDEN: Okay, thank you, Toni. Justin.

DR. DAVIS: I think this question is for Dr. Drew, and it has to do with the projections that were done here to compare the different potential regulation options, and their potential impact on SSB (rebuilding). You know I feel like one essential argument we were having during the Addendum VI process was about a slot limit versus a minimum length.

You know proponents of a slot limit, like myself, sort of suggest that what you're essentially doing is declaring a moratorium on all but probably four or five age classes in the population, and that by doing that you're going to hopefully sort of broaden the age structure and have proportionately higher abundance in those larger, older, age classes that anglers find so desirable. Proponents of a minimum length would say you're focusing too much fishing mortality on a narrow band of age classes, and essentially not enough fish are going to make it through the slot.

Overall, you're going to have a negative effect on SSB, and you're not going to have enough fish make it through to have a lot of fish in those older, larger age classes. I view that as sort of like two competing hypotheses, and I think another one that's arisen here is this hypothesis that protecting the 2015-year class is essential for rebuilding the stock.

As I've heard it framed in some quarters, the 2015-year class is our last best hope to rebuild the striped bass stock, and if we fail to protect the year class, we're sort of doomed to failure. I don't know that anyone has really advanced an alternative hypothesis to that, but it's certainly the motivation for the work that was done here. When I looked at the draft amendment and the projections, I guess I was kind of surprised at first to see that, you know as it was noted on Page 56, and I think this was in the slide too.

Projections also indicate that the stock recovery timeline is the same for all four options. I think it's tempting at first to look at Figure 3, and look at that and say, oh it looks like the 35-inch minimum really provides a much greater chance of rebuilding SSB. Then you look at the Y axis and it's essentially a 4 percent difference than the status quo over a projection that goes out to 2032. I think that's sort of probably within the margin of error. I guess I was surprised at first to see that essentially there seems to be no difference between a slot limit and a minimum length, with respect to where we're going to end up with at SSB, 2032. Also, that there does

not seem to be evidence from these projections that measures that are more protective with 2015-year class are going to help us rebuild SSB better or faster.

Thinking about it, I guess it might be reasonable to think these projections aren't that useful in looking at that first comparison of the slot limit versus minimum length. Because this is just SSB, it's not talking about the packets that SSB comes in. This isn't looking at age structure. It's just overall SSB, we can't determine whether there is more fish in those older, larger age classes like we might expect from the slot. But for the second one, the 2015-year class, I guess what I'm interested in knowing is to what degree.

Do these projections suggest that protecting the 2015-year class, or being more protective of it than the 28 to 36 slot isn't beneficial overall? You know largely to achieving our SSB rebuilding timelines, or are there reasons to think these projections are not really that informative of what we might actually get out of changing the regulations. I apologize, I know that was sort of long-winded. But that is my priority question.

CHAIR BORDEN: Thanks, Justin. Katie, do you want to take a shot at some of those? I think that it's probably in your area of expertise.

DR. DREW: Sure, I can take a shot at it, and we'll see if anything useful comes out. I would agree that I think these projections show that sort of, basically the projections were really focused on, if we change the selectivity of the ocean fishery, is there going to be a benefit to the stock? You know as you said, you focus more fishing mortality on the oldest and largest classes as more of them survived those age classes first, or do you focus in on a smaller component, and let more of them survive afterwards?

These projections seem to indicate that it doesn't really matter that much for that total SSB. You're right, we haven't looked at, we didn't break this down by age class. I think in the TC memo that is not part of this, there was some information on how it affected 2015 versus some of those other year classes, and there were some small differences there, in terms of one option would protect 2015 more, and other options would protect '17 and '18 more.

Those kinds of questions are really tinkering around the edges. The big thing that is going to be driving whether or not you recover, is what you can do about the total F and total effort. For these projections we're assuming that we're going to maintain, we're going to be able to stay at F target going forward.

I think maybe we would see something different if we assumed that one set of regulations would lead to more or less effort than the others. But really, what's driving these differences is the effort, the overall fishing mortality, and less about how you are applying it to specific age groups within the population. Also keep in mind that we're still assuming the Chesapeake Bay fishery is unchanged for this, and there is still release mortality on fish that are outside the slot or fish that are below that minimum size. It's not like those fish are completely protected either. Basically, all of that adds up to say the uncertainty about our projective and about recruitment and what that's going to be, and things like that. You know any kind of benefit or detriment to those selectivity changes is really washed out by some of that uncertainty and the larger, overall importance of fishing mortality for the population. That is kind of why you are seeing some of the results that you're seeing for these projections. If there is additional stuff that the Board would like to zero in on, on some of these questions,

I think we can definitely take some guidance on that. But really it seems to be saying that selectivity measures to protect a specific year class, especially one like 2015, which already will have experienced eight years of fishing mortality by the time we even implement these changes, isn't going to give you as much benefit as something that reduces F on the

population as a whole. I hope that helps, I'm also happy to expand on anything if necessary.

CHAIR BORDEN: Justin, do you want to follow up?

DR. DAVIS: If you wouldn't mind one quick follow up, Mr. Chairman, thanks. Dr. Drew, do you expect that these sorts of projections might be more informative if they were done during the assessment update that's coming in 2022, because then we would have some information about how the fishery performed under the slot limit since we had implemented it?

DR. DREW: Yes, absolutely. I think that's part of why we didn't show any of the absolute trajectories coming out of this, is that these selectivity curves are based on kind of this length-based approach of trying to figure out how many fish are going to be vulnerable to the fishery based on size and growth, which is really very different from how the assessment model is figuring out that selectivity curve.

I think those results are not directly comparable to the model results. I think they are informative for this kind of a question, and they are the best that we could do with what we have. But for sure, we would get better information once we can do that assessment update with a couple of years under the new management regulations, and see what actually shows up in the data.

CHAIR BORDEN: Next, I have John McMurray.

MR. McMURRAY: Are we limiting this to questions now, or are you taking comments on whether or not options are viable for implementation?

CHAIR BORDEN: Both at this point.

MR. McMURRAY: Okay, so I would like to comment on Option E, the harvest moratorium. I have some real issues with it. First, it's limited to the recreational sector instead of requiring ocean sectors to share the burden. I would like to hear some rationale on that. But it's for that reason, but not that reason alone, that it's not a politically viable option.

Not only would the recreational folks lose their minds if we went down this road, but it would effectively kill a lot of charter business very quickly, and for what? Do we even know what sort of impact it will have? Right now, the PDT can't even provide an idea of how a moratorium would impact the stock, and whether or not it might significantly accelerate rebuilding, because we don't know how much recreational fishing effort would change if anglers can no longer kill bass. Nobody knows how much is fishing mortality now, until the recreational landings are converted to release mortality if a moratorium was proposed. Furthermore, I'm struggling to understand how anyone here believes that given the current state of the stock that such drastic action is actually needed.

As depleted as the stock is today, the current SSB is between 3 and 4 times as large as it was in the early eighties. The Commission managed to rebuild the bass population by 1995, without ever completely closing the fishery. I would like to see that go away. I would like to hear what some of the other commissioners think about that.

CHAIR BOREN: I've got Mike Luisi.

MR. LUISI: This may be a first, but I completely agree with John, on the idea of Option E. It's just not a viable alternative politically, and for management purposes I think there are too many unknowns within Option E, as to what progress we'll make and what results will come from a harvest moratorium versus a full-scale moratorium across all sectors. This option as written would pit the harvesters against the catch and release fishermen, and the charterboat industry would take an enormous hit.

One of the questions that Emilie asked is, is this a viable option for implementation, and my answer to that question would be no. I would prefer that the moratorium option be stricken from this, and we focus on the slot limit options in the ocean, which

we know based on science, those slot limits will have an effect. But to protecting, based on the goal of this section of the amendment, to protecting the 2015-year class. Thanks for the time.

CHAIR BORDEN: All right, Emilie, before I call on the next speaker, could you put up the options, please, and then highlight the one in red that the suggestion is to take it out? Okay, next I have, let's see, David Sikorski. David.

MR. SIKORSKI: Dr. Drew's comments triggered a lot of different thoughts I've been having, especially after seeing the TC and the PDT discuss that they're looking at the 2015-, 2017-, and 2018-year classes in their analysis. I think that's the right thing to do, and I think something missing from this section completely is the Chesapeake Bay.

When we see Chesapeake Bay defined in 4.2.1 it's 18 inches or greater, and that doesn't even accurately describe our CE proposal, which we're currently fishing under, which is a 19-inch minimum for private anglers, one fish. A 19-inch minimum for those on for-hire vessels, two fish. Just for the clarity for the public, I think I would like to see those pieces highlighted.

As it relates to this analysis that we've done for this 2015-year class, I think it's important that we look at a Chesapeake Bay analysis, not just in the ocean view of these year classes, because the 17s are in our fishery, the 18s are on their way in. They are probably in the commercial fishery at this point, with an 18-inch minimum in the commercial fishery, and eking their way into the recreational fishery. I think we're missing; you know as we were talking earlier about recruitment. That is great, we need to look at these juvenile fish and see what they're doing. But I think a big piece we're missing in our knowledge base here, without an updated assessment, of course, is what happened to those fish between year one and when they're leaving the Chesapeake Bay. It's been a longstanding concern. There have been changes.

I don't know enough about what we used to do here in the Chesapeake Bay, but I remember the term exploitable biomass. I think that's kind of what this analysis does for the coastal fishery, makes us understand what regulations might impact certain year classes, and again, I feel like we're missing that for the Chesapeake Bay.

Definitely for the recreational fishery, and that's what we're talking about here, but also the commercial fishery, to better understand that selectivity, because the quota doesn't tell the whole story, especially when we're really looking at these year classes and really looking at these recruitment challenges that are occurring.

I think we're a bit blind in that section. I did offer a motion or provide a motion to staff related to this topic, and I would like your judgment on it, if this would be the right time for that, or maybe we wait until everybody else goes, similar to like Megan did, and consider it at the end. But ultimately, I would like to add an analysis related to the Chesapeake Bay, if it's the right time.

CHAIR BORDEN: David, I would like to handle it the same way I did for Megan, so I'll come back to you.

MR. SIKORSKI: Thank you, Sir.

CHAIR BORDEN: I've got Megan Ware, the last one on my list.

MS. WARE: My question was actually encompassed in Justin's question, so I'll pass.

CHAIR BORDEN: Okay, so Toni, do you have any other hands up?

MS. KERNS: I have one additional hand, Roy Miller.

CHAIR BORDEN: Roy, you're up.

MR. MILLER: I would just like to quickly add my support for the Option E suggestion from Mike and John. Speaking from the standpoint of someone who was on the Striped Bass Technical Committee

in the late 1970s until the late 1990s, during the period of recruitment failure in the late 1970s and early 1980s through the moratorium years. We are in a vastly different state today, with regard to the striped bass stock, than we were during the period 1985 through 1989. I don't think a moratorium should be on our option list at this point in time.

CHAIR BORDEN: The vast majorities of the speakers have spoken in favor of taking out Option E. Is there anyone here that objects to doing that?

MR. FOTE: Dave, I had put my hand up. I don't know why I was on the list and I all of a sudden disappeared.

CHAIR BORDEN: Tom, that's never happened to you before, so I'm going to recognize you.

MR. FOTE: It's interesting, I thought what John is saying, what Roy is saying. We are all diverse in how we feel about this fishery. But this fishery is totally different than when we rebuilt it in the seventies and when we started rebuilding it in the eighties. Back then we were basically, there was not a huge fishery on it like it is now.

Most of the mortality was not coming from the catch and release fishery, as it is now in the recreational fishery. What we did was protect the year class until it spawned, and moved the size limit. I remember, we did it by statute. I had to go every year to Trenton to raise the size limit one inch or two inches at a time.

I made like nine trips, and one of the Chairmen of the Committee refused to hear it anymore, so I had to move it to the Veterans Committee instead of the Fisheries Committee. I'm looking at this and I'm saying, what are we doing? I mean the economic impact if any of these were put in place, so we're basically getting into a disaster.

Also, what are we really doing? We're going to increase the catch and release mortality, which is the major part of this fishery to begin with right now in the recreational sector. We're not addressing that problem that we made the circle hooks and we did so many different tweaks to it, that I don't think it's going to produce what we thought it was going to produce.

It's also going to be very hard to enforce. I'm looking at this and saying, what are we actually doing here, except spinning our wheels? I'm just completely devastated that after 35 years of bringing striped bass back. It's more than one effort. This is a lot different spawn. Our spawning stock biomass was big enough in 2014, 2017, 2018 to produce great year classes.

We're having an environmental problem and a problem in Chesapeake Bay, and maybe it's not surviving because of the catfish or some other fish. I don't know. But we might have a different thing going on. It was a certain period of time that when the Chesapeake Bay was having problems, that when we were doing the tagging studies that Wilson was doing.

We were actually, they were projecting that 50 percent of the coastal migratory stock were actually coming into the Delaware and the Hudson River. This fishery is totally different than it was in the eighties, just by the way people catch fish, how they release fish, and the numbers of fish we release. But we've got to look at it a little different than we did back then.

CHAIR BORDEN: Thanks, Tom, does anyone object to removing Option E from the document? Toni, are there any hands up?

MS. KERNS: I have John Clark and Marty Gary and Tom Fote with their hands up.

CHAIR BORDEN: Okay, so Tom's already spoken, so I'm going to go to John Clark and Marty.

MR. CLARK: I'm sorry, Mr. Chair, it wasn't to oppose for that, it was just for a clarification. I just wanted to ask Emilie. It isn't clear that Option B through D, if those were kept, whether approved recreational conservation equivalency programs

from Addendum VI would continue with those options.

We discussed keeping the division between recreational and commercial. But for example, we had a special summer slot season on striped bass in Delaware, which is currently approved under Addendum VI, and I just wanted to clarify whether that would continue under these other options.

CHAIR BORDEN: Emilie, to that point.
MS. FRANKE: Thanks, John. The Board would need to consider that very question, how conservation equivalency would apply if the Board selected a different size or slot limit.

CHAIR BORDEN: All right, so I'm going to go back on the list, Marty.

MR. MARTIN GARY: No objection to removing Option E. I just wanted to make sure we noted, and I'm sure everybody on the Board on this call has, that during the public comment period there was a significant number of people that weighed in, mentioning moratorium and the consideration by this Board.

At the same time, what was going through my mind as I listed to Roy and Tom, was there is a significant number of people that sit on this Board, that have a lengthy baseline of experience and knowledge that goes back prior to the moratorium period, that a lot of people are referring to. Tom and Roy just related their experiences. I know personally, I started my career in 1985, when Maryland initiated its moratorium, I was working as a biologist for them.

I think the common theme is, is here and now the same as then? I think universally, everybody that we talked amongst ourselves that knows that timeframe very well acknowledges it, no it is not. John McMurray, you also mentioned it as well. I just wanted to make sure we knew, we were paying attention and were listening to those folks in the public comment period. We did hear you, and we all contemplated that, I think. But no objection, Mr. Chairman to removing Option E.

CHAIR BORDEN: It sounds like there are no objections to removing it. That item is removed. Any other changes on this section? If not, I'm going to go back to David, and ask him for his motion. David, would you like to make your motion?

MR. SIKORSKI: Yes Sir. I know I provided the justification previously, and I would welcome any wordsmithing so we can get at that point, especially by the technical folks. **But I would move to add protection to the 2015-year class, through adding a maximum size limit option/slot option in the Chesapeake Bay recreational fishery in section 4.2.1 Maximum size limit options developed by the PDT should aim to maximize protection for the 2015, 2017, and 2018- year classes, consistent with the Technical Committee advice for the coastal analysis.**

CHAIR BORDEN: That's a motion, is there a second to the motion? Do I have a second?

MS. KERNS: Mike Armstrong.

CHAIR BORDEN: Mike Armstrong. David, do you want to speak to this, and then I'll call on Mike?

MR. SIKORSKI: Well, I think I provided a lot of the justification previously, prior to making the motion, so I will allow Mike to provide his justification, instead of repeating myself.

CHAIR BORDEN: All right, thank you. Mike.

DR. ARMSTRONG: I think most of the justification has been said. But I do think there is a contribution to the mortality of these year classes still coming from the Bay, and I think it's worthwhile to try to protect them everywhere they occur.

CHAIR BORDEN: All right, I'm going to take other comments. If you would like to speak on this motion, please raise your hand.

MS. KERNS: You have Mike Luisi, followed by Adam Nowalsky.

CHAIR BORDEN: Mike Luisi, then Adam.

MR. LUISI: Thanks, Dave, for bringing this up. You and I talked about this earlier. I appreciate you making the motion for discussion. I wonder if, based on the years that you've presented here, to maximize protection for 2017 through 2018, that could make it very difficult, given the availability of fish at certain size limits.

You made the reference, and the '15s are old enough now, or they're becoming part of the coastal stock, yet the '17s and '18s are part of our regiment fish at this time. I wonder instead, maybe not instead of, but included in your size limit option/slot limit option, if there would be something you might want to think about regarding seasonal closures, to help reduce mortality on those particular resident fish.

Instead of a slot limit option, which I think is going to be hard to come by, based on the year span that we're trying to protect. Because we've done seasonal closures of targeting in this past year, and I think we were successful. I think we could use that as a way to minimize dead discards on those particular year classes, as a way of protecting them rather than change the limits and slot limits. I just throw that out there for your thought, and I'll leave it there.

CHAIR BORDEN: All right, then I have Adam.

MR. NOWALSKY: I see two elements with this motion that I'm not clear on. The first is that the first sentence it says to move to add protection, but then the second part of this motion talks about maximizing protection for three different year classes. It almost seems to me that we are ultimately adding protection to all three years classes, so I'm not clear what the direction we're giving to the PDT is in this.

The second element of it is that given that this says that options developed by the PDT, does this motion predispose us to not sending this document therefore out today, and does this motion ultimately need to get discussion now, some degree of perfection, and ultimately on the same table that the other motion is.

Because again, as I read this, we don't have a discreet option here. We're asking the PDT to develop it, which would preclude us from releasing this today. I would appreciate clarity from the maker, on again, what direction we're trying to give with regards to what we're protecting, and direction again as to where this would leave the document if this passes as written.

CHAIR BORDEN: David, please follow up if you would like to respond.

MR. SIKORSKI: Yes, Sir, thank you. As far as the intent is concerned, give us a nearly identical analysis that's been performed under the section of protection of 2015-year class, where the TC added the 2017- and 2018-year classes into that analysis, I think it's Pages 57, 58ish in the draft document.

That's what I'm looking for from a Chesapeake Bay perspective. In this document as a whole, I feel like there is a lot of Chesapeake Bay components that are missing. I thought that this would be a way to put something into the document at this point to highlight that, and give us better guidance as we move forward.

As it relates to how we handle this motion, I would look to the Chair and other members of the Board, in how it relates to this document as a whole. I think it would be logical to treat it the same way that we treated the previous motion at this point. To me it's a key piece that's missing here, especially given the more recent information we saw on the JAI in Maryland three years in a row.

We've really got to be looking closely, and not just assuming that the way we're prosecuting the fishery in the Chesapeake Bay is going to be okay. This is further kind of exacerbated by the way that what Maryland's CE proposal is, or what the one we're operating under, that did not reduce commercial catch.

I've been highly concerned about that, and frankly it's been done in all three Bay jurisdictions, to not limit commercial quota, which is mortality. As Dr. Drew was saying, we're only looking at pieces of the F, but all these things come together to give us our overall F that we're prosecuting on these fish. The more pieces of the puzzle we can have, the more comfortable I am that we're heading in the right direction. I welcome any guidance on how we get there, but I want to fill in the blanks here of what we're not seeing related to the Chesapeake Bay fisheries.

CHAIR BORDEN: Adam, do you have a follow up to that?

MR. NOWALSKY: I just think that as written, I don't have a specific recommendation for rewording this motion, other than I would suggest that if this second part is going to stay, regarding the three different year classes that perhaps we consider changing the first part of the motion to reflect that as well, because that is ultimately what we're looking here for is protection, not just for the 2015-year class, but for all three years classes in this motion.

CHAIR BORDEN: David, that is a question to you. Do you have any objections to adding 2017 and 2018 to the first line?

MR. SIKORSKI: I do not, no objection.

CHAIR BORDEN: Mike Armstrong, do you have any objection?

DR. ARMSTRONG: No objection.

CHAIR BORDEN: It's added without objection by the maker of the motion and the seconder. Further discussion on this.

MS. KERNS: No additional hands.

CHAIR BORDEN: This actually falls under the, as David noted, this falls under the same category as Megan's motion. We don't know the path that this is going to take, if in fact we're going to continue to perfect this document, then clearly, we have the opportunity to refer this option to the PDT, and ask them to work on this and present information at the next meeting. Maybe we should handle it in the same manner. Would someone like to make a motion to table until the end of the meeting?

MS. KERNS: Mr. Chair, before you make that motion, Marty Gary had his hand up, and I don't know if it was related to objecting.

CHAIR BORDEN: Marty. My Vice-Chair, he's going to lead us out of the woods on this.

MR. GARY: I don't know if I'm going to lead you out of the woods here or not, but I was struggling, I think, using the same language Adam has about the intent. Maybe Dave, if I could be so bold to ask you, as you made the motion. I get the reason, '15, '17, '18, they're all in the upper quartile of Maryland's JAI geometric mean. They are good year classes, and I understand where you're coming from. But is your intent then, say for instance '17 and '18.

By the time this Amendment would be implemented, you're looking at what, five- and six-year-old fish, which are right in the middle of our resident fishery. Then the '15s of course, they don't all ever leave the Bay, so there are a few larger fish around, but they would be up there a little bit, they are larger size fish. Is your intention to put, looking at, when you say maximize protection. I look at those two words, maximize protection. Are you looking at a slot limit that would essentially put those fish out of that exploitable stock biomass range? Would it be, let's have a slot limit that's, I don't know, 28-32 inches or something like that? You're protecting those smaller, younger fish, '17 and '18, but also affording protection to some of the '15s that still may be residing in the Bay. Is that where you're headed with this, and is that what you want the PDT to analyze?

MR. SIKORSKI: I am at a point where it's one step at a time. I do think that an ultimate outcome could be protecting these fish with some sort of

measures. But I said earlier, we're kind of blind in this section of the fishery and how we're exploiting it. What I'm really looking for, you know I was really impressed by the assessment that's been already provided to us on the ocean fish.

I feel like that same thing on the Bay fish will help guide the real answer to your question at a later date, if we get that assessment. I don't want to get out in front of anything until some information provides us. I know what my gut tells me, and it's that the Chesapeake Bay has a role to play in reducing our impact on these fish, because they are a big part of recruiting. I'm sorry, big part of rebuilding this stock.

But I need more information to understand exactly what pieces of the puzzle we should put together from a regulation standpoint, and now is the time, I think, to start planning for implanting this in '23, regardless of whether we approve today or not, because if not, what are we going to wait even longer? That is my biggest concern. It's really just more technical guidance. If it passes and if the information is provided to us for us to make another decision at a later meeting.

CHAIR BORDEN: What's the preference of the Board here? Do you want to vote on this or do you want to table it?

MS. KERNS: Marty, is your hand up to answer that question?

MR. GARY: I'm sorry, Mr. Chair, you're looking for a motion either to table or vote on it?

CHAIR BORDEN: Yes, in other words, then the tabled motion would be to handle it the same way Megan Ware's motion was handled. We would take it up at the end of the meeting, while we have a better sense of what course of action is going to be taken.

MR. GARY: Okay, it sounds like we're going to vote on it now or later. I'm really uncomfortable with the way this is being explained and written. I'm happy to vote on it now, I'm not going to support it if we do, or we can table it and vote about it later.

CHAIR BORDEN: All right, does someone want to make a motion on this?

MS. KERNS: Adam Nowalsky.

CHAIR BORDEN: Adam.

MR. NOWALSKY: I move to table until the end of the Amendment 7 agenda item.

CHAIR BORDEN: Do I have a second?

MS. KERNS: John Clark.

CHAIR BORDEN: All right, so we have a motion to table, it's non-debatable. Let me just ask, is there any objection to this motion? Does anyone object? Any hands, Toni?

MS. KERNS: No objections.

CHAIR BORDEN: No objections so the motion passes without objection. That will be taken up at the end of the session. Okay, Emilie, we're back to you.

MS. FRANKE: Sounds good, thank you, Mr. Chair, I can move on to the next issue here. This next issue is recreational release mortality, and this is in Section 4.2.3 of the Draft Amendment. Again, starting with the statement of the problem. Recreational release mortality is a large component of annual fishing mortality.

It was the largest component from 2017 through 2020, but that's just because the striped bass fishery is predominantly recreational, and the majority of the catch is released alive. The current management program primarily uses bag limits and size limits to constrain recreational harvest, and it is not designed to control effort, which makes it difficult to control overall fishing mortality.

Efforts to reduce overall fishing mortality through harvest reductions may be of limited use, unless recreational release mortality can be addressed. In addition to the circle hook requirement implemented through Addendum VI, which is the Option A status quo option in this section. The Board could consider the following types of options to address recreational release mortality.

The Board could consider effort controls, which are seasonal closures in Option E, additional gear restrictions in Option C, and/or outreach and education options under Option D. It is important to note that although the impact of many of these options are difficult to quantify, they are intended to reduce the number of recreational releases, or they are intended to improve post release survival.

Again, the status quo option here is the circle hook requirement, as implemented through Addendum VI, and this requires circle hooks when fishing recreationally with bait. This does not apply to any artificial lure with bait attached. Also, as guidance approved by the Board, back in March of this year, it is recommended that striped bass caught on any unapproved method of take, be returned to the water immediately without unnecessary injuries. Moving into the first set of options, which are seasonal closures.

Again, these could be selected in addition to the status quo circle hook requirement, and seasonal closures are intended to reduce the number of live releases by reducing effort, and reducing the number of trips that interact with striped bass. The Draft Amendment includes some discussion on the different types of closures, as requested by the Board at the August Board meeting, to help inform the Board and the public's consideration of the different options. The majority of the options developed by the PDT are options for no targeting closures, in order to address recreational releases resulting from both harvest trips and from catch and release trips. Again, these closure options are not associated with a specific reduction.

But for future potential management actions, the draft document notes a PDT recommendation that the TC establish a standardized method for estimating the reduction in removals, associated with a no-targeting closure in advance of any future management actions. I'll go through the different no-targeting closure options at this point.

The Board can select one of these no-targeting closure options. Options B1 and B2 would be no targeting closures during Wave 4. A no-targeting closure during Wave 4 would reduce effort during a time when all states have an active fishery, and during a time when there are environmental stressors like peak air and water temperatures.

Option B1 would be a coastwide no-targeting closure during Wave 4 for a minimum time period selected from the following sub-options. It could be July 1-15, July 16-31, August 1-15, or August 16-31. CE would not be permitted for this option. Option B2 would be a state or a regional no-targeting closure during Wave 4.

Similar to B1, CE would not be permitted for this option. Starting with Sub-option B2-a, this would allow each state to select a two-week period at minimum during Wave 4 for their closure. Under B2-b, each state would select a three-week closure at minimum during Wave 4, except for Maine and New Hampshire, which would select a two-week closure period at a minimum.

This type of option, Option B2-b was developed to address concerns about the relatively large proportion of directed trips that occur in Wave 4 in some states, and the shorter period of time that large striped bass are available in some areas. This option was developed based on MRIP directed trip data from 2017-2019, using a method looking at the standard deviation of Wave 4 directed trips, to identify those two states that would take a shorter closure and the rest of the states that would take a longer closure during Wave 4.

B2-c would be a regional closure that would allow each region to select a two-week closure period at a

minimum during Wave 4. Potential regions as listed here are defined in the Draft Amendment. However, the document notes that the Board can redefine these regions if desired. Just a quick note from the Advisory Panel meeting.

There was some concern about state coordination and accountability associated with a regional closure option. The next type of no targeting closure option is Option B3, and this would allow states to select a two-week closure period minimum to reduce effort during waves when the striped bass fishery is active, and directed trips are occurring.

Similar to the other issues, CE would not be permitted for this option. Sub-option B3-a would require states to select a closure period during a wave with at least 15 percent of the state's striped bass directed trips. B3-d would require states to select a closure period during a wave with at least 25 percent of the state's directed trips. Again, these options were developed based on MRIP data from 2017-2019, and again a note from the Advisory Panel meeting. Some AP members noted that even a two-week closure could have significant negative impacts on the fishing industry. Here is the table from the Draft Amendment showing the proportion of striped bass directed trips by wave for each state, from 2017 through 2019.

The data shown here informs the development of the options that I just described. From the Advisory Panel meeting there was some support for using just MRIP effort data as shown here. There was also a question and concern about whether these directed trip percentages are really accurate, especially for some of the ocean regions, the southern states like Maryland, Virginia and North Carolina.

The next closure option would be Option B4, and this is actually an option the Board needs to consider if the Board selects one of the prior no-targeting closure options. The Board would need to consider whether existing no-targeting closures implemented in 2020, as part of the Addendum VI CE programs would meet the seasonal closure requirements for any new closures or not.

Option B4-a, existing or targeting closures implemented in 2020 would fulfill the new closure requirements. Under B4-b, those existing closures would not fulfill the new closure requirements. Those states would need to implement additional closures to meet the new requirements, and maintain those CE size limits or the states would need to implement the FMP standard size limits along with the new closure.

Then finally, the last option for seasonal closures is spawning closures, and these spawning closures could contribute to stock rebuilding, by eliminating harvest or reducing releases of spawning fish. In this case existing closures would meet the requirements of these options. B5-a would be a no-harvest closure during Wave 1, and Wave 2 in spawning areas.

B5-b would be a no targeting closure for a two-week period on the spawning grounds during peak spawning. CE would not be permitted, and the Board could choose one or both of these spawning closure options. Moving on to Option C in this recreational mortality section, which are gear restrictions.

Again, the Board could consider additional gear restrictions to increase the chance of survival of striped bass that are caught and released. The Board could select one or more of these options. C1 would prohibit the use of any device other than a nonlethal device to remove striped bass from the water, or assist in releasing stripe bass.

The Draft Amendment includes a definition of what a nonlethal device is. Option 2 would prohibit the use of treble hooks, Option C3 would require barbless hooks, Option C4 would prohibit trolling with wire, and then Option C5 would be an option for the Board to consider whether this incidental catch guidance through Addendum VI would become a requirement.

This incidental catch statement would become a requirement that striped bass caught on any unapproved method of take would be returned to the water immediately without unnecessary injuries. Again, if you're seeking a requirement, this would apply to circle hooks and any other gear restrictions selected for this Amendment. A note from the Advisory Panel here that there was some significant concern from AP members about these gear restriction options. The AP noted that these options seem to target certain parts of the fishing industry, and the AP noted that gear is used differently across states, and the benefits of these gear restrictions would vary pretty widely.

Then finally, the AP noted that the circle hook requirement was informed by relatively more science, enrolled public support, and these options presented here are not. Then finally, Option B is related to outreach and education. States have already implemented outreach and education campaigns, but these options are intended to more explicitly recognize these efforts as part of the Draft Amendment.

D-1 would require states to promote best handling and release practices, and the states would be required to provide updates in their compliance reports. Then under D2, education and outreach would be recommended that they continue to promote best practices. Then one AP member noted that this required outreach would need to be clearly defined. With that, Mr. Chair, I'm happy to take any questions on these recreational release mortality options.

CHAIR BORDEN: Questions for Emilie, and then we'll get into the statements and suggested modifications, if any. Questions. Toni.

MS. KERNS: I have Adam Nowalsky and Jason McNamee, and Tom Fote your hand was up and then it went down, and then it was up and then it went down again, so I'm not sure.

CHAIR BORDEN: Adam and then Jason.

MR. NOWALSKY: Given the concerns from the AP with Option C and their comments. Is there anything in the way of mortality studies that we could use to justify the inclusion of those restrictions?

CHAIR BORDEN: Emilie.

MS. FRANKE: Thanks, Adam, let me just get down to that section of the Draft Amendment here. For treble hooks the Draft Amendment referenced a couple of studies, as well as for the barbless hook option one study was referenced there. But there were no studies referenced for the killing with wire option or the nonlethal device option.

CHAIR BORDEN: Adam, do you want to follow?

MR. NOWALSKY: I would just ask if the PDT weighed in at all on what information was provided for the barbless and the treble hook, as to whether or not they felt that there would be quantifiable reductions in mortality that we would be able to go back to the public at some point in the future and say, here is what this got you.

MS. FRANKE: The PDT did not specifically weigh in on that besides the discussion about the difficulty of quantifying the benefits of any gear restrictions. I guess the one note from the PDT is that these options were developed based on public comment unheard through the Addendum VI process and through the PID process.

CHAIR BORDEN: Next, I have Jason McNamee.

DR. McNAMEE: I'll actually start, I was going to ask a different question, but I'll quickly work off what Adam was just talking about. Just to offer, I guess a comment. I'm inclined to drop those, with the exception of C5, drop the gear stuff out of this. The main reason is, I don't know if others enjoyed the circle hook experience that we went through.

But it's clear that individual fishermen have sort of a secret recipe for how they like to fish for striped bass. I'm not interested in getting twisted up in

that again, for what in the end may be very little value. Just some comments on the gear stuff there. But my main question is, the regional options for the seasonal closures, it's a question for Emilie, if you could sort of channel your inner PDT.

With the idea there to try and coordinate states that are sharing water bodies. I do see a sense in trying to group states by shared water bodies, because I think it would be problematic to enact a closure. I'll just use the example of Long Island Sound. You know if New York had one set of two weeks and Connecticut had another set of two weeks, it would probably defeat the purpose of reducing recreational releases and the mortality associated with that. Was that kind of the idea there, was to group states by shared water body, more or less?

MS. FRANKE: Yes, exactly, that was the intent here. The PDT again took a stab at coming up with these regions here on the screen in the Draft Amendment, but noted that it was difficult to kind of get a clean breakdown by shared waterbodies. There was sort of always one or two ways you could go. The PDT recognizes that there is not a straightforward way to break this down, but that was the intent of trying to group them by waterbodies.

DR. McNAMEE: Great, thank you, Emilie.

CHAIR BORDEN: Next, I have John McMurray and then Pat Geer.

MR. McMURRAY: I don't know if I want to see all of the sub-options in C go away. We did hear from the public about treble hooks and barbless hooks and the gaffs. Maybe they can come out later, but for now I think they should stay in for the public to comment on. But I'm really surprised that Sub-option C4 made it into the document, because if I recall correctly, there was very little if any discussion at the Board meetings or in the public comment period about wire line trolling.

I guess my question is, is there some science that supports the contention that wire line trolling exhausts fish any more than any other method? Before you answer, I did want to point out that if this were to go into effect, I mean it would be pretty devastating to the Montauk charterboat industry, and I just don't see the need for it in here.

CHAIR BORDEN: Okay, Pat Geer, and any preface, just whatever comments are going to come after this. It would be really helpful if you would refer to a specific number or letter, and then say, I think this should come out. Then Emilie will follow the same process she followed in the past, and highlight it in red. I think it will make it easier for everyone to keep track of what is being proposed. Pat.

MR. GEER: I would suggest that we remove Option C entirely, and maybe move C5 under our existing circle hook requirement. But what I would like to say is that these are important, but we may get more bang for our buck with education and outreach, and maybe put them into our outreach and education, Option D, where we basically including fish handling techniques, we include these items as probably not the best practices possibly for fishing.

But maybe move them over there. There are better ways of protecting the resource by not using these types of gears, instead of making it a requirement that's going to be very difficult to enforce, move it into our outreach and education, where we try to teach people that it might not be the best use of the resource by using these gears.

CHAIR BORDEN: Thanks, Pat. I think that's useful. Toni, do you have others on the list?

MS. KERNS: I do, I have Justin Davis, Tom Fote, and Adam Nowalsky.

CHAIR BORDEN: Justin.

DR. DAVIS: I would agree with Jason and Pat. I generally would support removing Option C in its entirety. I do have a question relative to Sub-option

C5. It seems to me that the need for Sub-option C5 is predicated on adopting one of the sub-options C1-C4. We already have this provision in place, relative to circle hooks.

Absent adopting a new measure that creates another unapproved method of take. It doesn't seem like C5 is a standalone as needed, unless something else is done. I can't remember who, but I think at some point someone made the comment of, we should get rid of everything but C5, but to me there is no need for C5 if C1-C4 go away, which is what I would be in favor of.

CHAIR BORDEN: Tom Fote and then Adam.

MS. KERNS: Mr. Chair, can we just make one clarifying comment to C5, before you go? C5, it's in the plan, Justin, it's a recommendation, it's not a requirement, if you'll remember, because it wasn't something that went out for public comment, so therefore it's a recommendation. But it occurs, but not a requirement.

CHAIR BORDEN: Justin, do you want to follow up on that?

DR. DAVIS: Yes, thanks, Mr. Chairman. Toni, do you mean relative to circle hooks, it's a recommendation but not a requirement?

MS. KERNS: Correct.

DR. DAVIS: Okay, thanks.

CHAIR BORDEN: Okay, so I'm back on Tom Fote and then Adam.

MR. FOTE: I would like to add one thing in this. It really goes to C5, is that if we have a closure both seasons, no picture taking of any striped bass at all, all fish must be released in the water. I think that any fish that can't be kept, because we know the size of it, should be released in the water, and no picture taking.

I mean, I look at these pictures of all these big fish being held up. We know they're going to be all released, and we put more stress in them pulling them out of the water, loading them into the boat. Some guy holding him there for five or six minutes while he gets the best picture, and then throwing them back overboard.

If we look at what they do with tarpon, they basically release the fish in the water. You're not allowed to take the fish out of the water if you want to protect them during closed seasons, or even during when the fish are not going to be landed for food. You've got to release them in the water without taking a picture. That would save more fish than anything else that's listed on these slides.

MS. FRANKE: Mr. Chair, this is Emilie, can I do a quick response?

CHAIR BORDEN: Go ahead.

MS. FRANKE: Thanks, Tom. The PDT did discuss a potential option for requiring in-water release of striped bass, for the reasons that you mentioned. However, there were some concerns about safety, in terms of making that a requirement. You know if striped bass were incidentally caught or in other scenarios, that it would potentially be a safety concern requiring an in-water release.

CHAIR BORDEN: Adam.

MR. FOTE: Can I answer that?

CHAIR BORDEN: Yes.

MR. FOTE: If we're not supposed to be landing the fish and we're supposed to be releasing them, there are different tools you can get to release fish that are four feet long. I have one downstairs without basically pulling it out of the water. People are required to get them. You are required when you get the gear to take the fish down and when you're fishing groundfish, I mean reef fish.

It basically lets them down easy, so you don't basically blow out the guts. I think we can get around that, but I look at all these pictures, and we know every scientist I have talked to about holding fish up to where they hold them to take those pictures, damages especially the big fish.

CHAIR BORDEN: Adam, you're up.

MR. NOWALSKY: Yes, based on the answers to my earlier questions, this would be another voice of support. I'm leaning towards a complete removal of Option C. I would not be opposed to the inclusion of C5, if there was some other place to put it, as it referred to some other gear restrictions that we've already talked about that are in place already.

But if we don't have C1 through C4 here, I'm having a hard time figuring out how we could leave C5 in. But if staff had a creative way to do it, I would otherwise support it. But beyond that, another voice in favor of removal of Option C.

CHAIR BORDEN: Sounds like we're getting general agreement to remove this with the sentiment being voiced that we try to address some of these issues in our public outreach. On C5, as Adam said, if there is another way to weave that into another portion of the document. It doesn't sound like there is a lot of objections to that. Let me ask, do we have objections to removing this, and handling it that way? Does anyone object?

MS. KERNS: I just want to give a second for the people who had their hands up, I think, and wanted to make questions, a chance to take them down. I have two hands in objection, John Maniscalco and John McMurray.

CHAIR BORDEN: Okay, and to both Johns, could you just clearly state so it's part of the record what your objection is? Johns, either one of you.

MR. MANISCALCO: I am not speaking for John McMurray, only for myself at this point. But I wonder why we would remove formal consideration of prohibiting gaffing. I don't understand how anyone would think that despite, maybe there is not a study that we're planning to remove, but helping a giant point in part of the fish does not seem like it is likely to lead to a low level of release mortality, and I don't know why we wouldn't be considering it at this point.

CHAIR BORDEN: John McMurray.

MR. McMURRAY: The goal is to reduce discard mortality. These seem like very commonsense ways to do it, even if there is difficulty in assessing the effectiveness of them. Well, it's commonsense that pulling three hooks out of a fish is more difficult than pulling one out. The same could be said with barbed hooks versus un-barbed hooks. I'm not going to fight everyone on this, but I do think it should stay in. I think the public should get a crack at it.

CHAIR BORDEN: Okay, so it sounds like the consensus is to take it out. We have two objections. I would ask that those objections be reflected in the minutes. Any other changes on this section?

MS. KERNS: I have Mike Armstrong followed by Max Appelman.

CHAIR BORDEN: Mike and then Max.

DR. ARMSTRONG: I would actually like to register an objection to get rid of C1. We put that in, it's been successful. I think it's something that's doable and should be in there, as is C5. I'll put that out there. Can we go back to B?

CHAIR BORDEN: Certainly.

DR. ARMSTRONG: If we could bring that up on the screen. Anyway, we're willing to do very difficult measures to help this stock. Seasonal closures at the height of tourism are not difficult, that's catastrophic, for benefits that are currently unquantified, and two weeks is not going to get us a lot.

Our whole fishery of striped bass is during the summer essentially, so we're shutting down the recreational fishery in Massachusetts for two weeks, in July and August. That just can't happen for us. If there was a huge quantifiable benefit, sure, we would jump onboard. But that's just not there. I'm okay with leaving an option in that gives the states a little bit more flexibility to move it out of Wave 4, if we have the data. I would advocate for eliminating B1 and the others can stay.

CHAIR BORDEN: Mike, you faded out a little bit, eliminate B1 and what?

DR. ARMSTRONG: And B2.

CHAIR BORDEN: Okay.

DR. ARMSTRONG: Which I think that's the coastwide option, which is just a nonstarter, and then let's see, B2, a bunch of options but all of them are closures during Wave 4. I understand why we would want to do that, but I am not seeing a huge benefit for getting people off the water for two weeks.

The other thing. I think for most people it's completely unenforceable, the no targeting aspect. You know maybe Mike Luisi can jump in and advise us on that. But as long as you have bluefish in the water, you are fishing for striped bass. It's just an unenforceable thing.

CHAIR BORDEN: Okay, I've got Max next, thanks, Mike.

MR. APPELMAN: I put my hand up when we were talking about gear restrictions, and I realized the conversation shifted to the season closures. I'm not prepared to talk about that, but I was just going to speak in support of not removing Option C1 from the gear restrictions, of course in support for that with some of the other commissioners.

CHAIR BORDEN: All right, you've heard the suggestions on this. Do we have any other comments?

MS. KERNS: Yes, I have a slew of hands. The list that I had, and I don't know if any of these hands have now gone down, so I'm going to try to keep track. Megan Ware, Ritchie White, Loren Lustig, Dennis Abbot, Pat Geer, Justin Davis, Marty Gary, and Mike Luisi. I have them all written down if you need me to repeat them later. I just want to note, there is a member of the public that has their hand up, and the Chair did say that he would not be taking public comment at this time, going through the issues, so just letting them know that.

CHAIR BORDEN: Okay, so I'm going to run through these and try to provide some guidance at the end of this. Megan, and then Ritchie White, you're up after that, on bat as they say in Boston.

MS. WARE: Thanks, Mr. Chair, I'll be brief, because that is quite a list. I support removal of B1 and B2. I think what I'm struggling with here is some of the rationale for focusing on Wave 4 is the peak air and water temperatures, which I totally understand is an issue in other states. But the states that are most affected by that are the New England states, which don't have that issue.

I mean, I get hypothermia alerts on my phone in July for Maine water, so I'm struggling to see, to go out to public comment with a Wave 4 closure because of peak air temperature and peak water temperature. I support Mike Armstrong in that, and then I would also keep C1 for the gear restrictions at this point, so perhaps a compromise there is removing C2, C3 and C4.

CHAIR BORDEN: Ritchie White.

MR. WHITE: I agree with Megan, B1 and 2 are just totally unenforceable in the Gulf of Maine with bluefish there. Law Enforcement is very clear about that, so that is just a waste of time. I would agree with Mike to leave in C1.

CHAIR BORDEN: Okay, Loren, you're up.

MR. LOREN W. LUSTIG: Yes, my comment relates to C5. Would you like me to give you the comment now, or perhaps hold it for later?

CHAIR BORDEN: You can do that, because I've allowed other people to stray into the Cs.

MR. LUSTIG: Okay, if I could get the slide back with C5 that would be helpful. Earlier in our discussion, there was a comment made by a staff member that it really was a recommendation not a requirement, and I took note of that. There it is on C5, notice it does use the word requirement. Perhaps if we do any wordsmithing, we should adjust that to be recommendation. That's all my comment.
CHAIR BORDEN: Dennis Abbott.

MS. KERNS: Mr. Chairman, if it's okay, I just want to make sure that it's understood. What is in the plan right now relative to C5 is a recommendation. This document would make it a requirement, as written.

CHAIR BORDEN: Dennis Abbott.

MR. DENNIS ABBOTT: I think Ritchie covered the points that I was going to make, and I will additionally say that a two-week closure with a season for us that runs approximately 12, 13 weeks would be quite an imposition, even if it was enforceable. I strongly would recommend removing those closures for us.

While I have the floor, could I ask the Chair a question, a general question? We've had a lot of discussion today about this document, getting it ready to go out for public comment today. What is the ramification of us putting it off for another meeting week? As I look at it, it doesn't matter whether we finish the document in February or whether we do it in May.

Because our implementation time wouldn't be until 2023. I think as it relates to the two motions that have been tabled. I think that we should be delaying, if possible, and allowing those two motions to go through, and let the PDT do its work, and allow us time to have a better document at the end of the day. Is there any loss of not finishing the document today?

CHAIR BORDEN: That's a good question, Dennis, and that's exactly why I said early in the meeting a couple of times, that regardless of which path we follow, we implement at the same time. There is really nothing lost by deferring action. As far as I know, staff can correct me if I'm wrong, it's still a 2023 implementation timeline, regardless.

MR. ABBOTT: Thank you, Mr. Chair, that was my thinking on that.

CHAIR BORDEN: Emilie, please correct me or Toni if you have a different opinion, please.

MS. KERNS: I think that that is correct, David. I think the one thing that we would look for from the Board is areas that need improvement to, that if it's not going to go out for public comment today that we know that, so that we can send it back to the PDT.

For these motions that have been tabled we would need to address them before the end of the day, so that if they did pass, we could have the PDT work on them, so that you could approve something for public comment in January. Because if we go much past January then you would start to impact the implementation timeline.

CHAIR BORDEN: Okay thank you, so I'm back on the list. I've got Pat Geer and then Justin Davis and then Mike Luisi. Pat.

MR. GEER: This is a clarifying question for the members of the PDT. The 15 day period, do they have to be consecutive days?

MS. FRANKE: Yes.

MR. GEER: They do have to be, okay. As far as going back, I know I'm jumping around a little bit, but as far as the gears with the gaffing. We tried to do that with cobia, and we have a law in our state for no gaffing for cobia, but it's pretty much

unenforceable for the most part, unless we see them. That's why I just felt that it would be better to try to do education and outreach. But if folks feel it's important to leave it in there, you know I'm okay with that too.

CHAIR BORDEN: Justin and then Mike Luisi.

DR. DAVIS: Real quick, I'll just express the opinion that I think we've heard enough folks say they would be in favor of keeping C1 in the document. But I think we should keep it in the document, I just don't think we have consensus on taking it out at this point. I also wanted to comment on Option B as a whole.

From my standpoint, I would be in favor of taking Option B as a whole out of the document. I think that no targeting closures are, certainly speaking from Connecticut's standpoint, I suspect for a lot of other jurisdictions are a regulatory nightmare and unenforceable. After what we just went through with the circle hook mandate and implementing that.

I am really gun shy about creating more mandates with questionable enforceability. I also share the concerns expressed earlier that we can't quantify the benefit from these potential closures, so we can't explain to the public what benefit we're getting for the sacrifice we're asking them to take. I sort of do think there might be some merit to exploring the idea in D5-a of no harvest spawning closures, and putting that idea out in front of the public.

But to me that's not an issue around recreational release mortality, and I think the connection made in the document is pretty tenuous, where it says releases might be reduced during the period if you prohibit harvest, because people will be discouraged from fishing. I don't even know if a harvest spawning closure really belongs in this section.

I understand why it's there, but I think it should remain just that. But in general, I just feel like this whole section is setting us up for implementing something where we can't clearly explain the benefit. It's going to create all kinds of enforcement issues. It's going to agitate a large section of the public.

I think it also just sort of reflects in my mind, a bit of a, I don't know what I would call it, maybe an outdated or inaccurate sort of idea of like, what do we want out of this fishery? I mean I think this is a fishery that is primarily recreational. The benefit we want from this fishery is opportunity for people to go fishing, which in turn provides economic benefits to society, because people are going fishing and spending money to do it.

I don't know why we would want to take opportunity to fish away from people, without a clear idea of exactly what we're getting from it. I'm in favor of removing Option B all together. I sense other folks on the Board may not be as ready to go that far, but I just wanted to put that out there.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: I'm of the complete opposite opinion of some of the folks around the table who are suggesting that we remove Option B, Option B1 and Option B2 from the document, due to the number of different reasons that were mentioned. The one thing that made me most happy about this document when I read through it, was that these options on recreational release mortality were really starting to cut into a new way of thinking and a new way of approaching fishing mortality. Emilie started off this section explaining that part of the problem with this fishery is that we have a tremendous amount of recreational release mortality occurring coastwide, whether it's in the different bays, the estuaries, or along the coast. It is making up a large portion of the mortality associated with the fishery.

Mike Armstrong mentioned it earlier, but we took the path last year at implementing a two-week closure during Wave 4 at the highest air temperature and water quality, it was the most

poor. For two weeks we heard from our fishermen that the sky was going to fall, and everyone would be out of business. Yet that didn't happen.

We had a couple weeks' time when we had a tremendous heat wave. For the most part, fishermen complied with the no targeting provision. There were some warnings and citations written, from my understanding. But it is a learning process. Most people, I think we could agree that the majority of people who are fishing are rule followers, to some degree.

You're not going to capture everyone in a no targeting closure, but you're going to capture the rule followers, the ones that want to see this stock come back. Unless we deal with recreational mortality and release mortality, through non-targeting closures, we've basically done nothing. To modify harvest is one thing, but this is where we really need to put our focus, and we need to change the course of our actions to this non-targeting closure period. It's two weeks.

Yes, maybe there are difficulties in the enforcement. But it's for two weeks. It's not for three months. You know you can do anything for two weeks, and therefore I really feel like it would go against everything I believe in at this point, as far as how we're going to address recreational release mortality, by removing Option B from the document.

I could be inclined to consider removing B1 and B2, and leaving in B3, which gives states a little more flexibility, as far as how they could apply that closure, time periods in their fishery where the F is high. Maybe the middle of the summer isn't great for everyone. But as long as there is a closure during high effort periods, I think that's still going to make some progress in our development of addressing this recreational release mortality.

If we don't do non-targeting closures, we really haven't done anything regarding release mortality. I will say once again, you know we implemented the closure in 2021 the last two weeks in July, which is our peak tourist season and peak fishing time. We made it through, and we know that we saved a lot of fish during that time. I'm against removing it totally, but could be convinced to take some of these options out, as long as Option B3 stays within the document.

MS. KERNS: David, I have more hands. Do you want that list? David, if you're talking, I can't hear you.

CHAIR BORDEN: That was my best speech of the day.

MS. KERNS: I'm sure it was.

CHAIR BORDEN: I would just make the personal observation here that I am, as a recreational angler who targets striped bass with a fly rod, and practices 100 percent catch and release. I am very sensitive on this issue. But I find myself, in listening to both Justin and Mike, agreeing with both of them on parts of what they said. This is a good example, I think, of an issue that just begs us to continue to work on it, figure out ways to continue to work on this.

Maybe we just separate this out from the document, this section, but commit ourselves to working on it over some period of time, six months, nine months, and try to get at some of these nuances and problems. I mean the enforceability problem that has been talked about, I think is real. Some of these other issues, I think would benefit if we had a little bit more time as a Board to kind of focus on it.

I'm not exactly sure what the preferred way is to handle this, but personally it wouldn't trouble me if this entire section came out of the document, and the Board committed itself to dealing with this issue fairly quickly in a trailing action. But that's the only suggestion I have. I'll go back to being the Chair. We have kind of a consensus with some objections. I'm removing the red, and the objections were Mike Luisi and Emilie, can you tell me who else objected?

MS. FRANKE: I don't recall if anyone else objected to removing B1 and B2.

MS. KERNS: Mr. Chair, you have some hands up, and I'm not sure if they're in objection or if they just want to speak.

CHAIR BORDEN: Okay, so who are the hands, Toni?

MS. KERNS: I have Joe Cimino, Emerson Hasbrouck, and Jason McNamee.

CHAIR BORDEN: Joe, you're up.

MR. JOE CIMINO: I've been pretty quiet. You know I sat through our May meeting as a former PDT member, and pretty scared thinking about the tasks that they had at hand. We just spent the past several hours eviscerating their work in what I think was the only options they could have provided us.

I'm not sure the Board knows what they want at this point. But I do agree with Mike Luisi's sentiment, that just because something seems unenforceable, there is a lot in striped bass management that has that same sentiment that we felt was important, like circle hooks and federal water closures for other reasons.

It does disappoint me that we're just going to walk away from one of those unenforceable management options. I think just in general we're not ready for a document to go out to the public yet, if this body has taken the actions that they have today, compared to the requests that they had in May.

CHAIR BORDEN: Emerson and then Jason.

MR. EMERSON C. HASBROUCK: I'm not really opposed to removing Options B1 and B2, but I am completely opposed to removing everything in Section B. I mean we know that the largest component of fishing mortality is discard mortality, right? But if we take all of Section B away, and we've just taken most of Part C away. We've pretty much taken everything away that might address discard mortality in the recreational fishery. You know we've got a motion that's sitting on the table that we may or may not address later today, that's going to start a rebuilding program, and develop either, you know Option 1 I think was going to be status quo target or Option 2 was going to be to establish an F(rebuild).

If we're not going to do anything to address the largest component of F, what's left for us to do if we pick up that motion, or if we're going to do anything to rebuild this resource? We're already down to one fish, you can't go less than one fish. If we're looking at reducing F, then what do we have left, a shorter season? What's the difference in a way between a shorter season and a closed couple of weeks during the season?

I think we need to be careful in what we remove from this, or we're not going to have anything. Then we're going to be in a real tough place to rebuild this resource. Unless there is something else, or unless we want to defer while the Plan Development Team develops some other options to replace B, I'm going to ask, well it's a direct question, but it's somewhat rhetorical. What are we going to do to reduce release mortality, which is the largest component of F?

CHAIR BORDEN: Jason.

DR. McNAMEE: Maybe I'll start by saying, I would be okay with the removal of B1 and B2. I think they are kind of prescriptive, and I think the rest of B can be inclusive of these anyways. The reason I say it in this order is I tend to agree with Emerson, and that is, this is clearly a tool, and an important tool.

I think we're getting to the point where we're kind of limited, so I think it would be a mistake to completely remove B from the document. You know removing B1 and B2 meets this goal that I think we have here, of trying to streamline the document a little bit. I think the rest of these again, can incorporate any of these actions here in B1 and B2.

We slim it down a little bit, we don't remove the notion of closures entirely from our arsenal here of the tools we have available to us. The other thing I wanted to bring up we haven't hit on, but that is B4, Sub-option B4. I think if it's okay with you, I know we're getting late here, Mr. Chair, I don't think we're going to finish in the next two minutes.

But I'm kind of wondering, so this was the part that has to do with existing closures being able to account for this stuff with existing closures. I would like to know a little bit more about the PDTs thinking behind this, specifically, is our goal here to be additive with these options here. Like in that case I would say, no you can't swap in something you already have to account for one of these closures. But if that's not the intent, then I would feel differently about it. I'm just wondering. Emilie might be able to quickly shed a little bit of light on that. If it's not a quick answer, I'm fine just kind of thinking about it on my own.

MS. FRANKE: Mr. Chair, this is Emilie, I can provide a quick answer.

CHAIR BORDEN: Sure.

MS. FRANKE: B4 addresses those, there are two no targeting closures implemented in 2020 as part of Addendum VI CE program, to achieve the 18 percent reduction, and that was for Maryland and PRFC. From the PDTs perspective the PDT just wanted to flag with this option that those existing closures were implemented to contribute to achieving the 18 percent reduction in those states.

Just acknowledging that those closures were part of achieving a reduction, and whether or not the Board's desire to account for those as part of any new sort of closure, or if those states would need to implement additional closures, because those closures are already being used to achieve reductions, if that makes sense.

DR. McNAMEE: Thanks for that, Emilie, that's perfect. I appreciate that context in that one. As long as B is going to be in here in some way, shape or form, I think that's a really important one for us to think on a little bit, and comment on, so thanks for that.

CHAIR BORDEN: Okay, so Toni, do we have anyone else on the list who hasn't already spoken?

MS. KERNS: No, we do not.

CHAIR BORDEN: Okay, we've got kind of two suggestions on the table. Remove the items in red, and then there is a suggestion that we on C, if Emilie could jump to C, please, is to leave C1 in the list, so that would be black, Emilie. My question to the Board is, that is kind of where I see the consensus at this point. Is there anyone that objects to that consensus? We would remove these three red items, and then if Emilie can jump back to the prior slide, and you would remove that. We had a couple of objections, and those objections will be noted.

MS. KERNS: We had Adam and Mike Luisi with their hand up in objection.

CHAIR BORDEN: Any further discussion? If not, the items in red will be removed.

MS. KERNS: You still have Adam and Mike with their hands up, I'm not sure.

CHAIR BORDEN: Adam, do you want to speak?

MR. NOWALSKY: Yes, I would, thank you. On Option B, I agree that we're closer to consensus on the removal of B1 and B2 than we are to a consensus of keeping them in. I wouldn't object to B1 and B2. I think the other Bs provide a range of options for that. With regards to Option C, I have not heard a consensus on leaving C1 in. I've heard what I would believe is a split, in terms of people that I've heard speak. My suggestion would be consideration of, again, finding something else to do with C1 potentially under education, the question of a gaff. There are many ways to use a gaff that is non-lethal, a lift for example. There can be an awful lot of education that can be done.

There is no need to go ahead and gaff fish that you know are borderline. I think that that, from what we've heard today, I think there have been people that have spoken in favor of leaving this in that have raised some very valid points. However, I think if we're going to just leave gear restrictions with this one item in here and say gaff or no gaff. Given the other issues we've heard, and concerns about it, I think the gaff question would be better served as an educational item right now.

We're talking about some really comprehensive changes to the fishery in a lot of ways, to introduce more regulatory and enforcement issues already. Our goal here is to do everything we can to encourage angler compliance and angler satisfaction, which will result in them following the regulations and promote the conservation of the resource.

The farther we get away from that goal, Mr. Chairman, I think the more of a disservice we do to the resource, as well as ourselves. Again, I don't disagree on where you're at with B, but I would disagree that there is a consensus to leave C1 in. Again, I've heard a split. I would be comfortable though with moving language about this topic to the area of information and outreach.

CHAIR BORDEN: Let's just do this sequentially. Emilie, if you would go back to B, please. Okay, so these items are coming out by consensus, with a couple of objections. Now, we'll go back to C, so everyone is clear. We've got a couple of different ways of handling C1, but it seems like we have agreement on the rest of C. If members could comment on whether or not they want to handle it the way Adam is suggesting, or leave it as is that would be useful.

MS. KERNS: I now have Justin Davis, Ritchie White and Cheri Patterson and Dave Sikorski, in addition to Mike Luisi with his hand still up.

CHAIR BORDEN: Okay, Toni, could you just read that over?

MS. KERNS: Justin Davis, Ritchie White, Cheri Patterson, Mike Luisi and Dave Sikorski.

CHAIR BORDEN: Ritchie.

MR. WHITE: I think we should leave it in. New Hampshire already has regulations that do not allow gaffing of striped bass. You know we talk about the potential of now allowing targeting for two weeks, and then we go to something pretty simple, as not gaffing. You know it's kind of mind blowing to me that something as simple as this, not hard for someone to get a device, it's easy to do. It should be left in.

CHAIR BORDEN: Cheri.

MS. CHERI PATTERSON: I agree with Ritchie. He was ahead of me on this. This is an enforceable rule. We have talked about some rules that are questionable as to whether enforceable, or even whether they are functional towards determining if they are going to work or not. This is something that it's understood it will work. Again, New Hampshire already has this in their rules, and I think it needs to stay in.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: I'm fine with leaving C as is. I don't have any trouble striking those three. I do want to make one last comment though regarding Options B1 and B2. While I think you probably heard a few additional people support the removals. I appreciate the sentiment that the objection will be noted.

But the note on that objection will die today, and it will not be carried any further along, because the public won't even have those options to review and discuss and consider. I don't even know how those objections to the removal of B1 and B2 will even be made known to the public, because it's not going to be in the document.

CHAIR BORDEN: Mike, it's going to get reflected in the minutes.

MR. LUISI: Sure, but most of the members of the public aren't going to read the minutes of this discussion over the last four and a half hours. I'm just a little disappointed that we don't take those options out to the public to get the feedback from them, and if that feedback is as strong as those members around the table have suggested, then the Board could consider eliminating them, or not selecting them down the road. I'll just leave it there. As long as B3 stays in, at least there will be one effort control that we can consider.

CHAIR BORDEN: Okay, David Sikorski.

MR. SIKORSKI: I am supportive of effort controls. I support some of what Mike just said today, and I think it was Dr. Davis that had mentioned spawning closures and how they relate to recreational angler recreational release mortality. To me spawning closures is a much bigger issue, how we're treating pre-spawned fish was beyond the recreational fishery. Then they have the Chesapeake Bay ones, there is harvest in both Maryland and Virginia on pre-spawned fish in both sectors. I don't know where it fits, because it doesn't.

But if we're talking about F, we're talking about F at a coastwide level, and the need to manage it. I just wonder if the PDT could provide some more guidance on what our impact is on pre-spawned fish across all sectors and all fisheries. Just to give the Board an understanding of potential places to alleviate F in a strategic way, knowing that these fish are headed to the spawning ground, and recruitment continues to be a challenge. I would look for some guidance from some folks on that. That issue is appropriate.

CHAIR BORDEN: What I'm hearing is that C1 is going to stay in as is. Does anyone object to want to go on the record as objecting?

MS. KERNS: I have no hands.

CHAIR BORDEN: Okay, so Emilie, does that finish this section?

MS. FRANKE: The only thing that hasn't been discussed is Option E, which is education and outreach. There are two options there.

CHAIR BORDEN: Any comments on this, other than the fact that it's a good idea? I think we're through with this section. As I announced right at the start of the meeting, it was my intent to deal with the Addendum VII issue, and then we're going to come back to this document, and pick up exactly where we are, and decide what path we move forward. The meeting is going to continue.

CONSIDER DRAFT ADDENDUM VII FOR PUBLIC COMMENT

Emilie, if you would move on to Addendum VII, and just outline this. I think this should be a fairly quick issue to deal with, and then we'll come right back and pick up where we left off.

MS. KERNS: We're going to do that, we're just going to have to flip the PowerPoint back over to Maya, I think. Switching up the PowerPoints here, so just give us a second, please.

MS. FRANKE: All right, Toni, I've got it up here on the screen. I can go through the presentation. Switching gears here to Draft Addendum VII to Amendment 6 for Board review, and this is related to Commercial Quota Transfers for the Ocean Region. Again, just some quick background.

In February the PID for Draft Amendment 7 was approved for public comment, and it included the issue of coastal commercial quota allocation. Coastal commercial quota allocation has been based on harvest data from the 1970s, which may or may not be an appropriate baseline. No other ASMFC managed species is managed with harvest data as old as used for striped bass. The Board did not include this issue for further consideration in Draft Amendment 7.

Many Board members acknowledge the concerns that were raised, but found that it was not the time to address allocation. The Board noted that the

Draft Amendment process would not be the right time, because these allocations especially could make the process more complex. However, in order to provide a management option that could provide some immediate relief to states that were seeking a change in commercial quota.

The Board initiated Draft Addendum VII in August of this year, to consider allowing voluntary commercial quota transfers of the coastal quota. This Draft Addendum considers transfers of commercial coastal quota only, between states with coastal quota. This 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 those two areas.

Here is the proposed timeline for Draft Addendum VII. After the Board initiated the Draft Addendum in August, the PDT developed the draft addendum document, which was included in supplemental meeting materials for the Board's review. Today the Board is considering approval of Draft Addendum VII for public comment. If the Draft Addendum is approved for public comment today, the public comment period would take place over the next few months, and the earliest the Board could consider approval would be January of next year. Option A in Draft Addendum VII is the status quo, in which no commercial quota transfers are permitted. The only alternative in this Draft Addendum is Option B, which would allow transfers of coastal commercial quota. Under this option 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 and a receiving state, and the administrator commissioner of the agency involved must submit a signed letter to the Commission, identifying the involved state, species, and pounds of quota to be transferred. There is no limit on the amount of quota that can be transferred by this mechanism, and a transfer becomes effective upon receipt of a letter from the Commission staff to the donor and receiving states, and does not require approval by the Board.

All transfers are final upon receipt of the signed letters by the Commission, and these transfers do not permanently affect the state-specific shares of the quota. Then finally, once the quota has been transferred to a state, the state receiving that quota becomes responsible for any overages of the transferred quota.

The PDT in the development of this Draft Addendum noted some concerns with adding ocean commercial quota transfers to the fishery management program at this time. If the Board approves Draft Addendum VII for public comment, it is recommended that the PDT concerns be added to the Draft Addendum document. The PDT notes similar concerns were previously raised by the Technical Committee in 2014, when transfers were considered in Draft Addendum IV.

The first concern from the PDT is that quota transfer could underline the goals and objectives of the Addendum VI reduction. The commercial ocean fishery has consistently underutilized quota, and during the Addendum VI process the TC noted that the reduction in commercial quota would achieve the necessary Addendum VI reduction, only if the commercial fishery performed as they have in the past, so if they continue to underutilize their quotas to the same degree.

This assumption would be violated if the transfer of commercial quota is permitted, and if Addendum VI quotas were fully utilized by allowing the transfer of latent quota, harvest would be higher than estimated in those Addendum VI projections. The second PDT concern is that a pound of commercial quota is not equal across states.

Through conservation equivalency states have been able to adjust their commercial size limits, and this results in changes to their respective commercial quotas. For example, when implementing Addendum VI, Massachusetts increased its commercial minimum size limit, and this increased

the quota. New York lowered its commercial slot limit minimum, which decreased its quota.

These types of changes in state quota through CE has been occurring since before Addendum VI, so over time there have been several adjustments to commercial size limits, resulting in changes to commercial quotas. Given additional time, the PDT might be able to address this issue, and consider all the changes made to the base quota allocations over time. Mr. Chair, that wraps up my summary of the Draft Addendum, and the memo from the PDT.

CHAIR BORDEN: Emilie has outlined the issue. These concerns came up, honestly, they should have come up earlier in the process, and they did. I think the problem here was the concerns were not voiced during the last session when we discussed this. There were other issues that got raised by New Hampshire.

Now, I spoke to members of the Delaware delegation, and basically told them that I would recognize them at the start of this meeting. They've heard the comments that have been made and the concerns that have been made. I think John Clark would like to speak directly to those, and offer a path forward. John.

MS. KERNS: I think it was, I don' t know, Roy Miller has his hand up, so maybe it was Roy.

MR. CLARK: It was Roy, David, I'll defer to Roy.

CHAIR BORDEN: Okay, Roy, please.

MR. MILLER: I have that motion I would like to put before the group. I had sent it to Toni, hopefully she can load it.

MS. KERNS: Got it up there for you, Roy.

MR. MILLER: I would like to make the following motion. **Move to defer consideration by the Striped Bass Board of Draft Addendum VII to Amendment 6 to the Atlantic Striped Bass Plan to allow further development and review of the transfer options.** Our rationale for this suggestion, the concerns expressed by the PDT. There would be additional time with a deferment to address those concerns, and also the concerns raised by the state of New Hampshire. That is my rationale for deferring this action at this time.

CHAIR BORDEN: All right, so we have a motion by Roy Miller, do we have a second to that motion?

MS. KERNS: Marty Gary.

CHAIR BORDEN: Seconded by Marty Gary. Roy, just for my own edification. The last time that this issue came up, John spoke on behalf of your delegation and basically voiced the opinion that his state and your delegation, would be willing to work with the Commission staff on this. Is that still the intent?

MR. MILLER: Yes.

CHAIR BORDEN: Okay thank you, so questions for Roy, excuse me. Marty, would you like to comment as the seconder?

MR. GARY: Only just to say, I've had a chance to sit on virtually every PDT meeting, so I fully understand their concerns. I think Delaware does too. But also, been talking to the delegation in Delaware, and I think a lot of the folks understand that side of the equation. This is another opportunity to see if we can address their needs, and also the concerns. Hopefully this will get there.

CHAIR BORDEN: Other comments.

MS. KERNS: I have Megan Ware and then Mike Armstrong, then Cheri Patterson and Chris Batsavage.

CHAIR BORDEN: Megan Ware.

MS. WARE: I think this will be a question for staff. I'm just trying to understand what this means, in terms of timing. It's the intent to bring this back to the February Board meeting, or is there potentially going to be too much going on with Amendment 7

that would be a further out task? I'm just trying to understand.

MS. KERNS: Thanks, Megan. Emilie, I'll pinch hit for you. I think it depends on, again what action gets changed in the document, and then how much work the PDT has on Amendment 7. The Board has said the priority is Amendment 7, and so the PDT would work on those issues first, prior to working on changes to Addendum VII. It would depend on what feedback we got from the state. I don't know if it's just Delaware, or we're also going to be getting feedback from other states of what issues to address.

CHAIR BORDEN: Cheri.

MS. PATTERSON: I really appreciate this consideration by Delaware. However, I think that considering what we're dealing with in our current discussion, the discussions we were just having, that we have a larger concern to deal with, not just transfer of commercial options. I would like to do a substitute motion.

CHAIR BORDEN: That's within your right.

MS. PATTERSON: **I would like to move to postpone Draft Addendum VII to Amendment 6, until such time as striped bass is not overfished and overfishing is not occurring.** If I can get a second, I'll provide some rationale.

CHAIR BORDEN: Do I have a second?

MS. KERNS: Tom Fote.

MS. PATTERSON: Thank you, Tom. The rationale is, you know apart from New Hampshire's concerns and questions that are in the materials. You know some of these points that are going to be hashed out, were definitely silent in the approved motion. I think we need to, as Delaware has indicated, need to delve further into that. But I would like to point out more explicitly what came out of the PDT memo in that they're concerned that quota transfers could undermine the goals and the objectives of the reductions taken under Addendum VI. 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.

Addendum VI commercial quotas were fully utilized by allowing the transfer of latent quota. Commercial harvest would be higher than estimated in the Amendment 6 projections, and states would not maintain the required commercial reduction, thus potentially undermining the goals and objectives of Amendment 6 to end overfishing. A pond of commercial quota is not equal across all states through conservation equivalency.

As the PDT had indicated, they really don't have the time to be looking at this, and they haven't had the time to look at all the changes made to the base quota allocations that have resulted from adjusting the commercial size limits. There are just too many questions here, and we're struggling on how to get out of a fish species that is being overfished and overfishing is occurring. I just don't think that this is a good idea at this point.

CHAIR BORDEN: Okay, so Tom Fote, do you want to comment as the seconder?

MR. FOTE: Yes, I would like to. I'm not against Delaware getting more quota. I think, when I think of when we set up the quota, which was based on the years, because that's when there were no fish spawning in the Delaware River and the Delaware Bay. New York's problem was because of lack of reporting on black sea bass and they asked for more quota, the same thing with Connecticut.

We have now seen the population in the Delaware River greatly increase. We've got to figure out a way to handle Delaware's situation. I support doing that. But to transfer quota at this time, no. I would like to move ahead and try to figure out how to handle the problem with Delaware having a quota that was based on when the bass fishery was really nonexistent in the Delaware River.

CHAIR BORDEN: Okay, so Toni, could we go back on the list? Could you give me the names again, please?

MS. KERNS: You have Chris Batsavage, Max Appelman, John Clark and Mike Armstrong.

CHAIR BORDEN: Okay, Chris, you're up.

MR. CHRIS BATSAVAGE: I guess consideration, I guess speaking to the first motion if we were to go forward with something, and not postpone, is I mean narrowly focus the amount of quota that can be transferred. I mean yes, admittedly if we transferred all the latent quota that would undermine what we're hoping to do in Addendum VI.

I think transferring all of North Carolina's allocation would do the same thing. But if there was a small amount of quota that could potentially be transferred, and I don't know what that amount would be. But stay within the range of what the commercial landings have been over the last few years that was used to kind of base projections from Addendum VI. That might be maybe a short-term solution to address the problems that Delaware has identified over the last several years at least. But I do understand and recognize the concerns of the PDT, that kind of the way the Addendum is written now, with kind of an all or nothing transfer option. That kind of really goes against what we're trying to do overall with striped bass. I just wanted to throw that potential option out there, to see if that's even something worth considering.

CHAIR BORDEN: Max.

MR. APPELMAN: I'm prepared to support the first motion, because I think the PDT really could spend some time and try to address some of these concerns with the transfers, and sort of get them on the same playing field. Maybe propose some additional options to alleviate some concerns about undermining the most recent actions with Addendum VI.

I would support that first motion. But with the motion to substitute, I guess I'm a little confused as to what this would mean to where the Board's priorities were with removing the issue of commercial allocations as a whole from Amendment 7, and putting it aside until after Addendum VII was complete. I believe the intent was, once Amendment 7 is implemented there would be discussions about addressing commercial allocations from a coastwide perspective.

This Addendum was really just to try to provide immediate relief in the interim. If the substitute motion were to pass, and now we wouldn't even consider this until the stock is not overfished or overfishing is not occurring. Where would that leave the Board's priorities with addressing issues with commercial quota?

CHAIRMAN BORDEN: Comments.

MS. KERNS: David, I can tell you that it was staff's intention to bring up an allocation addendum after Amendment 7 was completed, regardless of where Draft Addendum VII went, because that was the direction we received, that this Draft Addendum VII, for lack of a better word, was sort of a quick fix to provide an option for Delaware to get an opportunity for some quota prior to that Addendum on allocation.

MR. APPELMAN: Follow up, Mr. Chair.

CHAIR BORDEN: Yes, go ahead, Max.

MR. APPELMAN: I guess my first question would be, if that is still the intent, would the concept of commercial quota transfers be part of that initiative? Then I guess maybe some clarification from the makers of the motion that this would sort of adjust the Board's priorities with commercial allocation with broader issues with commercial allocations once Amendment 7 is complete. The thought being there that I don't think we would be in an over, you know the stock would not be overfished come that time, so my timeline here is a little confusing.

CHAIR BORDEN: Cheri, do you want to provide clarification on that, or does somebody on the staff want to comment on that?

MS. KERNS: I can comment, David, to the extent that it is up to the Board what would go in the Allocation Amendment. We would need obviously direction from the Board of what to put in the document. There is a possibility, I guess I could say that Max, anything is possible. Then I'll just say you have, I don't have the order anymore, but Mike Armstrong, John Clark and Roy Miller with their hands up.

CHAIR BORDEN: John Clark, you're next on my list, Mike Armstrong is after that.

MR. CLARK: I would like to speak in opposition to the substitute motion and in favor of the original motion. As Roy mentioned, we recognize the concerns of the PDT, and I think it was the Draft Addendum as written is very basic. I think there are options we could put in there that would take care of most of these concerns here.

One of the options that Chris Batsavage just mentioned I think would be helpful, is we would put limits on the amounts. I mean every transfer could go to the Board for Board approval, which could have the effect that there wouldn't be any transfers approved for a long time to come anyhow.

But I just don't think it's right to just put this off until some vague future time. As we know from allocations, when we do get to the point where we're actually looking at striped bass allocation of the commercial quota. We know that's going to be a long-drawn-out process. Amendment 7, as we've just said, won't be approved until 2023. Who knows how long that allocation addendum would take?

I think we're not expecting immediate relief. We recognize the state of the stock right now. But at the same time, we think if we can get an addendum passed that would have some of these guardrails in place, that we would get the Board plenty of input, as to whether a transfer would take place or not. Perhaps we could work something out in the hopefully not for ten years into the future, where we could see some transfers take place.

Obviously, our timing is not great at this point. But we have been bringing this issue up at least since, well pretty much since Amendment 6 went into place. This is not a new issue from us, and I really think that at this point the Board could at least let us go forward with something, because you know it's unfortunate in our timing, but I think we could come up with addendum options that will satisfy the concerns that have been expressed.

CHAIR BORDEN: I next have Mike Armstrong.

DR. ARMSTRONG: I don't think we can support the motion to substitute. We are probably six, seven years from overfishing not being occurring, based on the projections. I think there is a way to reallocate or some other method that will be F neutral. Like clearly, we can't transfer stuff now, because it will raise F.

Going back to the main motion. I'm not sure, I've been listening to Toni. If she says we should kill it and start fresh after Amendment 7, or if we could keep this. If we can keep it, I would love to see it perfected, saying something like defer until after we finish Amendment 7. Not necessarily implement it, but just done reviewing and approving it, which would be next spring. Just because I don't want to raise the hopes of the proponents that the PDT will start working on it right away. I don't think they can. We are about to pass, I think a fair amount of stuff from this Amendment, and that is the priority. We do have to push it down the road, and maybe we stipulate exactly when we'll start working on it.

CHAIR BORDEN: Toni, who else do you have on the list, and I'm getting close to the point where I'm going to call the question on the substitute motion.

MS. KERNS: Roy Miller is next on the list. I just want to make sure it's clear. I was just trying to outline the process for addressing allocation later

down the road. I wasn't necessarily saying you all need to kill this or not. But I was trying to make clear that the PDTs priority will be Amendment 7, and if there is additional time we will address Addendum VII, and bring it to the Board in January as a motion for it to pass. But if there is not time then we would have to postpone longer.

CHAIR BORDEN: Roy, I'm going to give you the last word and then I'm going to call the question.

MR. MILLER: Very quickly, thank you, Mr. Chair. For the reasons that John has stated and Mike Armstrong and Chris. I would recommend against approving the substitute motion. Recreational mortality is the largest component of our mortality that we have to deal with, as a substitute of this Addendum.

Commercial harvest as it presently exists is not the problem. I feel that given sufficient time we can craft a proposal that is close to neutral, in terms of its impacts on the coastal commercial harvest. If not neutral than close to neutral. For that reason, I oppose the substitute motion. I specifically left the original motion indefinite, in terms of how much time to allow. If people are more comfortable with putting finite limits on when the Draft Addendum can be considered, that would be something we would entertain.

CHAIR BORDEN: I'm going to call the question on the substitute motion. Do delegations need time to caucus? Does anyone need time to caucus?

MS. KERNS: I have one hand raised for caucus.

CHAIR BORDEN: Okay, so we'll take a two-minute caucus, and then I'm going to ask Toni to call the roll, and everyone will raise your hand at the appropriate time, depending upon how you're voting. Two-minute caucus. All right, the time is up. Toni, are you ready?

MS. KERNS: I am ready, Mr. Chairman. To expedite it, can we just ask for those in favor, and I will call off the names? It will be faster.

CHAIR BORDEN: Okay, I will do that. All those in favor of the substitute motion, please raise your hand and Toni will call out the names.

MS. KERNS: I have New Hampshire and New York. That is all.

CHAIR BORDEN: Okay, so two in favor, opposed. Please take the hands down and all those opposed to the motion, please raise your hand.

MS. KERNS: Going to let the hands settle. I have Connecticut, Pennsylvania, New Jersey, Maine, District of Colombia, Maryland, U.S. Fish and Wildlife Service, Delaware, Massachusetts, North Carolina, Rhode Island, NOAA Fisheries, and Virginia.

CHAIR BORDEN: If I counted correctly, I had 13.

MR. GARY: Did you get PRFC, Toni?

MS. KERNS: PRFC, 14.

CHAIR BORDEN: Fourteen in opposition. Any null votes?

MS. KERNS: None.

CHAIR BORDEN: None, 0, any abstentions?

MS. KERNS: None.

CHAIR BORDEN: The vote fails. The vote was 2, 14, 0, and 0. We're back on the main motion. Is there anyone that requires the need to speak to this motion, to make a point that has not been made before?

MS. KERNS: I have Megan Ware.

MS. WARE: Just to follow up on a comment from Mike Armstrong earlier. If it would be accepted as a friendly from Roy and Marty, you consider a time certain, I guess it would be, for deferring? I would feel much more comfortable looking at this after

Amendment 7, or at least after the PDT work on Amendment 7 is concluded.

CHAIR BORDEN: Roy and Marty, I think that's a question to you. She is suggesting a perfection, you add in some language about after the PDT concludes its work on Amendment 7. Roy, is that acceptable or not? If it's not acceptable I'll just move to call the question.

MR. MILLER: Mr. Chair, it's a little awkward. I would like the opportunity to confer with my colleagues from Delaware.

CHAIR BORDEN: Okay, so how long would you like?
MR. MILLER: Would one minute be, okay?

CHAIR BORDEN: One minute is fine. Marty, are you in agreement with that?

MR. GARY: Yes, Mr. Chairman, thank you.

CHAIR BORDEN: Roy gets a minute.

MR. MILLER: Thanks, Mr. Chair, for your forbearance. We would be more comfortable if we saw the specific wording that Megan suggested, so we make sure it's in the record, and then I can tell you very quickly, as soon as we see it, whether we're comfortable with it.

CHAIR BORDEN: Megan, do you want to make your suggestion? I urge you to keep it simple.

MS. WARE: Yes, I guess after the word defer, I would put until May, 2022, because I think at this point is when I project, we will take final action on the document, on Amendment 7.

MR. MILLER: Mr. Chair, we're comfortable with that.

CHAIR BORDEN: Thanks, Roy. Marty, as the seconder are you comfortable with that perfection?

MR. GARY: Yes, Mr. Chair.

CHAIR BORDEN: Okay, so we have a perfected motion on the table. Is everyone ready to vote? Given the status of the last vote let me ask, is there anyone who objects to this motion?

MS. KERNS: Mr. Chair, I see no hands raised in objection.

CHAIR BORDEN: Okay, so this motion is approved without objection.

CONSIDER DRAFT AMENDMENT 7 FOR PUBLIC COMMENT (CONTINUED)

CHAIR BORDEN: I believe that concludes the discussion on this issue.

We will go back to Amendment 7, and I'll give the staff a minute to rearrange the PowerPoint.

MS. FRANKE: All right, Mr. Chair, I'm ready whenever you are.

CHAIR BORDEN: All right, Emilie, if you'll lead us through this. Before you do that, I just want to comment that it's almost six o'clock. We'll go until 6:30, and then make a judgment on how we want to move from there, if at all. Emilie, if you could, please move forward with 4.5.2.

MS. FRANKE: As the last section of the draft options that I will review today. This is Section 4.5.2 in the Draft Amendment document for conservation equivalency. Starting with the statement of the problem. There is value in allowing states to implement alternative regulations through conservation equivalency, as noted in the Draft Amendment, to meet the needs of state fisheries.

However, this creates regulatory inconsistency among states, and within shared waterbodies with associated challenges, such as enforcement challenges. Another challenge is that it's difficult to evaluate the effectiveness of CE programs once they are implemented, due to the challenge of separating the performance of management measures from outside variables, such as angler

behavior, and the availability of fish. There have been some concerns raised that some alternative measures implemented through CE could potentially undermine management objectives. Then finally, there is also limited guidance on how and when CE should be pursued, and how equivalency is defined. For this issue, Option A is the status quo and Options B through E consider whether to adopt new default restrictions or requirements for the use of CE, or whether to eliminate the use of CE from the FMP, which is Option F.

Sub-options selected under Options B through E would automatically apply to any new FMP standard approved through Amendment 7, and all subsequent management actions and CE proposals. Options B through E are intended to address concerns about CE at the front end of the CE process. That is considering when CE can be used and requirements for CE proposals.

Alternatively, Option F would eliminate the use of CE from the FMP. If this option is selected, Option F, then Options C through E would not be valid. I just want to note from the Advisory Panel meeting, some AP members noted the importance of accountability, and concern that accountability measures were not included in the draft options.

As a reminder, accountability options were not developed for this Draft Amendment due to the challenge, again of separating out the performance of management measures from factors like angler behavior and fish availability. One other note on this suite of options for CE. The PDT did discuss the request from the August Board meeting to consider incorporating CE proposals into a management document itself.

However, the PDT concluded that this would not be a viable option from the PDT perspective, due to the additional time that would be required to develop CE proposals for each management option for inclusion in draft documents for public comment, and the additional time that would be needed to develop management documents to include CE proposals.

First, just to review the status quo Option A. The Board has final discretion regarding the use of CE, and approval of CE programs. Under the status quo option the Board can restrict the use of CE on an ad hoc basis for any FMP requirement. Potential restrictions could include specifying measures that are not applicable through CE, or limiting the range of measures that may be proposed through CE. For example, along with other types of restrictions, again at the Board's discretion.

Moving on to Option B in Draft Amendment 7. The following sub-options under Option B would establish default restrictions on the use of CE for certain fisheries, depending on the status of the striped bass stock. When the stock conditions are met, CE programs would not be approved, based on the options that would be selected. It's important to note, that previously existing CE programs would remain in place until Board action is taken on a new FMP standard relevant to that fishery.

The first set of sub-options here is B1, which considers what the restrictions would be. B1-a would not allow CE if the stock is overfished. B1-b would not allow CE if the stock is below the SSB target, and B1-c would not allow CE if overfishing is occurring. The next set of sub-options considers the applicability of any of these options selected under B1. At a minimum, any of the selected restrictions that I just went over would apply to non-quota managed recreational fisheries in both the ocean region and the Chesapeake Bay Region, with the exception of the Hudson River, Delaware River, Delaware Bay and Chesapeake Bay spring trophy recreational fisheries. The reason for this is that most of the concern surrounding CE, as identified during the scoping process for Draft Amendment 7, are related to non-quota managed fisheries, and this is due to the use of uncertain data assumptions in modeling, and also challenges with measuring the effectiveness of CE.

The Board could choose to extend these CE restrictions to one or more of the following additional fisheries in Sub-option B2. B2-a would apply to CE restrictions as well to the Hudson River, the Delaware River, the Delaware Bay recreational fisheries. B2-b would extend those restrictions to include the Chesapeake Bay spring trophy fishery.

B2-c would extend those restrictions to include quota managed recreational fisheries, so bonus programs, and then B2-d would extend those restrictions to also apply to commercial fisheries. The next set of sub-options here, Option C, would establish default precision standards for MRIP catch and effort estimates used in CE proposals.

These options are based on the percent standard error, or PSE, associated with MRIP estimates. C1 would not allow any CE proposals to use MRIP estimates with a PSE exceeding 50. C2 the PSE could not exceed 40, and for C3 the PSE could not exceed 30. The PDT notes the statement from NOAA about MRIP estimates with PSEs.

NOAA states that MRIP estimates with PSEs over 30 should be viewed with caution, and that large PSEs, which are those above 50, indicate high variability and low precision. Finally, the Draft Amendment encourages states to increase APAIS sampling as needed, and as resources allow.

I just want to note that one AP member noted the NOAA concern about the use of MRIP for CE proposals, and also noted concern that a PSE threshold of 50 is still too high. The next set of sub-options, Option D would establish a default uncertainty buffer for CE proposals for non-quota managed fisheries. An uncertainty buffer is intended to increase the probability of success in achieving equivalency with the FMP standard. These uncertainty buffer options would provide a proactive accountability measure for non-quota managed fisheries.

Option D1 would require an uncertainty buffer of 10 percent for CE programs. D2 would require a buffer of 25 percent, and D3 would require a buffer of 50 percent. This buffer would apply to the percent reduction that's required, or the liberalization that's being allowed for the non-quota managed fisheries. For example, if a 20 percent reduction is required with a 10 percent uncertainty buffer, proposed CE programs would need to demonstrate a 22 percent reduction.

The Draft Amendment notes that the Board may need to further determine how the buffer is applied for some future management actions, particularly when CE proposals might include measures for both quota managed and non-quota managed fisheries. For example, as in Addendum VI, if the reduction can be split between sectors, the Board may request guidance from the TC or PRT when making those determinations of how exactly the uncertainty buffer would apply. Option E considers establishing a default definition of what equivalency means for CE proposals for non-quota managed fisheries. These options are intended to specify the percent reduction or liberalization that must be met in the CE proposal, when the FMP standard is suggested to have different effects at the coastwide versus the state-specific level. Proposed CE programs would be required to demonstrate equivalencies to either the percent reduction or liberalization projected at the coastwide level, that's Option E1.

For example, this is the requirement for Addendum VI, that each state achieves the 18 percent reduction as projected by the FMP standard at a coastwide scale. Alternatively, Option E2 proposed CE programs would be required to demonstrate equivalency to the percent reduction projected for the FMP standard at the state level, instead of the FMP standard projected at the coastwide level.

For example, if there is an FMP standard that's adopted that achieves a 20 percent change in removals when applied coastwide, in this example state A, when the FMP standard is projected at the statewide level, state A sees a 25 percent change in removals, and state B sees a 10 percent change. Under Option E1, which uses the coastwide level, both states would be required to demonstrate

equivalency to 20 percent, which is that coastwide level projection.

Under Option E2, the state specific projected changes would be, so state A would be required to demonstrate equivalency of 25 percent and state B would be required to demonstrate equivalency for 10 percent. Then finally to wrap up here, Option F would prohibit the use of CE. It would remove the allowance for CE from the striped bass management program until it is reinstated by the Board in a future management action.

Again, previously existing CE programs would remain in place until states are required to implement any new FMP standards that are approved by the Board. Just another note, that if Amendment 7 changes the ocean region status quo recreational slot limit that was discussed in the 2015-year class section.

Any new size limit would apply to the ocean region, including the Hudson River, Delaware River, and Delaware Bay, unless the FMP establishes a separate standard for those fisheries, in this case where CE would be prohibited. With that, Mr. Chair, that's all I have for the CE draft options, and I'm happy to take questions.

CHAIR BORDEN: Are there any questions for Emilie on any of those items?

MS. KERNS: I have one hand, Mike Luisi.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: Emilie, with the changes that are possible here with conservation equivalency, how does it relate to the Commission's conservation equivalency policy document? Is this something, and I thought I had heard that the Policy Board is considering updates to that policy document. Is there a connection between what we're considering here for striped bass and what might be considered for other species that the Commission manages, or is this specific to striped bass only, and the policy document will remain intact as is?

MS. FRANKE: I'm going to defer to Toni on this one.

MS. KERNS: What is being proposed here is specific to striped bass only, Mike. At the Policy Board I'm going to go over a list of questions that the Management and Science Committee have been tasked with. Some of the questions relate to some of the topics here, like for example buffers that we're asking the Management and Science Committee to look into. Then based on information that comes back from the Management and Science Committee, we'll consider changes to the policy or guidance document for CE, that would apply to all species.

MR. LUISI: Okay, thanks. This would be an add on to the possible change for the more holistic group of species that we manage. This would be on top of that. There would be a section on how striped bass are specifically managed, or would the document just refer to Amendment 7 for striped bass?

MS. KERNS: It wouldn't refer to it, it's just that these would be specific requirements for the striped bass fishery. Then David, you have Mike Armstrong.

CHAIR BORDEN: Toni, any other hands up?

MS. KERNS: Mike Armstrong.

CHAIR BORDEN: Mike, question.

DR. ARMSTRONG: Yes, I have a question about the PSEs. I don't want us to go down the wrong road on this. This might be a question for Dr. Drew. That's the PSE applied coming from what? You start with a statewide value for the whole year with a PSE, then you decide to go with a mode, and that's a different PSE.

Then you decide to go with a season built into that. Without walking through it, I can't really wrap my head around it, but it sounds like you have to strap error bars when you're pulling all these pieces in. I just want to make sure what we're getting into when we're recommending this. This is a starting

PSE, whatever you're altering? Someone, help me please.

DR. DREW: I can maybe take a first stab at this, but I think I would defer to the PDT on what their intentions were for this. But yes, the goal would be to, if you are going to do a seasonal measure, then the data that you need to be able to calculate a meaningful value out of that data. You know if you're working then with wave-specific data, or if you're working with mode-specific data, then the PSE would apply to that dataset.

You can pool across years or you could pool across states within a region, to get your PSE to that level. You know the MRIP data, you are able to do small domain estimation on the MRIP data, so you could say, what is Maryland's PSE for Wave 2 over these five years, and have a value of that PSE that takes into account all of the correct statistical weighting on that front. You're not having to do a tailored expansion for example, to combine some of this variance. But I think the goal is that if you are focusing on very narrow datasets, that there is some consideration of the error or the uncertainty around that dataset, and to give kind of clear guidance to the TC when they're working up these analyses, about what level of risk the Board feels is appropriate.

DR. ARMSTRONG: Okay, thank you.

CHAIR BORDEN: Toni, anybody else on the list?

MS. KERNS: I have no other hands.

CHAIR BORDEN: Anyone proposing a change?

MS. KERNS: One hand, John Clark.

MR. CLARK: Just for the sake of moving this along. I would like to see that option removed that totally eliminates CE from striped bass. Would it be possible, Emilie, to put all the options on a single page so we can see them all at once? I think it was the last option, oh there we go, yes. Of course, I'd like to make, well obviously we're going to keep that one. But that's one I would definitely like to see removed, and I think some of the other ones there are going to be pretty tricky. But a prohibition on the use I would like to see removed.

CHAIR BORDEN: Okay, so John has recommended prohibition, so members should speak pro or con on that. Any hands up?

MS. KERNS: You have Ritchie White.

CHAIR BORDEN: Ritchie.

MR. WHITE: The public seemed to be pretty clear the last time we were out to the public, so I think this option ought to stay in, so the public has a chance to comment on it. I would be opposed to removing it.

CHAIR BORDEN: Any other hands up, Toni?

MS. KERNS: I have Adam Nowalsky, John McMurray, and Mike Luisi.

CHAIR BORDEN: Adam.

MR. NOWALSKY: I support John in the removal of Option F from these options. I believe the use of CE is not a Board specific decision to make with regards to universally prohibiting it on the use of a species, given the ongoing work that's going on by the Full Commission. If the Full Commission ultimately decides at the Policy Board level that they would like to discontinue CE, we would certainly have to accept that at the Board level. But given that we currently have Board discretion, whether or not to accept or deny a given CE proposal, I think that's adequate.

I think if this Board wants to consider certain options to put restrictions that are relevant to the species that we manage, I think that's certainly worthy of discussion. But the prohibition element here, I believe that's a much bigger decision that exceeds this species board to make.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: I support the removal of Option F, the prohibition on the use of CE. In this case I support John's suggestion. I think had it been status quo and prohibition of use it would have been a different story, but Option B through E define different ways for which conservation equivalency will be evaluated with the use of uncertainty buffers and other standards.

I think it tightens the grip on how states use conservation equivalency going forward. I think that's a first good step in understanding and using conservation equivalency. I don't think getting rid of it entirely is appropriate, so I would support John.

CHAIR BORDEN: Toni, who is the third name you had on the list?

MS. KERNS: I have more names that are here that signed up, so I have John McMurray and then Cheri Patterson, Tom Fote, and Dennis Abbott.

CHAIR BORDEN: John McMurray.

MR. McMURRAY: I agree with Ritchie White. We can't remove Option F now. The public was clear they wanted the Board to consider this, that's all.

CHAIR BORDEN: Cheri.

MS. PATTERSON: I'm going to reiterate what John and Ritchie have said. We had pretty clear public response on this particular option.

CHAIR BORDEN: Tom Fote.

MR. FOTE: I have to agree with Adam and Mike, because we have just the opposite experience that New Hampshire has.

CHAIR BORDEN: Okay, Dennis Abbott.

MR. ABBOTT: Not to be repetitive. I think it should stay in. I think the public then should have an opportunity to comment, though I do believe that eventually we probably wouldn't enact a prohibition, but I think it's necessary to hear what people have said, will say, and let it go at that.

CHAIR BORDEN: Okay, so Toni, who else have you got on the list?

MS. KERNS: That's all, wait, Justin Davis.

DR. DAVIS: I'm in support of removing this option from the document. I kind of feel like the reality of the situation is that it's highly unlikely when we take final action on this document that we're going to adopt this option, and prohibit the use of CE. I think conservation equivalency has a role to play in the management program for this species.

I think what's most important right now is to put the appropriate guardrails in place on the use of CE. I think we're going to get the most productive feedback from the public when we focus their comment and their input on that, on how do we improve the use of CE for this management program. I just don't think it's realistic that we're going to take it out of the management program, and so I question the value of having it in here.

CHAIR BORDEN: All right, well at this point we don't have a clear mandate one way or another, so it might be simpler if someone made a motion, and then we'll deal with it as a standalone motion.

MS. KERNS: John Clark.

CHAIR BORDEN: John Clark.

MR. CLARK: I'll make that motion. I move to remove Option F from the CE options.

CHAIR BORDEN: All right that's a motion by John Clark, is there a second?

MS. KERNS: Mike Luisi.

CHAIR BORDEN: Mike Luisi. John, do you want to speak to that and then I'll ask Mike?

MR. CLARK: I think everything has been said. You know I think Adam made a very valid point that this goes beyond the Striped Bass Board to decide whether CE should be in there. I don't even think it should go out to the public. Why give them an option that is not going to happen?

CHAIR BORDEN: All right, Mike Luisi, you're next.

MR. LUISI: Yes, I agree in a way with Justin Davis, but I think we get more constructive feedback on the other options if we remove Option F. At the time when we got the initial reaction from the public, there weren't the other options for them to really break down and think about. It was easy to say remove it completely. But I think here, when they get a full scope of the guardrails that are being considered, it will be more productive if we get feedback on the guardrails, rather than removal.

CHAIR BORDEN: All right, we've had about eight speakers that have all voiced their preferences on this. Is there somebody new who would like to raise a different point, either pro or con?

MS. KERNS: You have no hands.

CHAIR BORDEN: Okay, I think I'm just going to call the question. I'll provide a one-minute caucus break. If you could put up the clock, please, Toni/staff.

MS. KERNS: That's a little trickier. Emilie, I don't know if you have the clock. I'll set a timer and I'll let you know when you have 10 seconds left.

CHAIR BORDEN: Okay that's great. One minute caucus. Thank you very much, Toni, so we're going to call the vote on this. As before, when you vote raise your hand and Toni will call of the names, and we'll tabulate them accordingly. All those in favor of the motion, signify by raising your hand.

MS. KERNS: Just going to let the hands settle for a second. I have Connecticut, Pennsylvania, New Jersey, District of Colombia, Massachusetts, Maryland, Delaware, North Carolina, PRFC, and Virginia. Emilie, do you have a count on that?

MS. FRANKE: Yes, I have 10 in favor.

MS. KERNS: I will take the hands down. Ready?

CHAIR BORDEN: All those opposed.

MS. KERNS: I have Maine, New Hampshire, New York, and Rhode Island that's four. I'll put the hands down.
CHAIR BORDEN: All right, abstentions.

MS. KERNS: I have two abstentions, NOAA Fisheries, and Fish and Wildlife Service.

CHAIR BORDEN: Any null votes?

MS. KERNS: Let me just get the hands down, now we can do the nulls. I have no null votes.

CHAIR BORDEN: All right so the vote is 10, 4, 2, 0. The motion passes. We're back to consensus mode. I don't see any, or I haven't heard any other suggestions for alterations. Here I'll just ask one more time. Does anybody want to change anything else in this section? We've removed one item. Any hands up?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so we will proceed on that basis, everything else stays in. All right, Emilie. I know we've got two tabled motions to deal with. What else do we have to deal with?

MS. FRANKE: Mr. Chair, that is all I have for my presentation.

CHAIR BORDEN: Okay, could we go back to the first, Megan Ware's tabled motion? We are at the end of the agenda item. Toni, do we need a motion to take this off the table at this point, or is it automatically on the table?

MS. KERNS: I believe we do, but I want Bob to correct me. I could be wrong.

CHAIR BORDEN: Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Actually, we do not need a motion, since it was delayed through a time certain.

CHAIR BORDEN: Time certain, that's what I thought. Thank you. This motion is on the table, it's ready to be voted on. We've had a discussion on the motion. I guess the only thing for members to reflect on is, and this kind of applies to both motions. These motions will basically require some additional work by either staff or PDT, so that would mean, if that's correct.

That would mean that the items would come back to the Board at the next meeting, where the provisions of the Amendment would be actually finalized. Are individuals ready to vote on this? Anyone want to speak to this to raise an issue you have not already raised?

MS. KERNS: I have two hands, Mike Luisi and Justin Davis.

CHAIR BORDEN: Mike, and then Justin.

MR. LUISI: I'm thinking back to the discussion that we had before on this. I absolutely support the development of a rebuilding plan for striped bass. However, I feel that the way that this motion reads it kind of handcuffs the PDT at developing one option for a certain time period to achieve spawning stock biomass rebuild.

I wonder if this could be written in a way which would task the PDT to develop a formal rebuilding plan for striped bass under Amendment 7, under Management Response to Recruitment Triggers, including status quo F target, and additional options to establish an F rebuild calculated for various time periods, not to exceed ten years. I think that gives the PDT a little more flexibility to give the Board and the public a bit more to digest and provide comment on, rather than identifying the time period of 2029 as the only other option other than status quo.

I would be prepared to make a motion, I guess it would be to substitute, since there would be some changes. But I piggy-backed a lot of the language here. That is kind of where I am. I can hold off and wait to get additional comments, but I'm prepared to do that whenever you want to call on me, Mr. Chairman.

CHAIR BORDEN: Let me take Justin and then after I take Justin, maybe I'll go back to Megan, and ask her whether or not she wants to change anything here, having heard the comment. Justin.

DR. DAVIS: I think Mike was kind of getting after what I was wondering is, process. If we voted to approve this motion, it would mean that the PDT has to do some additional work, and the Board has to see the document again before we can approve the whole thing to go out for public comment. Is that correct?

CHAIR BORDEN: Yes.

DR. DAVIS: Okay, thanks. That is just a clarification I was looking for, and I think given what Mike was saying, if we're going to send this back to the PDT either way, I would prefer to give the PDT the latitude to look at this question of a rebuilding plan, and essentially have the freedom to decide if there are other options in here that might want to consider, other approaches they may want to take, rather than the motion being prescriptive about which options have to be put in the document.

CHAIR BORDEN: Megan, I said I was going to come back to you. You've heard the comments. Do you want to change anything? I think it could be a fairly simple change, by including some language like, not later than 2029.

MS. WARE: Yes, I'm generally willing, I guess to be a little more broad in this. I will say, I don't think we can go later than 2029, because the clock has

already started, and according to our current management plan we're on the ten-year clock. I think we're beholden to that, unless we're then changing that element of the plan, which I don't think we can do that in this document and also vote on it. I guess what I'm trying to say. I think we're beholden to no later than 2029, but I am happy to consider language that would say something of no later than 2029, if that helps.

CHAIR BORDEN: You would be adding after the word by, no later than 2029?

MS. WARE: Yes, I think so. I'm just reading it.

CHAIR BORDEN: Take out by.

MS. WARE: Yes, I think that's what people are getting at.

CHAIR BORDEN: John McMurray, would that perfection be acceptable to you?

MR. McMURRAY: Yes, I'm looking at it now. I think that would be okay.

CHAIR BORDEN: Okay, so we have a perfected motion on the table. Any other discussion on this issue?

MS. KERNS: You have Max Appelman.

CHAIR BORDEN: Max.

MR. APPELMAN: Just for clarification. I think I heard this when the motion was initially made, but the intent here is just for the PDT to develop a rebuilding program to be codified into the Amendment, but not to also explore changes in measures to achieve this new F(rebuild) at the same time. That would be a subsequent action, did I hear that right?

CHAIR BORDEN: Does staff want to comment to that point?

MS. WARE: This is Megan, I can speak to my motion. Max, the intent here, I think you are kind of on it, is to establish a rebuilding structure in this Amendment, and then kind of leverage that upcoming 2022 assessment, to tell us what that F(rebuild) is, and where we are associated with it.

I think until we have that information, we don't know what the step is after that. We could find ourselves in a position where we're below F(rebuild) and that's great, or we could find ourselves in a position where we're above that, and that's not so great. I think the important part here is establishing that framework, so that we can leverage the 2022 assessment to tell us the information we need.

CHAIR BORDEN: All right, any other issues on this?

MS. KERNS: I have Mike Luisi.

CHAIR BORDEN: Mike.

MR. LUISI: I hate to be a pain in the ass. I guess it's clear in the record, but I was thinking more along the lines. I mean I think the change here is good, no later than 2029. I just want to make sure it's clear that we are tasking the PDT to develop a formal rebuilding plan, rather than to consider a formal rebuilding plan.

I know that's a small modification for the language, but I think that sets the stage for an understanding that we are not going to formalize it and send this to the public now, that the PDT is going to develop something that we'll get to see at the next meeting. I'll just put that out there. Either way, as long as it's on the record I think it's clear, but it may be better to put it in the motion.

CHAIR BORDEN: All right, so any other changes to this? Do the makers of the motion or anyone else want to suggest a perfection? If not, I'm going to call the question.

MS. KERNS: You have Adam Nowalsky.

CHAIR BORDEN: Adam.

MR. NOWALSKY: I was just going to offer that if you felt, and other members here, I think Mike is leaning in this direction, that this may not be clear. I would prepare to attempt to substitute this that would go ahead and make it clear that we are tasking the PDT to include something, and that we have two options here. If it is your interpretation at this point, Mr. Chairman, that the record is crystal clear, that this motion as written is tasking the PDT to develop something for inclusion, and would not be limited to just these two options, then I'm fine with moving forward. But in the absence of that clarity, I would be prepared to offer that as a substitute at this point.

CHAIR BORDEN: As much as I hate to say this. This is an important issue, and I think we need to deal with this as a motion.

MS. KERNS: I think Megan is willing to take that as a friendly, Mr. Chair, as she has texted me.

CHAIR BORDEN: Megan. If you want to perfect this again, I'll allow that.

MS. WARE: I think the points have been well made, so let's do, move to task the PDT to develop a formal rebuilding plan, and Adam and Mike, if that is not what you were thinking, please let me know.

MS. KERNS: They don't have their hands up, so I'm going to take that as a thumbs up.

MR. NOWALSKY: Yes, the only other addition I would make here would be something that would reflect, not that this isn't limited, just Option 1 and 2, perhaps changing this to Options would include a status quo F target and another option that would establish. That would allow the flexibility for the PDT to develop something else or a variation of one of these options.

MS. WARE: I'm fine with that. I think we can say Options could include status quo, and then the description for the Option 2 I have in there.

CHAIR BORDEN: Okay, so Megan is suggesting another perfection to the motion. John McMurray, are you in agreement with that?

MR. McMURRAY: Yes, I'm okay with that, thank you.

CHAIR BORDEN: Okay, so any other perfections here?

MS. KERNS: No hands.

CHAIR BORDEN: No hands, so is there anyone who objects to this? Any hands up?

MS. KERNS: No hands in objection.

CHAIR BORDEN: Okay, so the motion is approved without objection. Now if we can go to the next motion, we're almost done here. We have a second motion. This second motion was tabled, it's now on the table for discussion. Is there anything new to be added to this? Any changes? Any hands up, Toni?

MS. KERNS: No hands.

CHAIR BORDEN: Any objection to approving this motion?

MS. KERNS: I see no hands.

CHAIR BORDEN: Motion stands approved without objection. Is there any other business? Is there an AP appointment?

MS. KERNS: Mr. Chair, it's up to Joe, or the state of New Jersey. We can do it through an e-mail vote if you would prefer. It's up to whatever Joe or the state of New Jersey would like.

CHAIR BORDEN: Joe Cimino, do you want to make a nomination for the AP?

MR. CIMINO: I appreciate that thought, Mr. Chair, but I'm perfectly happy doing that via e-mail vote.

CHAIR BORDEN: Okay that's fine, so anything else to come before the Board?

MS. KERNS: I see no hands, Mr. Chairman.

ADJOURNMENT

CHAIR BORDEN: Thank you all for your tolerance, I know we're way over the time deadline, but we plowed through a lot of information. This meeting stands adjourned.

(Whereupon the meeting adjourned at 6:37 p.m. on October 20, 2021)

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MEMORANDUM

TO: **Atlantic Striped Bass Management Board**

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

DATE: **January 10, 2022**

SUBJECT: **Draft Amendment 7 Updates and PDT Recommendation on Year Class Options**

In October 2021, the Atlantic Striped Bass Management Board (Board) tasked the Plan Development Team (PDT) with developing new options to add to Draft Amendment 7 for the Board's review at the 2022 Winter Meeting. The PDT met multiple times from November 2021 through January 2022 to develop the new options and update the following sections as tasked by the Board:

Section 4.1. Tier 1. Fishing Mortality Management Triggers	Added an option for a 2-year average of fishing mortality (F) for the F threshold trigger
Section 4.2.1. Measures to Protect Year Classes: Recreational Size and Bag Limits	Added options for Chesapeake Bay recreational size limits to protect strong year classes *Note: Please see below for the PDT's recommendation regarding Section 4.2.1*
Section 4.4. Rebuilding Plan	Added a section outlining a rebuilding framework following review of the 2022 stock assessment update, and options that consider a low recruitment assumption in forthcoming rebuilding calculations

The Draft Amendment was also updated to remove options as specified by the Board in October.

In addition to the Board's specified changes, the PDT updated the Draft Amendment with clarifying edits where necessary. The PDT also modified the following sections to better align with the intent of those options, as described in this memo:

- *Section 4.1. Tier 3. Recruitment Trigger*: Sub-options B2 and B3
- *Section 4.1. Tier 4. Deferred Management Action*: Option E
- *Section 4.2.1.3 CE Consideration for Recreational Measures to Protect Year Classes:* Option B
- *Section 4.6.2. Management Program Equivalency*: Sub-option B2

PDT Recommendation on Recreational Size Limit Options to Protect Strong Year Classes

The PDT recommends the Board remove *Section 4.2.1 (Measures to Protect the 2015, 2017, and 2018 Year Classes: Recreational Size and Bag Limits)* from consideration in Draft Amendment 7. If these options are removed, the Addendum VI FMP standard for recreational size and bag limits would be maintained for Draft Amendment 7. The other options considered in Draft Amendment 7 for management triggers, recreational release mortality, conservation equivalency, and stock rebuilding would still move forward on the proposed timeline for Amendment 7.

The PDT recommends removing the options to protect strong year classes from consideration for two primary reasons. First, the projections indicate the stock recovery timeline (i.e., the year female spawning stock biomass (SSB) is projected to exceed the threshold and the year it is projected to exceed the target) is the same for all size limit options, including status quo. The Board added the issue of protecting year classes to Draft Amendment 7 to support stock rebuilding efforts, particularly to address concerns about the 2015 year class entering the status quo ocean recreational slot limit. However, the projections indicate that changing size limits to protect year classes does not have a significant impact on rebuilding the stock if the F rate remains constant. If the Board's goal is to expedite stock rebuilding, reducing the overall F rate would have a greater impact on the stock recovery timeline than only changing fishery selectivity (i.e., sizes and ages available for harvest).

Second, selecting new recreational measures through Amendment 7 before the 2022 stock assessment update presents significant timing challenges given uncertainty with how selected measures would align with the assessment results. For example, if the assessment indicates a reduction is needed, the recreational measures selected through Amendment 7 may or may not achieve that reduction. If not, the Board would have to reconsider recreational measures for the second time in the same year. If the assessment indicates the status quo Addendum VI measures are projected to achieve F rebuild (i.e., the F rate that would achieve the SSB target by 2029), then changes to recreational fishery measures may not be warranted at this time through Amendment 7. The result in either case would be in conflict with the Board's desire for management stability when possible.

These timing challenges coupled with the projection results indicating the same recovery timeline for all options, including the status quo, prompted the PDT's recommendation to remove *Section 4.2.1* from Draft Amendment 7. The Board could reconsider changes to recreational size and bag limits in a subsequent management action following review of the 2022 stock assessment update, as needed.

If the Board does consider changing size limits to protect specific year classes, the proposed size limits may need to be adjusted on a regular basis in order to provide continued protection from harvest through time, as fish from those year classes continue to grow. The Board could plan to adjust measures every few years, while considering how to balance year class protection with a desire for management stability.

Options Modified by the PDT
Following further discussion after the October Board meeting, the PDT modified the following options to better align with the intent of those sections.

In *Section 4.1 Tier 3 Recruitment Triggers*, the PDT modified sub-options B2 and B3, which specify management responses if the recruitment trigger is tripped. The PDT removed a previous alternative that would have initiated stock rebuilding, which is a more appropriate management response to a SSB-based trigger and not to the recruitment trigger. The modified alternatives B2 and B3 are based on calculating interim F reference points using a low recruitment assumption. Sub-option B2 would require reducing F to the interim F target if F exceeds that interim F target. Sub-option B3 would require reducing F to the interim F target if an F-based management trigger (as defined in *Section 4.1*) is tripped after reevaluation using the interim F reference points.

Evaluating one point estimate of F against the F target (sub-option B2) is more conservative than the F-based management trigger definitions described in *Section 4.1* (used in sub-option B3). **The PDT recommends the Board consider at the January meeting which of these approaches best aligns with the intent of the recruitment trigger response.** If only one of these approaches aligns with the Board's intent, the Board could remove one of the proposed sub-options in order to narrow the focus and consideration of this trigger moving forward.

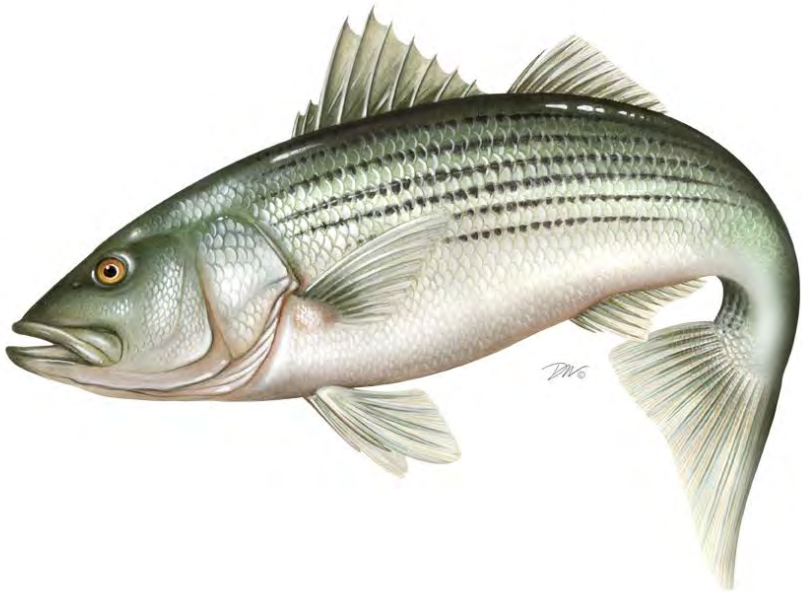
In *Section 4.1 Tier 4 Deferred Management Action*, the PDT modified Option E to require a higher probability of SSB remaining above the SSB threshold over the next 5 years in order to defer management action. Previously, the option specified a 50% probability, but the PDT increased that probability to 75% to increase the confidence that SSB would not fall below the threshold before the next assessment when considering deferred management action.

Section 4.2.1.3 Conservation Equivalency (CE) Considerations for Recreational Measures to Protect Year Classes, the PDT added an option that CE could be permitted with limitations (Option B) for alternative recreational measures to protect strong year classes. This provides a middle ground option between allowing CE without any limitations (Option A) and not permitting CE at all (Option C).

In *Section 4.6.2 Management Program Equivalency* (i.e., conservation equivalency), the PDT modified sub-option B2 regarding the default applicability of CE restrictions based on stock status. Any CE restrictions based on stock status would by default apply to non-quota managed recreational fisheries, <u>including the Chesapeake Bay spring trophy fisheries</u>, with the exception of recreational fisheries in the Hudson River, Delaware River, and Delaware Bay. The Chesapeake Bay spring trophy fishery would now be subject to CE restrictions based on stock status by default because the Board decided in October that the Chesapeake Bay spring trophy fishery is considered part of the ocean region for management purposes under Amendment 7.

Atlantic States Marine Fisheries Commission

Draft Amendment 7 to the Interstate Fishery Management Plan for Atlantic Striped Bass



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.

January 2022

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Draft Amendment 7 to the Interstate Fishery Management Plan for Atlantic Striped Bass

Prepared by

Atlantic States Marine Fisheries Commission
Atlantic Striped Bass Plan Development Team

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This is a report of the Atlantic States Marine Fisheries Commission pursuant to U.S. Department of Commerce, National Oceanic and Atmospheric Administration Award No. NAXXXXXX

The Atlantic States Marine Fisheries Commission seeks your input on Draft Amendment 7 to the Atlantic Striped Bass Fishery Management Plan.

The public is encouraged to submit comments regarding this document during the public comment period. Comments must be received by **11:59 (EST) on XXXXX.** Regardless of when they were sent, comments received after that time will not be included in the official record. The Atlantic Striped Bass Management Board will consider public comment on this document before finalizing Amendment 7.

You may submit public comment by attending a public hearing held in your state or jurisdiction or mailing, faxing, or emailing written comments to the address below. Comments can also be referred to your state's members on the Atlantic Striped Bass Management Board or Atlantic Striped Bass Advisory Panel; however, only comments received at a public hearing or written comments submitted to the Commission will become part of the public comment record.

Mail: Emilie Franke
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington VA. 22201

Email: comments@asmfc.org
(Subject: XXXX)
Phone: (703) 842-0740
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If your organization is planning to release an action alert in response to Draft Amendment 7, or if you have questions, please contact Emilie Franke, Fishery Management Plan Coordinator, at 703.842.0740 or efranke@asmfc.org.

The timeline for completion of Amendment 7 is as follows:

August 2020	Board initiated Amendment 7
February 2021	Board reviewed Draft Public Information Document (PID) and approved PID for public comment
February - April 2021	Public comment on PID
May 2021	Board reviewed public comment; directed Plan Development Team to develop Draft Amendment
May - December 2021	Preparation of Draft Amendment
January 2022	Board reviews Draft Amendment and considers approving for public comment ***Current Step***
February 2022- April 2022	Public comment on Draft Amendment
May 2022	Board reviews public comment and selects final measures for the Amendment; Policy Board and Commission approve the Amendment

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1.0 INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC), under the authority of the Atlantic Coastal Fisheries Cooperative Management Act, is responsible for managing Atlantic striped bass *(Morone saxatilis)* in state waters (0-3 miles) along the Atlantic Coast. The states and jurisdictions of Maine through North Carolina, including Pennsylvania, the District of Columbia, and the Potomac River Fisheries Commission (PRFC), participate in the management of this species as part of the Commission's Atlantic Striped Bass Management Board (Board). Amendment 7 to the Interstate Fishery Management Plan (FMP) for Atlantic striped bass replaces Amendment 6 (2003) and its Addenda I – VI. Management authority in the exclusive economic zone (3-200 miles from shore) lies with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS).

1.1 BACKGROUND INFORMATION

Since Amendment 6 was adopted in 2003, the status and understanding of the striped bass stock and fishery has changed considerably. The results of the 2018 Benchmark Stock Assessment (NEFSC 2019) in particular led the Board to discuss a number of significant issues facing striped bass management. The 2018 benchmark stock assessment indicated the striped bass stock has been overfished since 2013 and is experiencing overfishing, which changed perception of stock status. The Board accepted the assessment for management use in 2019; management triggers established through Amendment 6 tripped at that time, requiring the Board to take action to address both overfishing and the overfished status.

In April 2020, the Board implemented Addendum VI to end overfishing. In August 2020, the Board initiated development of Amendment 7 to the FMP to update the management program to better align with current fishery needs and priorities, and build upon the Addendum VI action to initiate rebuilding.

In February 2021, the Board approved for public comment the Public Information Document (PID) for Draft Amendment 7. Public comment was received and hearings were held between February and April 2021. At their May 2021 and October 2021 meetings, the Board approved the following issues for development in Draft Amendment 7:

- Management Triggers (see *Section 4.1* Management Triggers)*;*
- Measures to Protect the 2015 Year Class (see *Section 4.2.1* Measures to Protect the 2015, 2017, and 2018 Year Classes: Recreational Size and Bag Limits)*;*
- Recreational Release Mortality (see *Section 4.2.2* Measures to Address Recreational Release Mortality)*;*
- Rebuilding Plan (see *Section 4.4* Rebuilding Plan); and
- Conservation Equivalency (see *Section 4.6.2* Management Program Equivalency).

1.1.1 Statement of Problem

1.1.1.1 Management Triggers

The management triggers are intended to keep the Board accountable and were developed at a time when the stock was thought to be at historic high abundance and well above the female spawning stock biomass (SSB) target. However, as perceptions of stock status and fishery performance have changed, shortfalls with how the management triggers are designed have emerged. When female SSB is below the target level, the variable nature of fishing mortality can result in a continued need for management action. The shorter timetables for corrective action are also in conflict with the desire for management stability. As a consequence, the Board is sometimes criticized for considering changes to the management program before the stock has a chance to respond to the most recent management changes. Furthermore, the use of point estimates in decision-making does not account for an inherent level of uncertainty. Lastly, the observed long period of below average recruitment which contributed to recent declines in biomass has raised questions about the recruitment-based trigger and whether it is designed appropriately.

1.1.1.2 Measures to Protect the 2015 Year Class

A period of low recruitment (age-1 fish entering the population) from 2005 – 2011 is believed to have contributed to the persistent decline in female SSB in recent years. The Board and stakeholders have expressed that protecting emerging, strong year classes is of the utmost importance for rebuilding the striped bass stock. The 2015 year class, which is the strongest year class observed since 2003, has been available to Chesapeake Bay fisheries over the past few years and will soon be entering the recreational ocean region slot limit of 28" to less than 35" implemented by the majority of Atlantic coast states under Addendum VI in 2020. If this ocean slot limit is maintained, the 2015 year class may be subject to high recreational harvest mortality in the ocean for the next several years, in addition to mortality in the Chesapeake Bay, reducing its potential to help rebuild the stock. The 2015 year class will also be subject to recreational release mortality as it approaches the lower bound of the ocean slot, and again once the surviving fish have grown larger than the upper bound of the slot. The 2015 year class is also subject to release mortality in the Chesapeake Bay.

1.1.1.3 Recreational Release Mortality

Recreational release mortality constitutes a large component of annual fishing mortality—the largest component from 2017 through 2020—because the striped bass fishery is predominantly recreational and an overwhelming majority of the catch is released alive, either due to cultural preferences (i.e., fishing with the intent to catch and release striped bass) or regulation (e.g., the fish is not of legal size). Some stakeholders value the ability to harvest striped bass, while others value the experience of fishing for striped bass regardless of whether they are able to retain fish. The current management program, which primarily uses bag limits and size limits to constrain recreational harvest, is not designed to control fishing effort which makes it difficult to control overall fishing mortality. While the acceptable proportion of recreational release mortality in total removals should reflect the management objectives for the fishery, efforts to reduce overall fishing mortality through harvest reductions may be of limited use unless recreational release mortality can be addressed.

1.1.1.4 Stock Rebuilding and Low Recruitment

The Board has expressed concern about recent low recruitment estimates and the potential impact of low recruitment levels on the ability of the striped bass stock to rebuild by 2029. If rebuilding measures are implemented based on the standard recruitment method from the stock assessment but recruitment remains lower than average, the population may not be able to rebuild to the female SSB target by 2029. The next stock assessment update (expected in 2022) will calculate the fishing mortality rate required to rebuild the stock, and those rebuilding calculations could take into account different assumptions about recruitment.

1.1.1.5 Management Program Equivalency (Conservation Equivalency)

There is an essential tension between managing the striped bass fishery on a coastwide basis while affording states the flexibility to deviate from the FMP standard through conservation equivalency (CE). [1] There is value in allowing states to implement alternative regulations tailored to the needs of their fisheries; however, this creates regulatory inconsistency among states and within shared waterbodies with associated challenges (e.g., enforcement). It is difficult to evaluate the effectiveness of CE programs and their equivalency to the FMP standard once implemented due to the challenge of separating the performance of management measures and outside variables (like angler behavior and availability of fish). Concerns have been raised that some alternative measures implemented through CE could potentially undermine management objectives. And finally, there is also limited guidance on how and when CE should be pursued, particularly when the stock is overfished and rebuilding is required, and how "equivalency" is defined.

1.1.2 Benefits of Implementation

The status and understanding of the striped bass resource and fishery has changed considerably since implementation of Amendment 6 in 2003. Reevaluation of striped bass management processes, specifically management triggers and conservation equivalency, and consideration of recreational fishery measures, including measures to address release mortality, will support stock rebuilding and promote the sustainable management of the striped bass resource and fishery moving forward.

1.1.2.1 Ecological Benefits

Striped bass play an important ecological role in coastal marine ecosystems. Managers and stakeholders have expressed interest in the role of striped bass in the ecosystem from both a top-down perspective (as a predator that could affect other species) and a bottom-up perspective (as a consumer affected by prey availability). Young-of-year striped bass feed primarily on small invertebrates, and as they age, they start eating fish and larger invertebrates, including Atlantic menhaden, herring, bay anchovies, blue crabs, and lobster. Striped bass are also preyed on by other species; as young-of-year and juveniles, they are consumed by adult

[1] FMP standard refers to a management measure specified in the FMP.

fish like bluefish, weakfish, and even other striped bass. Sustainable management of striped bass will contribute to maintaining a balanced marine ecosystem.

1.1.2.2 Social/Economic Benefits

Rebuilding the Atlantic striped bass population will enhance the economic and social benefits attributable to this population in the ASMFC member states. Economic benefits of a rebuilt stock would include increased use values (e.g., consumptive and non-consumptive use values related to commercial and recreational fishing) and non-use values (e.g., existence values) for current and future generations. There are many potential socioeconomic impacts that could result from changes in striped bass management, notably potential changes to the recreational size limit and potential implementation of seasonal closures. These potential changes may result in short-term negative impacts to recreational angler welfare. However, the net positive long-term social and economic benefits stemming from stock recovery and subsequent catch increases in successive years will likely outweigh the short-term impacts. Potential restrictions on how and when states can pursue CE programs could result in socioeconomic impacts if there is less flexibility to implement alternative regulations tailored to the needs of each state's fisheries.

1.2 DESCRIPTION OF THE RESOURCE

1.2.1 Species Life History

1.2.1.1 Stock Structure and Geographic Range

Atlantic coastal migratory striped bass inhabit estuaries and the Atlantic Ocean along the eastern coast of North America from the St. Lawrence River in Canada to the Roanoke River and other tributaries of Albemarle and Pamlico Sounds in North Carolina (Merriman, 1941). Some individuals from longer river systems within this range may not undergo coastal migrations, but rather restrict their migrations to within the river and estuary (Morris et al., 2003; Zlokovitz et al., 2003). Stocks which occupy coastal rivers from the Tar-Pamlico River in North Carolina south to the St. Johns River in Florida are primarily endemic and riverine and do not presently undertake extensive Atlantic Ocean migrations as do stocks from the Roanoke River north (Richkus, 1990), based on tagging studies (Callihan et al., 2014; Callihan et al., 2015). Striped bass are also naturally found in the Gulf of Mexico from the western coast of Florida to Louisiana (Merriman, 1941; Musick et al., 1997). Striped bass were introduced to the Pacific Coast using transplants from the Atlantic Coast in 1879 as well as into rivers, lakes, and reservoirs throughout the US and foreign countries such as Russia, France, and Portugal (Hill et al., 1989).

The anadromous populations of striped bass on the Atlantic coast are primarily the product of four distinct spawning stocks: an Albemarle Sound-Roanoke River stock, a Chesapeake Bay stock, a Delaware River stock, and a Hudson River stock (ASMFC 1998). The Atlantic coast fisheries rely primarily on production from the spawning populations in the Chesapeake Bay and in the Hudson and Delaware rivers. Historically, tagging data indicated very little mixing

between the Albemarle Sound-Roanoke River stock and so that stock is managed and assessed separately from the coastal stock.

The Chesapeake Bay stock of striped bass is widely regarded as the largest of the four major spawning stocks (Goodyear et al. 1985; Kohlenstein 1980; Fabrizio 1987). Recent tag-recovery studies in the Rappahannock River and upper Chesapeake Bay show that larger and older (ages 7+) female striped bass, after spawning, move more extensively along the Atlantic coast than stripers from the Hudson River stock (ASMFC 2004).

Striped bass abundance in the Delaware River, as measured by juvenile seine surveys, rose steadily following pollution abatement during the mid-1980s and peaked in abundance in 2003 and 2004. Like the Chesapeake Bay and Hudson stocks, spawning in the Delaware River begins during early April and extends through mid-June (ASMFC 1990). Recent tagging studies in the Delaware River show that larger and older (ages 7+) female striped bass undergo extensive migration northward into New England from July to November that spatially overlap the migratory range of Chesapeake Bay striped bass (ASMFC 2004).

1.2.1.2 Age and Growth

Generally, longevity of striped bass has been estimated as 30 years, although a striped bass was aged to 31 years based on otoliths (Secor 2000). This longevity suggests striped bass populations can persist during long periods of poor recruitment due to a long reproductive lifespan. In general, the maximum ages observed have increased since 1995 when the striped bass fisheries reopened. From 1995 to 2016, the maximum observed female age increased from 16 to 31, with the oldest fish caught in Chesapeake Bay, Virginia, in 2014. During the same period, the maximum observed male age increased from 16 to 24 with the oldest fish caught in Chesapeake Bay, Virginia, in 2011.

As a relatively long-lived species, striped bass are capable of attaining moderately large size, reaching as much as 125 pounds (57 kg) (Tresselt 1952). Growth rates of striped bass are variable, depending on season, age, sex, competition and location. For example, a 35 inch (889 mm) striped bass can be 7 to 15 years of age and a 10-pound (4.5 kg) striped bass can be 6 to 16 years old (ODU CQFE 2006). Growth occurs during the seven-month period between April and October. Within this time frame, striped bass stop feeding for a brief period just before and during spawning, but feeding continues during the upriver spawning migration and begins again soon after spawning (Trent and Hassler 1966). Growth rates and maximum size are significantly different for males and females. Both sexes grow at the same rate until 3 years old; beginning at age-4, females grow faster than males. Females grow to a considerably larger size than males; striped bass over about 30 pounds (14 kg) are almost exclusively female (Bigelow and Schroeder 1953).

1.2.1.3 Spawning and Reproduction

Atlantic striped bass are anadromous, meaning they spend most of their adult life in ocean waters, but return to their natal rivers to spawn in the spring. The rivers that feed into the

Chesapeake Bay and the Delaware and Hudson Rivers are the major spawning grounds for the coastal migratory population. The spawning season along the Atlantic coast usually extends from April to June and is governed largely by water temperature (Smith and Wells 1977) and the number of mature ova in female striped bass varies by age, weight, and fork length. Studies have found that older fish produce more eggs than younger fish and heavier fish produce more eggs than smaller fish (Jackson and Tiller 1952; Raney 1952; Goodyear 1984; Mihursky 1987; Richards et al. 2003; Sadler et al. 2006; Gervasi et al. 2019). Newly hatched bass larvae remain in fresh or slightly brackish water until they are about 12 to 15 mm long and move in small schools toward shallow protected shorelines, where they remain until fall. Over the winter, the young concentrate in deep water of rivers.

The 2018 assessment used maturity-at-age values derived from an updated dataset with samples from multiple states along the coast, which estimated that 89% of females are mature by age-8 and 100% are mature by age-9. There are indications that some older striped bass may not spawn every year (Raney 1952) and Jackson and Tiller (1952) reported curtailment of spawning in about 1/3 of the fish age-10 and older taken from Chesapeake Bay, though they also found striped bass up to age-14 in spawning condition.

Striped bass, like many fish populations, shows high interannual variability in recruitment. Environmental effects have been shown to be correlated with recruitment success in striped bass, including over-winter temperatures, hydrological conditions, and zooplankton prey availability (Hurst and Conover 1998; Martino and Houde 2010 and 2012). However, Martino and Houde (2012) found density-dependent effects on growth and mortality in the upper Chesapeake Bay for age-0 striped bass, where growth rates were higher and mortality rates lower in years with lower juvenile density.

1.2.1.4 Mortality

Because striped bass are a long-lived species, this suggests natural mortality is relatively low. One increasing source of natural mortality is disease. Mycobacteriosis was first detected in the Chesapeake Bay in 1997 (Heckert et al 2001; Rhodes et al. 2001) and may have been apparent in Chesapeake Bay striped bass as early as 1984 (Jacobs et al. 2009a). A rise in *mycobacterium* infection in the Chesapeake Bay could be causing increases in natural mortality (Pieper 2006; Ottinger and Jacobs 2006). Vogelbein et al. (2006) hypothesized that increased natural mortality could be associated with elevated nutrient inputs to the Chesapeake Bay contributing to eutrophication and suboptimal, stressful habitat for striped bass; or, the increased natural mortality could be associated with low abundance of Atlantic menhaden and reductions in Chesapeake Bay forage species resulting in starvation.

Prevalence of *mycobacterium* infection ranges from ~50% (Overton et al. 2003) to 75% with molecular techniques (Kaattari et al. 2005) and is dependent on the age class sampled, with prevalence increasing with age to approximately age 5 and then decreasing in older ages (Kaattari et al. 2005; Gauthier et al. 2008). *Mycobacteriosis* appears to be much less prevalent in other producer areas such as the Delaware Bay (Ottinger et al. 2006) and the Albemarle Sound-Roanoke River (Overton et al. 2006; Matsche et al. 2010). Although fish who are infected

with the disease show overall decreased health (Overton et al. 2003), the slow progression of the disease may take years to become lethal in infected fish, thus allowing for multiple spawning opportunities, making determination of the population level impacts of the disease difficult (Jacobs et al. 2009b). In the most recent study, Groner et al. (2018) suggested disease-associated mortality will likely increase with warming temperatures in the Chesapeake Bay.

Striped bass exhibit a number of characteristics identified by NOAA as increasing their vulnerability to climate change effects, including complexity of reproductive strategy, short duration aggregate spawning, sensitivity to temperature, prey-specificity, and specific larval requirements (Morrison et al. 2015). Temperature is correlated with or impacts a number of aspects of striped bass biology, including time to hatch and egg and larval mortality (Massoudieh et al. 2011); larval growth length and yolk utilization (Peterson et al. 2017); activity levels and metabolic rate (Hollema et al. 2017); consumption, and growth (Secor et al. 2000); and growth and mortality in striped bass larvae (Secor et al. 2017). See *Section 1.4.3* for details on climate change impacts to striped bass habitat.

1.2.1.5 Ecological Roles

Young-of-year striped bass feed primarily on small invertebrates like amphipods, bristle worms, and mysid shrimp. As they get older, they start eating fish and larger invertebrates (starting around age-2). Adult striped bass consume a variety of species, including Atlantic menhaden, herring, bay anchovies, blue crabs, and lobster (Schaefer 1970; Hartman and Brandt 1995; Walter et al. 2003; Rudershausen et al. 2005; Ferry and Mather 2012). Their diet varies depending on how big they are, what season it is, where they are feeding, and how abundant their different prey species are (Walter and Austin 2003; Overton et al. 2009). Striped bass are also preyed on by other species. As young-of-year and juveniles, they are consumed by adult fish like bluefish, weakfish, and even other striped bass, and larger striped bass may be eaten by sharks or birds like bald eagles and osprey (ASMFC 2011).

Managers and stakeholders have expressed interest in the role of striped bass in the ecosystem from both a top-down perspective (as a predator that could affect other species) and a bottom-up perspective (as a consumer that was affected by prey availability). The high abundance of striped bass in the late 1990s and early 2000s led to concerns that striped bass could have a negative impact on other species that they preyed on, like shad and river herring, or that they competed with for food, like weakfish (Uphoff 2003; Davis et al. 2012). Declines in striped bass condition and the increasing prevalence of mycobacteriosis in Chesapeake Bay raised concerns that the depletion of key prey species like Atlantic menhaden were negatively affecting striped bass (Jacobs et al. 2009; Overton et al. 2003).

In August 2020, ASMFC adopted an ecosystem approach for the management of Atlantic menhaden using ecological reference points (ERPs) for menhaden management. Ecological modeling indicated striped bass were one of the most sensitive species to menhaden abundance. Therefore, the ERP values that sustained striped bass would likely provide sufficient forage for other predators under current ecosystem conditions. ERPs for the management of Atlantic menhaden are as follows:

- ERP target: The maximum fishing mortality rate on Atlantic menhaden that sustains Atlantic striped bass at their biomass target when striped bass are fished at their F target
- ERP threshold: The maximum fishing mortality rate on Atlantic menhaden that keeps Atlantic striped bass at their biomass threshold when striped bass are fished at their fishing mortality rate target.

These ERPs allow ASMFC to take into account menhaden's role as a forage fish, especially its importance to striped bass, when setting harvest limits for menhaden. However, the biological reference points for striped bass are still set using single-species modeling. ASMFC is working on refining the ERP model and improving the understanding of the role of striped bass in the ecosystem beyond the relationship with menhaden.

1.2.2 Stock Assessment Summary

The 2018 Benchmark Stock Assessment (NEFSC 2019) provides the most recent status of the coastwide striped bass stock for use in fisheries management. The assessment was peer-reviewed at the 66th Northeast Regional Stock Assessment Review Committee (SARC) meeting in November 2018 and approved by the Board for management use in May 2019. The accepted assessment model is a forward projecting statistical catch-at-age (SCA) model which uses catch-at-age data and fishery-dependent and -independent survey indices to produce annual estimates of recruitment, annual fishing mortality (F), and selectivity parameters in order to calculate abundance and female SSB through the assessment terminal year of 2017. As a complement to the SCA model, an instantaneous tag return model (IRCR) was run on data from the U.S. Fish and Wildlife Service (USFWS) coastwide striped bass tagging program through the 2017 tagging year. The IRCR model makes inferences using the numbers of tagged fish that have been recaptured to the numbers of fish that were originally tagged over time to estimate the survival rate of striped bass from year-to-year, fishing mortality rates and natural mortality rates.

The 2018 benchmark was the first assessment for striped bass to use the improved MRIP survey methods to estimate recreational fishery catches. The new time series of recreational catch estimates is on average 2.3 times higher than the values used in previous stock assessments, resulting in higher estimates of stock size. Although the magnitude of these estimates has changed, the overall trend throughout time remains similar for both harvest and total catch (released fish + harvested fish).

1.2.2.1 Abundance and Structure

Striped bass abundance (age-1+) increased steadily from 1982 through 1997 when it peaked around 420 million fish. Total abundance fluctuated without trend through 2004 and from 2005-2009, total abundance declined to around 189 million fish. Total abundance increased to 351 million fish by 2016 before dropping to 249 million fish in 2017. The increase in 2012 was due primarily to the abundant 2011 year class from Chesapeake Bay. Abundance of age-8+

striped bass (representing mature fish) increased steadily through 2004. Between 2004 and 2011, age-8+ abundance oscillated followed by a decline since 2011. Age-8+ abundance in 2017 was estimated at 6.7 million fish, a value near the 30th percentile of the time-series.

1.2.2.2 Fishing Mortality

The current single-stock SCA model separates fishery removals into an ocean fleet and a Chesapeake Bay fleet, but there is one set of coastwide fishing mortality reference points. The ocean fleet includes removals from ocean waters and other areas such as Delaware Bay and Long Island Sound. Fully-recruited fishing mortality in 2017 for the Chesapeake Bay and Ocean fleets was 0.068 and 0.262, respectively. Total fishing mortality has been at or above the threshold in 13 of the last 15 years of the assessment (2003-2017) and was estimated to be 0.31 in 2017.

1.2.2.3 Recruitment

Striped bass experienced a period of strong recruitment (age-1 fish entering the population) from 1994-2004, followed by a period of lower recruitment from 2005-2011 (although not as low as the early 1980s, when the stock was considered collapsed). This period of low recruitment contributed to the decline in female SSB that the stock has experienced since 2010. Recruitment of age-1 fish was high in 2012, 2015, and 2016 (corresponding to strong 2011, 2014, and 2015 year classes), but estimates of age-1 striped bass were below the long-term average in 2013, 2014, and 2017. Recruitment in 2017 was estimated at 108.8 million age-1 fish, below the time series average of 140.9 million fish.

1.2.2.4 Female Spawning Stock Biomass (SSB)

Female SSB peaked in 2003 and has been declining since then; female SSB has been below the threshold level since 2013. Female SSB grew steadily from 1986 through 1996 after which female SSB dropped to just below levels observed in 1995. Female SSB grew steadily between 1999 and 2003 when it peaked around 114,000 thousand metric tons and has generally declined since then.

1.2.2.5 Two-Stock Model Development

Although the coastwide fishing mortality reference points include the effects of harvesting smaller striped bass in the Chesapeake Bay (and in other areas like the Delaware Bay and Hudson River), they do not reflect the heavily male-skewed sex ratio in the Chesapeake Bay catch. During the 2018 benchmark assessment, the current single-stock SCA model was modified into a competing two-stock SCA model; a Chesapeake Bay stock and a mixed ocean stock which included all other stock components of the population. The intent of the two-stock model approach was to develop separate reference points for the Chesapeake Bay stock and the ocean region (which includes the Delaware Bay/Hudson River stock complex); however, this model requires further testing and was not approved for management by the SARC-66 peer review panel.

1.2.3 Current Stock Status

The current stock status determination is based on the 2018 Atlantic Striped Bass Benchmark Stock Assessment (NEFSC 2019). The results of the 2018 benchmark indicate that the Atlantic striped bass stock is overfished and overfishing is occurring. Female SSB in 2017 was estimated at 68,576 metric tons (151 million pounds), which is below the female SSB threshold of 91,436 metric tons (202 million pounds) (Figure 7). Total fishing mortality in 2017 was estimated at 0.31, which is above the fishing mortality threshold of 0.24 (Figure 8). The reference points currently used for management are based on stock conditions in 1995, the year the stock was declared rebuilt. The biomass threshold is the level of female SSB in 1995, the biomass target is 125% of the threshold, and the fishing mortality threshold and target are the levels of fishing mortality projected to achieve the biomass reference points over the long-term, respectively. The specific values of these reference points change when the time series of female SSB is updated with each iteration of the stock assessment model.

1.3 DESCRIPTION OF THE FISHERY

The Atlantic striped bass fishery is predominantly recreational with the recreational sector accounting for over 80% of total removals by number each year since 1985 (Table 18). In 2019, total removals (commercial and recreational combined, including harvest and dead releases) were estimated at 5.5 million fish; the recreational sector accounted for 87% of total removals by number. In 2020, total removals were estimated at 5.1 million fish; the recreational sector accounted for 87% of total removals by number (Table 17-18).

1.3.1 Commercial Fishery

Commercial striped bass fisheries operate in the waters of Massachusetts, Rhode Island, New York, Delaware, Maryland, the Potomac River Fisheries Commission, Maryland, Virginia, and North Carolina. The primary gear types for the commercial fisheries are gill nets, hook and line, and pound nets/other fixed gears. Additional gears used in the commercial fishery include haul seines and trawls.

The commercial fishery is managed via a quota system resulting in relatively stable landings since Amendment 6 (approved in 2003; implemented in 2004). From 2004 to 2014, coastwide commercial harvest averaged 6.8 million pounds (942,922 fish) annually (Tables 19-21). 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 (Tables 17-18). 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.

There are two sets of quota allocations; one to all states (Maine through North Carolina, excluding Pennsylvania) for harvest in the ocean, and a second allocation to Maryland, PRFC,

and Virginia for harvest in Chesapeake Bay. 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. Although the regional quota allocations are about equal, the majority of commercial harvest comes from Chesapeake Bay; roughly 60% by weight and 80% in numbers of fish since 1990. The differences between landings in weight and in numbers of fish are primarily attributed to the availability of smaller fish and lower size limits in Chesapeake Bay relative to the ocean fishery. Additionally, the ocean fishery tends to underutilize its 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). 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).

1.3.2 Recreational Fishery

The recreational fishery is comprised of private and for-hire components. The private component includes anglers fishing from shore (including all land-based structures) and private/rental boats. The for-hire component is composed of charter boats and headboats (also called party boats). Although charter boats tend to be smaller than headboats, the key distinction between the two types of operations is how the fee is typically determined. On a charter boat trip, the fee charged is for the entire vessel, regardless of how many passengers are carried, whereas the fee charged for a headboat trip is paid per individual angler.

The recreational sector operates in state waters across the entire management unit (Maine through North Carolina) and uses hook and line almost exclusively. The recreational fishery is managed via bag and size limits and therefore recreational catch and harvest vary from year to year with changes in angler effort and the size and availability of fish.

Recreational harvest of striped bass follows a similar trend to the commercial harvest. Since 1984 when recreational harvest was lowest (2.4 million pounds; 264,004 fish), recreational harvest has increased reaching a peak by weight in 2013 at 65 million pounds, and by numbers of fish in 2010 at 5.4 million fish (Tables 23-24). Between 2004 and 2014, recreational harvest remained at a steady level averaging 54.8 million pounds (4.6 million fish) per year. Following the implementation of the size and bag limit changes in the recreational fisheries in Addendum IV due to declining biomass, recreational harvest decreased to an average of 33.6 million pounds (2.8 million fish). In 2020, recreational harvest was estimated at 14.9 million pounds (1.7 million fish).

A large proportion of recreational harvest comes from Chesapeake Bay (Tables 23-24). From 2004-2014, 33% of recreational harvest in numbers of fish came from Chesapeake Bay. From 2015-2019, that percentage increased to 43% in numbers of fish, likely as a result of the strong 2011, 2014, and 2015 year classes moving through the fishery. The majority of recreational harvest in the ocean fishery comes from Massachusetts, New York, and New Jersey.

The vast majority of recreational striped bass catch is released alive either due to angler preference or regulation; roughly 90% annually since 1990 (Figure 13). Based on peer reviewed literature, a 9% release mortality rate is used to estimate the number of fish that die as a consequence of being caught and released. Despite this low rate, the popularity of striped bass as a targeted recreational species means that recreational releases contribute a significant source of mortality to the stock each year. In 2020, recreational anglers caught and released an estimated 30.7 million fish, of which 2.76 (9%) million are assumed to have died; this represents 54% of total striped bass removals (commercial and recreational) in 2020 (Table 17-18).

1.3.3 Subsistence Fishing

Data describing the exact magnitude of subsistence fishing, (i.e., catching fish in order to provide necessary food) for striped bass does not exist. However, some anglers, usually fishing from shore, may rely to some degree on striped bass they catch for food. Additionally, the head and carcasses of larger striped bass often discarded by anglers after processing the fillet are highly sought after in some areas.

1.3.4 Non-Consumptive Factors

Catch and release fishing for striped bass is often considered a non-consumptive use of the striped bass resource. A large number of fishermen coastwide target striped bass with the intention of releasing all of the fish that are caught. This practice can take place during no-harvest (i.e., no-take) closures, but is not permitted during no-targeting closures. See *Section 1.3.2* for more details on the number of striped bass released alive.

1.3.5 Interactions with Other Fisheries

In the recreational fishery, anglers targeting striped bass may also be targeting species that commonly occur with striped bass. Or, striped bass anglers may incidentally interact with non-target species. The 2018 stock assessment (NEFSC 2019) included analysis identifying recreational species that are commonly caught with striped bass in ocean waters (i.e., species that were intercepted at least 100 times over the entire time series) for each state based on private/rental boat trip data that occurred during Waves 3-5 for states from Maine through Virginia. A Jaccard coefficient was calculated for each species, with a higher coefficient indicating the species is caught more often with striped bass. For most states, bluefish or Atlantic mackerel had the highest Jaccard coefficient, meaning it was the species caught most often with striped bass in ocean waters.

Striped bass are caught as bycatch in non-striped bass commercial fisheries. The commercial discard estimates for striped bass incorporate estimated discards from non-striped bass fisheries based on tag return data.

1.4 HABITAT CONSIDERATIONS

1.4.1 Habitat Use and Migration Patterns

Migration of striped bass occurs at adult and juvenile stages. Adults migrate into rivers to spawn in turbulent fresh water upstream of the estuarine turbidity maximum (ETM) and as far as the Fall Zone (transition zone from Coastal Plain to Piedmont provinces) during spring (Greene et al., 2009). Afterwards, migratory adult striped bass return to the ocean, where they travel north along the coast in summer and fall, and south during the winter; non-migratory adult striped bass return downstream to estuarine waters but do not transit coastal waters during the summer, fall, and winter (Greene et al., 2009).

In general, juveniles migrate downstream in summer and fall. Juvenile striped bass migration varies by locations. In Virginia, the movement of young bass during their first summer is downstream into Chesapeake Bay waters of higher salinity (Setzler et al., 1980). In the Hudson River, striped bass begin migrating in July. Migration was documented through an increase in the number of juvenile striped bass caught along the beaches and subsequent decline in the numbers in the channel areas after mid-July. Downstream migration continues through late summer, and by the fall, juveniles start to move into Long Island Sound (Raney, 1952). The ASMFC Striped Bass Technical Committee (TC) tracks juvenile abundance, and cohort strength, through sampling to produce annual striped bass juvenile abundance indices (JAIs) in six different nursery areas.

Juvenile striped bass rarely complete coastal migrations. The presence of juveniles <20 cm (ages 0-1) in New Jersey's non-natal estuaries indicates some dispersal from Hudson River, Delaware Bay, and Chesapeake Bay (via C&D Canal) estuaries where they were spawned (Able et al., 2012). Many striped bass inhabiting rivers and associated estuaries undergo evacuation into coastal waters following extreme precipitation events that reduce water temperature, salinity, and dissolved oxygen (Bailey & Secor, 2016); events projected to increase in frequency and intensity due to climate change (USGCRP, 2017). In Chesapeake Bay 50% of females, who grow faster, emigrate to coastal waters by age 3 while a significant proportion of young males remain within the estuary (Kohlenstein, 1981); however, emigration cues are under debate and may be more a function of size than age (Secor et al., 2020). From Cape Hatteras (and in some years, Cape Lookout), North Carolina, to New England, fish may migrate in groups along the coast. They migrate north in the summer and south in the winter, however, the extent of the migration varies between sexes and populations (Hill et al., 1989). Larger bass, typically the females, tend to migrate farther distances. Striped bass historically were not usually found more than 6 to 8 km offshore (Bain & Bain, 1982). In the past decade, large schools have been moving between state waters and federal Exclusive Economic Zone (EEZ) waters during the year (Kneebone et al., 2014) and further offshore during the winter months (ASMFC, MDDNR, NCDMF and USFWS, unpublished data) well out into federal EEZ waters (e.g., 25-30 nm, or 46.3 to 55.6 km). These coastal migrations are not associated with spawning and usually begin in early spring, but this time period can be prolonged by the migration of bass that are spawning.

Some areas along the coast are used as wintering grounds for adult striped bass. Historically the inshore zones between Cape Henry, Virginia, and Cape Lookout, North Carolina, served as the wintering grounds for the migratory segment of the Atlantic coast striped bass population (Setzler et al., 1980). Geographic Information Systems (GIS) analysis of cooperative winter tagging cruise data from 1988-2013 did not detect a northward latitudinal shift in highest percent capture of striped bass, although occurrence of a longitudinal shift was not included in the analysis (Osborne, 2018). However, recent Atlantic coastal striped bass winter sampling coordinated by ASMFC indicated that overwintering striped bass have been encountered north of Chincoteague Inlet, Virginia to Ocean City, Maryland and in offshore areas entering the EEZ. There are three or more groups of fish that are found in nearshore ocean waters of North Carolina, Virginia, and Maryland between the months of November and March, the wintering period. These groups include striped bass from Albemarle and Pamlico Sounds, North Carolina, Chesapeake Bay, and Hudson River (ASMFC, MDDNR, NCDMF and USFWS, unpublished data); and of these, large striped bass spend the summer in New Jersey and north (Holland & Yelverton, 1973; Nelson et al., 2010; Pautzke et al., 2010). Based on tagging studies conducted under the auspices of ASMFC and the Southeast Area Monitoring and Assessment Program (SEAMAP) each winter since 1988, striped bass wintering off North Carolina, Virginia, and Maryland range widely up and down the Atlantic Coast, at least as far north as Nova Scotia, and represent all major migratory stocks (US Fish and Wildlife Service, ASMFC, and partners, unpublished data).

1.4.2 Identification and Distribution of Habitat

1.4.2.1 Spawning and Egg Habitat

Striped bass spawn in fresh water or nearly fresh water of Atlantic Coast rivers and estuaries. They spawn above the tide in mid-February in Florida but in the St. Lawrence River they spawn in June or July. The bass spawn in turbid areas as far upstream as 320 km from the tidal zone (Hill et al., 1989). The tributaries of the Chesapeake Bay are the primary spawning areas for the migratory stock of striped bass, but other major areas include the Hudson River, Delaware Bay, and the Roanoke River. Prior to spawning, females pause below the salt front (Hocutt et al., 1990) while eggs ripen and water temperature reaches 12-18 degrees Celsius (Secor, 2000) before continuing into freshwater reaches. Spawning is triggered by increased water temperature, occurs between 10 and 24 degrees Celsius, and generally peaks at temperatures between 14 and 19 degrees Celsius (Setzler et al., 1980). Spawning is characterized by brief excursions to the surface by females surrounded by males, accompanied by much splashing. Females release eggs in the water where fertilization occurs (Raney, 1952). Spawning occurs during all hours of day and night (Setzler et al., 1980). Striped bass spawning runs may be blocked when the concentration of total suspended solids exceeds 350 mg/L (Radtke & Turner, 1967).

An egg is only viable for about an hour for fertilization. Following fertilization, the fertilized eggs are spherical, non-adhesive, and semi-buoyant and will harden within one to two hours at 18 degrees Celsius (Hill et al., 1989). Survival of striped bass eggs is dependent on environmental conditions. In general, cooler and wetter winter and spring conditions are favorable. A

temperature range of 17-19 degrees Celsius is important for egg survival as well as for maintaining appropriate dissolved oxygen levels (Bain & Bain, 1982), although they can tolerate a temperature range of 14-23 degrees Celsius (Mansueti, 1958). Eggs hatch from about 30 hours at 22 degrees Celsius to about 80 hours at 11 degrees Celsius (Hill et al., 1989). Eggs can tolerate dissolved oxygen levels down to 1.5 mg/L and salinities ranging from 0-10 ppt with 1.5-3 ppt being optimal (Mansueti, 1958). Water currents are an important factor for the survival of the eggs. Minimum water velocity of 30 cm/sec, from either current or tidal flow, is needed to keep the eggs suspended in the water column; the optimum flow rate is 100-200 cm/sec (Mansueti, 1958). An oil globule provides some buoyancy for the egg, and it is larger when water velocity is slower (Albrecht, 1964). Without the buoyancy, the eggs sink to the bottom, where the sediment may smother them. It is possible for the eggs to hatch if the sediment is course and not sticky or muddy, but survival is limited (Bayless, 1972). Suspended sediment loads ≥1,000 mg/L were lethal to striped bass eggs but were tolerant to loads of 0-500 mg/L (Auld & Schubel, 1978).

1.4.2.2 Larvae Habitat

There are three stages of larval development. These are: yolk-sac larvae, finfold larvae, and post-finfold larvae (Hill et al., 1989). The yolk-sac larvae occur right after hatching and the stage usually lasts for about 3 to 9 days. They are 2.0 to 3.7 mm in length and contain an easily identified yolk-sac. Yolk-sac larvae occur in open water at varying depths (Setzler et al., 1980). This phase is finished when the yolk-sac is absorbed. The finfold phase lasts for about 11 days and the striped bass reach a length of 12mm (Setzler et al., 1980). Occurrence of finfold larvae varied with time of day and depth (Hill et al., 1989). The last phase is the post-finfold larvae which lasts for about 20 to 30 days and the larvae reach a length of 20 mm (Bain & Bain, 1982). Post-finfold striped bass larvae are present at varying depths in open waters of estuaries.

Survival of the larvae depends on optimal conditions of three main factors: temperature, salinity, and dissolved oxygen. The optimal temperature for larvae is 18 to 21 degrees Celsius, but temperatures of 12 to 23 degrees Celsius can be tolerated (Bain & Bain, 1982). Studies have shown that striped bass larvae do better and have a higher survival rate when they are in low salinity waters (>0-15 ppt) rather than fresh water (Setzler et al., 1980). Abundance was highest in oligohaline portions of the St. Lawrence Estuary ETM zone; 60 times higher than in tidal fresh water and 330 times higher than in mesohaline ETM waters (Vanalderweireldt et al., 2019). The third factor, dissolved oxygen, is equally critical for larvae as it was for the egg stage. A reduction in the dissolved oxygen level reduces the chances of survival of the larvae (Turner & Farley, 1971), which have a lower limit of 3 mg/L (Chittenden, 1971). Poorly buffered rivers may have significant changes in pH. A pH of 5-6.5 in the absence of contaminants causes significant mortality to 11-13 day old fish and a pH of 5.5 is toxic to 159-day-old fish (Buckler et al., 1987). Another factor that influences the survival of striped bass larvae is turbulence. While at first it is necessary for the larvae to reside in turbulent waters to maintain position, the larvae quickly become motile and then are able to maintain position on their own (Doroshev, 1970). Optimum flow for larvae is 30-100 cm/sec although larvae can survive 0-500 cm/sec (Regan et al., 1968). Suspended sediment loads ≥500 mg/L had a significant negative effect on larval survival (Auld & Schubel, 1978).

1.4.2.3 Juvenile Habitat

Striped bass become juveniles at about 30 mm, when the fins are fully developed. At this point they resemble adults. Temperature tolerance for young-of-year striped bass 20-100 mm ranges from 10-30 degrees Celsius and 18-19 degrees Celsius is optimal (Bogdanov et al., 1967, as cited in Setzler, 1980). Salinity does affect striped bass' capacity to survive low temperatures. Young-of-year striped bass exposed to 5 degrees Celsius water had greater survival across a broad range of salinities (5-35 ppt); however, when exposed to 1 degree Celsius water young-of-year striped bass survival was greater within a narrower salinity range of 10-25 ppt (Hurst & Conover, 2002). Striped bass juveniles exhibit a warmwater fundamental temperature niche (Coutant, 2013); e.g., 80-270 mm (0.25-0.72 kg) fish selected 24-27 degree Celsius water (Coutant et al., 1984) and 430-626 mm (0.91-3.52 kg) fish occupied 20-24 degrees Celsius water (Coutant & Carroll, 1980). Juveniles can tolerate water up to 30-33.5 degree Celsius provided there is sufficient dissolved oxygen (Coutant, 2013). As the juvenile bass grow, they migrate to nearshore areas and then to higher salinity areas of an estuary (Raney, 1952) usually remaining upstream of polyhaline waters (Able et al., 2012) optimally at 10-20 ppt (Bogdanov et al., 1967, as cited in Setzler, 1980). Young-of-year striped bass are less tolerant of low dissolved oxygen than larvae and egg, having a lower limit of 3 mg/l and optimally ≥6 mg/l (Bogdanov et al., 1967, as cited in Setzler, 1980). Juvenile striped bass often occupy waters having a clean sandy bottom, but they have also been found over gravel beaches, rock bottoms, and soft mud areas suggesting that they do not require specific microhabitat conditions (Bain & Bain, 1982; Hill et al., 1989). Association with emergent marsh banks is common throughout the year and especially during spring and fall and commonly with submerged channel embankments in summer (Able et al., 2012). They are usually found in schools of as many as several thousand fish. However, the location of the schools depends on the age of the fish (Hill et al., 1989) and season. Juveniles 21-46 cm (ages 2-5) were most abundant at depths of 5.5-9.1 m in New Jersey nearshore coastal waters (Able et al., 2012), but during winter in Chesapeake Bay juveniles are known to migrate into holes down to 30.5 m deep (Mansueti, 1954).

1.4.2.4 Adult Habitat

Mature adult striped bass in the migratory contingents leave the estuaries and migrate along the coast where they have lower temperature requirements and comparable dissolved oxygen requirements as juvenile bass (Bain & Bain, 1982). The fundamental thermal niche of striped bass ≥3.1 kg is cool water at 17.5 (mean) to 19 (mode) degrees Celsius (Bettoli, 2005). Temperatures 25-30 degrees Celsius could be tolerated for limited durations provided sufficient dissolved oxygen concentrations were present (>2 mg/l), although condition declined and higher mortality occurred for fish >10 kg (Coutant, 2013). Lower temperature boundary for activity is 0.1-1 degree Celsius; rapid temperature changes can be tolerated (Greene et al., 2009). Striped bass are tolerant of a broad range of salinities (0-35 ppt) and abrupt changes to salinity (Greene et al., 2009). Depths occupied range from 0.6-46 m although straying into deeper waters does occur (Greene et al., 2009). Tagging studies indicate that fish from all stocks range widely along the Atlantic Coast, historically generally remaining in state (0-3 miles) waters but more recently in some areas entering the EEZ (3-200 miles; Kneebone et al., 2014; ASMFC, MDDNR, NCDMF and USFWS, unpublished data). GIS analysis of tagging data from 1988-2013 detected a 3-11 m vertical shift to deeper water and a shift to coarser sand grain

size associated with the highest percent capture (Osborne, 2018). While in coastal and estuarine waters, striped bass are associated with a variety of habitats including substrates composed of sand, gravel, rock, boulder, eelgrass, and mussel beds; subsurface features such as sand bars, troughs, gullies, and shallow bays; floating rockweed; sandy and rocky shorelines; and in the surf zone (Greene et al., 2009).

1.4.3 Chemical, Biological, and Physical Threats to Striped Bass and Their Habitat

Residual chlorine; chlorinated hydrocarbons such as PCBs; monocyclic aromatic hydrocarbons such as benzene; and metals such as, copper, zinc, cadmium, mercury, and aluminum are known to be toxic to life history stages of striped bass. Residual chlorine causes 50% mortality in eggs when the concentration is 0.22 ppm, and there is 50% mortality in larvae when the concentration is 0.20 ppm (Hill et al., 1989). Chlorine was also observed to be a predominant factor in egg mortality by Hall et al. (1981). Ozone is an effective substitute for chlorine to reduce fouling (Marine Research Incorporated, 1976). Studies have shown that ozone has a detrimental effect on striped bass eggs (Kosak-Channing & Helz, 1979). Eggs exposed to 0.05 mg/L and 0.10 mg/L of ozone in an estuarine environment were delayed in hatching, but only 70% of the eggs hatched in fresh water under the expected time frame. There was 6% mortality when the eggs were exposed to 0.06 mg/L of ozone for 12 hours, but there was 100% mortality when they were exposed for 36 hours. Effects of ozone and chlorine on striped bass eggs are comparable in estuarine waters, but ozone can have more of an effect if discharged in fresh water located near striped bass spawning areas (Hall et al., 1981). Exposure to sublethal levels of benzene for 24 hours increases the respiratory rates of juveniles and if they are exposed for longer periods of time, reversible narcosis can occur (Brocksen & Bailey, 1973). Chronic exposure to benzene can also result in difficulty locating and consuming prey (Korn et al., 1976). When striped bass are exposed to 6.9 ppm of benzene for 24 hours there is 50% mortality in juveniles (Benville & Korn, 1977). Copper and zinc have an effect on yolk-sac larvae, but eggs are unaffected by these metals. Juveniles can develop lesions in their gill tissue as well as impaired respiration when they are exposed to cadmium and mercury. Low pH increases the toxicity of aluminum (Rago, 1992) and high aluminum levels can severely alter epidermal microridge structures in larvae (Rulifson et al., 1986).

Increased attention is focused on emerging contaminants such as endocrine disruptors (pharmaceuticals, pesticides, industrial compounds, and personal care products), microplastics, and automotive derived compounds. Endocrine disruption of striped bass has not been studied; however, it is known to cause increased disease susceptibility, intersex (Blazer et al., 2007), and altered sexual development (Oberdörster & Oliver, 2001) in fishes. Microplastics are known to enter trophic pathways through ingestion (Au et al., 2017; Bergmann et al., 2015; Bour et al., 2020; Parker et al., 2020) as are nanoplastics through inhalation and gill uptake (Tetra Tech, 2020). Modeling efforts are underway to understand trophic pathways of microplastics exposure and accumulation in striped bass; however, study of potential physiological and behavioral effects is lacking (Tetra Tech, 2020). Striped bass response to automotive derived contaminants has not been studied, although road runoff has the capacity to cause abnormal behavior and physiological change (Chow et al., 2019; McIntyre et al., 2018).

Historically, physical threats to striped bass habitat were attributed to channelization, creation of dams, and land reclamation. In coastal regions, 50% of the original estuarine areas important to striped bass have been lost to filling, road construction, or real estate development (Clark, 1967; Kennish, 2002). In the South Atlantic region, dams restrict the upstream migration on the Roanoke, Tar, Neuse, and Pee Dee rivers (Baker, 1968). Efforts have been undertaken to restore access to historical striped bass spawning habitats through the provision of fishways or through removal of impediments to migration. Contemporary threats to striped bass access to spawning and nursery habitat include alteration of river flow regime by consumptive uses such as agriculture and manufacturing as well as dam operation (Cimino et al., 2009). Furthermore, access to aquatic habitats is largely driven by precipitation. Elevated spring precipitation and river flow increases volume of spawning and nursery habitat available to striped bass (Secor et al., 2017). Heavy winter and spring precipitation events in the northeast and eastern US continue to increase in frequency and intensity coupled with a northward shift in the rain-snow transition zone (USGCRP, 2017).

Change in water temperature may be localized such as from industrial discharge or regional resulting from climate change. The localized heated water discharged from many power plants can cause thermal shock in the fish with the severity depending on the life stage (Schubel et al., 1976). Eggs are more sensitive and subject to greatly mortality from the high temperatures. Larvae and juveniles decrease in their susceptibility as they grow older, and there is not usually higher than 50% mortality of thermal shock in adults (Hill et al., 1989). Regionally, climate change has the potential to alter temperature and precipitation dynamics which directly affects timing of spawning migration as well as survival, growth, and habitat suitability throughout the year. In Chesapeake Bay, spawning female striped bass migration was earlier when spring water temperature was warmer (~3 days per 1 degree Celsius increase); this trend was more evident for larger females (Peer & Miller, 2014). Model projections for Hudson River spawning indicate occurrence up to 15 days earlier (Nack et al., 2019). Suitable temperatures, precipitation and flow, and prey availability directly affect larval striped bass survival (Martino & Houde, 2010; Millette et al., 2019); the temporal and spatial match of which are subject to disruption by climate change (Cimino et al., 2009). Increased winter temperatures may facilitate feeding efficiency, increase growth, and improve juvenile overwinter survival (Cimino et al., 2009); conversely warming of summer estuarine waters subjected to decreased dissolved oxygen will reduce available juvenile and adult summer habitat (Constantini et al., 2008). Striped bass occupied normoxic Patuxent River (Chesapeake Bay) waters at supraoptimal temperatures up to 31 degrees Celsius because of higher growth rate potential within the tributary (Kraus et al., 2015). The disease mycobacteriosis coupled with elevated summer sea surface temperature (>26 degree Celsius) appears to have a negative effect on striped bass survival in Chesapeake Bay (Groner et al., 2018). Climate warming conditions that raise estuarine and riverine surface water temperatures above 28 degrees Celsius concurrent with hypoxic bottom waters would expose striped bass to annual summer temperature-oxygen squeeze conditions that could limit growth and production (Constantini et al., 2008).

Since colonial times, conversion of forests and wetlands to agricultural, suburban, and urban uses has contributed to increased eutrophication and resultant hypoxic and anoxic conditions in the Chesapeake Bay watershed (Brush, 2009; Kemp et al., 2005) as has happened in many other watersheds. Hypoxic coastal waters reduce the extent of suitable fish habitat. Temperature-oxygen squeeze habitat conditions have been observed in Chesapeake Bay during summer and fall and where striped bass sought to avoid waters >27 degrees Celsius (Itakura et al., 2021). Hypoxia is common in coastal waters receiving inputs of anthropogenic derived nutrients (Hagy et al., 2004); particularly when those waters have strong density stratification, low tidal energy, and high surface temperatures during seasons where oxygen levels are already low (Breitburg, 2002). A contributing factor to hypoxia is the extent of impervious surface within the watershed where increases in impervious surface are associated with increased probability of hypoxic waters and reduced likelihood of young-of-year striped bass presence (Uphoff et al., 2011). In Chesapeake Bay, the volume of suitable juvenile and adult striped bass summer habitat has contracted as the volume of hypoxic water has increased (Cimino et al., 2009). Expansive hypoxia coupled with warming water temperatures due to climate change will further reduce future summer habitat available to striped bass (Coutant, 1990).

Conversion of forested and wetland areas to agricultural, suburban, and urban uses are known to affect aquatic systems through increase of factors such as runoff volume and intensity; physical instability, erosion, and sedimentation; thermal pollution; contaminant loads including endocrine disruptors and microplastics; road salt; nutrients through nonpoint and direct discharges, sewage leaks and spills, and stormwater runoff; and disruption of organic matter dynamics. Watershed development associated with urban sprawl and population growth has resulted in significant impairment of striped bass habitat in Chesapeake Bay due to sedimentation, eutrophication, contaminants, flow alteration, and thermal pollution (Cimino et al., 2009). Increased urbanization is associated with increased mobilization of contaminants in runoff (Kaushal et al., 2020) which will be exacerbated by increasingly common and intense rain events. Percent impervious surface is a commonly used indicator of watershed development whereby 10% is a threshold for aquatic ecosystem deterioration (Cappiella & Brown 2001; Beach 2002). In essence, a watershed's percent impervious surface is a catchall index of aquatic habitat condition. Watershed percent impervious surface has been used to assess suitability of striped bass spawning and nursery habitat in Chesapeake Bay tributaries (Uphoff et al., 2011; Uphoff et al., 2020).

1.4.4 Habitat Management as an Element of Ecosystem Management

Migratory striped bass require a broad geographic range to complete their life cycle; consequently, the ecosystems used are vast and variable and the cooperative management approach embodied by ASMFC is necessary. Attempts to incorporate ecosystem management into fisheries management are increasing. Ecosystem management can be interpreted as a) the consideration of how the harvest of one species might impact other species in an ecosystem and incorporating that relationship in management decisions and b) the incorporation of the protection and enhancement of habitat features that contribute to fish production into the fishery management process. While the implementation of multispecies management is

increasingly common, incorporation of habitat condition in the management framework and decision-making process is rare.

Biologists, fisheries managers, and fishermen all recognize that habitat quality is one of the keys to maintaining and improving fish stocks for harvest. Increasing demands for seafood and recreation requires that fisheries regulations provide for maximizing yield, minimizing bycatch, and rebuilding and maintaining adequate spawning stocks. Effective fishery management requires more than issuing regulations governing sizes, seasons and catch limits. Degraded habitat negatively affects aquatic communities necessary to support fish life, reduces levels of fish, and inhibits management to provide adequate fish for food or recreational experiences.

Fisheries managers recognize that provisions must be made for agriculture, housing, commerce, and transportation that support our present and growing population; however, components of an unaltered watershed including forested uplands, wetlands, and tidal and nontidal streams are integral for maintaining suitable fish habitat. By 2020 the terrestrial portions of Chesapeake Bay watershed comprised 17% actively used for agriculture, 11% had been developed, and 60% was forested (Chesapeake Conservation Partnership, 2020). These watershed wide percentages are not uniformly distributed among spawning tributaries. For example, the Potomac River is estimated at 26% agriculture and 26% developed, the Choptank River is estimated at 48% agricultural and 10% developed, and the James River is estimated to be 14% agricultural and 11% developed (Chesapeake Bay Program as cited in Chesapeake Bay Foundation, 2021). Population within the Chesapeake Bay watershed will increase from 18 million in 2020 to a projected 22.5 million by 2050 and with it an estimated additional 570,000 acres or 1.3% of land area converted to developed land (Chesapeake Conservation Partnership, 2020). Inherent in land development is increased impervious surface, its veritable permanence, and resultant exacerbation of chemical, biological, and physical threats to striped bass habitat. As ecosystems are altered, production of coastal fishery resources is typically reduced.

Habitat management, as a tool of fisheries management, was traditionally practiced by installation and manipulation of physical structures in the water for the benefit of aquatic life, remediation of point source pollution, removal of stream blockages, and planting of streamside trees. These traditional practices have demonstrated benefit and continue to be employed. However, fisheries management must consider the myriad of impacts that result from land use change and implement environmental protection and restoration activities outside the traditional scope of fish management.

At the federal level, the coastal Regional Fisheries Management Councils' fisheries management plans (FMPs) and Federal EEZ FMPs all now are required to define Essential Fish Habitat (EFH) including Habitat Areas of Particular Concern (HAPC) and to be proactive in protecting it. A report to Congress by an Ecosystems Principles Advisory Panel, Ecosystem-Based Fishery Management (1999), recommended that Regional Management Councils develop Fisheries Ecosystem Plans that recognizes the interrelationships between species and the habitat needs of the managed species. The ASMFC FMP process has habitat protection as one of its objectives (ASMFC, 2019). Each of the cooperating states of the ASMFC should

incorporate habitat protection recommendations in its state waters as an element of their fisheries management framework. However, state fisheries management agencies often lack jurisdiction to mandate measures to protect and conserve fish habitat. Variously named state and county departments of natural resources, environment, coastal resources, and health have the primary responsibilities for programs that protect, promote, and enhance environmental quality for residents and living resources. Fisheries management agencies must integrate their fish production objectives with activities of these habitat management agencies. For example, North Carolina has mandated the preparation and implementation of a Coastal Habitat Protection Plan, which requires the collaboration of the state's Coastal Management, Environmental Management, and Marine Fisheries commissions.[2] Active involvement of fisheries management agencies in strategic planning, application of regulatory controls and permits that feature protection of environmental quality, and production of fish as objectives can provide for human needs while minimizing the impact on ecosystems.

1.5 IMPACTS OF THE FISHERY MANAGEMENT PROGRAM

1.5.1 Biological and Ecological Impacts

Options to address recreational release mortality through seasonal closures, gear restrictions, and/or education and outreach may reduce the number of striped bass released alive (through seasonal closures) or may increase the chance of survival of striped bass caught and released in the recreational fishery (through gear restrictions and education/outreach). Some seasonal closure options would offer additional benefit to the stock by reducing effort during seasons associated with higher post-release mortality rates or by protecting spawning or pre-spawn fish, which could contribute to stock rebuilding. Changes to the recreational size limit to protect the relatively strong 2015 year class, and potentially other strong year classes, would shift recreational harvest effort to different age classes as compared to the status quo, which would have potential impacts on total SSB that will vary depending on the size limit considered. Changes to the management triggers may affect how quickly and how often the fishing mortality rate, which is the rate at which striped bass are dying because of fishing, is adjusted.

1.5.2 Social and Economic Impacts

This Amendment includes several measures which could carry social and economic impacts, notably potential changes to the recreational size limit to protect strong year classes and potential implementation of seasonal closures. Changes in spatial or seasonal closures, gear restrictions, bag and size limits, and other effort controls affect important attributes of a recreational fishing trip, such as the number of fish of each species that anglers catch and are allowed to keep. In turn, these changes in trip attributes will modify the utility (i.e., level of satisfaction) an angler expects to obtain from the fishing trip (McConnell et al. 1995, Haab and

[2] See https://deq.nc.gov/about/divisions/marine-fisheries/public-information-and-education/habitat-information/chpp for more information.

McConnell 2003). As a result, the angler may shift target species, modify trip duration or location, or decide not to take the trip and do something else instead. These behavioral responses lead to changes in directed fishing effort, with accompanying changes in harvest, fishing mortality, and angler welfare. This is, however, only a short-term response and stock dynamics will dictate any longer-term effects on the resource, which may subsequently feed back and affect future management decisions and angling behavior.

Assessing the fishery impacts and potential success of proposed policy measures requires a predictive model that links angler participation and decision-making to changes in management measures, stock levels, and fishing conditions. When data describing angler trip-taking, species targeting, and/or harvest decisions are available, fisheries economists can utilize bioeconomic models to assess the impact of changes in regulation on recreational fishing. Bioeconomic models seek to assess the total effect of changes in policy, immediate and future.

Bioeconomic models combine an economic sub-model with a biological sub-model, which are linked via the impact of angler behavior and fishing mortality on stock dynamics. The integrated model is characterized by two-way feedback loops between fish stocks and angler decision-making in terms of participation, species targeting, and harvest. The number of trips, angler preferences for harvest and release, stock sizes, and regulations jointly determine fishing mortality which, in turn, impacts both future stock levels and future recreational fishing outcomes (Jarvis 2011, Lee at al. 2017). The economic sub-model uses anglers' preferences for different trip attributes to derive anglers' demand for recreational trips under alternative policy scenarios. The biological sub-model, typically an age-structured or size-structured population dynamics model in discrete time, specifies the effect of recreational fishing on the future structure and abundance of the population. Before conducting simulations under alternative policy scenarios, the integrated bioeconomic model can be calibrated such that the number of predicted trips under existing regulations corresponds to MRIP effort estimates (Lee at al. 2017, Holzer and McConnell 2017). The use of bioeconomic simulations allows for a wide range of analyses regarding policy options, often including novel regulatory alternatives, and provides both expected outcomes, in terms of stock abundances and angler welfare, as well as confidence levels around these outcomes.

Recent research into striped bass anglers' preferences and behavior illustrates the connection between regulatory policies and fishing effort while also providing information that could be used to operationalize a bioeconomic model for striped bass management in the future.

Murphy et al. (2019) surveyed striped bass anglers from Massachusetts, Connecticut, Virginia, and North Carolina, collecting data on angler motivations, attitudes, behavior and responses to alternative policy measures. The authors found that changes in size and bag limits led to changes in trip-taking, species targeting, and harvest decisions; these changes in behavior were correlated with angler characteristics such as consumptive orientation (i.e., different attitudes toward catching fish, keeping fish, catching large numbers of fish, and catching trophy fish) and that attitudes; and motivations of striped bass anglers were considerably diverse.

Carr-Harris and Steinback (2020) developed an angler behavioral model using stated preference choice experiment data collected from striped bass anglers from Maine through Virginia. The model was used to simulate trip-taking, harvest decisions, fishing mortality, and angler welfare across a range of alternative policy measures for anglers in Massachusetts, Rhode Island, and Connecticut, incorporating the impacts of fish size on angler behavior, utility, and resulting size- and sex-specific fishing mortality. The authors found that the range of economically efficient policies (i.e., policies that maximize angler welfare for a given level of recreational fishing mortality) was broad if managers were concerned with controlling recreational fishing mortality only, though considerably narrower if protecting female spawning stock was instead the primary management objective. Carr-Harris and Steinback (2020) note their behavioral model could be extended geographically and combined with a population dynamics sub-model to form an integrated bioeconomic model that would be capable of assessing feedbacks and long-run impacts of management decisions on anglers and the striped bass resource. Such an integrated model would allow the ASMFC to estimate the impact of alternative policy options (such as those in draft Amendment 7), as currently done by the New England Fishery Management Council for the cod and haddock recreational fishery (Lee et al. 2017) (see *Section 6.3 Socio-Economic Research Needs*).

1.5.2.1 Striped Bass Fisheries and the Economy

A 2019 report from Southwick Associates[3] indicates 97% of the economic impacts associated with striped bass fishing came from the recreational sector in 2016. According to the report, total revenues in the commercial sector (from Maine to North Carolina) were $19.8 million that year, while total expenditures in the recreational sector amounted to $6.3 billion. The contribution of the commercial sector to the region's gross domestic product (GDP), when attempting to account for all industries involved in harvesting, processing, distributing, and retailing striped bass to consumers, was $103.2 million and supported 2,664 regional jobs. In comparison, the contribution of the recreational sector to the region's GDP was $7.7 billion and supported 104,867 jobs. Importantly, the report acknowledges that it is not intended to be used to set fishery regulations, but rather to demonstrate the economic significance of striped bass to local economies. It should also be noted that these numbers are for the entire region and actual economic impacts are expected to vary by state.

The dollar values above refer to economic impacts, not to the economic value (or net economic benefit for society) associated with the recreational and commercial fisheries. While data required to quantify these measures are not currently available, the effects of changes to the striped bass management program for recreational sector can be qualified as follows: further limitations on the size and number of fish that can be kept can lead to increased effort to retain a legal-sized fish and an increase in dead releases. Conversely, increased fishing restrictions could result in a reduction in number of recreational trips which could translate into a reduction

[3] While this is a useful source of updated information, it is not peer-reviewed and, therefore, the methods behind the report's figures should be considered accordingly.

in angler welfare. However, as in the case of the economic impacts (and assuming increased restrictions do not permanently deter stakeholders from the striped bass fishery), these effects are expected to be outweighed by the positive effects on anglers', harvesters', and consumers' welfare associated with stock recovery in successive years.

2.0 GOALS AND OBJECTIVES

2.1 HISTORY OF MANAGEMENT

Atlantic striped bass (*Morone saxatilis*) have supported valuable commercial and recreational fisheries on the U.S. Atlantic coast for centuries. The Commission coordinates interstate management of the species in state waters (0-3 miles from shore), while management authority in the exclusive economic zone (3-200 miles) lies with NMFS. The first Interstate FMP for the species was approved in 1981 in response to poor juvenile recruitment and declining landings. The FMP recommended increased restrictions on commercial and recreational fisheries, such as minimum size limits and harvest closures on spawning grounds. Two amendments were passed in 1984 recommending additional management measures to reduce fishing mortality. To strengthen the management response and improve compliance and enforcement, the Atlantic Striped Bass Conservation Act (P.L. 98-613) was passed in late 1984. The Striped Bass Act mandated the implementation of striped bass regulations passed by the Commission and gave the Commission authority to recommend to the Secretaries of Commerce and Interior that states be found out of compliance when they failed to implement management measures consistent with the FMP.

The first enforceable plan under the Striped Bass Act, Amendment 3, was approved in 1985, and required size regulations to protect the 1982 year class—the first modest size cohort since the previous decade. The objective was to increase size limits to allow at least 95% of the females in the 1982 year class to spawn at least once. Smaller size limits were permitted in producer areas than along the coast. Several states opted for a more conservative approach and imposed a total moratorium on striped bass landings for several years. The amendment contained a trigger mechanism to relax regulations when the 3-year moving average of the Maryland juvenile abundance index (JAI) exceeded an arithmetic mean of 8.0. This was attained with the recruitment of the 1989 year class and led to the development of Amendment 4. Also, in 1985, the Commission determined the Albemarle Sound-Roanoke River (Albemarle-Roanoke) stock in North Carolina contributed minimally to the coastal migratory population, and was therefore allowed to operate under an alternative management program.

Amendment 4, implemented in 1989, aimed to rebuild the resource rather than maximize yield. The amendment allowed state fisheries to reopen under an interim target fishing morality (F) of 0.25, which was half the estimated F needed to achieve maximum sustainable yield (MSY). The amendment would allow an increase in the target F (0.5) once female SSB was restored to levels estimated during the late 1960s and early 1970s. The dual size limit concept was maintained (28" coastal versus 18" producer areas), and a recreational trip limit and commercial season was implemented to reduce the harvest to 20% of that during 1972-1979. A

series of four addenda were implemented from 1990-1994 to maintain protection of the 1982 year class through sequentially higher minimum size limits which reached 34" along the coast by 1994.

In 1990, to provide additional protection to striped bass and ensure the effectiveness of state regulations, NMFS adopted a prohibition on possession, fishing (catch and release fishing), harvest, and retention of Atlantic striped bass in the Exclusive Economic Zone (EEZ), with the exception of a defined transit zone within Block Island Sound (55 Federal Register 40181-02). Atlantic striped bass may be transported through this defined area provided that the vessel is not used to fish while in the EEZ and the vessel remains in continuous transit, and that the fish were legally caught in adjoining state waters. The EEZ has remained closed since 1990. In addition, an Executive Order issued in 2017 prohibits the sale of striped bass caught from the EEZ.

In 1995, the Atlantic striped bass migratory stock was declared recovered by the Commission (the Albemarle-Roanoke stock was declared recovered in 1997 and the Delaware River stock was declared recovered in 1998) and Amendment 5 was adopted to increase the target F to 0.33, midway between the existing F target (0.25) and F_{MSY}. Target F was allowed to increase again to 0.40 after two years of implementation. Regulations were developed to achieve the target fishing mortality, which included measures to restore commercial harvest to 70% of the average landings during the 1972-1979 historical period, and recreational season, possession (two fish), and size limits (a return to 28" on the coast and 20" for producer areas). States were allowed to submit proposals to implement alternative regulations that were deemed conservationally equivalent to the Amendment 5 measures, provided no size limits were below 18". From 1997-2000[4], a series of five addenda were implemented to respond to the latest stock status information and adjust the regulatory program to achieve each change in target F.

In 2003, Amendment 6[5] was adopted to address five limitations within the existing management program: 1) potential inability to prevent the Amendment 5 exploitation target from being exceeded; 2) perceived decrease in availability or abundance of large striped bass in the coastal migratory population; 3) a lack of management direction with respect to target and threshold biomass levels; 4) inequitable effects of regulations on the recreational and

[4] The 1997 reauthorization of the Striped Bass Act also required the Secretaries of Commerce and Interior provide a biennial report to Congress highlighting the progress and findings of studies of migratory and estuarine Striped Bass. The tenth such report was recently provided to Congress (Shepherd et al. 2020).

[5] While NMFS continues to implement a complete ban on the fishing and harvest of striped bass in the EEZ, Amendment 6 includes a recommendation to consider reopening the EEZ to striped bass fisheries. In September 2006, NMFS concluded that it would be imprudent to open the EEZ to striped bass fishing because it could not be certain that opening the EEZ would not lead to increased effort and an overfishing scenario. In 2018, the Consolidated Appropriations Act directed NMFS (in consultation with ASMFC) to review the federal moratorium once the 2018 benchmark was completed, and consider lifting the ban, however, there has not been any update from NMFS on this directive.

commercial fisheries, and coastal and producer area sectors; and 5) excessively frequent changes to the management program.

Amendment 6 modified the F target and threshold, and introduced a new set of biological reference points (BRPs) based on female SSB, as well as a list of management triggers based on the BRPs. The F threshold value was set to achieve MSY and the F target was set to provide a higher long-term yield from the fishery and adequate protection to ensure that the striped bass population is not reduced to a level where the spawning potential is adversely affected. The F target provided a buffer to account for the uncertainty in the estimate of F_{MSY} threshold. The female SSB threshold value was set equal to the female SSB value in 1995, the year that the striped bass stock was declared rebuilt, while the SSB target was set to 125% of the SSB threshold. New management measures were selected based on the F target.

The coastal commercial quotas were restored to 100% of the states' average landings during the 1972-1979 historical period, except for Delaware's coastal commercial quota which remained at the level allocated in 2002[6]. For the recreational fisheries, a two-fish bag limit with a minimum size limit of 28 inches was established, except for the Chesapeake Bay fisheries and North Carolina fisheries that operate in the Albemarle-Roanoke. The Chesapeake Bay and Albemarle-Roanoke regulatory programs were predicated on a more conservative F target than the coastal migratory stock, which allowed these states/jurisdictions (hereafter states) to implement separate seasons, harvest caps, and size and bag limits as long as they remained under that F target. Additionally, states were permitted the flexibility to deviate from the coastwide regulations by submitting conservation equivalency proposals. No minimum size limit could be less than 18 inches under Amendment 6. The same minimum size standards regulated the commercial fisheries as the recreational fisheries, except for a minimum 20 inch size limit in the Delaware Bay spring American shad gillnet fishery.

Five addenda to Amendment 6 have been implemented. Addendum I, approved in 2007, established a bycatch monitoring and research program to increase the accuracy of data on striped bass discards and recommended development of a web-based angler education program. Addendum II was approved in 2010 and established a new definition of recruitment failure such that each index would have a fixed threshold rather than a threshold that changes annually with the addition of each year's data. Addendum III was approved in 2012 and requires all states with a commercial fishery for striped bass to implement a uniform commercial harvest tagging program. The Addendum was initiated in response to significant poaching events in the Chesapeake Bay and aims to limit illegal harvest of striped bass.

[6] The decision to hold Delaware's commercial quota at the 2002 level was based on tagging information that indicated F on the Delaware River/Bay stock was too high, and uncertainty regarding the status of the spawning stock for the Delaware River/Bay.

Addendum IV was triggered in response to the 2013 benchmark assessment, which indicated a steady decline in SSB since the mid-2000s to the point of approaching the SSB threshold in the terminal year. The Addendum established new F reference points, including the elimination of Chesapeake Bay stock-specific reference points due to modeling limitations, and changed commercial and recreational measures to reduce F to a level at or below the new target. While the 1995 female SSB level had proved to be a useful reference point for striped bass, fishing at (and even below) the F_{MSY} target reference point did not maintain female SSB at the 1995 level. To address this issue, the 2013 benchmark stock assessment recommended new F reference points that would maintain SSB at or above its 1995 level which Addendum IV adopted. Chesapeake Bay fisheries were required to implement lower reductions than coastal states (20.5% compared to 25%) since their fisheries were reduced by 14% in 2013 based on their management program; however, this included replacing the Bay's variable commercial harvest cap (based on exploitable biomass) with a fixed level based on reducing 20.5% from the 2021 harvest. Along the coast, the measures included 25% coastal commercial quota reductions and a 1-fish limit and 28" minimum size for recreational fisheries. The addendum maintained the flexibility to implement alternative regulations through the conservation equivalency process, which resulted in some variety of regulations among states. All states promulgated regulations prior to the start of their 2015 seasons.

In February 2017, the Board initiated development of Draft Addendum V to consider liberalizing coastwide commercial and recreational regulations. The Board's action responded to concerns raised by Chesapeake Bay jurisdictions regarding continued economic hardship endured by its stakeholders since the implementation of Addendum IV and information from the 2016 stock assessment update indicating that F was below target in 2015, and that total removals could increase by 10% to achieve the target F. However, the Board chose to not advance the draft addendum for public comment largely due to harvest estimates having increased in 2016 without changing regulations. Instead, the Board decided to wait until it reviewed the results of the 2018 benchmark stock assessment (NEFSC 2019) before considering making changes to the management program.

Addendum VI was initiated in response to the 2018 benchmark assessment which indicated the stock was overfished and experiencing overfishing in 2017. Approved in October 2019, the Addendum aims to reduce total removals by 18% relative to 2017 levels in order to achieve the F target in 2020 and begin rebuilding the stock. Specifically, the Addendum reduces all state commercial quotas by 18%, and implements a 1 fish bag limit and a 28"to less than 35" slot limit for ocean fisheries and a 1 fish bag limit and an 18" minimum size limit in Chesapeake Bay to reduce total recreational removals by 18% in both regions. The Addendum's measures are designed to apply the needed reductions proportionally to both the commercial and recreational sectors, although states were permitted to submit alternative regulations through conservation equivalency that achieve an 18% reduction in total removals statewide. The Board reviewed and approved management options for 2020 on a state-by-state basis in February, and all states promulgated regulations by April 1 (Tables 12-13).

Addendum VI also requires the mandatory use of circle hooks when fishing with bait to reduce release mortality in recreational striped bass fisheries. States are encouraged to promote the use of circle hooks through various public outreach and education platforms to garner support and compliance with this important conservation measure. Circle hook regulations were required to be implemented no later than January 1, 2021. In March 2021, the Board approved a clarification on the definition of bait and methods of fishing that require circle hooks. The Board also approved guidance on how to address incidental catch of striped bass when targeting other species with non-circle hooks with bait attached.[7]

2.2 PURPOSE AND NEED FOR ACTION

The purpose of Amendment 7 is to update the management program to align with 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 this amendment to build upon the Addendum VI action to end overfishing and initiate rebuilding in response to the overfished status.

The Board-approved 2018 benchmark stock assessment indicated the striped bass stock is overfished and experiencing overfishing relative to the updated reference points defined in the assessment. By accepting the assessment for management use in 2019, two management triggers were tripped requiring the Board to take action to address both the overfishing and overfished status. Addendum VI was implemented in 2020 to address the overfishing status by implementing measures to reduce fishing mortality back to the fishing mortality target in 2020. To address the overfished status, the Board must adjust the striped bass management program to rebuild the biomass to the target level by no later than 2029 (within 10 years). Addendum VI measures are expected to contribute to stock rebuilding.

This draft amendment presents options that would contribute to stock rebuilding and would update the management program to address concerns raised by the Board and the public (see *Section 1.1.1 Statement of the Problem*). For the recreational fishery, this amendment considers management measures to address recreational release mortality and to protect strong year classes. Regarding management program processes, this amendment considers options to modify the use of conservation equivalency in the Striped Bass FMP and options to modify the management triggers established through Amendment 6. Regarding the rebuilding plan, this amendment considers options for how recruitment assumptions would be applied to the rebuilding calculations and projections in the next stock assessment update (expected in 2022). Besides these five issues, all other management measures are consistent with Amendment 6 and its Addenda; however, other issues can be addressed in a separate management

[7] This guidance on incidental catch could not be implemented as a compliance criterion since incidental catch was not originally part of Addendum VI.

document(s) following approval of the final amendment (see *Section 4.7 Adaptive Management*).

2.3 GOAL

The Goal of Amendment 7 to the Interstate Fishery Management Plan for Atlantic Striped Bass is:

> To perpetuate, through cooperative interstate fishery management, migratory stocks of striped bass; to allow commercial and recreational fisheries consistent with the long-term maintenance of a broad age structure, a self-sustaining spawning stock; and also to provide for the restoration and maintenance of their essential habitat.

2.4 OBJECTIVES

In support of this goal, the following objectives are specified:

1. Manage striped bass fisheries under a control rule designed to maintain stock size at or above the target female spawning stock biomass level and a level of fishing mortality at or below the target exploitation rate.
2. Manage fishing mortality to maintain an age structure that provides adequate spawning potential to sustain long-term abundance of striped bass populations.
3. Provide a management plan that strives, to the extent practical, to maintain coastwide consistency of implemented measures, while allowing the States defined flexibility to implement alternative strategies that accomplish the objectives of the FMP.
4. Foster quality and economically viable recreational, for-hire, and commercial fisheries.
5. Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.
6. Adopt a long-term management regime that minimizes or eliminates the need to make annual changes or modifications to management measures.
7. Establish a fishing mortality target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population, relative to the 2000 estimate.

2.5 MANAGEMENT UNIT

The management unit includes all coastal migratory striped bass stocks on the East Coast of the United States, excluding the Exclusive Economic Zone (3-200 nautical miles offshore), which is managed separately by NMFS. The coastal migratory striped bass stocks occur in the coastal and estuarine areas of all states and jurisdictions from Maine through North Carolina. Inclusion of these states in the management unit is also congressionally mandated in the Atlantic Striped Bass Conservation Act (PL 98-613).

2.5.1 Chesapeake Bay Management Area

The Chesapeake Bay management area is defined by the striped bass residing between the baseline from which the territorial sea is measured as it extends from Cape Henry to Cape Charles to the upstream boundary of the fall line. Unlike the Albemarle Sound-Roanoke River stock, the striped bass in the Chesapeake Bay are unquestionably part of the coastal migratory stock and are assessed as part of the coastal migratory striped bass management unit. However, Amendment 7 implements a separate management program for the Chesapeake Bay due to the size availability of striped bass in this area.

2.5.2 Albemarle Sound-Roanoke River Management Area

The Albemarle Sound-Roanoke River (Albemarle-Roanoke) stock is currently assessed and managed separately by the State of North Carolina under the auspices of ASMFC.[8] The Albemarle-Roanoke management area is defined by the striped bass inhabiting the Albemarle, Currituck, Croatan, and Roanoke Sounds and their tributaries, including the Roanoke River. The Virginia/North Carolina line bound these areas to the north and a line from Roanoke Marshes Point to the Eagle Nest Bay bounds the area to the south. The Bonner Bridge at Oregon Inlet defines the ocean boundary of the Albemarle-Roanoke management area.

The Albemarle-Roanoke stock is not included in the coastwide assessment and management program because it contributes minimally to the coastal migratory stock. The Albemarle-Roanoke stock is smaller in total abundance relative to the other producer areas and does not participate in the coastal migration until older ages. The female maturation schedule for the Albemarle-Roanoke stock is also different than the Chesapeake Bay stock (ASMFC 2013; NCDMF 2014). The Technical Committee will continue to monitor the contribution of the Albemarle-Roanoke stock to the coastal migratory population and make recommendations to the Management Board regarding future management.

2.6 REFERENCE POINTS

The current status of the Atlantic striped bass stock will be determined with respect to its biological reference points through the stock assessment. Amendment 7 maintains the previously existing reference point definitions from Amendment 6, as modified by Addendum IV, for female spawning stock biomass (SSB) and fishing mortality rate (F).

[8] Estuarine striped bass in North Carolina are currently managed under Amendment 1 to the North Carolina Estuarine Striped Bass Fishery Management Plan (FMP) and its subsequent revision and recent supplement (NCDMF 2013, 2014, 2019). It is a joint plan between the North Carolina Marine Fisheries Commission (NCMFC) and the North Carolina Wildlife Resources Commission (NCWRC).

2.6.1 Definition of Overfishing and Overfished

A common approach in fisheries management for evaluating the need for management action as determined by stock status is through the use of a control rule. For striped bass, the control rule is based on the level of: 1) fishing mortality rate (F) and 2) female spawning stock biomass (SSB). Overfishing is defined relative to the rate of removals from the population, as determined by the fishing mortality on the stock, whereas overfished status is defined relative to female SSB. For striped bass, the threshold levels of F and SSB are used to determine overfishing and overfished status, respectively. If F exceeds the F threshold, overfishing is occurring, and if SSB falls below the SSB threshold, the stock is overfished.

The management program is designed to achieve the target F and SSB levels. The use of fishing mortality and spawning stock biomass targets and thresholds will provide managers with a series of factors to use when evaluating the status of the stock. *Section 4.1* outlines a series of management triggers associated with the targets and thresholds.

The following sections identify SSB and F reference points for the coastwide population, which includes the Chesapeake Bay, Hudson River and Delaware River/Bay as a metapopulation. These reference points are consistent with those accepted in the Striped Bass 2018 Benchmark Assessment and Peer Review (NEFSC 2019).

Additional work is being conducted by the TC and SAS to develop management area-based reference points (e.g., for the Chesapeake Bay) for future Board consideration.

2.6.1.1 Female Spawning Stock Biomass Target and Threshold

The biomass target and threshold are based on the weight of sexually mature females in the striped bass population. The 1995 estimate of female SSB is 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% of the female SSB threshold. Based on the results from the 2018 assessment, the SSB threshold is 91,436 metric tons (202 million pounds) and the SSB target is 114,295 metric tons (252 million pounds) (Table 1). Female SSB target and threshold values will be updated with future stock assessments because these reference point values are estimated based on the best available data.

The striped bass population will be considered overfished when the female SSB falls below the SSB threshold level. *Section 4.1* outlines management triggers based on female SSB reference points.

The use of the word “target” is not intended to imply that the management program will try to limit the population from expanding beyond the target level. In other words, when the population is above the target it is not the intent to reduce the population back to target levels.

2.6.1.2 Fishing Mortality Target and Threshold

Fishing mortality based reference points are designed to manage the rate at which individual striped bass die because of fishing. The fishing mortality target and threshold are the values of F estimated to achieve the respective SSB target and threshold over the long-term. If the current F exceeds the F threshold, then overfishing is occurring. This means the rate at which striped bass are dying because of fishing (i.e., harvest and dead discards) exceeds the stock's ability to maintain itself at the SSB threshold. The value of the F target is set at a cautionary level intended to safeguard the fishery from reaching the overfishing threshold.[9] The F target and threshold values will be updated with future stock assessments because these reference point values are estimated based on the best available data.

Section 4.1 outlines management triggers based on the F reference points.

Table 1. Coastwide Population Reference Points

Reference Point	**Definition**	**Value (as estimated in 2018 benchmark stock assessment)***
$SSB_{THRESHOLD}$	SSB in 1995	202 million pounds
SSB_{TARGET}	125% of SSB in 1995	252 million pounds
$F_{THRESHOLD}$	F associated with achieving the SSB threshold	0.24
F_{TARGET}	F associated with achieving the SSB target	0.20

*The target and threshold values may change through future stock assessments because they are estimated based on the best available data.

2.6.1.3 Reference Points for the Albemarle Sound-Roanoke River

The State of North Carolina will manage the Albemarle Sound-Roanoke River stock using reference points from the latest North Carolina Albemarle Sound-Roanoke River stock assessment accepted by the Technical Committee and approved for management use by the Board (Figures 9-10). The recreational and commercial fisheries in the Albemarle Sound and Roanoke River will operate under North Carolina's Fishery Management Plan while the recreational and commercial fisheries in the Atlantic Ocean will continue to operate under the Commission's management measures as the rest of the coastal fisheries.

[9] F reference points are calculated by the stock assessment model, which includes incorporating recruitment from the values observed from 1990 to the terminal year of the assessment. If an alternative recruitment management trigger is selected from *Section 4.1,* an interim F target and threshold may be calculated based on recruitment values from a low recruitment time period only, as specified in *Section 4.1*.

2.7 STOCK REBUILDING PROGRAM

2.7.1 Stock Rebuilding Targets

Should the Atlantic striped bass population be overfished at any time, it is the intent under Amendment 7 to rebuild the female spawning stock biomass to the target level (defined in *Section 2.6.1.1*) within the timeframe established in *Section 2.7.2*.

2.7.2 Stock Rebuilding Schedules

If at any time the Atlantic striped bass population is declared overfished and rebuilding needs to occur (as specified in *Section 4.1 Management Triggers*), the Management Board will determine the rebuilding schedule at that time. The only limitation imposed under Amendment 7 is that the rebuilding schedule is not to exceed 10 years.

2.7.3 Maintenance of Stock Structure

Using the outputs from the stock assessment model, the Technical Committee will monitor the status of the age structure in the striped bass population. If the Technical Committee identifies a persistent change in the age structure that could jeopardize recruitment then the Management Board could modify the exploitation pattern to increase survival of target age classes. In addition, if an individual stock exceeds threshold limits for biomass or exploitation the Board should consider management changes for that stock.

3.0 MONITORING PROGRAM SPECIFICATION

In order to achieve the goals and objectives of Amendment 7, the collection and maintenance of quality data is necessary. All state fishery management agencies are encouraged to pursue full implementation of the standards of the Atlantic Coastal Cooperative Statistics Program (ACCSP).

3.1 COMMERCIAL CATCH AND LANDINGS INFORMATION

States and jurisdictions with commercial striped bass fisheries are required to collect commercial fishery data elements consistent with ACCSP standards and adhere to the ACCSP standard of mandatory trip-level reporting for catch and effort data collection. These data are used to support commercial quota monitoring efforts to prevent annual quota overages. Commercial quotas are allocated on a calendar year basis with quota monitoring being conducted annually during the Fishery Management Plan Review process based on landings information submitted in state compliance reports. States also conduct quota monitoring during the fishing season. Any overages incurred by a state or jurisdiction is deducted from that state or jurisdictions allowable quota in the following year.

3.1.1 Commercial Tagging Program

States and jurisdictions are required to implement a tagging program for all commercially harvested striped bass within state or jurisdictional waters. Further descriptions of the program requirements are provided in the following sections.

Tag Information and Type

All states and jurisdictions with a commercial striped bass fishery are required to submit a Commercial Tagging Report to ASMFC no later than 60 days prior to the start of the first commercial fishery in that state or jurisdiction. The Commercial Tagging Report will include a picture of the tag(s), as well as a description of the tag color, style, and inscription for all gears and/or seasons issued. Additionally, it should include the number of tags issued or printed and a description of the biological metric used to determine the number of tags printed and distributed to participants. All tags used in a state or jurisdictions tagging program must be tamper-evident. Tags are required to be valid for only one year or fishing season. Tags are required to be inscribed with, at a minimum, the year of issue, the state of issue, and a unique number that can be linked back to the permit holder. Where possible, tags should also be inscribed with size limit. States should consider the use of bar codes or QR codes imprinted on tags, for use in tracking fish from harvester to dealer to buyer, as the technology becomes more available. Changes to the tags, with the exception of year, are required to be reported to ASMFC as specified in *Section 5.3*.

Tag Timing

States or jurisdictions with a commercial striped bass fishery may choose to implement their commercial tagging program at either the point of harvest or the point of sale.

Tag Allowance

States and jurisdictions with a commercial striped bass fishery are required to allocate commercial tags to permit holders based on a biological metric. This option is intended to help prevent state or jurisdictional commercial quota overages, which will contribute to the health and sustainability of the striped bass population. The biological metric used to allocate tags to participants is required to be included in the annual Commercial Tag Report.

Tag Accounting

States and jurisdictions with a commercial striped bass fishery must require permit holders to turn in unused tags or provide an accounting report for any unused tags prior to the start of the next fishing season. Tags or the accounting report shall be turned into the agency issuing the tags. The accounting report must include the disposition of all tags issued to the permittee (e.g., used, unused, broken, lost). Permit holders who do not comply with this section may be subject to penalties as set forth below.

Reporting for Tagging Program

States and jurisdictions with a commercial striped bass fishery shall, at a minimum, approve the ACCSP standards for catch and effort data collection. The ACCSP standard for commercial catch and effort data is mandatory, trip-level reporting of all species commercially harvested with reporting of specific minimum data elements; including species, quantity, state and port of landing, market grade and category, areas fished and hours fished. Dealers and/or harvesters landing catches must report to the state of landing monthly or more frequently, if possible. Each gear and area combination should be detailed; such as separate listings each time the fisherman changes gear or fishing area within a trip. Price data are preferred at the trip-level,

but partners may opt to collect prices through dealer surveys.

Striped Bass Processing

For all commercial striped bass tagging programs, tags must remain affixed to the fish until processed for consumption by the consumer. Retail markets may prepare portions of legally tagged striped bass for the consumer but must retain the tagged carcass until all portions are sold. The tag must then be removed from the rack and destroyed (e.g. by cutting the tag in two). Possession of untagged striped bass or striped bass fillets or steaks without the properly tagged carcass in establishments where fish are sold or offered for sale (including wholesale establishments, retail establishments and restaurants) is presumptive evidence of intent to sell, trade, or barter such striped bass.

Striped Bass Exportation

It is unlawful to sell or purchase commercially caught striped bass without a commercial tag. This is to prevent the sale or purchase of untagged striped bass into a state or jurisdiction where there is currently no commercial fishery program.

Penalties

It is recommended that states and jurisdictions strengthen their penalties for striped bass violations, including counterfeit tag operations, so that the penalties are sufficient to deter illegal harvest of striped bass. License revocation or suspension is supported as a primary penalty for state or federal violations. Civil and/or criminal penalties can be effective deterrents.

It is recommended that if the permit holder issued tags cannot account for unused commercial striped bass tags, then that individual will not be issued a commercial striped bass permit for the subsequent fishing year.

3.2 RECREATIONAL CATCH AND INFORMATION

The Marine Recreational Information Program (MRIP) contains estimated Atlantic striped bass catches starting in 1981 for shore, private/rental boats, and for-hire modes. Recreational harvest of striped bass was previously collected through the Marine Recreational Fisheries Statistics Survey (MRFSS), which was a recreational data collection program used from 1981-2003. The MRFSS program was replaced by MRIP in 2004 and was designed to provide more accurate and timely reporting as well as greater spatial coverage. The MRFSS and MRIP programs were simultaneously conducted in 2004-2006 and this information was used to calibrate past MRFSS recreational harvest estimates against MRIP recreational harvest estimates.

In 2018, MRIP implemented the Fishing Effort Survey (FES) which used an improved methodology to address several concerns with the prior Coastal Household Telephone Survey. These concerns included under-coverage of the angling public, declining number of households with landline telephones, reduced response rates, and memory recall issues. Past estimates

have been recalibrated to the FES. This calibration resulted in much higher recreational catch estimates compared to previous estimates. The 2018 striped bass benchmark assessment incorporated these newly calibrated MRIP estimates.

Recreational catches of striped bass were downloaded from https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries using the query option.

A description of MRIP survey methods can be found online: https://www.fisheries.noaa.gov/recreational-fishing-data/types-recreational-fishing-surveys#access-point-angler-intercept-survey.

3.3 SOCIAL AND ECONOMIC COLLECTION PROGRAMS

Data on a number of variables relevant to social and economic dimensions of striped bass fisheries are collected through existing ACCSP data collection programs and MRIP; however, no explicit mandates to collect socioeconomic data for this species currently exist. In addition to landed quantities, commercial harvesters and dealers may report ex-vessel prices or value, fishing and landing locations, landing disposition, and a variety of measures capturing fishing effort. MRIP regularly collects information on recreational fishing effort and landings, and occasionally gathers socioeconomic data on angler motivations and expenditures.

3.4 BIOLOGICAL DATA COLLECTION PROGRAM

3.4.1 Fishery-Dependent Data Collection

Required fishery-dependent data collection programs are as follows:

1. Catch composition information will be gathered by those states/jurisdictions with commercial fisheries (currently Massachusetts, Rhode Island, New York, Delaware, Maryland, Virginia, Potomac River Fisheries Commission, and North Carolina) and by those states with significant recreational fisheries (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Maryland, Virginia, and the Potomac River Fisheries Commission). Samples shall be representative of location and seasonal distribution of catch, and appropriate biological data shall be collected.

2. Representative catch and effort data will be gathered by those states with significant commercial fisheries (currently Massachusetts, New York, Delaware, Maryland, Virginia, and the Potomac River Fisheries Commission) and by those agencies monitoring recreational fisheries (National Marine Fisheries Service, Rhode Island, Connecticut, New York, New Jersey, Maryland, Virginia, and the Potomac River Fisheries Commission).

3. Striped bass tagging programs currently executed by the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Southeastern Monitoring and Assessment Program,

Massachusetts Division of Marine Fisheries, New York Department of Environmental Conservation, New Jersey Department of Environmental Protection, Maryland Department of Natural Resources, Virginia Marine Resources Commission, and North Carolina Division of Marine Fisheries will be continued to generate estimates of migration and mortality rates.

3.4.2 Fishery-Independent Data Collection

3.4.2.1 Young-of-Year (YOY) Surveys

Annual juvenile recruitment (appearance of juveniles in the ecosystem) of striped bass which comprise the Atlantic Coast migratory population is measured in order to provide an indication of future stock abundance. When low numbers of juvenile fish (age 0) are produced in a given year, recreational and commercial catches from that year class may be lower four years later when surviving fish become available to the fisheries. Recruitment is measured by sampling current year juvenile fish abundance in nursery areas. Currently, these juvenile abundance indices are determined annually for stocks in the Kennebec River, Hudson River, Delaware River, Chesapeake Bay and its tributaries, and Albemarle Sound-Roanoke River. Since there is a time delay of several years between the measurement of recruitment and initial harvest of those fish, managers have ample time to protect year classes that have not yet been exploited.

The juvenile abundance index values for the Hudson River, Delaware River, Chesapeake Bay and its tributaries serve as input to the assessment model. Juvenile abundance indices can also serve as another indicator of the status, and future status, of the striped bass population. Recruitment failure is defined as an index value that is below 75% of all values in a fixed time series appropriate to each juvenile abundance index. The fixed time series for determining recruitment failure are as follows:

State JAI	Water Body	Reference Period
ME	Kennebec River	1987-2009
NY	Hudson River	1985-2009
NJ	Delaware River	1986-2009
MD	Chesapeake Bay	1957-2009
VA	Chesapeake Bay	1980-2009
NC	Albemarle-Roanoke	1955-2009

The following states are currently required to conduct juvenile abundance index surveys on an annual basis: Maine for the Kennebec River; New York for the Hudson River; New Jersey for the Delaware River; Maryland for the Chesapeake Bay tributaries; Virginia for Chesapeake Bay tributaries; and North Carolina for the Albemarle Sound-Roanoke River.

The requirements for measurement of juvenile indices are as follows:

1. The sampling protocol (stations, sampling intensity and gear type) shall be consistent throughout the period for which the index is to be used. For new indices, the following information will be required: details of the sampling design of the study yielding the data used to develop the index; a description of the analyses performed; and a presentation of

the results of those analyses. The Technical Committee shall review any such submittal and either accept or reject it. If rejected, the Committee will provide a written explanation to the sponsor explaining the reasons for rejection.

2. In order to be validated, the index should exhibit a significant ($p<0.05$) positive correlation to either the magnitude of future landings (lagged 2-7 years) from the stock, or to the relative abundance of the same year class later in life (i.e., relative abundance of juveniles versus the relative abundance of yearling fish of the same year class).

3. The Management Board may require juvenile abundance surveys in additional river systems to evaluate the level of striped bass productivity.

4. The Technical Committee shall annually examine trends in all required juvenile abundance index surveys and evaluate index values against the recruitment trigger, as defined in *Section 4.1*.

3.4.2.2 Spawning Stock Biomass Surveys

Spawning stock surveys are required to be monitored in each of the following areas: Hudson River, Delaware River, Chesapeake Bay, and Albemarle Sound-Roanoke River.

The requirements for monitoring spawning stock biomass are as follows:

1. The Technical Committee shall examine output from the stock assessment model when stock assessment benchmarks or updates are conducted and use those estimates to evaluate the status of the striped bass stock relative to the female spawning stock biomass targets and thresholds in this Amendment.

2. Jurisdictions bordering the Hudson River, Delaware River, Chesapeake Bay, and Albemarle Sound/Roanoke River (currently New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina) shall be responsible for conducting spawning stock assessment surveys in those river systems. Accepted studies for fulfilling this requirement currently include: **New York**: Hudson River haul seine survey and shad by-catch analysis; **Maryland**: Gill net surveys; **Virginia**: spring pound net survey; **North Carolina**: spring electroshocking survey of spawning stock; **Pennsylvania-New Jersey-Delaware**: Delaware River electroshocking/gill net survey. Any changes to the survey methodology must be reviewed by the Technical Committee and approved by the Management Board prior to implementation.

3.4.2.3 Observer Programs

As a condition of state and/or federal permitting, many vessels are required to carry at-sea observers when requested. A minimum set of standard data elements are to be collected through the ACCSP at-sea observer program (refer to the ACCSP Program Design document for details). Specific fisheries priorities will be determined by the Discard/Release Prioritization Committee of ACCSP.

3.4.2.4 Tagging Studies/Program

Tagging of fish with individually-numbered tags is a proven technique for determining movement and migration routes and rates, growth rates and patterns, estimation of mortality/survival, estimation of population size (if assumptions are met), stock identification and determination of movement/migration corridors and habitat use. The use of more sophisticated electronic tags can provide additional habitat information such as temperature (of both water and fish body), depth and specific location. The species' Advisory Panel, Stock Assessment Subcommittee, Technical Committee and/or Management Board (for ASMFC), Advisory Panel or Committee (for Fishery Management Councils) and working groups for International Fisheries Commissions may decide to recommend that tagging studies be performed. Alternatively, such studies may be initiated independently by one or more of the partners in the fishery management process.

Fish tagging is a technical activity which is usually conducted by scientific personnel; however a number of other entities have become involved in or conducted their own tagging studies. If a new tagging study is proposed for striped bass, a number of considerations should be addressed. Any proposed study must have stated objectives, which directly relate to scientific or management purposes. A second important consideration is whether a species can be tagged with minimal mortality, as the utility of study data will be highly questionable if handling/tagging mortality is high. The ideal tag should be one which has a unique alpha-numeric identifier and organization contact information, is easily implanted, has a high rate of retention, is readily visible to potential recoverers without increasing an animal's susceptibility to predation, and remains permanently legible, or in the case of internally-embedded coded wire (CWT) or passive integrated transponder (PIT) tags, is easily and consistently detectable. The implantation location and type of CWT or PIT tags should be fully coordinated with other investigators tagging the same species. Tag number sequences and colors of externally visible tags should be coordinated with other investigators conducting similar studies, via the Interstate Tagging Committee, to ensure that duplication does not occur, and contact information for recoveries and returns should be clearly imprinted on the tag. Tagging should be conducted in a consistent manner by personnel who have been properly trained. Consideration should be given to requiring certification of both professional staff and volunteer angler taggers by the sponsoring organization, in order to increase both the efficiency of tagging and the survival of tagged fish through minimization of handling/tagging mortality. The ASMFC Interstate Tagging Committee has developed a certification for tagging programs, for which sponsoring organizations may wish to apply.

Tagging studies should be highly publicized among the fishing public to maximize the rate of return from both commercial and recreational sectors. In most cases, efforts should be undertaken to accurately measure the rate of tag encounter and reporting. Ideally each study conducted should assess short-term tagging (handling) mortality; short and long-term tag loss; and reporting rates for each fishery sector. Advertised/promised rewards should be provided promptly upon receipt of data. Study managers should insist on complete and accurate return information. Numbers of animals tagged should be sufficiently high to ensure that the desired information will be produced by the study. Careful and appropriate study design (i.e., purpose,

location, sample size, duration, recapture procedures, analysis) is vital to ensure success. Prior to study implementation, a repository for any resultant data should be specified, and long-term commitments made by the sponsoring program, and resources made available to analyze and publish the results. Funds should be provided/reserved to process recaptured tagged fish reported after the program has ended. In angler programs, participants with tagging kits should be notified when the program has ended. All incoming tagging data should be added to the existing database until no additional data are received. Failure to respond to reports of recaptured fish will be detrimental to surrounding tagging programs. Tag reporting apathy develops in anglers when they do not receive replies from the tagging entity.

Investigators may wish to consider collaboration with existing tag database managers (e.g. NMFS Northeast Fishery Science Center, Woods Hole, MA; or U.S. Fish and Wildlife Service, Fishery Resources Office, Annapolis, MD; Atlantic States Marine Fisheries Commission, 1050 N Highland Ave, Suite 200 A-N, Arlington, VA 22201, 703-842-0740, info@asmfc.org) for data entry and analysis. Studies should not be undertaken without adequate consideration of all of these issues. The Interstate Tagging Committee strongly encourages programs which are implemented with: 1) connection to an agency or scientific entity for study design and data analyses; 2) an established constituent base to promote the program; 3) training for individuals on proper fish handling and tagging techniques; and 4) identified research needs and objectives.

Any public or private entity proposing new tagging studies should seek guidelines from and provide a proposal to the Interstate Tagging Committee for review and coordination prior to initiation of any study. The proposal should use the ASMFC's Protocols for Tagging Programs as guidance in developing the proposed study. If the proposed study is an integral component of the FMP, study design should ideally be reviewed and approved by the Stock Assessment Subcommittee and/or Technical Committee as well, during the FMP review process. Tagging studies outside the ASMFC jurisdiction may choose not to participate in the ASMFC review process.

The ASMFC's Interstate Tagging Committee was developed to serve as a technical resource for jurisdictions other than the ASMFC, as well as for private, non-profit tagging groups, who may plan to tag. Protocols have been developed by the Committee as a source of information, advice and coordination for all Atlantic coast tagging programs. A copy of the protocol is available on the ASMFC web site. Copies of proposals for review and coordination should be provided to the Interstate Tagging Coordinator at the ASMFC.

3.5 ASSESSMENT OF STOCK CONDITION

An Atlantic striped bass stock assessment update or benchmark assessment will be performed by the Stock Assessment Subcommittee (SAS) on a regular schedule recommended by the Assessment Science Committee and as approved by the Interstate Fisheries Management Program Policy Board (ISFMP Policy Board). The Board can request a stock assessment at any time. The SAS and TC will meet to review the stock assessment and all other relevant data

sources. The stock assessment report shall follow the general outline as approved by the ISFMP Policy Board for all Commission-managed species. In addition to the general content of the report as specified in the outline, the stock assessment report may also address the specific topics detailed in the following sections. Specific topics in the stock assessment may change as the SAS continues to provide the best model and metrics possible to assess the Atlantic striped bass stock.

3.5.1 Assessment of Population Age/Size Structure

Estimates of Atlantic striped bass age and size structure are monitored based on results of the stock assessment. As of the 2018 benchmark assessment, the accepted model for use in striped bass stock assessments is a forward projecting statistical catch-at-age (SCA) model, which uses catch-at-age data and fishery-dependent and -independent survey indices to estimate annual population size and fishing mortality. Indices of abundance track relative changes in the population over time while catch data provide information on the scale of the population size. Age structure data (numbers of fish by age) provide additional information on recruitment (number of age-1 fish entering the population) and trends in mortality.

3.5.2 Assessment of Annual Recruitment

Recruitment (age-1) of Atlantic striped bass is estimated by the SCA stock assessment model. The SCA model uses several fishery-independent indices of relative abundance for young-of-year (YOY) and age-1 fish (New York and Maryland YOY and Yearling Surveys, and New Jersey and Virginia YOY Surveys).

3.5.3 Assessment of Spawning Stock Biomass

Spawning stock biomass is estimated by the SCA stock assessment model and those estimates are compared to target and threshold levels (i.e., biological reference points) in order to assess the status of the stock. The 1995 estimate of female SSB is 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% of the female SSB threshold.

3.5.4 Assessment of Fishing Mortality

The fishing mortality rate is estimated by the SCA stock assessment model and that estimate is compared to target and threshold levels (i.e., biological reference points) in order to assess the status of the stock. The F threshold and target are calculated to achieve the respective SSB reference points in the long term.

3.6 STOCKING PROGRAM

Amendment 7 does not include a stocking program for Atlantic striped bass.

3.7 BYCATCH DATA COLLECTION PROGRAM

In general, states shall undertake every effort to reduce or eliminate the loss of striped bass from the general population due to bycatch discard mortality. The Technical Committee shall examine trends in estimated bycatch during benchmark stock assessments and stock assessment updates.

The overarching goal of the bycatch data collection program (established through Addendum I to Amendment 6) is to develop more accurate estimates of striped bass discards and discard mortality. Additional sector-specific goals are listed below.

Commercial Fisheries

- Implement at-sea observer coverage on commercial vessels that are targeting striped bass, as well as vessels that may encounter striped bass, to collect information on the number of fish being discarded from various commercial gears. Ideally, the sampling effort will be optimally allocated, both seasonally and spatially, among directed and non-directed fishing that has a strong likelihood of generating striped bass bycatch.
- Determine the discard mortality associated with all of the commercial gear types currently encountering striped bass.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

Recreational Fisheries

- Determine proportional use of different gear types and fishing practices (e.g. fly fishing, live bait fishing, circle hooks, treble hooks, etc.).
- Determine the discard mortality associated with each gear type and fishing practice.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

For-Hire Fisheries

- Determine proportional use of different gear types and fishing practices (e.g. fly fishing, live bait fishing, circle hooks, treble hooks, etc.).
- Determine the discard mortality associated with each gear type and fishing practice.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

3.7.1 Requirements and Recommendations for Bycatch Data and Research

MANDATORY DATA COLLECTION

- Collect commercial fishery data elements consistent with ACCSP standards.
- Coordinate with NMFS to ensure coverage in federal waters.
- Continue collection of quantitative data on the bycatch of finfish species as reported by interviewed fishermen through existing recreational and for-hire intercept surveys (ACCSP standard).

RECOMMENDED DATA COLLECTION

- Implement commercial at-sea observer coverage on 2-5% of the total trips in state waters. Applicable to all states with commercial fisheries (directed and non-directed) that encounter striped bass.
- Develop "add-on" questions for interview surveys to collect information on gear/terminal tackle used (circle hooks, J-Hooks, treble hooks, fly fishing, live bait, etc.) in recreational and for-hire fisheries.
- Develop a survey to estimate size composition of discarded fish. The Board will need to work with the TC to determine an effective way to collect these data. Approaches for consideration include, but are not limited to, volunteer angler surveys, additional questions for intercept survey, and expansion of data collected in for-hire fisheries.

MANDATORY DISCARD MORTALITY STUDIES

- Review existing commercial discard studies to determine what information has already been collected.
- Review existing recreational studies for various species and gears to develop estimates of striped bass discard mortality.

RECOMMENDED DISCARD MORTALITY STUDIES

- Conduct studies to estimate the discard mortality associated with the following commercial gear types: trawl (highest priority), gill net, fixed nets (pound net/fyke net/floating fish trap), hook and line, haul seine. These studies do not need to be conducted in all states, but should be conducted to reflect the fishing activities (gear type, temperature, salinity, etc.) that encounter striped bass.
- Conduct additional studies on recreational post-release mortality associated with a range of temperature, salinity, and gear types.

MANDATORY TECHNICAL COMMITTEE ANALYSES

- Analyze any newly collected commercial at-sea observer data to determine if any discarding "hot spots" can be reliably identified.
- Develop estimates for the proportion of discards based on water temperature and salinity, if possible. Apply existing post-release mortality rates to the proportions to determine the effect on estimated discard mortality. For example, if 20% of the catch occurs in warm brackish water, that portion of the catch is likely to have a higher mortality rate than discards in cold ocean water.

RECOMMENDED TECHNICAL COMMITTEE ANALYSES

- Analyze the number and type of all fishing trips from each state, by season and area if possible, and determine ideal allocation of recommended observer coverage.

MANDATORY DATA REPORTING

- Once any mandatory or recommended elements of this program are implemented, states are required to report any bycatch and/or data monitoring as part of the annual compliance report to the Commission.

4.0 MANAGEMENT PROGRAM AND PROPOSED OPTIONS

This section includes the following sections with options for Board consideration and public comment: *Section 4.1 Management Triggers; Section 4.2.1 Measures to Protect the 2015, 2017, and 2018 Year Classes (Recreational Size and Bag Limits); Section 4.2.2 Measures to Address Recreational Release Mortality; Section 4.4 Rebuilding Plan;* and *Section 4.6.2 Management Program Equivalency.*

The striped bass ocean fishery (also referred to as "ocean region") is defined as all fisheries operating in coastal and estuarine areas of the U.S. Atlantic coast from Maine through North Carolina, excluding the Chesapeake Bay and Albemarle Sound-Roanoke River management areas. The Chesapeake Bay fishery is defined as all fisheries operating within Chesapeake Bay, except for the Chesapeake Bay spring trophy fishery. The Chesapeake Bay spring trophy fishery is part of the ocean fishery for management purposes because it targets coastal migratory striped bass.[10]

The Albemarle Sound-Roanoke River stock is managed separately by the State of North Carolina (see *Section 2.5.2*).

Draft Amendment 7 continues to use bag and size limits, as well as a circle hook requirement when fishing with bait, to manage recreational striped bass fisheries, and quotas and size limits to regulate the striped bass commercial fisheries. Draft Amendment 7 also considers options for effort controls (seasonal closures), additional gear restrictions, and outreach efforts to manage the recreational fishery and address recreational release mortality.

4.1 MANAGEMENT TRIGGERS

The management triggers are intended to keep the Board accountable and were developed at a time when the stock was thought to be at historic high abundance and well above the SSB target. However, as perceptions of stock status and fishery performance have changed, shortfalls with how the management triggers are designed have emerged. When female SSB is below the target level, the variable nature of fishing mortality can result in a continued need for management action. Additionally, the shorter timetables for corrective action are in conflict with the desire for management stability, and the use of point estimates does not account for an inherent level of uncertainty. Furthermore, the Board is sometimes criticized for considering changes to the management program before the stock has a chance to respond to the most recent set of management changes. Lastly, the observed long period of below average recruitment which contributed to recent declines in biomass has raised questions about the recruitment-based trigger and whether it is designed appropriately.

[10] While the Chesapeake Bay spring trophy fishery is subject to the same requirements as the ocean recreational fishery, Chesapeake Bay trophy fishery removals are counted as part of total removals from the Chesapeake Bay and are included as part of the Chesapeake Bay fleet in the stock assessment model.

The following options consider how to set the management triggers in Amendment 7. Upon reaching any (or all) of the specified management triggers, the Board is required to alter the management program to ensure the objectives of Amendment 7 are achieved. It is important to note that the Board is not limited to taking action only when a management trigger is tripped.

The Status Quo option is defined by the management triggers as specified in Amendment 6 to the Atlantic Striped Bass FMP (listed below). To account for the various combinations of management trigger methods, timeframes, implementation deadlines, and deferment options, the following management alternatives have been divided into four (4) tiers. The first tier outlines the F-based trigger methods, the second tier outlines the SSB-based trigger methods, the third tier outlines the recruitment trigger methods, and the fourth tier outlines deferred management options if a management trigger is tripped and certain criteria are met. Within each tier is a set of primary options and sub-options (alternatives) for the Board to choose from.

An alternative under each primary option within a tier must be chosen to complete each management trigger package. For example, to achieve the current management triggers specified in Amendment 6 (status quo), the Board would select: Tier 1, Sub-options A1, B1, and C1; Tier 2, Sub-options A1, B1, and C1; Tier 3, Sub-options A1 and B1; and Tier 4, Option A. This decision framework is designed to provide the Board the option to maintain, remove, or change any of the existing management triggers individually. The intent is to evaluate the triggers against the most recent year(s) of data from the most recent stock assessment update or benchmark stock assessment accepted by the Board for management use.

Amendment 6 Management Triggers (Status Quo):

1) If the fishing mortality threshold is exceeded in any year, the striped bass management program must be adjusted to reduce the fishing mortality to a level that is at or below the target within one year.
2) If female SSB falls below the threshold, the striped bass management program must be adjusted to rebuild the biomass to the target level within an established timeframe [not to exceed 10-years].
3) If the fishing mortality target is exceeded in two consecutive years and the female SSB falls below the target within either of those years, the striped bass management program must be adjusted to reduce the F to a level that is at or below the target within one year.
4) If female SSB falls below the target for two consecutive years and the fishing mortality rate exceeds the target in either of those years, the striped bass management program must be adjusted to rebuild the biomass to a level that is at or above the target within an established timeframe [not to exceed 10-years].
5) If any Juvenile Abundance Index shows recruitment failure (i.e., an index value lower than 75% of all other values in the dataset) for three consecutive years, then the Board will review the cause of recruitment failure (e.g., fishing mortality, environmental conditions, and disease) and determine the appropriate management action.

TIER 1 OPTIONS: Fishing Mortality (F) Management Triggers

Option A: Timeline to Reduce F to the Target

Sub-option A1 (status quo): Reduce F to a level that is at or below the target within one year.

Sub-option A2: Reduce F to a level that is at or below the target within two years.

Option B: F Threshold Triggers

Sub-option B1 (status quo): If F exceeds the F threshold, the striped bass management program must be adjusted to reduce F to a level that is at or below the target within the timeframe selected under Option A.

Sub-option B2: If the two-year average F exceeds the F threshold, the striped bass management program must be adjusted to reduce F to a level that is at or below the target within the timeframe selected under Option A. The two-year average F should not include data under different management actions (i.e., the F threshold trigger should not be evaluated unless there are at least two years of data in the assessment under the most recent management action).

Sub-option B3: If the three-year average F exceeds the F threshold, the striped bass management program must be adjusted to reduce F to a level that is at or below the target within the timeframe selected under Option A. The three-year average F should not include data under different management actions (i.e., the F threshold trigger should not be evaluated unless there are at least three years of data in the assessment under the most recent management action).

Note: Although the trigger would only be evaluated when sufficient data years are available for sub-options B2 or B3, the Board is not limited to taking action only when a management trigger is tripped.

Option C: F Target Triggers

Sub-option C1 (status quo): If F exceeds the F target for two consecutive years and female SSB falls below the SSB target in either of those years, the striped bass management program must be adjusted to reduce F to a level that is at or below the target within the timeframe selected under sub-option A.

Sub-option C2: If F exceeds the F target for three consecutive years, the striped bass management program must be adjusted to reduce F to a level that is at or below the target within the timeframe selected under sub-option A.

Sub-option C3: No management trigger related to F target.

TIER 2 OPTIONS: Female Spawning Stock Biomass (SSB) Management Triggers

Option A: Deadline to Implement a Rebuilding Plan

Sub-option A1 (status quo): No Deadline to Implement a Rebuilding Plan
There would not be any requirement regarding how quickly the Board must implement a rebuilding plan when an SSB-based management trigger is tripped, as long as the rebuilding timeframe does not exceed 10-years from when the management trigger was tripped (i.e., the Board may implement a rebuilding plan at any time in response to the management trigger). A management trigger is not considered tripped until the Board formally reviews and accepts, if necessary, the results of the relevant stock assessment.

Sub-option A2: Two-Year Deadline to Implement a Rebuilding Plan
The Board must implement a rebuilding plan within two years from when an SSB-based management trigger is tripped. A management trigger is not considered tripped until the Board formally reviews and accepts, if necessary, the results of the relevant stock assessment.

Option B: SSB Threshold Trigger

Sub-option B1 (status quo): If female SSB falls below the SSB threshold, the striped bass management program must be adjusted to rebuild the biomass to the target level within an established timeframe [not to exceed 10-years].

Sub-option B2: No management trigger related to the female SSB threshold. The Board cannot choose this option in combination with Sub-option C3 below (i.e., there must be an SSB-based management trigger). This option recognizes that if managing to the SSB target is more conservative than managing to the SSB threshold, and if the management response is the same (i.e., rebuild to the SSB target within 10 years) for both types of SSB triggers, then there does not necessarily have to be a trigger for both.

Option C: SSB Target Trigger

Sub-option C1 (status quo): If female SSB falls below the target for two consecutive years and the fishing mortality rate exceeds the target in either of those years, the striped bass management program must be adjusted to rebuild the biomass to a level that is at or above the target within an established timeframe [not to exceed 10-years].

Sub-option C2: If female SSB falls below the target for three consecutive years, the striped bass management program must be adjusted to rebuild the biomass to a level that is at or above the target within an established timeframe [not to exceed 10-years].

Sub-option C3: No management trigger related to the female SSB target. The Board cannot choose this option in combination with Sub-option B2 above (i.e., there must be an SSB-based management trigger).

TIER 3 OPTIONS: Recruitment Triggers

Option A: Recruitment Trigger Definition

The status quo recruitment trigger (sub-option A1) was designed and has performed adequately to identify true recruitment failure (i.e., a prolonged period of very low recruitment events as seen during the 1970s and 1980s). Sub-options A2 and A3 are designed to identify periods of recruitment that are not necessarily at historically low levels, but are lower than the period of high recruitment seen in the late 1990s and early 2000s. As requested by the Board, the recruitment trigger alternatives are more sensitive than the status quo in order to alert the Board to periods of low recruitment. Specifically, the alternative trigger options are designed to be an early warning sign of potential reduced productivity of the stock following multiple weak year classes entering the population.

The status quo recruitment trigger includes the years of very low recruitment in the 1970s and 1980s in the trigger reference period. Sub-options A2 and A3 would change the reference period to exclude those years of very low recruitment which results in a more sensitive trigger. Sub-options A2 and A3 use a reference period of 1992-2006, which was identified as a period of high recruitment (i.e., high recruitment regime) by a change point analysis on the Maryland juvenile abundance index (JAI). This period spans the time of high recruitment seen in the late 1990s through the early 2000s. The Maryland JAI was used as the basis for this analysis because it is closely correlated to the coastwide age-1 estimates from the stock assessment model, and provides the longest time series to evaluate changes in high and low periods over time. If sub-option A2 or A3 is selected, the TC will update the change point analysis during benchmark stock assessments to evaluate if the high recruitment period for the trigger has changed with new years of data.

Sub-option A1 (status quo): The recruitment trigger is tripped when any of the JAIs (ME, NY, NJ, MD, VA, NC) show recruitment failure, which is defined as a value that is below 75% of all values (i.e., below the 25th percentile) in a fixed time series appropriate to each juvenile abundance index, for three consecutive years. This status quo trigger tripped one time (NC in 2020) since approval of Amendment 6 in 2003 (Table 2). The state JAIs and reference periods are as follows:

State JAI	Water Body	Reference Period*
ME	Kennebec River	1987-2009
NY	Hudson River	1985-2009
NJ	Delaware River	1986-2009
MD	Chesapeake Bay	1957-2009
VA	Chesapeake Bay	1980-2009
NC	Albemarle-Roanoke	1955-2009

*Reference period established through Addendum II (2010).

For the following sub-options, the Board could select sub-option A2 (moderate sensitivity trigger) or A3 (high sensitivity trigger). Sub-options A2 and A3 would alert the Board to periods of low recruitment (i.e., while the stock has not quite reached recruitment failure, there have been multiple years of low recruitment).

Sub-option A2: The recruitment trigger is tripped when any of the four JAIs used in the stock assessment model to estimate recruitment (NY, NJ, MD, VA)[11] shows an index value that is below 75% of all values (i.e., below the 25th percentile) in the respective JAI from 1992-2006, which represents a period of high recruitment, for three consecutive years. The high recruitment reference period used for this trigger may be adjusted as recommended by the TC during benchmark stock assessments. This trigger alternative has a moderate sensitivity; it is more sensitive than the status quo but less sensitive than sub-option A3 (Figure 1). This trigger alternative would have tripped three times since 2003: NY in 2006; MD in 2010; MD in 2014 (Table 2).

Sub-option A3: The recruitment trigger is tripped when any of the four JAIs used in the stock assessment model (NY, NJ, MD, VA) shows an index value that is below the median of all values in the respective JAI from 1992-2006, which represents a period of high recruitment, for three consecutive years. The high recruitment reference period used for this trigger may be adjusted as recommended by the TC during benchmark stock assessments. This trigger alternative has a higher sensitivity than both the status quo trigger and sub-option A2 (Figure 1). This trigger alternative would have tripped six times since 2003: NY in 2006; MD in 2008; MD in 2009; MD and VA in 2010; NY in 2013; MD in 2014 (Table 2).

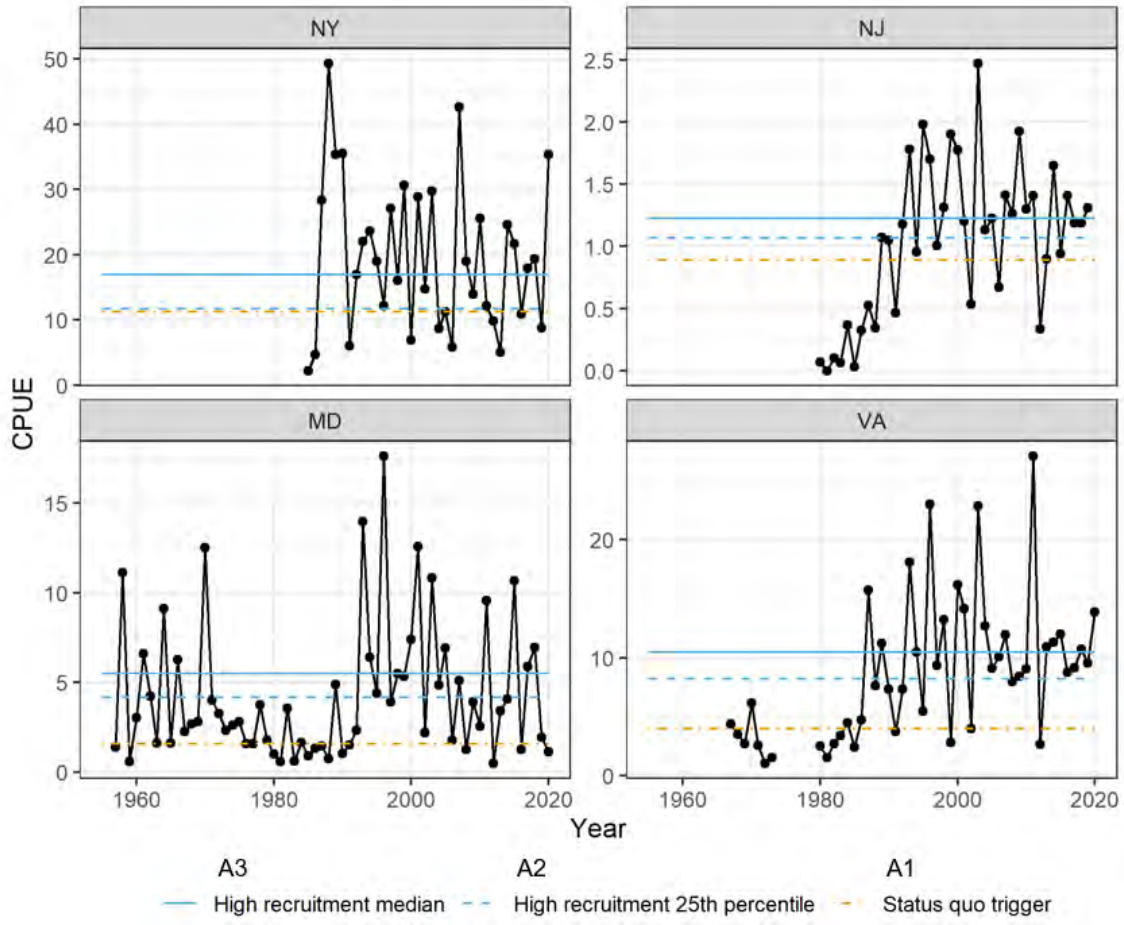
[11] The North Carolina JAI for the Albemarle Sound-Roanoke River is not used in the stock assessment because the Albemarle Sound-Roanoke River stock is managed and assessed separately by the state of North Carolina; the Maine JAI for the Kennebec River is not used in the stock assessment because that stock is assumed to only contribute a small amount to the coastwide stock.

Table 2. When the status quo and alternative juvenile abundance index (JAI) triggers would have tripped (black shaded cells) compared to the model estimates of recruitment. Note: "Core" JAIs are the four JAIs used in the stock assessment model to estimate recruitment (NY, NJ, MD, VA).

	Recruitment (Model age 1 estimates lagged back 1 year)	Sub-option A1 Status Quo Ref. period = Established through Addendum II One or more JAI below 25th Percentile for 3 consecutive years	Sub-option A2 Ref. period = High recruitment (1992-2006) One or more of the "core" JAIs below 25th Percentile for 3 consecutive years	Sub-option A3 Ref. period = High recruitment (1992-2006) One or more of the "core" JAIs below Median for 3 consecutive years
2003				
2004				
2005				
2006				
2007				
2008				
2009				
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
	# Years tripped	**1**	**3**	**6**

Below average recruitment
Above average recruitment
No data available
Trigger not tripped
Trigger tripped

Figure 1. Juvenile abundance indices (JAI) for NY, NJ, MD, and VA showing the trigger reference level for each recruitment trigger alternative. For each sub-option, the trigger would be tripped if any of the four JAIs falls below the specified reference level for three consecutive years.



Option B: Management Response to Recruitment Trigger

The following sub-options are alternatives for the management response that would be triggered when the recruitment trigger definition selected under Option A is tripped. Sub-options B2 and B3 are intended to reduce fishing pressure as the weak year classes enter the population. These management response options are not necessarily designed to increase recruitment in the future because the striped bass stock exhibits a weak stock-recruit relationship (i.e., a larger spawning stock does not necessarily correlate with higher recruitment).

Juvenile abundance indices and model recruitment estimates provide information on the near-term productivity of the stock. Several years of poor recruitment may indicate the stock is entering a low recruitment regime, and levels of removals that were sustainable during average or above average recruitment regimes may not be sustainable in the future. If the Board wants to be proactive about responding to periods of lower recruitment, the Board could redefine the F target to be more precautionary (sub-options B2 and B3).

The F target for striped bass is defined as the level of F that will maintain the population at the SSB target in the long-term. F target is calculated by drawing recruitment from the values observed from 1990 to 2017 (this time period includes both high and low recruitment values, but does not include the very low values in the 1980s). If recruitment is only drawn from a below-average period instead of the full 1990-2017 period, for example, the F target would be lower. If the population is fished at the current F target but average recruitment remains lower than the 1990-2017 mean, then the population may not rebuild to the SSB target in the long term.

Based on the change point analysis of the Maryland JAI with data through 2020, the TC identified 1992-2006 to represent the high recruitment period (i.e., high recruitment regime) and 2007-2020 to represent the low recruitment period (i.e., low recruitment regime). This translates to years 1993-2007 and 2008-2017 for age-1 model estimates of recruit abundance used to calculate the interim F target for sub-options B2 and B3. If sub-option B2 or B3 is selected, the TC will update the change point analysis during benchmark assessments to evaluate whether the definition of the high/low recruitment periods for the trigger has changed with new years of data.

OPTIONS

Sub-option B1 (status quo): If the recruitment trigger is tripped, the Board would review the cause of recruitment failure (e.g., fishing mortality, environmental conditions, and disease) and determine the appropriate management action.

For the following sub-options, the Board could select sub-option B2 <u>or</u> B3. Note: Sub-option B2 evaluates one point estimate of F against the F target, which is more conservative than the F-based management trigger definitions under Section 4.1 used in sub-option B3.

Sub-option B2. If the recruitment trigger is tripped, an interim F target calculated using the low recruitment assumption is implemented, and if F from the terminal year of the most recent stock assessment is above the interim F target, the striped bass management program must be adjusted to reduce F to the interim F target within one year.

Sub-option B3. If the recruitment trigger is tripped, an interim F target and interim F threshold calculated using the low recruitment assumption are implemented, and the F-based management triggers defined in *Section 4.1* would be reevaluated using those interim reference points. If an F-based trigger is tripped upon reevaluation, the striped bass management program must be adjusted to reduce F to the interim F target within the timeline defined in *Section 4.1*.

Note: Under both Sub-option B2 and B3, the lower interim F target would remain in place <u>at least</u> until the next stock assessment update or benchmark assessment is

approved for management use. The Board would determine at that time which F rate (target or interim target) to manage towards moving forward by considering factors such as current stock status, recent JAI data, and TC input.

TIER 4 OPTIONS: Deferred Management Action

Under Amendment 6, if a management trigger is tripped at any time, the Board must take the corresponding action. However, the following options provide the Board flexibility to defer management action when a management trigger is tripped and certain criteria are met. The Board may choose more than one option, unless it chooses Option A (status quo): No Deferred Management Action. Options C, D and E are invalid if the Board chooses Tier 1, Sub-option C3 (no F target management trigger).

These options were developed in response to the Board's concern about the frequent need for management action due to triggers tripping with each stock assessment update or benchmark. Stock assessment updates are typically conducted about every 2 years with benchmark assessments conducted about every 5 years. The alternative Options B-F would defer management action until the following stock assessment. The Board can request an additional stock assessment or request a change to the stock assessment schedule at any time.

Option A (status quo): No Deferred Management Action.

If any (or all) of the management triggers are tripped following a benchmark stock assessment or assessment update, the Board is required to respond to that trigger regardless of when the last management action was implemented in response to any management trigger.

Option B: Management action may be deferred until the next assessment if it has been less than three years since the last management action was implemented in response to a management trigger.

If any (or all) of the management triggers are tripped following a benchmark stock assessment or assessment update, and it has been less than three years since the last management action was implemented (i.e., the assessment incorporates less than three years of data under the new fishery regulations) in response to a management trigger, the Board may defer the management response until the management triggers are reevaluated after the next stock assessment.

Option C: Management action may be deferred until the next assessment if the F target management trigger is tripped and SSB is above the target.

If the F target management trigger is tripped but SSB is at or above the SSB target, the Board may defer the management response until the management triggers are reevaluated after the next stock assessment.

Option D: Management action may be deferred until the next assessment if the F target management trigger is tripped and SSB is projected to increase or remain at the current level over the next five years.

If the F target management trigger is tripped, and if none of the SSB management triggers are tripped and projections indicate SSB will increase or remain at the current level over the next five years, the Board may defer the management response until the management triggers are reevaluated after the next stock assessment.

Option E: Management action may be deferred until the next assessment if the F target management trigger is tripped and there is at least a 75% probability of SSB remaining above the SSB threshold over the next five years.

If the F target management trigger is tripped, and if none of the SSB management triggers are tripped and projections indicate SSB has at least a 75% probability of remaining above the SSB threshold over the next five years, the Board may defer the management response until the management triggers are reevaluated after the next stock assessment.

Option F: If a management trigger trips after the Board has already initiated action in response to a different management trigger, the Board can defer management action in response to the subsequent trigger until the next assessment.

For example, this scenario would most likely occur if the Board selects a new recruitment trigger that would require reducing F in response. The recruitment trigger could trip and the Board could initiate action in response; however, a few months later an F or SSB trigger could trip based on results of a stock assessment. Under this option, the Board could defer responding to the F or SSB trigger until the next assessment because the Board is already taking action in response to the recruitment trigger.

Figure 2a. Summary of management trigger options Tiers 1-2: fishing mortality (F) and female spawning stock biomass (SSB) triggers.

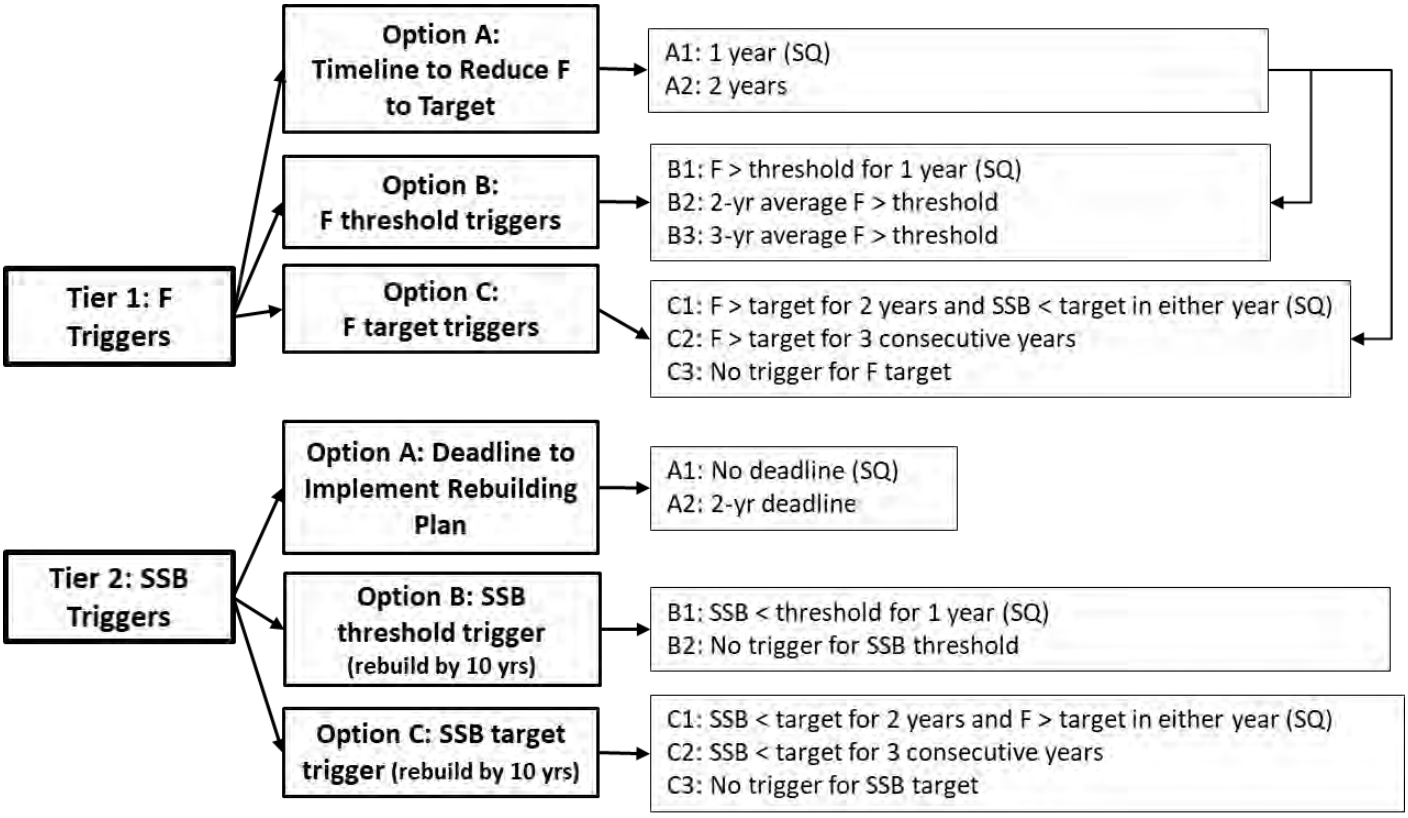


Figure 2b. Summary of management trigger options Tier 3: recruitment-based trigger.

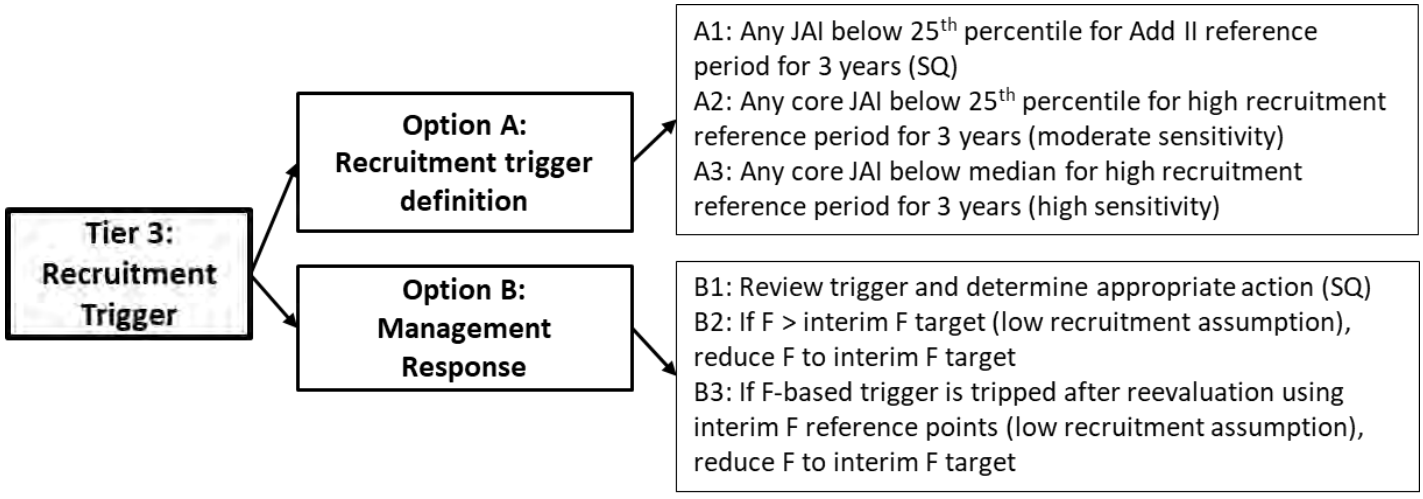
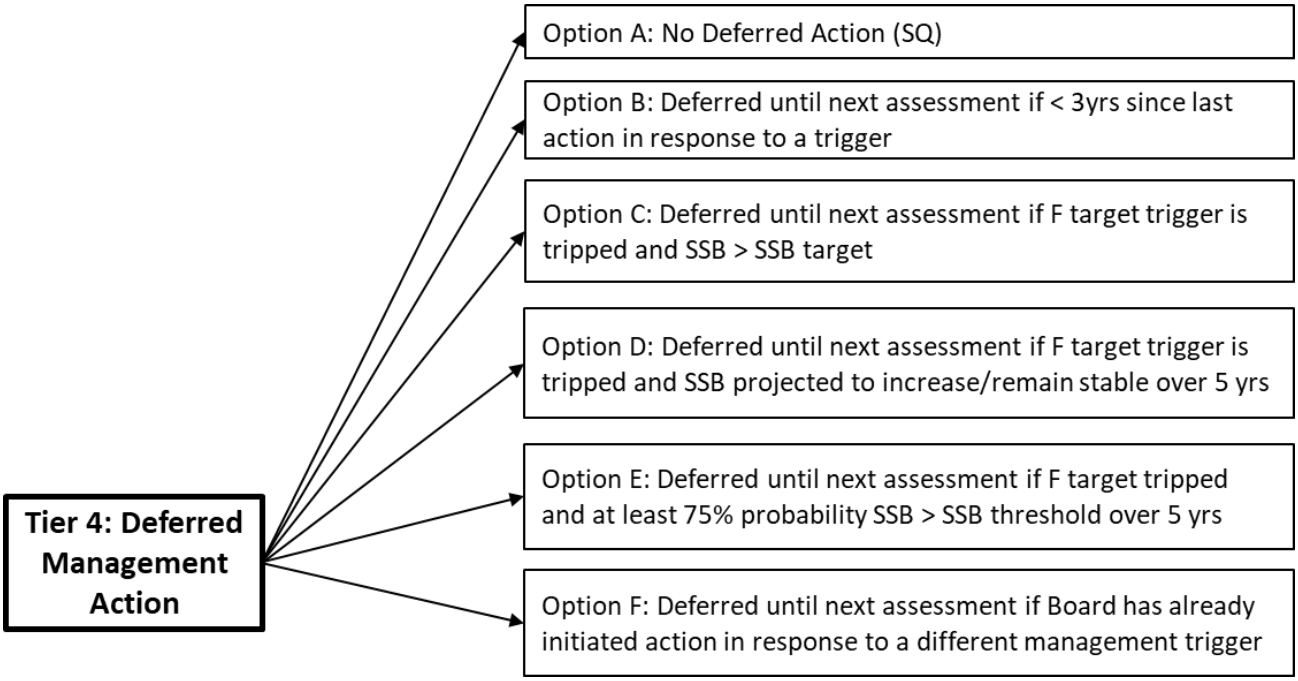


Figure 2c. Summary of management trigger options Tier 4: deferred management action.



4.2 RECREATIONAL FISHERY MANAGEMENT MEASURES

All bag limits are per person per day. All minimum and maximum size limits are in total length. States are required to maintain the same seasons that were in place in 2017.[12]

4.2.1 Measures to Protect the 2015, 2017, and 2018 Year Classes: Recreational Size and Bag Limits

***Note for January 2022 Board meeting**: The PDT is recommending the Board remove these options from consideration in Draft Amendment 7 based on the projection results coupled with the timing challenge of selecting new measures before the 2022 assessment results are available. Refer to Memo 22-10 for details. If these options are removed, the Addendum VI FMP standard for recreational size and bag limits would be maintained for Draft Amendment 7.*

The Board and stakeholders have expressed that protecting emerging, strong year classes is of the utmost importance for rebuilding the striped bass stock. The 2015-year class, which is the strongest year class observed since 2003, has been available to Chesapeake Bay fisheries over the past few years and will soon be entering the recreational ocean region slot size limit of 28"

[12] Some states have implemented alternative seasons through conservation equivalency. See Table 17 in *Section 9.0* for each state's 2020 recreational measures.

to less than 35" adopted by the majority of Atlantic coast states under Addendum VI in 2020. If this ocean slot size limit is maintained, the 2015 year class may be subject to high recreational harvest mortality in the ocean for the next several years, in addition to mortality in the Chesapeake Bay and recreational release mortality coastwide, reducing its potential to help rebuild the stock.

In addition to the 2015 year class, the Technical Committee (TC) also noted that both the 2017 and 2018 year classes were above average in multiple juvenile abundance indices (JAIs) and recommended including those year classes in this analysis. The 2017 and 2018 year classes have recently become available to the Chesapeake Bay fishery and will be subject to fishing mortality in the Chesapeake Bay for the next few years before becoming available to the ocean fishery.

The following options consider whether to alter the ocean and/or Chesapeake Bay recreational size and bag limits to enhance protection of emerging strong year classes:

Ocean Region Size/Bag Limit Options	Chesapeake Bay Size/Bag Limit Options
Option A Status Quo. 28" to <35" slot/1 fish	Option A Status Quo. 18" minimum/1 fish
Option B. 35" minimum size/1 fish	Option B. 18" to <23" slot/2 fish
Option C. 32" to <40" slot/1 fish	Option C. 18" to <28" slot/1 fish
Option D. 28" to <32" slot/1 fish	

These options are directed at the recreational fishery because concerns were raised about the potential impact of the ocean recreational slot limit on the 2015 year class. The intent of these options is to change the size limits to reduce harvest on the 2015, 2017, and/or 2018 year classes by shifting harvest to other year classes. While this would provide those year classes with some protection from harvest in the short term, those year classes will still be subject to release mortality. All of the proposed size limits would need to be adjusted through time in order to provide those year classes continued protection from harvest as fish continue to grow.

Recreational size limits could be changed for either or both the Chesapeake Bay and ocean recreational fisheries. The combination of Chesapeake Bay and ocean size limits should be considered to evaluate the coastwide protection from harvest that different combinations of size limits might provide. For example, some combinations of Chesapeake Bay and ocean size limits would protect some fish from harvest in the Bay but would not protect those same fish from harvest in the ocean.

The analysis for each recreational size limit option assumes fishing effort will remain constant over time. However, there is uncertainty around how angler behavior and fishing effort would change in response to a change in size limit and changes in fish availability (e.g., emerging year classes in the fishery). Reducing effort in the recreational fishery through seasonal closures, which are intended to reduce the number of fishing trips that interact with striped bass, would also provide protection for these and other year classes. *Section 4.2.2* outlines seasonal closure options for consideration.

ANALYSIS FOR RECREATIONAL SIZE LIMIT OPTIONS

Each recreational size limit option is analyzed in terms of the level of protection from harvest it would afford a year class as it ages through the population, i.e., the percent of each year class that is below the minimum size limit or outside the slot limit over time based on length-at-age estimates developed by the TC (Table 3). While estimating the percent protection from harvest provided by different size limits is useful to compare relative changes in protection among different size limit options, the percent protected estimates do not account for differences between the ocean and Chesapeake Bay fisheries. For example, the length-at-age estimates used for this analysis are coastwide estimates based on data compiled from several states. Since size-at-age is highly variable along the coast, the average length-at-age for the Chesapeake Bay may differ from these coastwide estimates. Specifically, the coastwide length-at-age estimates are likely an overestimate of length-at-age for Chesapeake Bay resident fish, which are heavily skewed toward males; growth rates and maximum size differ between males and females, with males growing slower and to a smaller size than females. Additionally, the percent protected estimates do not account for fish moving between the ocean and the Chesapeake Bay, which dictates when and which size fish are available to fisheries in each region. The percent protected estimates represent the percent of all fish for each age class that would be protected from harvest for each size limit considered, regardless of whether that age class is typically available in the Chesapeake Bay or ocean fishery.

Table 3. Estimated mean striped bass size-at-age based on the 2012-2016 state age data (weighted by state recreational catch) compiled for the 2018 benchmark stock assessment. The ages of the 2015, 2017, and 2018 year classes are in bold. Note: These are coastwide estimates based on data from several states along the coast; size-at-age is highly variable along the coast and there is overlap among age classes. Source: ASMFC.

Age	Estimated Mean Total Length (in)	
0	3.8	
1	6.4	
2	12.7	
3	17.0	
4	20.9	
5	**24.1**	**2018 year class in 2023**
6	**26.4**	**2017 year class in 2023**
7	28.7	
8	**31.6**	**2015 year class in 2023**
9	33.8	
10	35.5	
11	37.2	
12	39.1	
13	41.0	
14	42.2	
15+	44.0	

While changing the size limit may protect a year class from harvest in the near-term, the potential effects on long-term stock productivity also need to be considered. Accordingly, stock projections were conducted to compare the alternative options to the status quo. Projections were developed assuming the same level of fishing mortality (F target) and fishing effort for each option scenario, but different selectivity patterns, based on what proportion of each age is vulnerable to the fishery for each option. The projections assume fishing effort will remain constant regardless of which set of regulations are implemented.

Two sets of projections were developed: 1) scenarios for the ocean size limit options assuming the status quo Chesapeake Bay measures would remain in place; and 2) scenarios for combinations of ocean and Chesapeake Bay size limits. The combination scenarios highlight combinations of Chesapeake Bay and ocean size limits that would protect the widest size range of fish from harvest across both the Chesapeake Bay and ocean fisheries. Details on projection scenarios are provided in *Appendix 1*.

The TC noted the following key findings from all projection scenarios:

- The stock recovery timeline (i.e., the year SSB exceeds the threshold and the year SSB exceeds the target) is the same for all scenarios, including the status quo scenarios.
- The overall projected change in total SSB (all year classes combined) relative to the status quo is positive for most scenarios (*Appendix 1*); however, the percent change in total SSB is not statistically significant since it falls within the confidence interval of the SSB estimates from the status quo projections.
- Under all scenarios, the 2015 year class will have a higher contribution to stock productivity than the 2017 and 2018 year classes.
- The projected change in year-class-specific SSB (total SSB for each year class over time) relative to the status quo is mostly positive with some negative changes relative to the status quo for the 2015 year class SSB in some scenarios (*Appendix 1*).
- These results indicate that changing the selectivity does not have a significant impact on rebuilding the stock if the F rate remains constant. If the goal is to expedite stock rebuilding, controlling the overall F rate is more important than only changing the selectivity.

4.2.1.1 Ocean Recreational Fishery

The status quo 28" to <35" slot limit and 1 fish bag limit (Option A) for the ocean recreational fishery was implemented through Addendum VI to achieve at least an 18% reduction in total recreational removals from 2017 levels in order to reduce F to the F target in 2020. The alternative size limit options for the ocean region include two options from Draft Addendum VI that were projected to achieve a similar level of reduction (Option B and Option C) and a narrower slot limit (Option D) which is projected to result in a greater level of reduction from the 2017 recreational removals (Table 4).

Table 4. Estimated percent change in harvest, recreational release mortality, and total recreational removals relative to 2017 for ocean size options A-D.

Ocean Size Limit	Bag Limit	% change from 2017		
		Harvest	Release Mortality	Total Removals
Option A: 28" to <35" slot Status Quo	1	-46%	+3%	-19%
Option B: 35" minimum	1	-43%	+3%	-18%
Option C: 32" to <40" slot	1	-49%	+4%	-21%
Option D: 28" to <32" slot	1	-62%	+4%	-26%

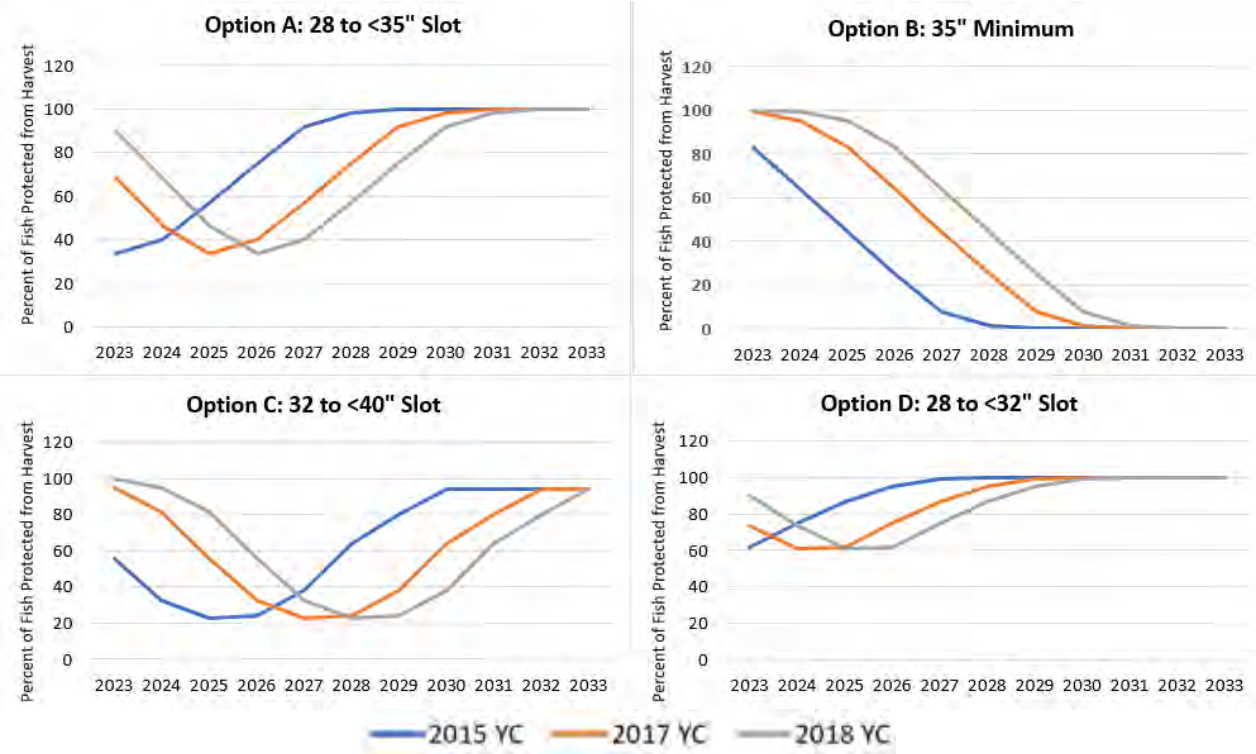
All alternative size limits would provide greater protection from harvest for the 2015, 2017, and 2018 year classes in 2023 relative to the status quo (Table 5). However, the level of protection for each year class will change in future years as those fish grow (Figure 3). For example, a 35" minimum size limit in the ocean (Option B) would provide the 2015 year class more protection from harvest in 2023 compared to the status quo slot limit (Option A) because those age-8 fish would mostly be below 35"; however, the protection afforded by the 35" minimum size limit will decrease over time as those fish grow and reach 35" in length. Under the status quo slot limit, protection for the 2015 year class would be lower in 2023, but this protection would increase over time as those fish reach 35" in length and can no longer be harvested.

Table 5. Percent of fish protected from harvest (outside the size limit) for each age for ocean size limit options based on coastwide size-at-age estimates. The ages of the 2015, 2017, and 2018 year classes in 2023 are in bold. The percent protected for ages 15 and above is the percent of all fish age 15+ combined.

					2018 YC in 2023	**2017 YC in 2023**		**2015 YC in 2023**							
Option	A1	A2	A3	A4	**A5**	**A6**	A7	**A8**	A9	A10	A11	A12	A13	A14	A15+
Option A: 28 to <35	100	100	100	98.9	**90.0**	**68.8**	46.6	**33.4**	40.1	56.9	75.1	92.0	98.4	99.7	100
Option B: 35 min	100	100	100	100	**100**	**99.4**	95.5	**82.9**	64.0	44.2	25.1	8.0	1.6	0.3	0.0
Option C: 32 to <40	100	100	100	100	**99.5**	**95.1**	81.3	**55.8**	32.7	22.9	24.2	38.1	64.1	80.3	93.9
Option D: 28 to <32	100	100	100	98.9	**90.5**	**73.2**	61.0	**61.4**	74.6	86.7	94.8	99.3	99.9	100	100

Note: Fish protected from harvest in the ocean may be subject to harvest in the Chesapeake Bay, and fish protected from harvest are still subject to release mortality.

Figure 3. Percent of fish in the 2015, 2017, and 2018 year classes that are protected from harvest over time starting in 2023, under each option. The percent protected for ages 15 and above is the percent of all fish age 15+ combined.



OPTIONS FOR THE OCEAN FISHERY

Note for January 2022 Board meeting: *The PDT is recommending the Board remove these options from consideration in Draft Amendment 7. If these options are removed, Option A (status quo) would remain the FMP standard for the ocean recreational size and bag limit for Draft Amendment 7.*

Table 5 and Figure 3 show the estimated protection from harvest provided by each option and how protection changes over time. It is important to note that fish protected from harvest are still subject to release mortality. Stock projections for Option B, C, and D indicate the stock recovery timeline (i.e., the year SSB is projected to exceed the threshold and the year SSB is projected to exceed the target) is the same as the stock recovery timeline under Status Quo (Option A).

If the Board selects Option B, C, or D below, the Board must also select an option regarding conservation equivalency under Tier 1 and Tier 2 in Section 4.2.1.3.

Option A. (status quo): The current recreational slot limit for the ocean fishery of 28" to less than 35" slot limit and a one fish bag limit would be maintained, along with all current

(approved in 2020) state implementation plans and CE programs from Addendum VI.[13] This option would maintain all components of Addendum VI CE programs for the ocean recreational fishery, including recreational size limits, bag limits, seasons, and CE-adjusted commercial quota levels that are combined with reductions in recreational removals. The Chesapeake Bay spring trophy fishery would maintain trophy size and bag limits specified in Addendum VI implementation plans and CE programs.

Option B. (minimum size): The recreational size limit for the ocean fishery would be 35" minimum size and a one fish bag limit. This minimum size and bag limit would also apply to the Chesapeake Bay spring trophy fishery.

Option C. (larger slot): The recreational slot limit for the ocean fishery would be 32" to less than 40" and a one fish bag limit. This slot limit and bag limit would also apply to the Chesapeake Bay spring trophy fishery.

Option D. (narrower slot): The recreational slot limit for the ocean fishery would be 28" to less than 32" and a one fish bag limit. This slot limit and bag limit would also apply to the Chesapeake Bay spring trophy fishery.

4.2.1.2 Chesapeake Bay Recreational Fishery

The status quo 18" minimum size limit and 1 fish bag limit (Option A) for the Chesapeake Bay recreational fishery was implemented through Addendum VI to achieve at least an 18% reduction in total recreational removals from 2017 needed to reduce F to the target in 2020.[14] As of 2021, Maryland, PRFC, and Virginia are operating under approved CE programs that include alternative size and bag limits, shortened or eliminated trophy seasons, and seasonal closures (Table 6). The Chesapeake Bay recreational fisheries target different size and age fish depending on the season. The spring trophy fishery targets large, migratory striped bass and is therefore considered part of the ocean region for management purposes, while the summer/fall recreational fishery typically targets smaller resident striped bass.

[13] Addendum VI state implementation plans and CE programs were approved in 2020 with the exception of Maryland's updated summer no-targeting closure dates (changed from August 16-31 closure in 2020 to July 16-31 closure in 2021), which was discussed at the August 2021 Board meeting.

[14] The projected reduction associated with the status quo Chesapeake Bay size and bag limit measures implemented through Addendum VI accounted for the trophy season continuing to operate with the same season as 2017.

Table 6. 2021 striped bass recreational measures implemented in Chesapeake Bay jurisdictions.

STATE	FISHERY	SIZE LIMITS	BAG LIMIT	OPEN SEASON
MD	Bay and tribs^	Catch and release only	Catch and release only	1.1-2.28, 3.1-3.31, 12.11-12.31
	Bay Spring trophy	35" min size	1 fish/day	5.1-5.15
	Bay Spring	19" min size; charter only 1 fish >28"	1 fish/day (2 for charter)	5.16-5.31
	Bay & tribs Summer and Fall	19" min size; charter only 1 fish >28"	1 fish/day (2 for charter)	6.1-7.15, 8.1-12.10; closed 7.16-7.31 (No Targeting)
PRFC	Spring Trophy	35” min size	1 fish/day	5.1-5.15
	Summer and Fall	20” min size	2 fish/day	5.16-7.6 and 8.21-12.31; closed 7.7-8.20 (No Targeting)
DC	Summer and Fall	18” min size	1 fish/day	5.16-12.31
VA	Bay Spring Trophy	NO SPRING TROPHY SEASON		
	Bay Spring	20”-28” slot limit	1 fish/day	5.16-6.15
	Bay Fall	20”-36” slot limit	1 fish/day	10.4-12.31

^ Susquehanna Flats: catch and release only 1.1 – 3.31 (no treble hooks when bait fishing); 1 fish at 19”-26” slot 5.16 – 5.31.

The alternative size and bag limits for the Chesapeake Bay include one option from Draft Addendum VI that was projected to achieve a similar level of reduction (Option B) and a larger slot limit (Option C) that is projected to result in a greater level of reduction from 2017 recreational removals (Table 7).

For Option C, there are two sub-options. Sub-option C1 would maintain all components of Addendum VI CE programs for the Chesapeake Bay, except the recreational size limits would be modified to include an upper bound of <28” (e.g., PRFC’s summer/fall 20” minimum size and 2-fish bag limit implemented through Addendum VI CE would be modified to a 20” to <28” slot and 2-fish bag limit). Sub-option C2 would require new CE proposals to be submitted, subject to any restrictions or requirements selected under *Section 4.6.2*, if applicable.

The slot limits proposed in Options B and C would provide greater protection from harvest over time for the 2015, 2017, and 2018 year classes relative to the status quo minimum size limit (Table 8). It is important to note the percent protected levels may be overestimated for the Chesapeake Bay, which has a resident striped bass population heavily skewed toward smaller males. Additionally, the percent protected does not account for seasonal migrations between the ocean and Bay, which dictates when and which size fish are available to fisheries in each region.

Table 7. Estimated percent change in harvest, recreational release mortality, and total recreational removals relative to 2017 for Chesapeake Bay options A-C. The percent change is estimated assuming all states would implement the FMP standards for the ocean and Chesapeake Bay. The total overall predicted reduction may differ if CE programs are implemented.

Size Limit	**Bag Limit**	**Trophy Fish Season**	**% change from 2017**		
			Harvest	Release Mortality	Total Removals
Option A: 18" minimum size Status Quo	1	Same trophy season as 2017	-40%	+4%	-20%
Option B: 18" to <23" slot	2	Trophy season starts no earlier than May 1	-33%	+4%	-21%
Option C: 18" to <28" slot C1. Maintain Add VI CE programs with modification to include an upper bound of <28". C2. New CE proposals required.	1	Same trophy season as 2017	*	*	-32%

*Only the overall change in total removals can be estimated for Option C.

Table 8. Percent of fish protected from harvest (outside the size limit) for each age for the Chesapeake Bay size limit options based on coastwide size-at-age estimates. The ages of the 2015, 2017, and 2018 year classes in 2023 are in bold. Size limits implemented through CE programs are in grey. The percent protected for ages 15 and above is the percent of all fish age 15+ combined.

					2018 YC in 2023	**2017 YC in 2023**		**2015 YC in 2023**							
Option	A1	A2	A3	A4	**A5**	**A6**	A7	**A8**	A9	A10	A11	A12	A13	A14	A15+
Option A: 18" min Status Quo (DC)	100	97.9	63.9	17.2	**2.4**	**0.7**	0.2	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MD CE: 19" min	100	99.2	75.7	26.6	**5.0**	**1.5**	0.4	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRFC CE: 20" min	100	99.7	85.1	38.2	**9.3**	**3.0**	0.9	**0.1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VA (Spring/Summer) CE: 20" to 28"	100	99.7	85.1	39.3	**19.3**	**34.7**	58.8	**83.8**	95.9	98.9	99.8	100	100	100	100
VA (Fall) CE: 20"to 36"	100	99.7	85.1	38.2	**9.4**	**3.2**	3.4	**11.1**	25.5	43.6	64.0	85.6	96.4	99.1	99.9
Option B: 18" to <23"	100	97.9	65.8	42.5	**65.9**	**84.8**	94.1	**99.1**	99.9	100	100	100	100	100	100
Option C: 18" to <28"	100	97.9	63.9	18.3	**12.4**	**32.4**	58.1	**83.7**	95.9	98.9	99.8	100	100	100	100

Note: Fish protected from harvest in the Chesapeake Bay may be subject to harvest in the ocean, and fish protected from harvest are still subject to release mortality.

OPTIONS FOR THE CHESAPEAKE BAY FISHERY

Note for January 2022 Board meeting: *The PDT is recommending the Board remove these options from consideration in Draft Amendment 7. If these options are removed, Option A (status quo) would remain the FMP standard Chesapeake Bay recreational size and bag limit for Draft Amendment 7.*

Table 8 shows the estimated protection from harvest provided by each option and how that protection changes over time. It is important to note that fish protected from harvest are still subject to release mortality. Stock projections for Option B and C in combination with various ocean size limits indicate the stock recovery timeline (i.e., the year SSB is projected to exceed the threshold and the year SSB is projected to exceed the target) is the same as the stock recovery timeline under the Status Quo (Option A).

Since Chesapeake Bay spring trophy fishery is considered part of the ocean fishery for management purposes under Amendment 7, see Section 4.2.1.1 for size limits applicable to the Chesapeake Bay spring trophy fishery.

If the Board selects Option B or C below, the Board must also select an option regarding conservation equivalency under Tier 1 and Tier 2 in Section 4.2.1.3.

Option A. (status quo): The current recreational size limit for the Chesapeake Bay of 18" minimum size and a one fish bag limit would be maintained, along with all current (approved in 2020) Chesapeake Bay state implementation plans and CE programs from Addendum VI.[15] This option would maintain all components of Chesapeake Bay Addendum VI CE programs, including recreational size limits, bag limits, recreational seasons, and CE-adjusted commercial quota levels that are combined with reductions in recreational removals.

Option B. (small slot): The recreational slot limit for the Chesapeake Bay fishery would be 18" to less than 23" and a two fish bag limit.

Option C. (larger slot): The recreational slot limit for the Chesapeake Bay fishery would be 18" to less than 28" and a one fish bag limit.

> **Sub-option C1.** All current (approved in 2020) Chesapeake Bay CE programs from Addendum VI would be maintained with the modification of recreational size limits to include an upper bound of less than 28". All other components of Chesapeake Bay CE programs would be maintained, including recreational bag limits, seasons, and CE-

[15] Addendum VI state implementation plans and CE programs were approved in 2020 with the exception of Maryland's updated summer no-targeting closure dates (changed from August 16-31 closure in 2020 to July 16-31 closure in 2021), which was discussed at the August 2021 Board meeting.

adjusted commercial quota levels that are combined with reductions in recreational removals.

Sub-option C2. New CE proposals would be required to deviate from the FMP standard.

4.2.1.3 Conservation Equivalency Consideration for Recreational Measures to Protect Year Classes

This section only applies if alternative recreational measures are selected to replace the status quo under Section 4.2.1.1 (Ocean Recreational Fishery) and/or Section 4.2.1.2 (Chesapeake Bay Recreational Fishery).

Tier 1: Conservation Equivalency Consideration for Alternative Recreational Size Limits to Protect Year Classes.

The following options consider how/if conservation equivalency could be applied to alternative recreational size limits to protect year classes.

Option A (Status Quo): CE would be permitted, subject to any restrictions or requirements selected in *Section 4.6.2*. The selected recreational size/bag limits are selected to protect particular year classes, and are not designed to achieve a specific change in harvest or removals; therefore, the Board would need to specify how states are to demonstrate equivalency. The PDT does not recommend this option because allowing changes to recreational size limits through CE without any limitations could compromise the goal of setting specific size limits to reduce harvest on particular year classes.

Option B: CE would be permitted with limitations on the range of CE measures that could be proposed, subject to any restrictions or requirements selected in *Section 4.6.2*. The limitations would be determined by the TC based on Board guidance to ensure CE proposals do not compromise year class protection.

Option C: CE would not be permitted.

Tier 2: Addendum VI Conservation Equivalency Programs Splitting the Reduction between Sectors

The following options consider how changing the recreational size limits through Amendment 7 would impact current Addendum VI CE programs that combined alternative recreational and commercial measures designed to achieve the required 18% reduction on a statewide basis, rather than within each fishery sector. Specifically, this refers to those CE programs that implemented a less than 18% reduction in commercial quota—offset by a larger reduction in recreational removals (New Jersey, Delaware, Maryland, PRFC, and Virginia). If the FMP standard(s) for Chesapeake Bay and/or ocean recreational size limits are changed through Amendment 7, the recreational measures implemented through Addendum VI CE would no

longer apply for those CE programs; however, the Board needs to consider whether the quota reductions implemented through those CE programs would carry forward.

Option A: The recreational component of Addendum VI CE programs that split the Addendum VI required reduction between sectors would no longer be valid under Amendment 7, but the commercial quota levels implemented through those CE programs would carry forward (Table 9). Under this option, the commercial quota levels implemented through Addendum VI CE programs for New Jersey, Delaware, Maryland, PRFC, and Virginia would be maintained at less than an 18% reduction from the Addendum IV quotas.

Option B: The recreational and commercial components of Addendum VI CE programs that split the Addendum VI required reduction between sectors would not be valid under Amendment 7. Under this option, New Jersey, Delaware, Maryland, PRFC, and Virginia would be subject to the quotas specified in *Section 4.3*, unless altered by a new CE proposal approved by the Board subject to any restrictions and requirements under *Section 4.6.2*.

Table 9. Addendum VI base quota and 2020 CE-adjusted quota.

State	Add VI (base)	2020 CE-Adjusted Quota^
Ocean		
Maine*	154	154
New Hampshire*	3,537	3,537
Massachusetts	713,247	735,240
Rhode Island	148,889	148,889
Connecticut*	14,607	14,607
New York	652,552	640,718
New Jersey**	197,877	215,912
Delaware	118,970	142,474
Maryland	74,396	89,094
Virginia	113,685	125,034
North Carolina	295,495	295,495
Ocean Total	**2,333,409**	**2,411,154**
Chesapeake Bay		
Maryland	**2,588,603**	1,442,120
Virginia		983,393
PRFC		572,861
Bay Total		**2,998,374**

* 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 by either changing size limit with equivalent 18% quota reduction (MA, NY), or by taking a greater than 18% reduction in recreational removals to offset a less than 18% commercial quota reduction (NJ, DE, MD, PRFC, VA).

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

4.2.2 Measures to Address Recreational Release Mortality

Recreational releases are fish caught and released alive during recreational fishing trips. A proportion of releases die as a result of that fishing interaction, which is referred to as release mortality (or dead releases). The number of striped bass that die after being caught and released is estimated by multiplying the total number of live releases by an estimated rate of hooking mortality. The stock assessment currently applies a 9% hooking mortality rate to all recreationally released striped bass. This does not mean that every time a fish is released alive it has a 9% chance of dying. Under some conditions, the released fish has a higher or lower probability of dying, but overall, coastwide, it is assumed that 9% of all striped bass released alive die.

This 9% hooking mortality rate estimate is from a study by Diodati and Richards (1996) which took place in a saltwater environment and encompassed a range of variables including hook types, hooking locations, and angler experience levels. The TC conducted a meta-analysis of other striped bass release mortality studies which confirmed that an overall 9% release mortality rate accounts for the variation in conditions and factors that attribute to release mortality coastwide.

Since 1990, roughly 90% of all striped bass caught recreationally were released alive either due to cultural preferences (i.e., fishing with the intent to catch and release striped bass) or regulation (e.g., the fish is not of legal size, was caught out of season, or the angler already caught the bag limit) (Figure 13). Each year since 2017, more fish were estimated to have died from catch and release fishing than were harvested by the recreational fishery. For example, 2.76 million fish are estimated to have died from catch and release fishing in 2020, whereas 1.71 million fish were harvested in 2020 (Table 16). Since release mortality accounts for a significant proportion of total fishing mortality, Addendum VI sought to lower the rate at which fish die after being released by requiring the use of non-offset circle hooks when fishing for striped bass with bait because circle hooks have been proven to help reduce rates of gut-hooking when fished correctly. In addition to hook type, studies have shown other factors influence release mortality as well, including environmental conditions (e.g., salinity, air and water temperatures), angler experience, and angler behavior (e.g., how fish are handled). Addendum VI also encouraged states to develop education campaigns to increase compliance with circle hook regulations and to encourage responsible angler behavior.

If management action is taken to influence where mortality (harvest vs. discard) is coming from, managers must consider the impacts those actions will have on the fishery. For example, management measures focusing on reducing recreational releases could discourage participation from anglers that value food fish and negatively impact industries that cater to those anglers.

The current management program primarily uses bag limits and size limits to control harvest, and is not designed to control the catch and release fishery which makes it difficult to control overall fishing mortality. Some stakeholders value the ability to harvest striped bass, either

commercially or recreationally, while others value the experience of fishing for striped bass regardless of whether they are able to retain fish. The acceptable proportion of release mortality in total removals should reflect the management objectives for the fishery. Nonetheless, in order to better control all sources of fishing mortality, managers could consider additional gear restrictions to help increase the chance of survival after being released, or additional effort controls (i.e., time and area closures) to reduce the number of trips interacting with striped bass and thus the overall number of striped bass released alive.

In addition to the circle hook requirement implemented through Addendum VI (Option A. Status Quo), the Board could consider the following types of options to address recreational release mortality:

- Option B. Effort Controls (Seasonal Closures)
- Option C. Gear Restrictions
- Option D. Outreach and Education

Although the impact of many of these options on the stock are difficult to quantify, they are intended to reduce the number of recreational releases or improve post-release survival. The Board could select one or more sub-options from one or more primary option categories that would be implemented in addition to the status quo circle hook measures.

Option A. Status Quo (Addendum VI circle hook measures)
Under this option, the circle hook requirement implemented through Addendum VI to Amendment 6 (Addendum VI Section 3.2) would remain in place <u>as the only measure implemented</u> specifically to address recreational release mortality:

> *The use of circle hooks, as defined herein, is required when recreationally fishing for striped bass with bait, which is defined as any marine or aquatic organism live or dead, whole or parts thereof. This shall not apply to any artificial lure with bait attached. A circle hook is "a non-offset hook where the point is pointed perpendicularly back towards the shank". The term "non-offset" means the point and barb are in the same plane as the shank (e.g. when the hook is laying on a flat surface, the entire hook and barb also lay flat). States have the flexibility to further specify details of the regulation to address specific needs of the state fishery. In order to promote the use of circle hooks, states are encouraged to develop public education and outreach campaigns on the benefits of circle hooks when fishing with bait. The intent of the requirement is to reduce striped bass discard mortality in the recreational fishery. It is recommended that striped bass caught on any unapproved method of take must be returned to the water immediately without unnecessary injury…*
>
> *The use of circle hooks by anglers targeting striped bass with bait, live or chunk, has been identified as a method to reduce the discard mortality of striped bass in recreational fisheries. When a circle hook begins to exit the mouth of a fish, the shape causes the shaft to rotate towards the point of resistance and the barb is more likely to embed in the jaw or corner of the fish's mouth. Circle hooks can reduce rates of "gut-*

hooking" and lower the likelihood of puncturing internal organs if the hook is swallowed…

For the following Options B – D, any sub-options selected would be implemented in addition to the current circle hook requirements described above in Option A (status quo).

Option B. Effort Controls (Seasonal Closures)

Recreational release mortality could be addressed by reducing fishing effort in the recreational fishery through implementation of seasonal closures, which are intended to reduce the number of live releases by reducing the number of fishing trips (effort) interacting with striped bass. The following options outline a variety of seasonal closures for consideration.[16] Some of the closure options would offer additional benefits to the stock by reducing effort during seasons associated with higher post-release mortality rates or by protecting spawning or pre-spawn fish, which could contribute to stock rebuilding. When considering effort controls, the Board must weigh the cost of limiting access to the fishery with the potential benefit of decreasing recreational release mortality.

Seasonal closures could be no-harvest closures (i.e., catch and release fishing is allowed) or no-targeting closures (i.e. no person may take, attempt to take, target, or have in possession any striped bass). The most appropriate approach may depend on the reason for the closure; for example, implementing a no-targeting closure during high temperature periods when release mortality rates are higher. The majority of the proposed options are no-targeting closures in order to address recreational releases resulting from both harvest trips and catch-and-release fishing trips. Although there are added enforceability concerns and uncertainty about angler compliance with no-targeting closures, the PDT assumes maximum reduction of effort, and thus a reduction in number of releases would be achieved with a no-targeting closure. While no-harvest closures would reduce the number of fish harvested, angler behavior may shift to catch-and-release fishing, thereby increasing the number of recreational releases which is counter to the objective of reducing release mortality.

It is important to note that fishing trips targeting other species that incidentally catch and release striped bass would still occur regardless of closure type. For example, an average of 24% of all trips interacting with striped bass in 2018 and 2019 were non-targeted trips or trips where striped bass was the secondary target species. These trips would likely still occur during a striped bass no-targeting closure. Additionally, seasonal closures for striped bass may shift effort to targeting other species or to other times of year when the striped bass fishery is open.

[16] In the criteria for CE proposals for Addendum VI, the TC noted season closures less than two weeks duration are unlikely to be effective. For that reason, the following options do not include any closures less than two weeks duration.

A coastwide closure would ensure consistency in the timing of closures across all states, but would present an equitability challenge. Recreational fisheries operate very differently along the coast based on timing (availability of fish), among other biological, environmental, and socioeconomic considerations, so coastwide closures would result in different levels of effort reduction across states. State-specific or regional closure options could help account for these differences, but this may result in a patchwork of season closures across the coast. States would need to develop closure proposals to pursue through their state public processes and submit for TC review and Board approval as part of state implementation plans.

Note on Estimating Reduction in Removals: Estimating the reduction in removals from a no-targeting seasonal closure depends on assumptions about changes in angler behavior, which is highly uncertain. The TC has not established a standardized method for estimating the reduction in removals from a no-targeting closure.[17] Given the no-targeting closure options considered in Draft Amendment 7, as well as the potential for states to propose no-targeting closures in future CE proposals, the PDT recommends the Board task the TC to establish such methods in advance of implementation of subsequent management actions. The TC may need guidance from the Board on this task.

If sub-option B1 (state-specific closures) is selected, the Board must also consider options under Tier 1 to determine applicability of existing no-targeting closures. Sub-option B2 (spawning closures) can be selected independent of or in addition to sub-option B1.

> **Sub-option B1. State-Specific Two-Week Closures:** All recreational targeting of striped bass would be prohibited for a minimum two-week period to reduce fishing effort during times when the striped bass fishery is particularly active in each state. As defined in sub-options B1-a and B1-b, a minimum threshold of directed trips targeting striped bass will be used to define "active" waves for each state in which to implement its closure. In addition to this criteria, state implementation plans should consider protection for spawning and pre-spawn fish, extreme air and water temperatures, and relevant water quality data (dissolved oxygen, salinity, etc.), as well as socioeconomic considerations and regulatory consistency within shared waterbodies.
>
> > **B1-a. Minimum 15% Directed Trips:** Each state's closure must occur during a Wave with at least 15% of the state's annual striped bass directed trips, as provided in Table 10. At least two waves in each state/region meets this 15% minimum threshold. Considering the limited availability of MRIP data for Pennsylvania, Potomac River Fisheries Commission, and District of Columbia,

[17] In their review of Addendum VI CE proposals, the TC noted "the TC supports the use of closed seasons to reduce effort and dead discards, but stresses that the predicted savings, particularly from a "no targeting" provision, are highly uncertain due to current data limitations and predicting changes in angler behavior."

those three jurisdictions would determine which state listed in Table 9 most closely aligns with their distribution of effort.

B1-b. Minimum 25% Directed Trips: Each state's closure must occur during a Wave with at least 25% of the state's annual striped bass directed trips, as provided in Table 10. At least one wave in each state/region meets this 25% minimum threshold. Considering the limited availability of MRIP data for Pennsylvania, Potomac River Fisheries Commission, and District of Columbia, those three jurisdictions would determine which state listed in Table 9 most closely aligns with their distribution of effort.

Table 10. Proportion of each state's total annual striped bass directed trips (primary and secondary target) by wave for 2017-2019. Note: the distribution of directed trips reflects closures that were already in place in 2017-2019 and so may not fully reflect when fish are available. Source: MRIP

	Jan-Feb Wave 1* Percent	Mar-Apr Wave 2* Percent	May-Jun Wave 3 Percent	Jul-Aug Wave 4 Percent	Sep-Oct Wave 5 Percent	Nov-Dec Wave 6* Percent
MAINE	0.0%	0.0%	34.7%	41.6%	23.7%	0.0%
NEW HAMPSHIRE	0.0%	0.0%	25.6%	53.7%	20.8%	0.0%
MASSACHUSETTS	0.0%	2.3%	33.7%	34.5%	23.8%	5.7%
RHODE ISLAND	0.0%	12.9%	30.3%	20.6%	19.2%	17.1%
CONNECTICUT	0.0%	22.9%	29.9%	18.7%	13.2%	15.3%
NEW YORK	0.0%	21.3%	26.3%	13.5%	20.3%	18.6%
NEW JERSEY	0.0%	24.7%	18.4%	4.1%	11.7%	41.1%
DELAWARE	0.0%	30.9%	15.3%	8.1%	7.8%	38.0%
MD CHES BAY	0.0%	14.6%	21.1%	26.7%	17.7%	19.9%
VA CHES BAY	0.0%	7.7%	5.5%	1.6%	15.0%	70.1%
MD OCEAN	0.0%	0.6%	20.7%	0.4%	40.7%	37.6%
VA OCEAN	0.0%	1.3%	24.1%	31.4%	0.0%	43.2%
NC OCEAN	5.1%	9.0%	12.2%	17.8%	1.7%	54.3%

*The Fishing Effort Survey is not administered in any state except NC during Wave 1, nor in ME during Waves 2 and 6.

***Tier 1. Applicability of Existing No-Targeting Closures*:** If sub-option B1 is selected, the Board needs to consider whether the no-targeting closures implemented in 2020 by Maryland and PRFC through CE to meet the required Addendum VI reduction would also meet the new seasonal closure requirement.

Option A. Existing no-targeting closures implemented in 2020 would fulfill the requirements of sub-option B1.

Option B. Existing no-targeting closures implemented in 2020 would not fulfill the requirements of sub-option B1. States that implemented no-

targeting closures in 2020 would need to choose between the following actions:

- Implement an additional closure to meet the new seasonal closure requirement as selected in sub-option B1; OR
- Implement only the new seasonal closure requirement as selected in sub-option B1, and implement the FMP standard size limit for the Chesapeake Bay recreational fishery *(Section 4.2.1)*.

Sub-option B2. Spawning Area Closures: The Board can select either or both of the following sub-options B2-a and B2-b. Existing spawning closures would be applied toward meeting the requirements of the selected option(s).[18] Spawning area closures during the spawning season could contribute to stock rebuilding by eliminating harvest and/or reducing releases of spawning and pre-spawn fish. Reducing releases during this time is particularly important to reduce stress and injury to fish as they move into lower salinity spawning areas. If new information on the timing of striped bass spawning is published in the future, the TC would conduct a review of that research and recommend changes to the timing of spawning closures if needed. If this option is selected, CE would not be permitted.

B2-a. No-Harvest Spawning Closure Required: All recreational harvest of striped bass would be prohibited during Waves 1 and 2 in the following spawning areas to protect pre-spawn and spawning fish: Chesapeake Bay, Delaware Bay/River, Hudson River, and Kennebec watershed). Prohibiting harvest for a long period of time may eliminate some striped bass trips altogether, and therefore reduce releases, during this period. Most spawning areas are already closed to harvest during Wave 1 and some spawning areas are closed for all or part of Wave 2 (Figure 4).

B2-b. No-Targeting Closure Required: All recreational targeting of striped bass would be prohibited for a minimum two-week period on all spawning grounds (not necessarily the entire spawning area) during Wave 2 or Wave 3, as determined by states to align with peak spawning. Some spawning areas in New Jersey (Delaware River) and Chesapeake Bay (Maryland) have no-targeting closures in place during part of Wave 2 and/or 3 (Figure 5).

[18] For example, if sub-option B5-a was selected and a state already has a no-harvest closure in place for Waves 1 and 2, that state would already be considered in compliance with the closure requirement.

Figure 4. 2021 seasonal closures in the **ocean region** by state.

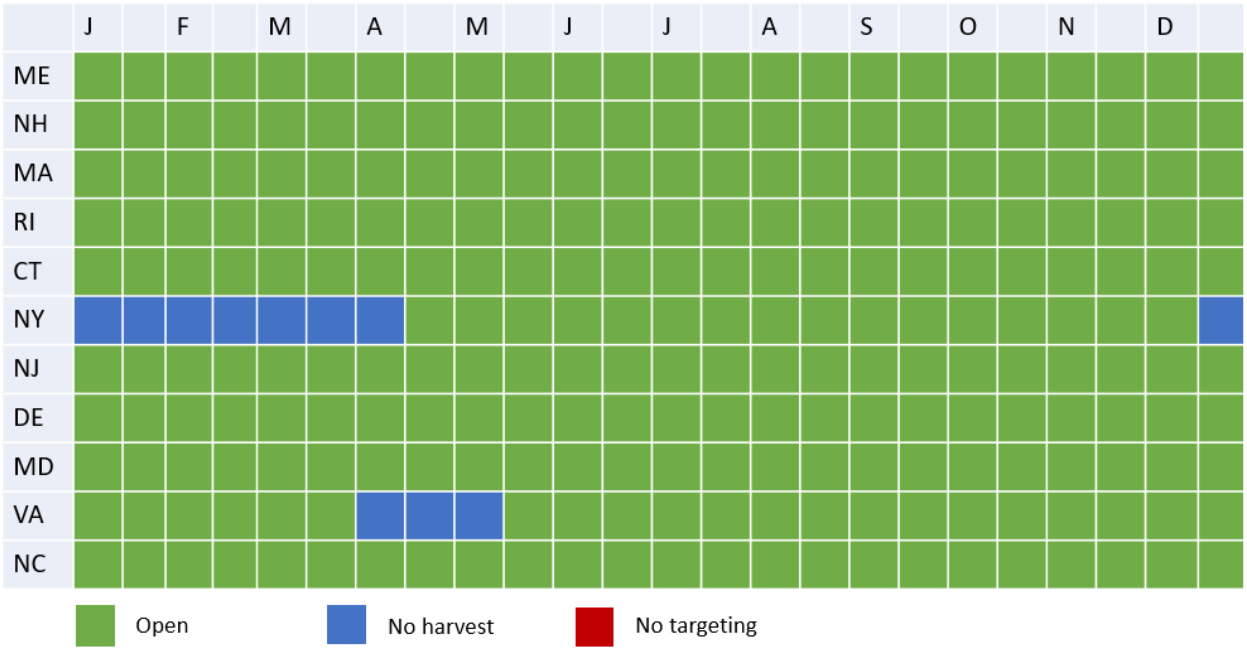
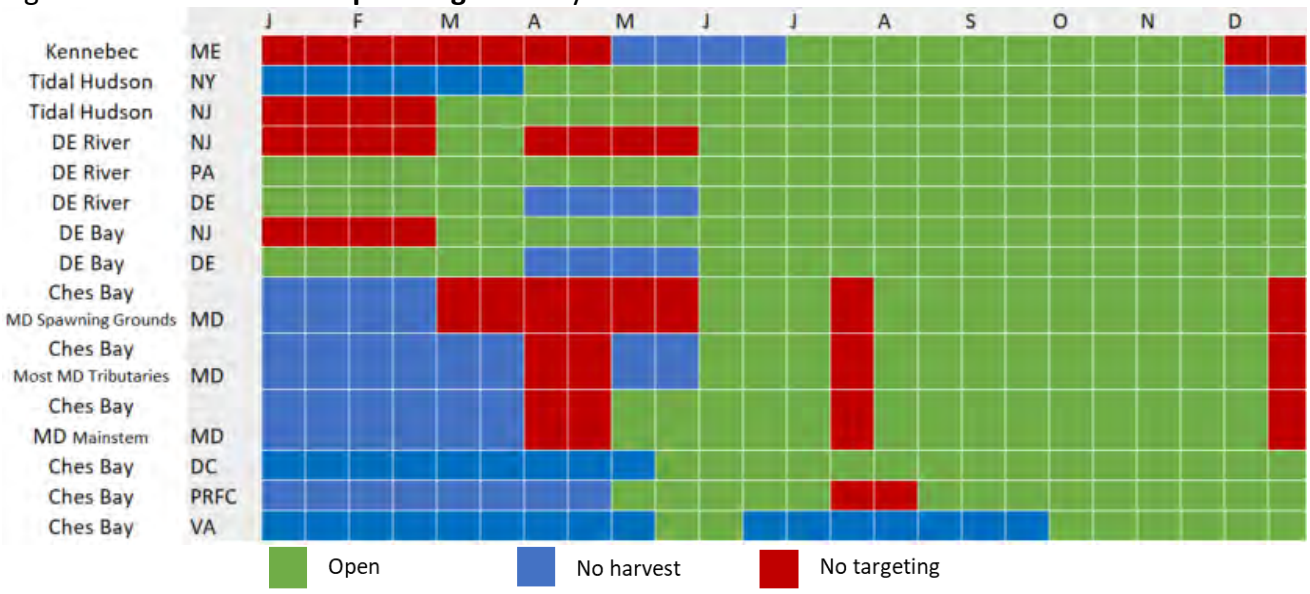


Figure 5. 2021 closures in **spawning areas** by state.



Option C. Additional Gear Restrictions

In addition to the status quo circle hook requirement, the Board could consider additional gear restrictions outlined in the following options to increase the chance of survival of striped bass caught and released in the recreational fishery. The benefit of gear restrictions (i.e., how many additional fish could be saved) is difficult to quantify for several reasons, including: 1) it is

unknown how many anglers already use these tactics; 2) possible non-compliance, especially with management measures that can only be observed on the-water and in real-time; and 3) enforcement challenges related to proving angler intent or target species (i.e., gear restrictions are difficult to enforce if the gear is acceptable to use when targeting a different species). Nonetheless, these options would be expected to result in a favorable trend towards a reduction in release mortality.

The Board may select one or both of the following sub-options C1 and C2.

> **Sub-option C1**: Recreational anglers would be prohibited from using any device other than a nonlethal device to remove a striped bass from the water or assist in the releasing of a striped bass. A non-lethal device means any tool used in the removal of striped bass from the water or to assist in the releasing of striped bass that does not pierce, puncture, or otherwise cause invasive damage to the fish that may result in its mortality. Some states already have regulations that ban the use of gaffs, but the language presented in this option would encompass a broader suite of lethal devices, including gaffs.
>
> **Sub-option C2**: Striped bass caught on any unapproved method of take would be returned to the water immediately without unnecessary injury. The Board approved this language on incidental catch as guidance to Addendum VI in March 2021; this guidance could not be a compliance criterion as part of Addendum VI since incidental catch was not originally part of Addendum VI. Selecting this option would make this incidental catch provision a requirement under Amendment 7 for striped bass that are incidentally caught on any unapproved method of take, including non-circle hooks with bait attached (as implemented through Addendum VI).

Option D. Outreach and Education

States have already implemented outreach and education campaigns related to the use and benefits of circle hooks and to encourage best handling and fishing practices, as recommended by Addendum VI. The following options are intended to more explicitly recognize those efforts as part of Amendment 7. ***The Board may select sub-option D1 or D2.***

> **Sub-option D1**: States would be required to promote best striped bass handling and release practices by developing public education and outreach campaigns. States must provide updates on public education and outreach efforts in annual state compliance reports. Best practices could include**:**
>
> - Be attentive and set the hook immediately to prevent the fish from swallowing the hook (setting the hook is not necessary with circle hooks).
> - If the hook is swallowed, do not forcefully remove it. Cut the line off as close to the mouth as possible and then release the fish.
> - Leave the fish in the water when possible, including while removing the hook, to minimize stress and injury to the fish. If you need to remove the fish from the

water, wet your hands or use a wet rag in order to preserve the protective mucous layer on the outside of the fish.
- Don't use the gills or eyes as a handhold. On larger fish, support under the belly.
- Reduce the fight time.
- Once an angler has retained their bag limit, consider targeting a different species.

Sub-option D2: It is recommended states continue to promote best striped bass handling and release practices by developing public education and outreach campaigns. States should provide updates on public education and outreach efforts in annual state compliance reports. Best practices could include those listed in sub-option D1.

4.3 COMMERCIAL FISHERY MANAGEMENT MEASURES

4.3.1 Size Limits

All commercial fisheries are required to maintain their 2017 size limits.[19]

4.3.2 Quota Allocation

Amendment 7 maintains the commercial quotas from Addendum VI to Amendment 6.[20] Table 11 provides the commercial quota in pounds for the ocean region and for Chesapeake Bay. The Chesapeake Bay commercial quota is allocated to Maryland, Virginia, and the Potomac River Fisheries Commission per the jurisdictions' mutual agreement. Table 12 provides each state's commercial quota for the ocean region.

Table 11. Ocean Region and Chesapeake Bay Commercial Quota

Region	Quota (Pounds of Fish)
Chesapeake Bay Total	2,588,603
Ocean Total	2,333,408

[19] Some states have implemented alternative commercial size limits through current (approved in 2020) conservation equivalency programs. Refer to Table 16 in *Section 9.0* for each state's 2020 commercial regulations.
[20] Some states have implemented adjusted commercial quotas and/or reallocated commercial quota to the recreational sector through current (approved in 2020) conservation equivalency programs. Some states prohibit commercial harvest/sale. Refer to Table 15 in *Section 9.0* for each state's quota for 2020, including CE-adjusted quotas where applicable.

Table 12. Ocean region commercial quota.

State	Quota (Pounds of Fish)
Maine	154
New Hampshire	3,537
Massachusetts	713,247
Rhode Island	148,889
Connecticut	14,607
New York	652,552
New Jersey	197,877
Delaware	118,970
Maryland	74,396
Virginia	113,685
North Carolina	295,495
Ocean Total	2,333,408

Note: Refer to Table 15 in *Section 9.0* for CE-adjusted quotas, where applicable, for fishing year 2020.

Quotas are allocated on a calendar year basis.[21] In the event a state exceeds its allocation, the amount in excess of its annual quota is deducted from the state's allowable quota in the following year.

Note: Refer to section 4.2.1.3 for options to consider how changing the recreational size limit through Amendment 7 could impact Addendum VI CE programs that combined recreational and commercial measures to achieve at least an 18% reduction statewide, including changes to commercial quotas.

4.3.2.1 Commercial Quota Transfers

Commercial quota transfers are not permitted. In August 2021, concurrent with the development of Draft Amendment 7, the Board initiated Addendum VII to Amendment 6 to consider allowing the voluntary transfer of commercial striped bass quota between states/jurisdictions that have commercial quota. In October 2021, the Board deferred consideration of Draft Addendum VII until May 2022.

4.4 REBUILDING PLAN

The 2018 benchmark stock assessment indicated the striped bass stock is overfished and experiencing overfishing relative to the updated reference points defined in the assessment. By accepting the assessment for management use in 2019, two management triggers were tripped requiring the Board to take action to address both the overfishing and overfished status

[21] North Carolina's fishing year is December 1 – November 30.

determinations. Addendum VI was implemented in 2020 to address the overfishing status by implementing measures to reduce F back to F target in 2020. To address the overfished status, the Board must adjust the striped bass management program to rebuild SSB to the target level in a timeframe not to exceed 10 years, no later than 2029. Addendum VI measures are expected to contribute to stock rebuilding, and options for recreational fishery management measures in Draft Amendment 7, including measures to address release mortality (*Section 4.2.2*), could also support stock rebuilding, if implemented.

The stock rebuilding process is iterative in nature given the 10 year rebuilding horizon. The next stock assessment update (expected in 2022) will provide an updated evaluation of stock status that will incorporate two years of management and data under Addendum VI (2020-2021). The most recent estimates of SSB and F currently available for management use are from the 2018 benchmark stock assessment with a terminal year of 2017. The 2022 stock assessment update will provide estimates of SSB and F through 2021, and will update the SSB and F reference point values. Additionally, the 2022 stock assessment will calculate the F rate required to rebuild SSB to the SSB target by no later than 2029 (i.e., F rebuild). F rebuild is distinct from F target such that F target is the F rate required to achieve the SSB target in the long term, with no fixed rebuilding time frame. F rebuild may or may not be lower than F target.

This section includes options to consider which recruitment assumption to apply to rebuilding calculations, and outlines the rebuilding plan framework for responding to the 2022 stock assessment results.

4.4.1 Recruitment Assumption for Rebuilding Calculation

The Board has expressed concern about recent low recruitment estimates and the potential impact of low recruitment levels on the ability of the striped bass stock to rebuild by no later than 2029. Several years of poor recruitment may indicate the stock is entering a low recruitment regime, and levels of removals that were sustainable during average or above average recruitment regimes may not be sustainable in the future.

F rebuild could be calculated by drawing recruitment from the values observed from 1990 to the terminal year of the stock assessment (i.e., the standard recruitment method used in the striped bass stock assessment). However, if recruitment is drawn from a below-average period instead of the full period from 1990-forward, for example, the F rebuild would be lower. If the population is fished at F rebuild using the standard recruitment method but average recruitment remains lower than the time series mean, the population may not be able to rebuild to the SSB target by 2029.

As part of the analysis for alternative recruitment trigger options (*Section 4.1*), the TC conducted a change point analysis of the Maryland juvenile abundance index to identify periods of high and low recruitment. This analysis identified 1992-2006 as a high recruitment period (i.e., high recruitment regime) and 2007-2020 as a low recruitment period (i.e., low recruitment regime). This translates to years 1993-2007 and 2008-2017 for age-1 model estimates of recruit

abundance. The age-1 model estimate of recruitment abundance will be updated to include estimates through 2021 during the 2022 assessment.

The following options consider which recruitment assumption would be applied to the rebuilding calculations and projections for the 2022 stock assessment update:

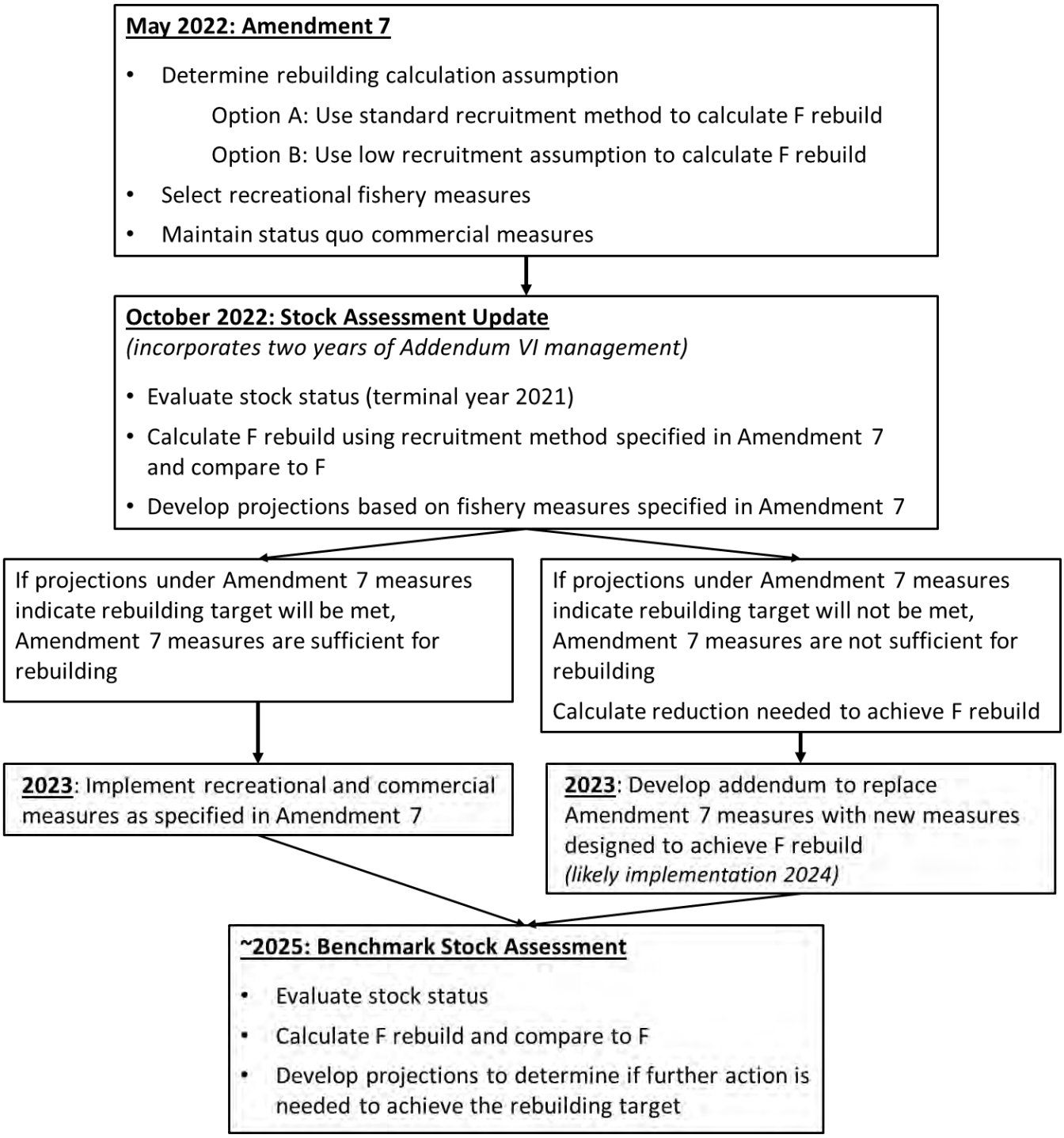
- **Option A (Status Quo)**: Rebuild female SSB to the SSB target level by no later than 2029. F rebuild is calculated to achieve the SSB target by no later than 2029 using the standard recruitment method from the stock assessment.

- **Option B**: Rebuild female SSB to the SSB target level by no later than 2029. F rebuild is calculated to achieve the SSB target by no later than 2029 using the low recruitment regime assumption as identified by the change point analysis. This approach is more conservative than Option A.

4.4.2 Rebuilding Plan Framework

The rebuilding plan framework is outlined in Figure 6. The rebuilding framework specifies how the measures selected as part of Amendment 7 will inform rebuilding calculations and projections in the 2022 assessment update, which will then determine whether additional action is needed in response to the assessment results.

Figure 6. Framework to rebuild to SSB target level by no later than 2029.



4.5 HABITAT CONSERVATION AND RESTORATION RECOMMENDATIONS

Each State should engage their county, township, and other local jurisdictions to implement protection for striped bass habitat to ensure the sustainability of that portion of the migratory or resident stock. Such a program should inventory historical habitats, identify habitats presently used, specify those targeted for recovery, and impose or encourage measures to retain or increase the quantity and quality of striped bass essential habitats.

Habitats essential for maintaining striped bass populations include spawning, nursery, wintering areas, and migration corridors. Each state jurisdiction should monitor those habitats located within state waters to ensure adequate water and substrate quality; the quantity, timing, and duration of freshwater flows into spawning and nursery areas; water, substrate quality, and integrity of wintering areas; and open and free access to migration corridors, especially ocean inlets. Federal agencies should work with state partners in addressing these needs in state waters and in the EEZ. State and Federal agencies should partner to develop detailed maps of striped bass habitat use, by life stage, to provide a basis for regulatory review of proposed federal or state actions which could adversely affect striped bass populations. Parameters of particular concern to which jurisdictions should be attentive include nutrient loading, long-term adverse changes in water quality, hypoxia events, substrate extraction in areas used by striped bass (e.g., proposed Corps of Engineers sand mining off NJ and NC, as well as navigational dredging), and projects which could potentially jeopardize striped bass habitat quality or access.

4.5.1 Preservation of Existing Habitat

1) States in which striped bass spawning occurs should notify in writing the appropriate federal and state regulatory agencies of the locations of habitats used by striped bass. Regulatory agencies should be advised of the types of threats to striped bass populations and recommended measures which should be employed to avoid, minimize, or eliminate any threat to current habitat quantity or quality.

2) Where available, States should seek to designate striped bass essential habitats for special protection. Tools available include High Quality Waters, Outstanding Resource Waters, and Fish Habitats of Concern (as defined by ASMFC, in preparation) designations. Designations should, where possible, be accompanied by requirements of nondegradation of habitat quality, including minimization of nonpoint source runoff, prevention of significant increases in contaminant loadings, and prevention of the introduction of any new categories of contaminants into the area (via restrictions on National Pollutant Discharge Elimination System (NPDES) discharge permits for facilities in those areas).

3) State fishery regulatory agencies should develop protocols and schedules for providing input on water quality regulations to the responsible agency, to ensure that water quality needs for striped bass are met.

4) State fishery regulatory agencies should develop protocols and schedules for providing input on Federal permits and licenses required by the Clean Water Act, Federal Power Act, and other appropriate vehicles, to ensure that striped bass habitats are protected.

5) Water quality criteria for striped bass spawning and nursery areas should be established or existing criteria should be upgraded to levels which are sufficient to ensure successful reproduction. Any action taken should be consistent with Federal Clean Water Act guidelines and specifications.

6) All State and Federal agencies responsible for reviewing impact statements and permit applications for projects or facilities proposed for striped bass spawning and nursery areas should ensure that those projects will have no or only minimal impact on local stocks. Natal rivers of stocks considered depressed or undergoing restoration are of special concern. Any project which would result in the elimination of essential habitat should be avoided.

7) State agencies should engage with local jurisdictions during comprehensive development planning to ensure impacts to striped bass spawning and nursery areas are avoided or minimized.

4.5.2 Habitat Restoration and Improvement

1) Each State should survey existing literature and data to determine the historical extent of striped bass occurrence and use within its jurisdiction. An assessment should be conducted of those areas not presently used for which restoration is feasible.

2) Every effort should be made to eliminate existing contaminants from striped bass habitats where a documented adverse impact occurs (e.g., PCBs from the Hudson River).

3) States should work in concert with the USFWS and NMFS, Office of Habitat Conservation, to identify federally-regulated hydropower dams which pose significant impediment to striped bass migration and target them for appropriate recommendations during FERC relicensing.

4.5.3 Avoidance of Incompatible Activities

1) Federal and State fishery management agencies should take steps to limit the introduction of compounds which are known to be accumulated in striped bass tissues and which pose a threat to striped bass health or human health.

2) Each State should establish windows of compatibility for activities known or suspected to adversely affect striped bass such as navigational dredging, bridge construction, and dredged material disposal and notify the appropriate construction or regulatory agencies in writing.

3) Projects involving water withdrawal (e.g., power plants, irrigation, water supply projects) should be scrutinized to ensure that adverse impacts resulting from impingement, entrainment,

and/or modification of flow and salinity regimes due to water removal will not adversely impact on striped bass stocks.

4) Each state which encompasses spawning rivers within its jurisdiction should develop water use and flow regime guidelines which are protective of striped bass spawning and nursery areas, and which will ensure the long-term health and sustainability of the stock.

4.5.4 Fishery Practices

The use of any fishing gear deemed by management agencies to have an unacceptable impact on striped bass habitat should be prohibited within appropriate essential habitats (e.g., trawling in spawning areas or primary nursery areas should be prohibited).

4.6 ALTERNATIVE STATE MANAGEMENT REGIMES

Once approved by the Atlantic Striped Bass Management Board, a state may not amend its regulatory program without the approval of the Board, except when implementing more restrictive measures. All other proposed changes to state regulations must be submitted in writing to the Commission. When implementing more restrictive measures, states should notify the Commission of the new measures in its annual compliance report.

Under no circumstances will states be allowed to institute minimum sizes below 18 inches in alternative management regimes.

4.6.1 General Procedures

A state may submit a proposal for a change to its regulatory program or any mandatory compliance measure under this amendment to the Commission. Such changes shall be submitted to the Chair of the Plan Review Team (PRT), who shall distribute the proposal to appropriate groups, including the Board, the PRT, the TC, and the Advisory Panel (AP).

The PRT is responsible for gathering the comments of the TC and the AP. The PRT is also responsible for presenting these comments to the Board for decision.

The Board will decide whether to approve the state proposal for an alternative management program if it determines that it is consistent with the management program detailed in this Amendment.

4.6.2 Management Program Equivalency

Management program equivalency (also known as “conservation equivalency” or CE) refers to actions taken by a state which differ from the specific requirements of the FMP, but which achieve the same quantified level of conservation for the resource under management. It is the responsibility of the state to demonstrate that the proposed management program is

equivalent to the FMP standards and consistent with the restrictions and requirements for CE determined by the Board.

The Commission's Conservation Equivalency Policy and Technical Guidance Document (CE Guidance Document) provides specific guidance on development, submission, review and approval of CE proposals[22].

Option A (Status Quo): Board Discretion on Conservation Equivalency Restrictions and Requirements

The Board will determine conservation equivalency. The Board has final discretion regarding the use of CE and approval of CE programs. The Board may restrict the use of CE on an ad hoc basis for any FMP requirement. Restrictions may include, but are not limited to:

- measures that are not applicable for CE;
- restrictions on rationale for pursuing CE;
- limitations on the range of measures that may be proposed (e.g., maximum or minimum size limits)
- the definition of "equivalency" (e.g., based on harvest or total removals; achieving the predicted state-specific or coastwide reduction);
- minimum levels of precision for catch and effort data used in CE proposals;
- whether proposals must include an uncertainty buffer on the reduction/liberalization target;
- if states may implement, without further Board review, alternative measures than those specifically approved by the Board if developed using the same methodology; and
- if additional sampling or fishery monitoring is required.

When setting restrictions, the Board should consider such factors as stock status, stock structure, data availability, range of species, socio-economic information, and management goals and objectives.

The following sets of options consider whether to adopt new default restrictions or requirements for the use of CE (Options B–E). Sub-options selected under Options B–E would automatically apply to new FMP standards approved through Amendment 7 and all subsequent management actions and CE proposals; additional restrictions and requirements for the use of CE could be identified on an ad hoc basis per the Board's discretion (as described above under the Status Quo option). Options B-E are intended to address concerns about the use of CE at the front-end of the CE process (i.e., considering when CE can be used and

[22] As of September 2021, the CE Guidance Document is under review for potential updates.

requirements for CE proposals).[23] For each Option B–E, the Board may select one or more sub-options, as applicable. If a sub-option is not selected under an option, the Status Quo (Board discretion) remains in place on that issue.

To inform consideration of these options, Table 13 outlines the CE programs implemented for Addendum VI.[24]

Table 13. CE programs implemented for Addendum VI.

State	Recreational Fisheries	Commercial Fisheries
MA	N/A	Changed size limit (35" minimum) with equivalent quota change
NY	Hudson River: Alternative size limit (18" to 28") to achieve 18% removals reduction in combination with standard Ocean slot	Changed size limit (26" to 38") with equivalent quota reduction
NJ	Alternative size limit (28 to < 38") to achieve 25% removals reduction	Decreased commercial quota reduction (to 0%) with surplus recreational fishery reduction and transferred commercial quota to recreational bonus program fishery (24 to < 28", 1 fish/day)
PA	DE River and Estuary downstream Calhoun St Bridge: Alternative size and bag limit on limited seasonal basis (2 fish/day at 21 to <24" during 4.1–5.31) to achieve 18% removals reduction	N/A
DE	DE River/Bay/tributaries: Alternative slot on limited seasonal basis (20" to <25" during 7.1–8.31) to achieve 20.4% removals reduction in combination with standard Ocean slot	Decreased commercial quota reduction (to -1.8%) with surplus recreational fishery reduction
MD	Chesapeake Bay: Alternative Summer/Fall for-hire bag limit with restrictions (2 fish, only 1 >28", no captain retention) through increased minimum size (19"), April and two-week Wave	Decreased Ocean and Chesapeake Bay commercial quota reduction (to -1.8%) with surplus

[23] It is difficult to evaluate the effectiveness of CE programs and their equivalency to the FMP standard after program implementation due to the challenge of separating the performance of management measures and outside variables (like angler behavior and availability of fish). Because of this, options for CE accountability were not developed.

[24] The conflict between allowing flexibility through CE and achieving regulatory consistency among states was most recently realized with the implementation of Addendum VI to Amendment 6. For the recreational fishery, the Addendum implemented measures to reduce recreational removals by 18% coastwide. However, at the state level, some states were predicted to reduce removals by more than 18% (and some by less), but CE proposals only had to achieve an 18% reduction regardless. Also, a majority of states pursued CE and submitted a large number of options for TC review, which raised questions for additional guidelines regarding the development of CE proposals.

	4 targeting closures, and shorter spring trophy season (May 1–15) to achieve 20.6% removals reduction; Ocean: FMP standard slot	Chesapeake Bay recreational fishery reduction
PRFC	Alternative Summer/Fall minimum size and bag limit (20" min, 2 fish/day) with a no targeting closure (7.7–8.20) and shorter spring trophy season (May 1–15) to achieve a 20.5% removals reduction	Decreased Chesapeake Bay commercial quota (to -1.8%) with surplus recreational fishery reduction
VA	Chesapeake Bay: Alternative slot limits during 5.16–6.15 (20" to 28") and 10.4–12.31 (20" to 36") and no spring trophy season to achieve a 23.4% removals reduction (reduction was the result of lowering prior bag limit from 2 to 1-fish per angler); Ocean: Alternative slot limit (28" to 36")	Decreased Ocean commercial quota (to -7.7%) and Chesapeake Bay commercial quota (to -9.8%) with surplus recreational fishery reduction

Option B. Restrict the Use of Conservation Equivalency Based on Stock Status
The following options would establish default restrictions on the use of CE for certain fisheries depending on striped bass stock status, as determined by the results of the most recent benchmark stock assessment or assessment update reviewed by the Board. When the stock conditions are met, CE programs would not be approved. Currently existing CE programs would remain in place until Board action is taken on new FMP standards relevant to the specific fishery.

Sub-option B1. Restrictions: CE programs would not be approved when *[sub-options B1-a and B1-b are mutually exclusive; sub-option B1-c may be selected alone or in addition to sub-option B1-a or B1-b]:*

> **Sub-option B1-a**: the stock is at or below the biomass threshold (i.e., overfished). CE programs would not be considered until a subsequent stock assessment indicates stock biomass is above the threshold level.
>
> **Sub-option B1-b**: the stock is below the biomass target. CE programs would not be considered until a subsequent stock assessment indicates the stock biomass is at or above the target level.
>
> **Sub-option B1-c**: fishing mortality is at or above the fishing mortality threshold (i.e., overfishing is occurring). CE programs would not be considered until a subsequent stock assessment indicates fishing mortality is below the threshold level.

The stock status restriction(s) selected in Option B1 would apply (at a minimum) to the non-quota managed recreational fisheries in the Ocean region and Chesapeake Bay region, with the exception of the Hudson River, Delaware River, and Delaware Bay recreational fisheries. Most of the concerns surrounding CE, as identified during scoping on the Draft Amendment 7 Public

Information Document, pertain to non-quota managed fisheries due to use of uncertain data, modeling assumptions, and challenges measuring the effectiveness of the program post-implementation. Quota-managed fisheries (including commercial fisheries as well as recreational "bonus program" fisheries that operate on a fixed harvest limit with transferred commercial quota[25]) remain accountable to a CE-adjusted quota using census level harvest data. However, non-quota managed fisheries have a CE-adjusted removals target that may be exceeded as subsequently determined by survey-based catch estimates. Commercial state-by-state quota management is also characterized by a wide range of fishery measures (with regards to trip limits, seasons, and gear types) among the states regardless of CE programs being in place, which may have contributed to the minimal concern directed at commercial fishery CE programs.[26] Additionally, the public's concerns were seldom focused on long-standing management program equivalencies for the recreational fisheries in the Hudson River, Delaware River, and Delaware Bay that (due to the size availability of fish in these areas) allow harvest of smaller fish than would otherwise be permitted under the ocean region's measures, hence their exemption here. However, the Board may choose to add to the default list of affected fisheries through Option B2.

Sub-option B2. Applicability: The stock status restrictions selected in Option B1 would apply to the following additional fisheries *[one or more sub-options may be selected]*:

> **Sub-option B2-a**: the Hudson River, Delaware River, and Delaware Bay recreational fisheries
>
> **Sub-option B2-b**: quota-managed recreational fisheries (e.g., "bonus programs")
>
> **Sub-option B2-c**: commercial fisheries (all of which are quota managed)

Option C. Precision Standards for MRIP Estimates Used in Conservation Equivalency Proposals
The following options would establish default precision standards for MRIP catch and effort estimates used in CE proposals. The options are based on the percent standard error (PSE, a measure of precision) associated with MRIP estimates. NMFS warns that "[MRIP] Estimates should be viewed with increasing caution as PSEs increase beyond 30. Large PSEs—those above 50—indicate high variability around the estimate and therefore low precision."[27] In addition, NMFS is implementing new Recreational Fishing Survey and Data Standards under which estimates will not be published if the PSE is greater than 50 and estimates with a PSE of 30 or

[25] Currently, only New Jersey operates such a recreational bonus program using commercial quota. Connecticut formerly operated a bonus program but suspended it indefinitely in 2020. Such programs are classified herein as commercial CE programs due to commercial quota basis.
[26] States which have different commercial size limits than the FMP standard (i.e., different from the size limits implemented in 2017) through CE at the time this Amendment was developed include Massachusetts and New York.
[27] See: www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries

greater will be presented with a warning that they "are not considered sufficiently reliable for most purposes, and should be treated with caution".[28]

CE proposals would not be able to use MRIP estimates associated with a PSE exceeding *[only one sub-option may be selected]*:

Sub-option C1: 50

Sub-option C2: 40

Sub-option C3: 30

All MRIP datasets used in CE proposals would be subject to this precision standard. For example, if a CE proposal uses wave- and/or mode-specific data, the PSEs associated with those specific data cannot exceed the selected precision standard.

Should states find themselves unable to propose certain CE programs because of the MRIP precision standard, they are encouraged to increase MRIP Access Point Angler Intercept Survey (APAIS) sampling to improve the PSE associated with their state's MRIP estimates. Increased APAIS sampling is recommended for all states, as resources allow, regardless of CE programming.

Option D. Conservation Equivalency Uncertainty Buffer for Non-Quota Managed Fisheries
The following options would establish a default uncertainty buffer for CE proposals for non-quota managed fisheries. An uncertainty buffer is intended to increase the alternative measures' probability of success in achieving equivalency with the FMP standard (i.e., not exceeding a harvest or removals target). CE programs for quota-managed fisheries have reactive accountability measures of in-season quota monitoring and closures when the quota is reached, and paying back quota overages in the subsequent year. The uncertainty buffer would provide a proactive accountability measure for non-quota managed fisheries operating under CE programs that are not subject to such reactive accountability measures.

Proposed CE programs for non-quota managed fisheries would be required to include an uncertainty buffer of *[only one sub-option may be selected]*:

Sub-option D1: 10%

Sub-option D2: 25%

Sub-option D3: 50%

When CE is pursued to implement new FMP requirements, the uncertainty buffer applies to the percent reduction required or liberalization allowed for the non-quota managed fishery (after

[28] See: www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-survey-and-data-standards

any potential transfer of reduction/liberalization between fisheries). For example, if a 20% reduction is required with a 10% uncertainty buffer, CE proposals would need to demonstrate a 22% reduction. Similarly, if a 20% liberalization is allowed with a 10% uncertainty buffer, proposed CE proposals may demonstrate up to an 18% liberalization. The uncertainty buffer still applies when CE is requested separate from an implementation plan (e.g., a CE proposal submitted after a required 20% reduction was implemented would need to demonstrate a 2% reduction rather than no change).

The Board may need to further determine how the buffer is applied for some future management actions, particularly when CE proposals may include measures for both quota-managed and non-quota managed fisheries (e.g., if a reduction can be split between sectors). The Board may request guidance from the TC and/or PRT.

Option E. Definition of Equivalency for CE Proposals with Non-Quota Managed Fisheries
The following options would establish a default definition of what "equivalency" means for CE proposals associated with the implementation of coastwide actions (in non-quota managed fisheries). In other words, the percent reduction or liberalization that must be met in a CE proposal when the FMP standard is projected to have different effects at the coastwide and state-specific levels. The intent is to add transparency and consistency to the use of CE across management actions. Refer to Table 13 for an example of how these options would apply.

Proposed CE programs would be required to demonstrate equivalency to *[only one sub-option may be selected]:*

> **Sub-Option E1**: the percent reduction/liberalization projected for the FMP standard at the coastwide level. (This represents the requirements for CE under Addendum VI to Amendment 6.)
>
> **Sub-option E2:** the percent reduction/liberalization projected for the FMP standard at the state-specific level.
>
> Table 14. *This table provides a hypothetical example to explain the difference between sub-option E1 and E2. Suppose an FMP standard is adopted that is projected to achieve a 20% change in fishery removals when applied coastwide. However, at the state level, the FMP standard is projected to achieve a 25% change in State A and a 10% change in State B. The sub-options vary in the amount of change that State A and State B would need to demonstrate when pursuing alternative measures to the FMP standard through CE.*
>
> *Notably, sub-option E1 may undermine an overall targeted reduction (due to State A's CE) or lead to exceeding an overall targeted liberalization (due to State B's CE). Sub-option E1 may make it impossible for State B to apply for CE under a reduction scenario (no way to meet the higher coastwide reduction amount). Sub-option E2 holds State A's CE to a greater reduction than the coastwide standard, but would allow a greater*

liberalization than the coastwide standard as well. Sub-option E1 represents the requirements for CE under Addendum VI to Amendment 6.

	State Change to be Demonstrated in a CE Proposal under Each Sub-option	
FMP Standard achieves a 20% change when applied coast-wide	Sub-option E1: Use coastwide change	Sub-option E2: Use state-specific change
State A (25% state change under FMP standard)	20%	25%
State B (10% state change under FMP Standard)	20%	10%

4.6.3 De Minimis Fishery Guidelines

The ASMFC Interstate Fisheries Management Program Charter (ISFMP Charter) defines *de minimis* as "a situation in which, under the existing condition of the stock and scope of the fishery, the conservation and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by a Fishery Management Plan or amendment," (ASMFC 2016).

4.6.3.1 Qualifications for De Minimis

States may apply for *de minimis* status if, for the last two years, their combined average commercial and recreational landings (by weight) constitute less than one percent (1%) of the coastwide commercial and recreational landings for the same two-year period. When petitioning for *de minimis* status, the state should also propose the type of exemption associated with *de minimis* status. In addition to determining if the state meets the criteria for *de minimis* status, the Board will evaluate the proposed exemption to be certain it does not compromise the goals and objectives of Amendment 7. The States may petition the Atlantic Striped Bass Management 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 Management Board justifying the continuance of *de minimis* status. States must include *de minimis* requests as part of their annual compliance reports.

4.6.3.2 Procedure to Apply for De Minimis Status

States must specifically request *de minimis* status each year. Requests for *de minimis* status will be reviewed by the PRT as part of the annual FMP review process (*Section 5.3: Compliance Reports*). Requests for *de minimis* must be submitted to the ASMFC Atlantic Striped Bass FMP Coordinator as a part of the state's yearly compliance report. The request must contain the following information: all available commercial landings data for the current and 2 previous full years of data, commercial and recreational regulations for the current year, and the proposed management measures the state plans to implement for the year *de minimis* status is requested. The FMP Coordinator will then forward the information to the PRT.

In determining whether or not a state meets the *de minimis* criteria, the PRT will consider the

information provided with the request, the most recent available coastwide landings data, any information provided by the TC and SAS, and any additional information deemed necessary by the PRT. The PRT will make a recommendation to the Board to either accept or deny the *de minimis* request. The Board will then review the PRT recommendation and either grant or deny the *de minimis* classification.

The Board must make a specific motion to grant a state *de minimis* status, including the measures the state would be excused from implementing. The state should request which measures they would like to be excused from as part of the *de minimis* request.

If landings in a *de minimis* state exceed the *de minimis* threshold, the state will lose its *de minimis* classification, will be ineligible for *de minimis* in the following year, and will be required to implement all provisions of the FMP. If the Board denies a state's *de minimis* request, the state will be required to implement all the provisions of the FMP. When a state rescinds or loses its *de minimis* status, the Board will set a compliance date by which the state must implement the required regulations.

If the coastwide fishery is closed for any reason through Emergency Procedures (*Section 4.7*), *de minimis* states must close their fisheries as well.

Any additional components of the FMP, which the Board determines necessary for a *de minimis* state to implement, can be defined at the time *de minimis* status is granted.

4.7 ADAPTIVE MANAGEMENT

The Board may vary the requirements specified in this Amendment as a part of adaptive management in order to conserve the Atlantic striped bass resource. The elements that can be modified by adaptive management are listed in *Section 4.7.2*. The process under which adaptive management can occur is provided below.

4.7.1 General Procedures

The PRT will monitor the status of the fishery and the resource and report on that status to the Board annually or when directed to do so by the Board. The PRT will consult with TC, the SAS, and the AP in making such review and report.

The Board will review the report of the PRT, and may consult further with the TC, SAS, or AP. The Board may, based on the PRT report or on its own discretion, direct the PDT to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement the new provisions.

The PDT will prepare a draft addendum as directed by the Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The PDT will also request comment from federal agencies and the public at large. After a 30-day

review period, staff, in consultation with the PDT, will summarize the comments received and prepare a final version of the addendum for the Board.

The Board shall review the final version of the addendum prepared by the PDT, and shall also consider the public comments received and the recommendations of the TC, LEC, and AP. The Board shall then decide whether to adopt, or revise and then adopt, the addendum.

Upon adoption of an addendum by the Board, states shall prepare plans to carry out the addendum, and submit them to the Board for approval according to the schedule contained in the addendum.

4.7.2 Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the Board:

(1) Goal
(2) Objectives
(3) Management areas and unit
(4) Reference points, including:
    (a) overfishing and overfished definition
    (b) region-specific reference points
(5) Rebuilding targets and schedules
(6) Management triggers and planning horizon
(7) Recreational Fishery Management Measures
(8) Commercial Fishery Management Measures, including:
    (a) commercial quota allocation
(9) Management Program Equivalency
(10) Recommendations to the Secretaries for complementary actions in federal jurisdictions
(11) Any other management measures currently included in Amendment 7

4.8 EMERGENCY PROCEDURES

Emergency procedures may be used by the Board to require any emergency action that is not covered by, is an exception to, or a change to any provision in Amendment 7. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2016).

4.9 MANAGEMENT INSTITUTIONS

The management institutions for Atlantic striped bass shall be subject to the provisions of the ISFMP Charter (ASMFC 2016). The following is not intended to replace any or all of the provisions of the ISFMP Charter. All committee roles and responsibilities are included in detail in the ISFMP Charter and are only summarized here.

4.9.1 Atlantic States Marine Fisheries Commission and ISFMP Policy Board

The ASMFC (Commission) and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's fisheries management activities. The Commission must approve all fishery management plans and amendments, including Amendment 7. The ISFMP Policy Board reviews any non-compliance recommendations of the various Boards and, if it concurs, forwards them to the Commission for action.

4.9.2 Atlantic Striped Bass Management Board

The Board was established under the provisions of the Commission's ISFMP Charter (Section Four; ASMFC 2016) and is generally responsible for carrying out all activities under this Amendment.

The Board establishes and oversees the activities of the PDT, PRT, TC, SAS, Tagging Subcommittee, and the AP. In addition, the Board makes changes to the management program under adaptive management, reviews state programs implementing the amendment, and approves alternative state programs through conservation equivalency. The Board reviews the status of state compliance with the management program annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP Policy Board under the terms of the ISFMP Charter.

4.9.3. Atlantic Striped Bass Plan Development Team

The Plan Development Team (PDT) is composed of personnel from state and federal agencies who have scientific knowledge of Atlantic striped bass and management abilities. The PDT is responsible for preparing and developing management documents, including addenda and amendments, using the best scientific information available and the most current stock assessment information. The ASMFC FMP Coordinator chairs the PDT. The PDT will either disband or assume inactive status upon completion of Amendment 7.

4.9.4 Atlantic Striped Bass Plan Review Team

The Plan Review Team (PRT) is composed of personnel from state and federal agencies who have scientific and management ability and knowledge of Atlantic striped bass. The PRT is responsible for providing annual advice concerning the implementation, review, monitoring, and enforcement of Amendment 7 once it has been adopted by the Commission. After final action on Amendment 7, the Board may elect to retain members of the PDT as members of the PRT, or appoint new members.

4.9.5 Atlantic Striped Bass Technical Committee

The Atlantic Striped Bass Technical Committee (TC) consists of representatives from state or federal agencies, Regional Fishery Management Councils, the Commission, a university, or

other specialized personnel with scientific and technical expertise, and knowledge of the Atlantic striped bass fishery. The Board appoints the members of the TC and may authorize additional seats as it sees fit. The role of the TC is to assess the species' population, provide scientific advice concerning the implications of proposed or potential management alternatives, and respond to other scientific questions from the Board, PDT, or PRT. The SAS reports to the TC.

4.9.6 Atlantic Striped Bass Stock Assessment Subcommittee

The Atlantic Striped Bass Stock Assessment Subcommittee (SAS) is appointed and approved by the Board, with consultation from the Atlantic Striped Bass TC, and consists of scientists with expertise in the assessment of the Atlantic striped bass population. Its role is to assess the Atlantic striped bass population and provide scientific advice concerning the implications of proposed or potential management alternatives, and to respond to other scientific questions from the Board, TC, PDT or PRT. The SAS reports to the TC.

4.9.7 Atlantic Striped Bass Tagging Subcommittee

The Tagging Subcommittee will consist of those scientists with the expertise in analysis of tag and recapture data for striped Bass. Its role is to assess the available data for inclusion in the assessment of the striped bass populations, which will be provided to the Stock Assessment Subcommittee for inclusion in the annual status of the stock report. The Tagging Subcommittee is also responsible for responding to Management Board questions using the available tagging data, when possible. The Tagging Subcommittee will report to the TC.

4.9.8 Atlantic Striped Bass Advisory Panel

The Atlantic Striped Bass Advisory Panel (AP) is established according to the Commission's Advisory Committee Charter. Members of the AP are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about Atlantic striped bass conservation and management. The AP provides the Board with advice directly concerning the Commission's Atlantic striped bass management program.

4.9.9 Federal Agencies

4.9.9.1 Management in the Exclusive Economic Zone

Management of Atlantic striped bass in the EEZ is within the jurisdiction of the three Regional Fishery Management Councils under the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). In the absence of a Council Fishery Management Plan, management is the responsibility of the National Marine Fisheries Service as mandated by the Atlantic Coastal Fishery Cooperative Management Act.

4.9.9.2 Consultation with Fishery Management Councils

At the time of adoption of Amendment 7, none of the Regional Fishery Management Councils had implemented a management plan for Atlantic striped bass, nor had they indicated an intent to develop a plan.

4.10 RECOMMENDATION TO THE SECRETARY OF COMMERCE FOR COMPLEMENTARY MEASURES IN FEDERAL WATERS

The Board will discuss this during final approval of the Draft Amendment.

4.11 COOPERATION WITH OTHER MANAGEMENT INSTITUTIONS

The Board will cooperate, when necessary, with other management institutions during the implementation of this amendment, including NMFS and the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils.

5.0 COMPLIANCE

The full implementation of the provisions included in this amendment is necessary for the management program to be equitable, efficient, and effective. States are expected to implement these measures faithfully under state laws. ASMFC will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan.

The Board sets forth specific elements that the Commission will consider in determining state compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fishery Management Program Charter (ASMFC 2016).

5.1 MANDATORY COMPLIANCE ELEMENTS FOR STATES

A state will be determined to be out of compliance with the provision of this fishery management plan according to the terms of Section Seven of the ISFMP Charter if:

- Its regulatory and management programs to implement Amendment 7 , or any addendum prepared under adaptive management (*Section 4.7*), have not been approved by the Board; or
- It fails to meet any schedule required by *Section 5.2* or within any addendum prepared under adaptive management (*Section 4.7*); or
- It has failed to implement a change to its program when determined necessary by the Board; or
- It makes a change to its regulations required under *Section 4* or any addendum prepared under adaptive management (*Section 4.7*), without prior approval of the Board.

5.1.1 Regulatory Requirements

To be considered in compliance with this fishery management plan, all state programs must include a regime of restrictions on Atlantic striped bass fisheries consistent with the requirements of *Section 3.1: Commercial Catch and Landings Programs; Section 3.4: Biological Data Collection Programs; Section 4.2 Recreational Fishery Management Measures;* and *Section 4.3: Commercial Fishery Management Measures*. A state may propose an alternative management program under *Section 4.6: Alternative State Management Regimes*, which, if approved by the Board, may be implemented as an alternative regulatory requirement for compliance.

States may begin to implement Amendment 7 after final approval by the Commission. Each state must submit its required Atlantic striped bass regulatory program to the Commission through ASMFC staff for approval by the Board. During the period between submission and Board approval of the state's program, a state may not adopt a less protective management program than contained in this Amendment or contained in current state law or regulation. The following lists the specific compliance criteria that a state/jurisdiction must implement in order to be in compliance with Amendment 7:

- Recreational fishery management measures as specified in *Section 4.2*
- Commercial fishery management measures as specified in *Section 4.3*
- Monitoring requirements as specified in *Section 3.0*, including the Commercial Tagging Program (*Section 3.1.1*), Fishery-Dependent Data Collection (*Section 3.4.1*), and Fishery-Independent Data Collection (*Section 3.4.2*)
- All state programs must include law enforcement capabilities adequate for successful implementation of the compliance measures contained in this Amendment.
- There are no mandatory research requirements at this time; however, research requirements may be added in the future under Adaptive Management, *Section 4.7*.
- There are no mandatory habitat requirements in Amendment 7. See *Section 4.4* for habitat recommendations.

For monitoring programs, states must submit proposals for all intended changes to required monitoring programs, which may affect the quality of the data or the ability of the program to fulfill the needs of the fishery management plan. State proposals for making changes to required monitoring programs will be submitted to the Technical Committee. Proposals must be on a calendar year basis. The Technical Committee will make recommendations to the Management Board concerning whether the proposals are consistent with Amendment 7.

In the event that a state realizes it will not be able to fulfill its fishery independent monitoring requirements, it should immediately notify the Commission in writing. The Commission will work with the state to develop a plan to secure funding or plan an alternative program to satisfy the needs outlined in Amendment 7. If the plan is not implemented 90 days after it has been adopted, the state will be found out of compliance with Amendment 7.

5.2 COMPLIANCE SCHEDULE

States must implement this Amendment according to the following schedule:

Month Day, 202X: Submission of state programs to implement Amendment 7 for approval by the Board. Programs must be implemented upon approval by the Board.

Month Day, 202X: States with approved management programs must implement Amendment 7. States may begin implementing management programs prior to this deadline if approved by the Board.

5.3 COMPLIANCE REPORTS

Each state must submit to the Commission an annual report concerning its Atlantic striped bass fisheries and management program for the previous year, no later than June 15th. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

The report shall cover:

- The previous calendar year's fishery and management program including mandatory reporting programs (including frequency of reporting and data elements collected), fishery dependent data collection, fishery independent data collection, regulations in effect, harvest and catch information, and *de minimis* requests.
- The planned management program for the current calendar year summarizing regulations that will be in effect and monitoring programs that will be performed, highlighting any changes from the previous year.

5.3.1 Commercial Tagging Program Reports

States and jurisdictions with a commercial striped bass fishery must annually report any changes to the tag program such as tag type, which includes color, text (with the exception of year), and style; the biological metric used; or any other requirements as specified under Section 3.1.1 no later than 60 days prior to the start of the first fishing season in that state or jurisdiction. This information will be compiled and distributed to law enforcement officials to aid in commercial tag enforcement in the striped bass fishery.

5.4 PROCEDURES FOR DETERMINING COMPLIANCE

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section Seven (ASMFC 2016). In brief, all states are responsible for the full and effective implementation and enforcement of fishery management plans in areas subject to their jurisdiction. Written compliance reports as specified in the Amendment must be submitted annually by each state with a declared interest. Compliance with Amendment 7 will be reviewed at least annually; however, the Board, ISFMP Policy Board, or the Commission may

request the PRT to conduct a review of state's implementation and compliance with Amendment 7 at any time.

The Board will review the written findings of the PRT within 60 days of receipt of a State's compliance report. Should the Board recommend to the Policy Board that a state be determined out of compliance, a rationale for the recommended noncompliance finding will be addressed in a report. The report will include the required measures of Amendment 7 that the state has not implemented or enforced, a statement of how failure to implement or enforce required measures jeopardizes Atlantic striped bass conservation, and the actions a state must take in order to comply with Amendment 7 requirements.

The ISFMP Policy Board will review any recommendation of noncompliance from the Board within 30 days. If it concurs with the recommendation, it shall recommend to the Commission that a state be found out of compliance.

The Commission shall consider any noncompliance recommendation from the ISFMP Policy Board within 30 days. Any state that is the subject of a recommendation for a noncompliance finding is given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the ISFMP Policy Board, it may determine that a state is not in compliance with Amendment 7, and specify the actions the state must take to come into compliance.

Any state that has been determined to be out of compliance may request that the Commission rescind its noncompliance findings, provided the state has revised its Atlantic striped bass conservation measures.

5.5. ANALYSIS OF THE ENFORCEABILITY OF PROPOSED MEASURES

All state programs must include law enforcement capabilities adequate for successfully implementing that state's Atlantic striped bass regulations. The LEC will monitor the adequacy of a state's enforcement activity.

5.6 RECOMMENDED (NON-MANDATORY) MANAGEMENT MEASURES

The following management measures are recommended for states to fully or partially implement. These measures are not part of the compliance criteria for Amendment 7. Through the Draft Amendment 7 development process, the PDT identified additional potential recommendations for the Board's consideration:

- States are encouraged to increase APAIS sampling above the MRIP baseline to provide more extensive coverage of their state recreational fisheries;
- States should consider complimentary/uniform regulations in shared water bodies if pursuing CE.

5.6.1 Spawning Area Closures

Consideration should be given to the prohibition of fishing on the spawning grounds during the spawning season. In addition to the mandatory spawning closures in Section 4.2.2 [delete if not-selected], states are encouraged to maintain existing spawning closures and evaluate the need for additional spawning closures.

5.6.2 Survey of Inland Recreational Fishermen

The states/jurisdictions are encouraged to conduct a survey of inland fishermen to evaluate the landings, catch rate, discards, participation, and number of trips.

5.6.3. Angler Education and Outreach

NOTE: If the option to require outreach is selected in Section 4.2.2 (Option D1), this would be incorporated into that section.

Through the ASMFC, if possible, states are recommended to develop and implement an angler education program. The main tool of the education program will be a website accessible from each state fisheries agency website. When funding is available, states should develop posters and/or brochures for posting and distributing at boat launches, shore-based fishing areas, and for placement on charter and rental boats. State agencies should also coordinate outreach to anglers through influential fishing organizations.

In order to promote the use of circle hooks, states are encouraged to develop public education and outreach campaigns on the benefits of circle hooks when fishing with bait. Angler education on the benefits of using circle hooks and on the effective safe handling of fish caught and released remains a critical component to improve post release survival.

6.0 RESEARCH NEEDS

The following list of research needs have been identified in order to enhance the state of knowledge of the Atlantic striped bass resource. Research recommendations are broken down into several categories: data collection, assessment methodology, life history, habitat, and socioeconomic. Some research needs are further categorized into high and moderate priority levels.

6.1 STOCK ASSESSMENT, DATA COLLECTION, AND LIFE HISTORY RESEARCH NEEDS

The following categorized and prioritized research recommendations were developed by the 2018 Benchmark Stock Assessment Subcommittee and the 66th SARC (NEFSC 2019).

6.1.1 Fishery-Dependent Data

High

- Continue collection of paired scale and otolith samples, particularly from larger striped bass, to facilitate development of otolith-based age-length keys and scale-otolith conversion matrices.
- Develop studies to provide information on gear specific (including recreational fishery) discard morality rates and to determine the magnitude of bycatch mortality.
- Conduct study to directly estimate commercial discards in the Chesapeake Bay.
- Collect sex ratio information on the catch and improve methods for determining population sex ratio for use in estimates of female SSB and biological reference points.

Moderate

- Improve estimates of striped bass harvest removals in coastal areas during wave 1 and in inland waters of all jurisdictions year round.

6.1.2 Fishery-Independent Data

High

- Develop an index of relative abundance from the Hudson River Spawning Stock Biomass survey to better characterize the Delaware Bay/Hudson River stock.
- Improve the design of existing spawning stock surveys for Chesapeake Bay and Delaware Bay.

Moderate

- Develop a refined and cost-efficient, fisheries-independent coastal population index for striped bass stocks.
- Collect sex ratio information from fishery-independent sources to better characterize the population sex ratio.

6.1.3 Stock Assessment Modeling/Quantitative

High

- Develop better estimates of tag reporting rates; for example, through a coastwide tagging study.
- Investigate changes in tag quality and potential impacts on reporting rate.
- Explore methods for combining tag results from programs releasing fish from different areas on different dates.
- Develop field or modeling studies to aid in estimation of natural mortality and other factors affecting the tag return rate.
- Compare M and F estimates from acoustic tagging programs to conventional tagging programs.

Moderate

- Examine methods to estimate temporal variation in natural mortality.

Low

- Evaluate truncated matrices to reduce bias in years with no tag returns and covariate based tagging models to account for potential differences from size or sex or other covariates.

6.1.4 Life History and Biology

High

- Continue in-depth analysis of migrations, stock compositions, sex ratio, etc. using mark-recapture data.
- Continue evaluation of striped bass dietary needs and relation to health condition.
- Continue analysis to determine linkages between the Mycobacteriosis outbreak in Chesapeake Bay and sex ratio of Chesapeake spawning stock, Chesapeake juvenile production, and recruitment success into coastal fisheries.

Moderate

- Examine causes of different tag based survival estimates among programs estimating similar segments of the population.
- Continue to conduct research to determine limiting factors affecting recruitment and possible density implications.
- Conduct study to calculate the emigration rates from producer areas now that population levels are high and conduct multi-year study to determine inter-annual variation in emigration rates.

6.2 HABITAT RESEARCH NEEDS

- See *Section 4.4* for habitat conservation and restoration recommendations, which include reviewing striped bass habitat use and data (e.g., water quality criteria) to inform habitat conservation and restoration.

6.3 SOCIO-ECONOMIC RESEARCH NEEDS

- Conduct research on a coastwide scale to analyze striped bass anglers' preferences and behavior in response to regulatory changes and changes in fishery conditions (e.g., changes in fish availability). This research could inform an economic sub-model component of a bioeconomic model for striped bass (see *Section 1.5.2*).
    - The economic sub-model would use anglers' preferences for different trip attributes to calculate anglers' demand for recreational trips under alternative policy scenarios. In modern applications, this is often achieved by parameterizing recreational demand using survey data from choice experiments in which anglers make trip decisions based on expectations about catch, harvest, and regulatory releases or discards. Choice experiment surveys and revealed preference studies could be used to estimate the effects of changes in regulations in the absence of market data and behavioral observations.
- When the above research is available, work with stock assessment scientists to develop a bioeconomic model for striped bass, which would combine an economic sub-model

and biological sub-model to assess feedbacks and long-run impacts of management decisions on anglers and the striped bass resource (see *Section 1.5.*2).

- Conduct research on angler preferences and behavior regarding targeting of substitute species (e.g., which species are targeted with striped bass and what species would anglers target if they were unable to keep striped bass) and how that behavior is influenced by regulations and how preferences differ across regions. This would inform understanding and predictions of changes in effort in response to future regulations and changes in fish availability (e.g., due to climate change).
- Improve understanding of non-consumptive value by region, including value of the catch and release fishery.

7.0 PROTECTED SPECIES

In the fall of 1995, Commission member states, NMFS, and USFWS began discussing ways to improve implementation of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in state waters. Historically, these policies had been only minimally implemented and enforced in state waters (0-3 miles). In November 1995, the Commission, through its ISFMP Policy Board, approved an amendment to its ISFMP Charter (Section Six (b)(2)) requiring protected species/fishery interactions to be discussed in the Commission's fisheries management planning process. As a result, the Commission's fishery management plans describe impacts of state fisheries on MMPA protected and ESA-listed (endangered or threatened) species, collectively termed "protected species". The following section outlines: (1) the federal legislation which guides protection of marine mammals and sea turtles, (2) the protected species with potential fishery interactions; (3) the specific types of fishery interaction; (4) information about the affected protected species; and (5) potential impacts to Atlantic coast state and interstate fisheries.

7.1 MARINE MAMMAL PROTECTION ACT REQUIREMENTS

Since its passage in 1972, and subsequent Amendment in 1994, one of the underlying goals of the MMPA has been to reduce the incidental serious injury and mortality of marine mammals in the course of commercial fishing operations to insignificant levels approaching a zero mortality and zero serious injury rate. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). The Act also requires NMFS to develop and implement a take reduction plan to assist in the recovery of, or prevent the depletion of, each strategic stock that interacts with a Category I or II fishery. A strategic stock is defined as a stock: (1) for which the level of direct

human-caused mortality exceeds the potential biological removal (PBR)[29] level; (2) which is declining and is likely to be listed under the Endangered Species Act (ESA) in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA.

Under 1994 mandates, the MMPA also requires fishermen in Category I and II fisheries to register under the Marine Mammal Authorization Program (MMAP). The purpose of this is to provide an exception for commercial fishermen from the general taking prohibitions of the MMPA. All fishermen, regardless of the category of fishery in which they participate, must report all incidental injuries and mortalities to a marine mammal caused by commercial fishing operations within 48 hours.

Section 101(a)(5)(E) of the MMPA allows for authorization of the incidental take of ESA-listed marine mammals in the course of commercial fishing operations if it is determined that: (1) incidental mortality and serious injury will have a negligible impact on the affected species or stock; (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and (3) where required under MMPA Section 118, a monitoring program has been established, vessels engaged in such fisheries are registered, and a take reduction plan has been developed or is being developed for such species or stock. MMPA Section 101(a)(5)(E) permits are not required for Category III fisheries, but any serious injury or mortality of a marine mammal must be reported.

7.2 ENDANGERED SPECIES ACT REQUIREMENTS

The taking of endangered or threatened species including sea turtles, marine mammals, and fish, is prohibited and considered unlawful under Section 9(a)(1) of the ESA. In addition, NMFS or the USFWS may determine Section 4(d) protective regulations to be necessary and advisable to provide for the conservation of threatened species. There are several mechanisms established in the ESA which allow for exceptions to the prohibited take of protected species listed under the ESA. Section 10(a)(1)(A) of the ESA authorizes NMFS to allow the taking of listed species through the issuance of research permits, which allow ESA species to be taken for scientific purposes or to enhance the propagation and survival of the species. Section 10(a)(1)(B) authorizes NMFS to permit, under prescribed terms and conditions, any taking otherwise prohibited by Section 9(a)(1)(B) of the ESA if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. In recent years, some Atlantic state fisheries have obtained section 10(a)(1)(B) permits for state fisheries.

[29] PBR is the number of human-caused deaths per year each stock can withstand and still reach an optimum population level. This is calculated by multiplying the minimum population estimate by the stock's net productivity rate and a recovery factor ranging from 0.1 for endangered species to 1.0 for healthy stocks.

Section 7(a)(2) requires federal agencies to consult with NMFS to ensure that any action that is authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species. If, following completion of the consultation, an action is found to jeopardize the continued existence of any listed species or cause adverse modification to critical habitat of such species, reasonable and prudent alternatives need to be identified so that jeopardy or adverse modification to the species does not occur. Section (7)(o) provides the actual exemption from the take prohibitions established in Section 9(a)(1), which includes Incidental Take Statements that are provided at the end of consultation via the ESA Section 7 Biological Opinions.

7.3 PROTECTED SPECIES WITH POTENTIAL FISHERY INTERACTIONS

Commercial striped bass fisheries operate in the state waters (0-3 miles) of Massachusetts, Rhode Island, New York, Delaware, Maryland, the Potomac River Fisheries Commission, Maryland, Virginia, and North Carolina.[30] The Chesapeake Bay typically accounts for roughly 60 percent of striped bass commercial landings by weight each year. The primary gear types for the striped bass commercial fishery are gill nets (roughly 50 percent of commercial landings by weight each year), hook and line (typically 20-30 percent of commercial landings by weight each year), and pound nets/other fixed gears (typically 10-20 percent of commercial landings by weight each year). Haul seines and trawls are also used in the commercial fishery to a lesser extent (combined less than 5 percent of commercial landings by weight each year). The recreational sector operates in state waters across the entire management unit (0-3 miles from Maine through North Carolina) and uses hook and line almost exclusively.

A number of protected species occur within the striped bass management unit for Atlantic striped bass. Ten are classified as endangered or threatened under the ESA; the remainder are protected under provisions of the MMPA. The species found in coastal Northwest Atlantic waters are listed below.

<u>Endangered</u>	
North Atlantic Right whale	(*Eubalaena glacialis*)
Fin whale	(*Balaenoptera physalus*)
Leatherback sea turtle	(*Dermochelys coriacea*)
Kemp's Ridley sea turtle	(*Lepidochelys kempii*)
Shortnose sturgeon	(*Acipenser brevirostrum*)
Atlantic sturgeon (New York Bight, Chesapeake Bay, Carolina, and South Atlantic Distinct Population Segments (DPS))	(*Acipenser oxyrinchus oxyrinchus*)

[30] North Carolina has reported zero offshore commercial harvest since 2013.

Threatened

Loggerhead sea turtle (NW Atlantic Ocean DPS)	*(Caretta caretta)*
Green sea turtle (North Atlantic DPS)	*(Chelonia mydas)*
Giant Manta Ray	*(Manta birostris)*
Atlantic Sturgeon (Gulf of Maine DPS)	*(Acipenser oxyrinchus oxyrinchus)*

MMPA

Includes all marine mammals above in addition to:

Minke whale	*(Balaenoptera acutorostrata)*
Humpback whale	*(Megaptera novaeangliae)*
Bottlenose dolphin[31]	*(Tursiops truncatus)*
Atlantic-white sided dolphin	*(Lagenorhynchus acutus)*
Short Beaked Common dolphin	*(Delphinus delphis)*
Harbor seal	*(Phoca vitulina)*
Gray seal	*(Halichoerus grypus)*
Harp seal	(*Phoca groenlandica*)
Harbor porpoise	(*Phocoena phocoena*)

In the Northwest Atlantic waters, protected species utilize marine habitats for feeding, reproduction, nursery areas, and migratory corridors. Some species occupy the area year round while others use the region only seasonally or move intermittently nearshore, inshore, and offshore. Interactions may occur whenever fishing gear and protected species overlap spatially and temporally.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species it is necessary to consider species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and observed records of protected species interaction with particular fishing gear types, to understand the potential risk of an interaction.

7.3.1 Marine Mammals

Large whales, small cetaceans (e.g., bottlenose dolphins), and pinniped (e.g., harbor seals) species co-occur with the Atlantic striped bass fishery.

Large whales

Large whales, including Humpback, North Atlantic right, fin, and minke whales, occur in the Northwest Atlantic. Generally speaking, large whales follow an annual pattern of migration

[31] The following bottlenose dolphin stocks occur within the striped bass management unit: Western North Atlantic Northern Migratory Coastal; Western North Atlantic Southern Migratory Coastal; Northern North Carolina Estuarine System; Southern North Carolina Estuarine System.

between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer/fall foraging grounds (primarily north of 41°N). This is a simplification of whale movements, particularly as it relates to winter movements. It is unknown if all individuals of a population migrate to low latitudes in the winter, although increasing evidence suggests that for some species, some portion of the population remains in higher latitudes throughout the winter (Clapham et al. 1993; Davis et at. 2017; Davis et al. 2020; Hayes et al. 2020; Swingle et al. 1993; Vu et al. 2012). For additional information on the biology, status, and range wide distribution of humpback, North Atlantic right, fin, sei, and minke whales, refer to the marine mammal SARs provided at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

Small Cetaceans and Pinnipeds

Small cetaceans can be found throughout the year in the Northwest Atlantic Ocean (Maine to Florida), including in harbors, bays, gulfs, and estuaries; however, within this range, there are seasonal shifts in species distribution and abundance. Pinnipeds are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35°N).

For additional information on the biology and range wide distribution of each species of small cetacean and pinniped, as well as information on other marine mammals that occur on the Atlantic coast, refer to the marine mammal SARs provided at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

7.3.1.1 Gear Interactions with Marine Mammals

Marine mammal interactions have been documented in the primary fisheries that target striped bass, including the pound net and gillnet fisheries as well as trawl, haul seine, and hook and line. The following sections are not a comprehensive review of all fishing gear types known to interact with a given species and the bycatch reports included below do not represent a complete list. It should be noted that without an observer program for many of these fisheries, actual numbers of interactions associated with the striped bass fishery are difficult to obtain.

Gillnets

The mid-Atlantic gillnet fishery is listed as a Category I fishery in the 2021 LOF (86 FR 3028, January 14, 2021). The fishery was originally listed as a Category II fishery but in 2003, it was elevated to a Category I fishery after stranding and observer data documented the incidental mortality and serious injury of bottlenose dolphins (68 FR 41725, July 15, 2003). Other species with documented interactions include the common dolphin, harbor seal, gray seal, and hooded seal; however, since gillnet fisheries target many species, not all incidents may have occurred while harvesting striped bass. Between 1995 and 2018, observer coverage has ranged from 1% to 9%.

The Chesapeake Bay inshore gillnet and the North Carolina inshore gillnet are all listed as Category II fisheries in the 2021 LOF (86 FR 3028, January 14, 2021). The primary species reported interacting with these gears is the bottlenose dolphin. Both the Chesapeake Bay inshore gillnet and the North Carolina inshore gillnet fisheries were elevated from a Category III fishery to a Category II fishery in the 2006 and 2001 LOFs, respectively (66 FR 42780, August 15, 2001; 71 FR 48802, August 22, 2006).

The Delaware River inshore gillnet, the Long Island Sound inshore gillnet, and the Rhode Island/Southern Massachusetts/New York Bight inshore gillnet fisheries are listed as Category III fisheries in the 2021 LOF (86 FR 3028, January 14, 2021). There have been no documented interactions with marine mammals in the past five years of data.

Hook and Line

Large whales have been documented entangled with hook and line gear or monofilament line (Greater Atlantic Region Marine Animal Incident Database, unpublished data; Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). In the most recent (2008-2017) mortality and serious injury determinations for baleen whales, the majority of cases identified with confirmed hook and line or monofilament entanglement did not result in the serious injury or mortality to the whale (84.8 % observed/reported whales had a serious injury value of 0; 15.2 % had a serious injury value of 0.75; none of the cases resulted in mortality; Cole and Henry 2013; Henry et al. 2017; Henry et al. 2020). In fact, 75.8 % of the whales observed or reported with a hook/line or monofilament entanglement were resighted gear free and healthy; confirmation of the health of the other remaining whales remain unknown as no resightings had been made over the timeframe of the assessment (Cole and Henry 2013; Henry et al. 2017; Henry et al. 2020). Based on this information, while large whale interactions with hook and line gear are possible, there is a low probability that an interaction will result in serious injury or mortality to any large whale species. Therefore, relative to other gear types, such as fixed gear, hook and line gear represents a low source serious injury or mortality to any large whale (Henry et al. 2020).

Based on the most recent 10 years of data provided in the marine mammal SARs (i.e., 2008-2017) for small cetaceans and pinnipeds that occur within the striped bass management unit, only bottlenose dolphin stocks have been identified (primarily through stranding records/data) as entangled in hook and line gear (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). In some cases, these entanglements have resulted in the serious injury or mortality to the animal. Specifically, reviewing stranding data provided in marine mammal SARs from 2008-2017, estimated mean annual mortality for each bottlenose stock due to interactions with hook and line gear was approximately one animal (Palmer 2017; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). Based on this, although interactions with hook and line gear are possible, relative to other gear types, such as trawl gear, hook and line gear represents a low source serious injury or mortality to any bottlenose dolphin stock. For other species of small cetaceans or pinnipeds, hook and line gear is not expected to be a source of serious injury or mortality.

Pound Nets

The Virginia pound net fishery is listed as a Category II fishery in the 2021 LOF due to documented interactions with bottlenose dolphins (86 FR 3028, January 14, 2021). During 2014–2018, there were no documented mortalities or serious injuries to bottlenose dolphins involving pound net gear in Virginia. There is no formal observer coverage for the Virginia pound net fishery but there has been sporadic monitoring by the Northeast Fishery Observer Program. All other Atlantic coast pound net fisheries are listed as a Category III fishery.

NOAA Fisheries issued a final rule in 2015 amending the Bottlenose Dolphin Take Reduction Plan and its implementing regulations under the Marine Mammal Protection Act (MMPA) requiring gear restrictions for VA pound nets in estuarine and coastal state waters of Virginia to reduce bycatch (80 FR 6925, February 9, 2015). NOAA Fisheries also amended regulations and definitions for Virginia pound nets under the Endangered Species Act (ESA) for sea turtle conservation to be consistent with this final rule. More information on this rule is available here: https://www.fisheries.noaa.gov/action/amendment-virginia-pound-net-regulations.

Fyke Net and Floating Fish Traps

The Rhode Island Floating fish trap and the Northeast/Mid-Atlantic fyke net fisheries are listed as a Category III fishery in the 2021 LOF (86 FR 3028, January 14, 2021). There are no documented interactions between marine mammals in the Northeast/Mid-Atlantic fyke net fishery nor the floating fish trap fishery.

Bottom Trawls

The Mid-Atlantic bottom trawl fishery is listed as a Category II fishery in the 2021 LOF (86 FR 3028, January 14, 2021). In 2005, Mid-Atlantic bottom trawl fishery was elevated to Category II based on mortality and injury of common dolphins and pilot whales (later removed from the list of species killed or injured by this fishery). This fishery continues to be listed as a Category II fishery due to interactions with bottlenose dolphins, common dolphins, and gray seals. Interactions with other species include the harbor seal, Risso's dolphin, and white-sided dolphin.[32]

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear.[33] In 2008, several minke whales were observed dead in bottom

[32] For additional information on small cetacean and pinniped interactions, see: Chavez-Rosales et al. 2017; Hatch and Orphanides 2014, 2015, 2016, 2019; Josephson et al. 2017; Josephson et al. 2019; Lyssikatos 2015; Lyssikatos et al. 2020; Orphanides 2020; Read *et al*. 2006; Waring et al. 2015b; Marine Mammal SARS: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA LOF at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

[33] Refer to Greater Atlantic Region Marine Animal Incident Database (unpublished data); Marine Mammal SARs: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-

trawl gear attributed to the northeast bottom trawl fishery; estimated annual mortality attributed to this fishery in 2008 was 7.8 minke whales (Waring et al. 2015). Since 2008, serious injury and mortality records for minke whales in U.S. waters have shown zero interactions with bottom trawl (northeast or Mid-Atlantic) gear.[34] Based on this information, large whale interactions with bottom trawl gear are expected to be rare to nonexistent.

Haul/Beach Seine

The Mid-Atlantic haul/beach seine fishery is listed as a Category II fishery in the 2021 LOF due to interactions with coastal bottlenose dolphin (86 FR 3028, January 14, 2021). NMFS has recorded one observed take of a bottlenose dolphin in this fishery in 1998 (Waring and Quintal 2000). During 2014–2018, one serious injury of a common bottlenose dolphin occurred associated with the mid-Atlantic haul/beach seine fishery. During 2014, a common bottlenose dolphin was found within a haul seine net in Virginia and released alive seriously injured (Maze-Foley and Garrison 2020). Harbor porpoise was removed from the list of species killed or injured in the Mid-Atlantic haul/beach seine fishery due to no other interactions between 1999 and 2003. The fishery was observed from 1998-2001 but there has been limited observer coverage since 2001.

7.3.2 Sea Turtles

All sea turtles that occur in U.S. waters are listed as either endangered or threatened under the ESA. Four sea turtle species likely to overlap with the striped bass fishery are loggerhead (*Caretta caretta*), Kemp's Ridley (*Lepidochelys kempi*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*) sea turtles.

The Atlantic seaboard provides important developmental habitat for post-pelagic juveniles, as well as foraging and nesting habitat for adult sea turtles. The distribution and abundance of sea turtles along the Atlantic coast is related to geographic location and seasonal variations in water temperatures. In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly et al. 1995a,b,c; Griffin et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April

region; NEFSC observer/sea sampling database, unpublished data ; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html

[34] Refer to: Greater Atlantic Region Marine Animal Incident Database (unpublished data); Waring et al. 2016; Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Cole and Henry 2013; and, Henry et al. 2014, 2015, 2016, 2017, 2019, 2020; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

and on the most northern foraging grounds in the GOM in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until late fall (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although it should be noted that hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Juvenile Kemp's ridleys sea turtles use northeastern and mid Atlantic waters of the U.S. Atlantic coastline as primary developmental habitat, with shallow coastal embayments serving as important foraging grounds during the summer months. Juvenile ridleys migrate south as water temperatures cool, and are predominantly found in shallow coastal embayments along the Gulf Coast during the fall and winter months. Kemp's ridleys can be found from New England to Florida, and are the second most abundant sea turtle in Virginia and Maryland waters (Keinath et al. 1987; Musick and Limpus, 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick, 1985; Bellmund et al., 1987; Keinath et al,. 1987; Musick and Limpus, 1997). These turtles primarily feed on crabs, but also consume mollusks, shrimp, and fish (Bjorndal, 1997).

The leatherback is the largest living turtle and its range is farther than any other sea turtle species (NMFS, 2013). Leatherback turtles are often found in association with jellyfish, with the species primarily feeding on Cnidarians (*medusae, siphonophores*) and tunicates (*salps, pyrosomas*). While these turtles are predominantly found in the open ocean, they do occur in coastal water bodies such as Cape Cod Bay and Narragansett Bay, particularly the fall. The most significant nesting in the U.S. occurs in southeast Florida (NMFS, 2013). Leatherbacks are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013b; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters; they are found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (NMFS and USFWS 1992; James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014).

More information about sea turtles can be found here: https://www.fisheries.noaa.gov/sea-turtles.

7.3.2.1 Potential Impacts of Striped Bass Fishery on Sea Turtles

The following sections are not a comprehensive review of all fishing gear types known to interact with a given species and the bycatch reports included below do not represent a complete list.

Gillnet

An observer program for protected species has not been established for the striped bass fishery. However, under the ESA Annual Determination to Implement Sea Turtle Observer

Requirement (80 FR 14319, April 18, 2015), one fishery that targets striped bass is included, the Chesapeake Bay Inshore Gillnet Fishery.

Hook and Line

Interactions between ESA listed species of sea turtles and hook and line gear have been documented, particularly in nearshore waters of the Mid-Atlantic (e.g., Greater Atlantic Region Sea Turtle and Disentanglement Network, unpublished data; NMFS Sea Turtle Stranding and Salvage Network, unpublished data; Palmer 2017). Interactions with hook and line gear have resulted in sea turtle injury and mortality and therefore, poses an interaction risk to these species. However, the extent to which these interactions are impacting sea turtle populations is still under investigation, and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of sea turtle populations.

Pound Nets

Populations of loggerhead, Kemp's ridley, and leatherback sea turtles are at risk in areas where pound net fishing is abundant, such as the Chesapeake Bay and surrounding waters. NOAA Fisheries issued a final rule in 2015 amending the Bottlenose Dolphin Take Reduction Plan and its implementing regulations under the MMPA requiring gear restrictions for VA pound nets in estuarine and coastal state waters of Virginia to reduce bycatch (80 FR 6925, February 9, 2015). NOAA Fisheries also amended regulations and definitions for Virginia pound nets under the ESA for sea turtle conservation to be consistent with this final rule. Pound net regulations were enacted to protect both sea turtles and bottlenose dolphins. More information on this rule is available here: https://www.fisheries.noaa.gov/action/amendment-virginia-pound-net-regulations.

Bottom Trawl

Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso and Epperly 2006; NMFS Observer Program, unpublished data). Since 1989, the date of our earliest observer records for federally managed fisheries, sea turtle interactions with trawl gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2008; Murray 2015b; Murray 2020; NMFS Observer Program, unpublished data; Warden 2011 a, b). Murray (2020) provided information on sea turtle interaction rates from 2014-2018 and estimated 571 loggerhead, 46 Kemp's ridley, 20 leatherback, and 16 green sea turtle interactions were estimated to have occurred in bottom trawl gear in the Mid-Atlantic region over the five-year period. On Georges Bank, 12 loggerheads, and 6 leatherback interactions. An estimated 272 loggerhead, 23 Kemp's ridley, 13 leatherback, and 8 green sea turtle interactions resulted in mortality over this period (Murray 2020).

7.3.3 Atlantic Sturgeon

Since 1998, there has been a moratorium on the harvest of Atlantic Sturgeon in both state and federal waters; however, the population has continued to decline and, in 2012, Atlantic sturgeon became listed under the ESA. The listing identifies five distinct population segments

(DPS), which include the Gulf of Maine, the New York Bight, the Chesapeake Bay, Carolina, and the South Atlantic (77 FR 5914 and 77 FR 5880, February 6, 2012). All DPSs are listed as endangered except for the Gulf of Maine population, which is listed as threatened. Primary threats to the species include historic overfishing, the bycatch of sturgeon in other fisheries, habitat destruction from dredging, dams, and development, and vessel strikes (77 FR 5914; 77 FR 5880). In April 2017, NOAA Fisheries published a final rule (82 FR 39160) to designate Atlantic sturgeon critical habitat (i.e., specific areas that are considered essential to the conservation of the species) in each of the DPSs.

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein et al. 2004 a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon may undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011; Wipplehauser 2012); however, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

For additional information on the biology, status, and range wide distribution of each distinct population segment (DPS) of Atlantic sturgeon please refer to 77 FR 5880 and 77 FR 5914, as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007) and the Atlantic States Marine Fisheries Commission 2017 Atlantic Sturgeon Benchmark Stock Assessment and Peer Review Report (ASMFC 2017).

7.3.3.1 Potential Impacts of Striped Bass Fishery on Atlantic Sturgeon

The following sections are not a comprehensive review of all fishing gear types known to interact with a given species and the bycatch reports included below do not represent a complete list.

<u>Bottom Trawl and Gillnet</u>

Since 1989, Atlantic sturgeon interactions (i.e., bycatch) with sink gillnet and bottom trawl gear have frequently been observed in the Greater Atlantic Region, with most sturgeon observed captured falling within the 100 to 200cm total length range; however, both larger and small individuals have been observed (ASMFC 2007; ASMFC 2017; Miller and Shepard 2011; NEFSC observer/sea sampling database, unpublished data; Stein et al. 2004). For sink gillnets, higher levels of Atlantic sturgeon bycatch have been associated with depths of less than 40 meters, mesh sizes of greater than 10 inches, and the months of April and May (ASMFC 2007). Hager et al. (2021) found that subadult Atlantic sturgeon are particularly susceptible to interactions with striped bass sink gillnet gear in the James River, VA.

For otter trawl fisheries, the highest incidence of Atlantic sturgeon bycatch have been associated with depths less than 30 meters (ASMFC 2007). More recently, over all gears and observer programs that have encountered Atlantic sturgeon, the distribution of haul depths on observed hauls that caught Atlantic sturgeon was significantly different from those that did not encounter Atlantic surgeon, with Atlantic sturgeon encountered primarily at depths less than 20 meters (ASMFC 2017).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The stock assessment analyzes fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. The total bycatch of Atlantic sturgeon from bottom otter trawls ranged between 624-1,518 fish over the 2000-2015 time series, while the total bycatch of Atlantic sturgeon from gillnets ranged from 253-2,715 fish. Focusing on the most recent five-year period of data provided in the stock assessment report[35], the estimated average annual bycatch during 2011-2015 of Atlantic sturgeon in bottom otter trawl gear is 777.4 individuals and in gillnet gear is 627.6 individuals.

Hook and Line

Interactions between ESA-listed species of Atlantic sturgeon and hook and line gear have been documented, particularly in nearshore waters (ASMFC 2017). Interactions with hook and line gear have resulted in Atlantic sturgeon injury and mortality and therefore, poses an interaction risk to these species. However, the extent to which these interactions are impacting Atlantic sturgeon DPSs is still under investigation and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of Atlantic sturgeon DPSs (NMFS 2011b; ASMFC 2017).

7.3.4 Shortnose Sturgeon

Shortnose sturgeon occur in estuaries large coastal rivers on the Atlantic coast from Canada to Florida, including the Chesapeake Bay and its tributaries. Shortnose sturgeon spend most of their life in their natal river system and estuaries and tend to spend little time in ocean waters (NMFS 1998). Adults generally migrate upriver in spring to spawn and move back downstream after spawning to higher salinity habitats for foraging (SSSRT 2010). Shortnose sturgeon have been listed as endangered under the ESA since 1967 and the 1998 recovery plan identified 19 DPSs across 25 river systems.

7.3.4.1 Potential Impacts of Striped Bass Fisheries on Shortnose Sturgeon

[35] The period of 2011-2015 was chosen as it is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

Bycatch of shortnose sturgeon in fisheries targeting other species has been documented throughout its range (SSSRT 2010). Bycatch of shortnose sturgeon primarily occurs in gillnet fisheries, but has also occurred in other gear types including pound nets, fyke nets, and hook and lines. Adult shortnose sturgeon are thought to be especially vulnerable to fishing gears targeting anadromous species (such as shad, striped bass, alewives and herring) during times of extensive migration, particularly their spawning migration (SSSRT 2010; Litwiler 2001).

7.3.5 Giant Manta Ray

While there is considerable uncertainty regarding the species' current abundance throughout its range, the best available information indicates that the species has experienced population declines of potentially significant magnitude within areas of the Indo-Pacific and eastern Pacific portions of its range (Miller and Klimovich 2017). While it's assume that declining populations within the Indo-Pacific and eastern Pacific will likely translate to overall declines in the species throughout its entire range, there is very little information on the abundance, and thus, population trends in the Atlantic portion of its range (Miller and Klimovich 2017).

Based on the giant manta ray's distribution, the species may occur in coastal, nearshore, and pelagic waters off the U.S. east coast (Miller and Klimovich 2017). Along the U.S. East Coast, giant manta rays are usually found in water temperatures between 19 and 22 degrees Celsius (Miller and Klimovich 2017) and have been observed as far north as New Jersey. Given that the species is rarely identified in the fisheries data in the Atlantic, it may be assumed that populations within the Atlantic are small and sparsely distributed (Miller and Klimovich 2017).

7.3.5.1 Potential Impacts of Striped Bass Fishery on Giant Manta Rays

The following sections are not a comprehensive review of all fishing gear types known to interact with a given species and the bycatch reports included below do not represent a complete list.

<u>Bottom Trawl and Gillnet Gear</u>

Giant manta rays are potentially susceptible to capture by gillnet and bottom trawl gear based on records of their capture in fisheries using this gear types (NEFSC observer/sea sampling database, unpublished data). Review of the most recent 10 years of NEFOP data showed that between 2010-2019, two (unidentified) Giant Manta Rays were observed in bottom trawl gear and two were observed in gillnet gear (NMFS NEFSC observer/sea sampling database, unpublished data). Additionally, all of the giant manta ray interactions in gillnet or trawl gear recorded in the NEFOP database (13 between 2001 and 2019) indicate the animals were encountered alive and released alive. However, details about specific conditions such as injuries, damage, time out of water, how the animal was moved or released, or behavior on release is not always recorded. While there is currently no information on post-release survival, NMFS Southeast Gillnet Observer Program observed a range of 0 to 16 giant manta rays captured per year between 1998 and 2015 and estimated that approximately 89% survived the interaction and release (see NMFS reports available at: http://www.sefsc.noaa.gov/labs/panama/ob/gillnet.htm).

Hook and Line

The most recent 10 years of data on observed or documented interactions between giant manta rays and fishing gear, there have been no observed/documented interactions between giant manta rays and hook and line gear (NEFSC observer/sea sampling database, unpublished data). Based on this information, hook and line gear is not expected to pose an interaction risk to giant manta rays and therefore, is not expected to be source of injury or mortality to this species

7.3.6 Seabirds

Like marine mammals, seabirds are vulnerable to entanglement in commercial fishing gear. Under the Migratory Bird Treaty Act, it is unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory birds except as permitted by regulation (16 U.S.C. 703). Given that an interaction has not been quantified in the Atlantic striped bass fishery, impacts to seabirds are not considered to be significant. Endangered and threatened bird species, such as the piping plover, are unlikely to be impacted by the gear types employed in the striped bass fishery. Other human activities such as coastal development, habitat degradation and destruction, and the presence of organochlorine contaminants are considered to be the major threats to some seabird populations.

7.4 POTENTIAL IMPACTS TO ATLANTIC COASTAL STATE AND INTERSTATE FISHERIES

There are several take reduction teams, whose management actions have potential impacts to coastal striped bass fisheries.

The Mid-Atlantic coastal gillnet fishery is one of two fisheries regulated by the Harbor Porpoise Take Reduction Plan (50 CFR 229.33 and 229.34). Amongst other measures, the plan uses time area closures in combination with pingers in Northeast waters, and time area closures along with gear modifications for both small and large mesh gillnets in mid-Atlantic waters. Although the plan predominately impacts the dogfish and monkfish fisheries due to higher porpoise bycatch rates, other gillnet fisheries are also affected.

The Atlantic Large Whale Take Reduction Plan (50 CFR 229.32) (ALWTRP) addresses the incidental bycatch of large baleen whales, primarily the North Atlantic right whale and the humpback whale, in several fisheries including Mid-Atlantic coastal gillnet fishery. Amongst other measures, the plan closes right whale critical habitat areas to specific types of fishing gear during specific seasons, and modifies fishing gear and practices. The Atlantic Large Whale Take Reduction Team continues to identify ways to reduce possible interactions between large whales and commercial gear. In 2014 and 2015, the ALWTRP was modified to reduce the number of vertical lines associated with trap/pot fisheries and required expanded gear markings for gillnets and traps in Jeffrey's Ledge and Jordan Basin (79 FR 35686, June 27, 2014; 80 FR 30367, May 28, 2015).

The Bottlenose Dolphin Take Reduction Team first convened in 2001 to discuss incidental catch of coastal bottlenose dolphins in Category I and II fisheries. In 2006, a Bottlenose Dolphin Take Reduction Plan was established, which created gear regulations for the mid-Atlantic coastal gillnet fishery, the Virginia pound net fishery, the mid-Atlantic beach seine fishery, and the North Carolina inshore gillnet fishery, among others. Specifically, the plan established mesh sizes for the gill net fisheries and prohibited night fishing for some regions and gear types (71 FR 24776, April 26, 2006).

Based on a consensus recommendation from the Bottlenose Dolphin Take Reduction Team, NOAA Fisheries issued a final rule in 2015 amending the Bottlenose Dolphin Take Reduction Plan and its implementing regulations under the Marine Mammal Protection Act (MMPA) to require the year-round use of modified pound net leaders for offshore Virginia pound nets in specified waters of the lower mainstem Chesapeake Bay and coastal state waters (80 FR 6925, February 9, 2015). The rule also finalized Virginia pound net-related definitions, gear prohibitions, and non-regulatory measures. NOAA Fisheries also amended regulations and definitions for Virginia pound nets under the Endangered Species Act (ESA) for sea turtle conservation to be consistent with this final rule. Pound net regulations were enacted to protect both sea turtles and bottlenose dolphins. More information on this rule is available here: https://www.fisheries.noaa.gov/action/amendment-virginia-pound-net-regulations.

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9.0 TABLES

Note: Tables 1-14 are in-text.

Table 15. Base quota, 2020 quota, and 2020 harvest by state in pounds. Source: 2021 state compliance reports. 2020 quota was based on Addendum VI and approved conservation equivalency programs.

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

* 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 by either changing size limit with equivalent 18% quota reduction (MA, NY), or by taking a greater than 18% reduction in recreational removals to offset a less than 18% commercial quota reduction (NJ, DE, MD, PRFC, VA).
Note: Maryland's Chesapeake Bay quota for 2020 was adjusted to account for the overage in 2019.

Table 16. 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 16 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" Common pool trip limits: Hook and Line - 250 lbs./license/week Gill Net - 300 lbs./license/week	1,445,394 lbs. (part of Bay-wide quota) – Initial quota 1,442,120 lbs. – Adjusted quota due to 2019 overage	Bay Pound Net: 6.1-12.31 Bay Haul Seine: 6.1-12.31 Bay Hook & Line: 6.4-12.31 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 Pound Net & Other: 2.15-3.25, 6.1-12.15 Gill Net: 1.1-3.25, 11.9-12.31 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 Gill net fishery was not opened Trawl fishery was not opened

Table 17. Summary of Atlantic striped bass recreational regulations in 2020. Source: 2021 State Compliance Reports. Minimum sizes and slot size limits are in total length (TL).

STATE	SIZE LIMITS (TL)/REGION	BAG LIMIT	GEAR/FISHING RESTRICTIONS	OPEN SEASON
ME	28” to <35"	1 fish/day	Hook & line only; circle hooks only when using live bait	All year, except spawning areas are closed 12.1-4.30 and C&R only 5.1-6.30
NH	28” to <35"	1 fish/day	Gaffing and culling prohibited; Use of corrodible non-offset circle hooks required if angling with bait	All year
MA	28” to <35"	1 fish/day	Hook & line only; no high-grading; gaffs and other injurious removal devices prohibited. Private angler circle hook requirement when fishing with natural bait (exception for artificial lures).	All year
RI	28” to <35"	1 fish/day	The use of circle hooks is required by any vessel or person while fishing recreationally with bait for striped bass	All year
CT	28” to <35"	1 fish/day	Inline circle hooks only when using whole, cut or live natural bait (Dec 1st, 2020). Spearing and gaffing prohibited	All year
NY	Ocean and DE River: Slot Size: 28 -35	1 fish/day	Angling only. Spearing permitted in ocean waters. C&R only during closed season.	Ocean: 4.15-12.15 Delaware River: All year
	HR: Slot Size: 18 -28	1 fish/day	Angling only.	Hudson River: 4.1-11.30
NJ	1 fish at 28” to < 38” (effective 4/1/2020)	1 fish/day	Non-offset circle hooks must be used when using bait with a #2 sized hook or larger in Delaware River & tributaries from 4.1-5.31.	Closed 1.1 – last day of Feb in all waters except in the Atlantic Ocean, and closed 4.1-5.31 in the lower DE River and tributaries
PA	Upstream from Calhoun St Bridge: 1 fish at 28” to <35"			
	Downstream from Calhoun St Bridge: 1 fish at 28” to <35”, and 2 fish at 21-24” slot size limit from 4.1 – 5.31			

(Table 17 continued – Summary of recreational regulations in 2020).

STATE	SIZE LIMITS/REGION	BAG LIMIT	GEAR/FISHING RESTRICTIONS	OPEN SEASON
DE	28” to <35"	1 fish/day	Hook & line, spear (for divers) only. Circle hooks required in spawning season.	All year. C&R only 4.1-5.31 in spawning grounds. 20”-25”slot from 7.1-8.31 in DE River, Bay & tributaries
MD	Ocean: 28” to <35"	1 fish/day		All year
	Chesapeake Bay and tribs^	C&R only	no eels; no stinger hooks; barbless hooks when trolling; circle or J-hooks when using live bait; max 6 lines when trolling	1.1-2.28, 3.1-3.31, 12.11-12.31
	Chesapeake Bay: 35" min	1 fish/day	Geographic restrictions apply.	5.1-5.15
	Chesapeake Bay: 1 fish/day, 19" minimum size; 2/fish/day for charter with only 1 fish >28"		Geographic restrictions apply; circle hooks if chumming or live-lining; no treble hooks when bait fishing.	5.16-5.31
	Chesapeake Bay and tribs: 1 fish/day, 19" minimum size; 2/fish/day for charter with only 1 fish >28"		All Bay and tribs open; circle hooks if chumming or live-lining; no treble hooks when bait fishing.	6.1-8.15 (no targeting 8.16-8/31)*, 9.1-12.10
PRFC	Spring Trophy: 1 fish/day, 35” minimum size		No more than two hooks or sets of hooks for each rod or line; no live eel; no high-grading	5.1-5.15
	Summer and Fall: 2 fish/day, 20” min		No more than two hooks or sets of hooks for each rod or line.	5.16-7.6 and 8.21-12.31; closed 7.7-8.20 (No Direct Targeting)

^ Susquehanna Flats: C&R only Jan 1 – March 31 (no treble hooks when bait fishing); 1 fish at 19”-26” slot May 16 – May 31.
*Open season in 2021 changed to 6.1-7.15 (no targeting 7.16-7.31), 8.1-12.10.

(Table 17 continued – Summary of recreational regulations in 2020).

STATE	SIZE LIMITS/REGION	BAG LIMIT	GEAR/FISHING RESTRICTIONS	OPEN SEASON
DC	18” minimum size	1 fish/day	Hook and line only	5.16-12.31
VA	Ocean: 28”-36” slot limit	1 fish/day	Hook & line, rod & reel, hand line only. No gaffing. Circle hooks required if/when fishing with live bait (as of July 2020).	1.1-3.31, 5.16-12.31
	Ocean Spring Trophy: NO SPRING TROPHY SEASON			
	Chesapeake Bay Spring Trophy: NO SPRING TROPHY SEASON			
	Bay Spring: 20”-28” slot limit	1 fish/day	Hook & line, rod & reel, hand line only. No gaffing. Circle hooks required if/when fishing with live bait (as of July 2020).	5.16-6.15
	Bay Fall: 20 - 36” slot limit	1 fish/day	Hook & line, rod & reel, hand line only. No gaffing. Circle hooks required if/when fishing with live bait (as of July 2020).	10.4-12.31
NC	28” to <35"	1 fish/day	No gaffing allowed. Circle hooks required when fishing with natural bait.	All year

Table 18. 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 19. Proportion of 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	
	Harvest	Discards*	Harvest	Release Mortality
1990	8%	4%	50%	38%
1991	9%	5%	45%	41%
1992	11%	9%	39%	42%
1993	15%	6%	39%	40%
1994	11%	6%	36%	47%
1995	11%	4%	46%	40%
1996	14%	4%	40%	42%
1997	15%	5%	39%	42%
1998	16%	4%	38%	42%
1999	16%	4%	40%	40%
2000	15%	3%	46%	37%
2001	12%	2%	53%	32%
2002	12%	3%	51%	35%
2003	10%	2%	55%	33%
2004	10%	2%	49%	40%
2005	11%	2%	50%	38%
2006	10%	1%	45%	44%
2007	13%	2%	49%	37%
2008	13%	1%	55%	30%
2009	13%	2%	60%	25%
2010	12%	2%	65%	21%
2011	13%	1%	67%	20%
2012	13%	3%	58%	27%
2013	9%	1%	61%	28%
2014	11%	2%	57%	31%
2015	10%	1%	51%	38%
2016	8%	1%	49%	42%
2017	8%	1%	42%	49%
2018	11%	2%	39%	49%
2019	12%	2%	39%	47%
2020	11%	1%	33%	54%

* 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. Note: Percent may not sum to 100 due to rounding.

Table 20. 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 21. 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 22. Commercial harvest and discards by region in numbers of fish (x1000), 1995-2020. Source: harvest is from state compliance reports, discards is from ASMFC. ^Estimates exclude inshore harvest.

Year	Ocean								Chesapeake Bay				Discards*			Grand Total Removals
	MA	RI	NY	DE	MD	VA	NC^	Total	MD	PRFC	VA	Total	Ocean	Bay	Total	
1995	39.9	19.7	43.7	5.6	4.0	9.9	23.4	146.1	267.0	29.3	95.0	391.3	141.7	46.8	188.5	725.9
1996	37.3	18.6	40.5	20.7	9.0	14.1	3.3	143.5	486.2	46.2	178.2	710.6	168.8	89.0	257.7	1,111.9
1997	44.0	7.1	37.6	33.2	8.4	17.3	25.8	173.4	620.3	87.8	195.2	903.2	249.7	76.3	326.0	1,402.6
1998	44.3	8.8	45.1	31.4	10.3	41.1	14.2	195.2	729.6	93.3	197.1	1,020.1	313.9	33.5	347.3	1,562.6
1999	40.9	11.6	49.9	34.8	10.2	48.7	21.1	217.2	776.0	90.6	139.8	1,006.3	305.2	31.9	337.0	1,560.6
2000	42.1	9.4	54.9	25.2	13.3	54.5	6.5	205.8	787.6	91.5	132.0	1,011.0	176.9	32.5	209.3	1,426.1
2001	45.8	10.9	58.3	34.4	11.1	42.3	25.0	227.7	538.8	87.8	77.1	703.7	140.5	42.2	182.6	1,114.0
2002	49.8	11.7	47.1	30.4	10.2	38.8	23.2	211.3	571.7	80.3	64.7	716.8	151.2	48.6	199.8	1,127.9
2003	56.4	15.5	68.4	31.5	11.6	10.5	5.8	199.6	427.9	83.1	143.7	654.7	98.8	32.5	131.3	985.6
2004	63.6	16.0	70.4	28.4	14.1	10.4	31.0	233.9	447.0	92.6	106.3	645.9	111.4	46.3	157.7	1,037.5
2005	60.5	14.9	70.6	26.3	6.1	11.3	27.3	217.1	563.9	80.6	108.9	753.3	87.2	58.9	146.1	1,116.5
2006	70.5	15.4	73.6	30.2	10.9	11.5	2.7	214.9	645.1	92.3	95.4	832.7	99.0	59.8	158.8	1,206.5
2007	54.2	13.9	78.5	31.1	11.6	10.6	16.8	216.7	587.6	86.5	124.3	798.4	94.3	66.4	160.7	1,175.8
2008	61.1	16.6	73.3	31.9	14.0	10.8	13.4	221.0	580.7	82.0	144.1	806.8	63.6	43.1	106.8	1,134.6
2009	59.4	16.8	82.6	21.6	12.5	8.9	9.0	210.9	605.6	89.6	143.8	839.0	60.5	69.7	130.2	1,180.0
2010	60.4	15.7	82.4	19.8	5.4	9.4	13.7	206.7	579.2	90.6	154.9	824.7	40.4	94.5	134.8	1,166.2
2011	58.7	14.3	87.4	20.5	2.1	12.2	10.9	206.0	488.9	96.1	153.7	738.7	35.0	50.5	85.5	1,030.3
2012	61.5	15.0	67.1	15.7	6.9	10.8	0.3	177.3	465.6	90.7	137.0	693.4	25.5	173.4	198.9	1,069.6
2013	58.6	13.8	76.2	17.7	7.6	10.0	0.0	183.8	391.5	78.0	131.0	600.5	36.5	77.5	114.0	898.4
2014	58.0	10.5	52.9	14.9	8.5	10.0	0.0	154.8	362.2	81.5	151.8	595.5	46.3	65.5	111.8	862.0
2015	42.3	11.3	45.6	11.0	2.6	7.7	0.0	120.4	298.3	71.0	132.2	501.5	33.8	50.7	84.5	706.4
2016	48.0	11.7	51.0	8.8	1.2	7.6	0.0	128.3	284.9	73.7	122.2	480.8	41.3	46.8	88.2	697.2
2017	41.2	10.1	61.6	9.5	3.5	7.6	0.0	133.5	263.6	67.5	128.0	459.2	78.1	20.2	98.3	691.0
2018	37.8	10.1	52.2	11.4	3.5	6.9	0.0	121.9	286.4	64.4	148.4	499.3	61.4	39.3	100.6	721.8
2019	29.6	7.3	29.6	8.2	3.3	6.9	0.0	84.9	356.7	62.6	149.6	568.9	19.4	64.6	84.0	737.8
2020	19.6	5.0	44.1	8.4	3.4	4.4	0.0	84.9	299.9	66.6	125.9	391.3	18.6	46.7	65.3	642.7

* 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 23. Total recreational catch, releases, and release mortality in numbers of fish by region (x1000), 1995-2020. Source: MRIP (Query July 8, 2021). Estimates exclude inshore harvest from North Carolina.

Year	Harvest (A+B1)			Releases (B2)			Total Catch (A+B1+B2)			Release Mortality (9% of B2)		
	Ocean	Bay	Total	Ocean	Bay	Total	Ocean	Bay	Total	Ocean	Bay	Total
1995	1,260	1,028	2,288	16,587	5,754	22,341	17,847	6,782	24,629	1,493	518	2,011
1996	1,362	1,125	2,487	22,384	6,511	28,895	23,746	7,636	31,382	2,015	586	2,601
1997	1,514	1,261	2,775	22,819	10,178	32,998	24,333	11,439	35,773	2,054	916	2,970
1998	1,647	1,268	2,915	29,294	6,918	36,213	30,941	8,187	39,128	2,637	623	3,259
1999	1,758	1,366	3,123	26,139	8,760	34,899	27,897	10,125	38,022	2,353	788	3,141
2000	2,198	1,604	3,802	25,090	8,734	33,824	27,289	10,338	37,627	2,258	786	3,044
2001	2,758	1,294	4,052	21,073	6,145	27,218	23,831	7,440	31,270	1,897	553	2,450
2002	2,756	1,249	4,005	23,653	7,371	31,024	26,409	8,620	35,030	2,129	663	2,792
2003	3,124	1,658	4,781	20,678	10,971	31,649	23,802	12,628	36,431	1,861	987	2,848
2004	3,078	1,475	4,553	27,868	12,857	40,725	30,946	14,332	45,278	2,508	1,157	3,665
2005	3,182	1,299	4,481	28,663	9,580	38,244	31,845	10,879	42,724	2,580	862	3,442
2006	2,789	2,095	4,884	41,239	12,232	53,470	44,028	14,327	58,354	3,711	1,101	4,812
2007	2,327	1,618	3,945	25,135	7,579	32,714	27,462	9,196	36,659	2,262	682	2,944
2008	3,025	1,356	4,381	21,878	4,691	26,569	24,904	6,046	30,950	1,969	422	2,391
2009	2,898	1,803	4,700	16,740	4,838	21,578	19,638	6,641	26,279	1,507	435	1,942
2010	3,906	1,483	5,388	13,606	5,957	19,564	17,512	7,440	24,952	1,225	536	1,761
2011	3,617	1,389	5,006	12,644	3,823	16,467	16,261	5,212	21,473	1,138	344	1,482
2012	3,071	975	4,046	11,242	9,290	20,532	14,314	10,265	24,578	1,012	836	1,848
2013	3,723	1,435	5,158	19,463	7,131	26,594	23,186	8,565	31,751	1,752	642	2,393
2014	2,276	1,758	4,034	15,107	9,031	24,137	17,382	10,789	28,171	1,360	813	2,172
2015	1,770	1,316	3,086	15,419	10,216	25,635	17,189	11,532	28,721	1,388	919	2,307
2016	1,817	1,683	3,500	17,794	15,333	33,127	19,611	17,016	36,627	1,601	1,380	2,981
2017	1,738	1,200	2,938	28,963	9,050	38,012	30,701	10,249	40,950	2,607	814	3,421
2018	1,195	1,050	2,245	22,739	8,669	31,407	23,933	9,719	33,652	2,046	780	2,827
2019	1,342	809	2,151	21,131	7,636	28,767	22,473	8,445	30,918	1,902	687	2,589
2020	923	787	1,710	22,710	7,959	30,669	23,633	8,746	32,379	2,044	716	2,760

Table 24. Recreational harvest by region in pounds (x1000), 1995-2020. Source: MRIP (Query July 8, 2021). ^Estimates exclude inshore harvest.

Year	Ocean												Chesapeake Bay			Grand Total
	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC^	Total	MD	VA	Total	
1995	83	127	2,739	1,049	1,331	5,594	8,587	301	0.0	141	232	20,184	3,115	3,773	6,889	27,072
1996	95	183	2,983	1,626	1,405	10,739	3,959	795	0.0	812	392	22,990	2,789	2,847	5,636	28,626
1997	223	538	5,133	1,997	2,263	8,543	2,179	374	0.0	1,096	865	23,211	3,203	4,203	7,405	30,616
1998	305	262	7,359	1,544	1,807	4,889	4,182	645	579	545	636	22,754	3,023	3,826	6,849	29,603
1999	196	181	4,995	1,904	1,327	7,414	9,473	312	3.8	110	339	26,256	2,323	4,986	7,309	33,565
2000	347	109	4,863	2,008	890	7,053	9,768	925	0.0	416	277	26,656	3,503	3,892	7,395	34,051
2001	446	334	7,188	2,044	1,101	5,058	12,314	695	314	382	1,082	30,959	2,928	5,376	8,304	39,263
2002	775	322	10,261	2,708	1,251	5,975	9,621	589	0.0	1,135	998	33,634	2,643	5,563	8,206	41,840
2003	458	466	10,252	4,052	2,666	10,788	12,066	763	14	392	966	42,882	5,246	5,964	11,210	54,092
2004	554	268	9,329	2,460	2,229	6,437	13,303	870	57	1,067	6,656	43,230	4,860	4,941	9,801	53,031
2005	546	384	7,541	3,155	3,133	11,637	14,289	680	7.7	487	3,947	45,808	7,753	3,860	11,614	57,421
2006	610	244	6,787	1,569	2,854	9,845	12,716	586	2.8	921	2,975	39,109	6,494	5,071	11,565	50,674
2007	422	93	7,010	2,077	2,786	10,081	8,390	207	0.0	516	1,965	33,547	5,249	4,027	9,277	42,824
2008	607	182	8,424	970	2,273	18,000	12,407	847	0.0	1,690	750	46,150	5,639	4,877	10,515	56,665
2009	781	222	9,410	2,185	1,458	7,991	17,040	940	138	48	187	40,399	8,672	5,340	14,012	54,411
2010	218	238	9,959	2,102	2,323	18,190	17,454	895	107	206	1,198	52,891	6,482	2,059	8,541	61,431
2011	245	659	11,953	3,066	981	13,151	15,715	605	8.6	308	4,467	51,157	6,220	2,214	8,435	59,592
2012	152	432	14,941	2,096	1,835	13,096	11,551	644	21	1.7	0.0	44,768	3,819	4,670	8,488	53,257
2013	331	831	9,025	4,428	4,236	16,819	19,451	1,073	1,051	67	0.0	57,313	5,137	2,607	7,744	65,057
2014	423	203	7,965	3,402	2,665	13,998	8,886	381	159	0.0	0.0	38,083	8,877	989	9,866	47,949
2015	132	202	7,799	1,394	2,585	8,695	9,982	340	28	0.0	0.0	31,156	7,786	957	8,743	39,899
2016	189	191	3,731	1,776	912	12,053	12,790	86	7.2	0.0	0.0	31,735	10,912	1,024	11,936	43,672
2017	318	394	5,664	1,655	1,560	8,885	10,886	666	0.0	1.8	0.0	30,030	7,309	613	7,922	37,953
2018	142	130	4,925	1,121	1,165	3,453	7,012	33	0.0	0.0	0.0	17,982	4,683	404	5,087	23,069
2019	415	291	2,698	2,300	685	7,072	6,674	44	7.3	0.0	0.0	20,187	3,145	224	3,370	23,556
2020	180	29	776	483	830	2,202	6,584	16	0.0	0.0	0.0	11,100	3,480	280	3,759	14,859

Table 25. Recreational harvest by region in numbers of fish (x1000), 1995-2020. Source: MRIP (Query July 8, 2021). ^Estimates exclude inshore harvest.

Year	Ocean												Chesapeake Bay			Grand Total
	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC^	Total	MD	VA	Total	
1995	4.0	7.4	124.3	70.9	75.8	250.3	671.4	25.8	0.1	13.4	16.5	1,259.8	491.1	536.7	1,027.7	2,287.6
1996	4.1	11.0	156.6	100.6	95.9	511.6	301.2	59.7	0.0	89.6	31.7	1,362.0	564.2	561.3	1,125.5	2,487.4
1997	43.0	29.9	365.6	124.7	149.0	450.5	171.2	29.1	0.0	91.1	60.1	1,514.1	552.4	708.4	1,260.8	2,775.0
1998	65.3	14.8	500.9	91.1	114.1	383.8	289.2	51.0	24.3	71.3	41.2	1,647.0	596.2	672.2	1,268.4	2,915.4
1999	37.5	9.9	327.1	116.6	88.2	450.9	657.1	28.3	1.6	14.1	26.4	1,757.8	530.9	834.8	1,365.7	3,123.5
2000	77.3	6.0	306.2	156.8	84.0	494.6	939.8	88.3	0.0	27.2	18.1	2,198.3	810.9	793.3	1,604.2	3,802.5
2001	91.9	23.5	551.0	149.8	78.2	364.2	1,267.5	70.6	64.1	36.7	60.7	2,758.1	513.3	781.1	1,294.4	4,052.5
2002	135.2	28.1	723.5	181.5	92.5	439.3	957.6	65.7	0.0	76.4	56.3	2,756.1	464.4	784.6	1,249.0	4,005.1
2003	99.7	41.3	797.2	226.4	181.7	678.4	942.8	75.7	0.9	29.3	50.4	3,123.8	816.0	841.6	1,657.6	4,781.4
2004	118.3	22.1	666.7	159.6	134.5	458.1	1,042.1	66.6	11.0	75.9	323.2	3,078.1	657.5	817.4	1,474.9	4,553.0
2005	118.3	35.5	536.1	195.6	202.6	854.6	958.1	48.8	3.6	34.2	194.9	3,182.2	815.5	483.1	1,298.6	4,480.8
2006	140.9	20.9	483.2	129.3	168.3	614.8	972.2	44.5	0.4	80.6	134.2	2,789.0	1,342.0	753.0	2,094.9	4,884.0
2007	95.5	8.1	471.9	135.8	163.9	602.8	722.2	17.2	0.0	28.0	81.8	2,327.1	1,127.3	490.3	1,617.6	3,944.7
2008	133.4	11.9	514.1	73.4	132.8	1,169.9	791.0	67.7	0.0	94.4	36.9	3,025.4	779.7	576.1	1,355.8	4,381.2
2009	146.5	17.3	695.0	138.4	100.3	574.2	1,141.5	64.8	10.2	3.0	6.5	2,897.7	1,094.4	708.1	1,802.5	4,700.2
2010	37.3	21.4	808.2	162.0	170.2	1,449.0	1,091.4	61.4	12.5	25.3	67.1	3,905.9	1,139.3	343.2	1,482.6	5,388.4
2011	48.5	54.2	873.5	202.2	91.1	1,005.3	1,038.9	43.7	0.8	51.2	207.6	3,617.1	1,112.1	277.2	1,389.3	5,006.4
2012	31.4	37.3	1,010.6	130.7	137.1	927.5	742.4	51.3	2.9	0.3	0.0	3,071.5	716.7	258.1	974.8	4,046.3
2013	73.3	63.2	658.7	308.3	269.6	902.5	1,324.2	70.6	48.4	4.4	0.0	3,723.2	1,136.7	297.9	1,434.5	5,157.8
2014	86.4	16.5	523.5	172.0	131.8	804.5	501.9	26.2	12.6	0.0	0.0	2,275.5	1,627.0	131.2	1,758.2	4,033.7
2015	14.4	10.0	485.3	67.0	140.8	406.8	600.3	41.9	3.5	0.0	0.0	1,770.1	1,108.0	207.7	1,315.7	3,085.7
2016	14.2	17.6	230.1	128.4	63.3	697.7	659.6	5.9	0.5	0.0	0.0	1,817.2	1,545.1	138.1	1,683.2	3,500.4
2017	22.0	37.7	392.3	59.8	94.9	477.3	626.4	27.8	0.0	0.1	0.0	1,738.3	1,091.6	108.0	1,199.6	2,937.9
2018	16.0	13.4	389.5	39.2	85.5	181.7	465.3	4.2	0.0	0.0	0.0	1,194.6	993.3	56.8	1,050.1	2,244.8
2019	38.0	14.7	195.6	104.1	67.1	498.0	412.9	10.9	1.0	0.0	0.0	1,342.2	764.1	44.6	808.7	2,150.9
2020	19.0	3.2	67.2	36.9	71.2	203.7	520.1	1.6	0.0	0.0	0.0	922.9	734.8	52.2	787.0	1,710.0

10.0 FIGURES

Note: Figures 1-6 are in-text.

Figure 7. Atlantic striped bass female spawning stock biomass and recruitment, 1982-2017. Source: 2018 Benchmark Stock Assessment.

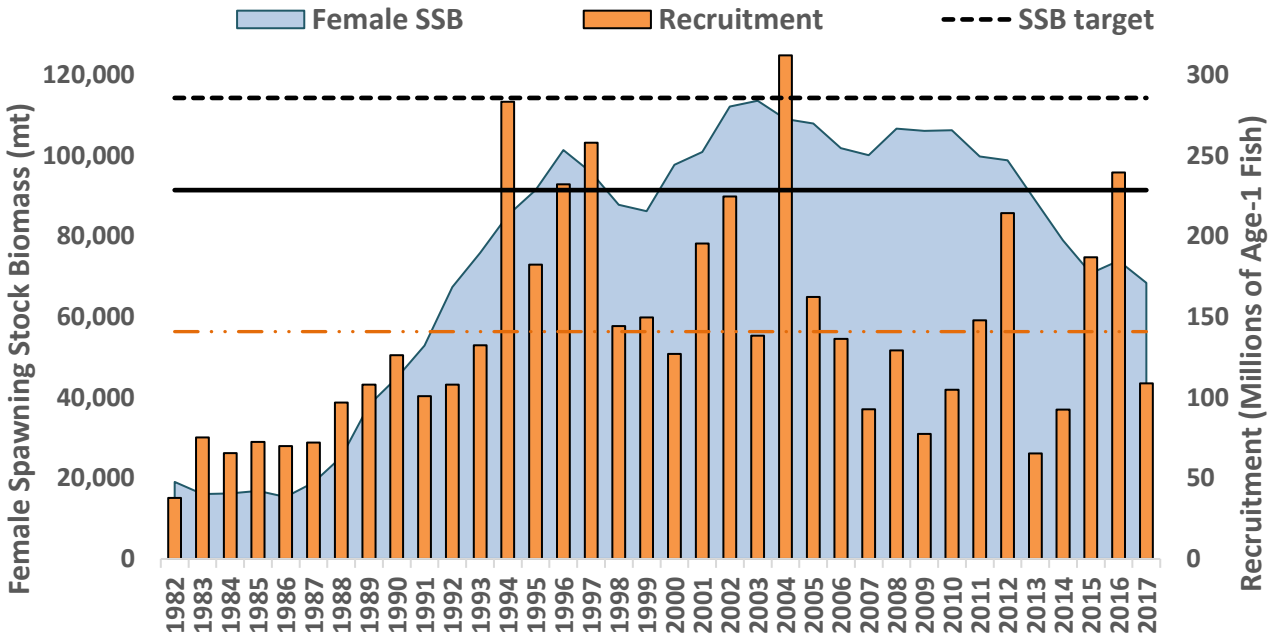


Figure 8. Atlantic striped bass fishing mortality, 1982-2017. Source: 2018 Benchmark Stock Assessment.

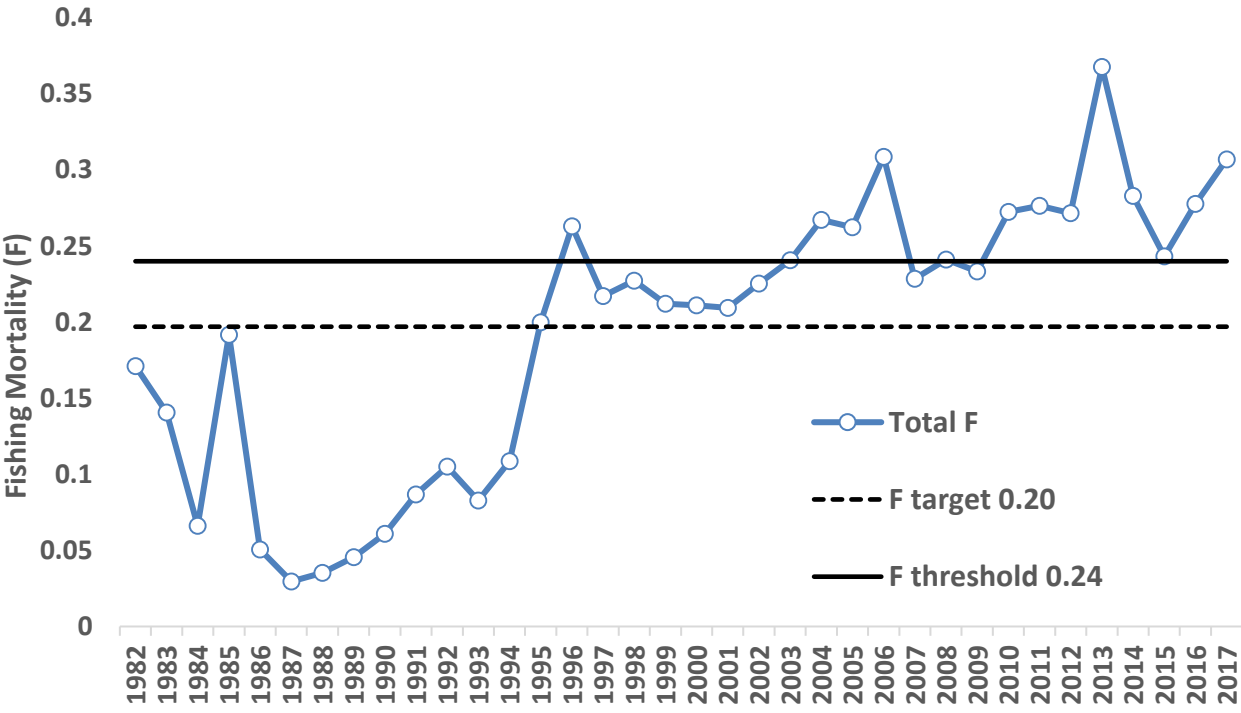


Figure 9. Albemarle Sound-Roanoke River striped bass female spawning stock biomass and recruitment (abundance of age-1), and biological reference points, 1991-2017. Source: 2020 Albemarle Sound-Roanoke River Stock Assessment (Lee et al. 2020).

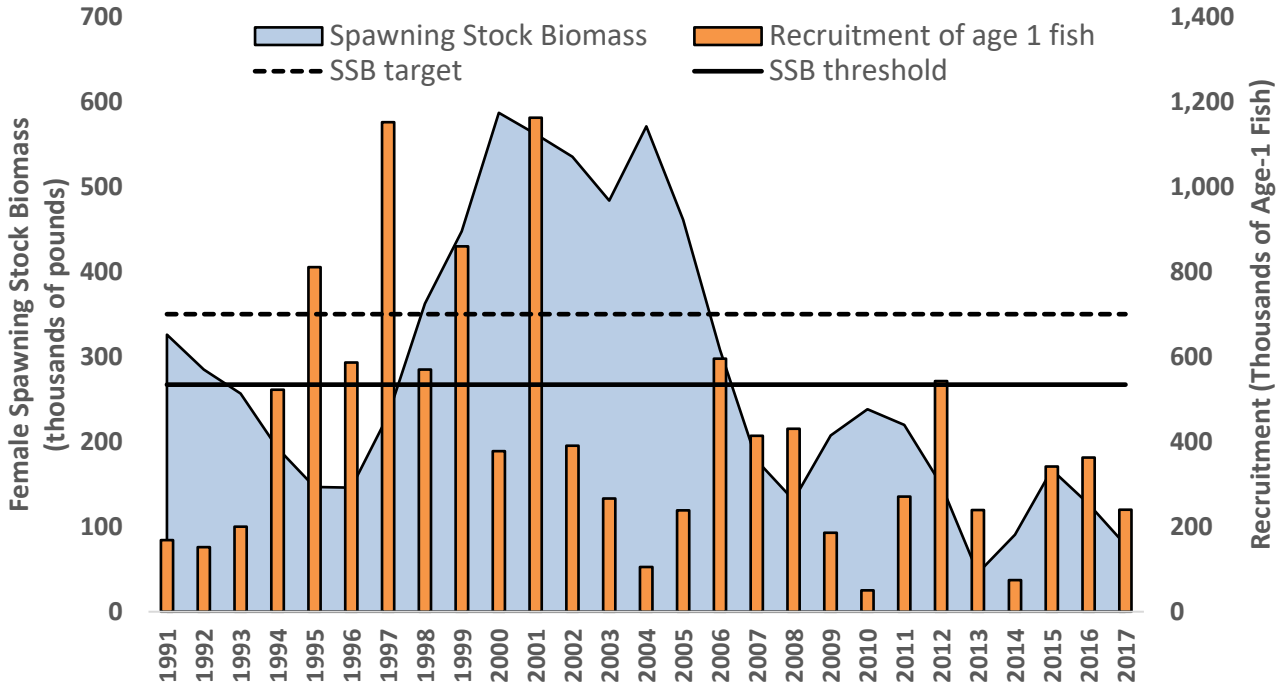


Figure 10. Albemarle Sounds-Roanoke River striped bass fishing mortality (F) estimates, and biological reference points, 1991-2017. Source: 2020 Albemarle Sound-Roanoke River Stock Assessment (Lee et al. 2020).

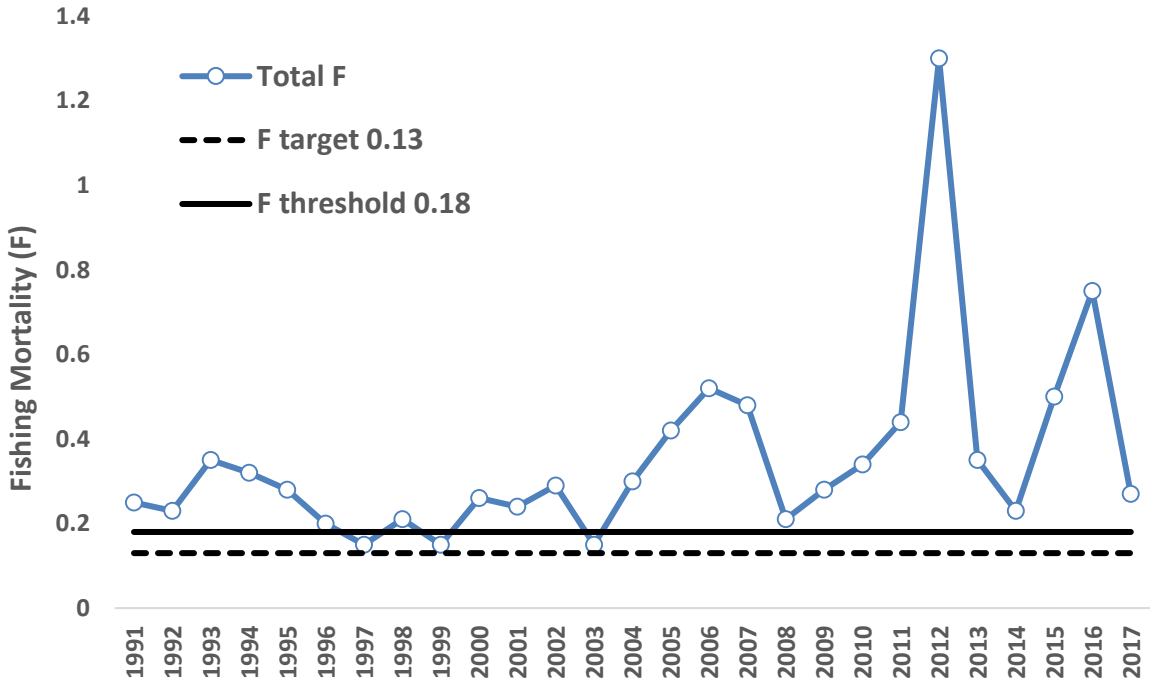


Figure 11. Total Atlantic striped bass removals by sector in numbers of fish, 1982-2020. Note: Harvest is from state compliance reports/MRIP, discards/release mortality is from ASMFC. Estimates exclude inshore harvest from Albemarle Sound-Roanoke River.

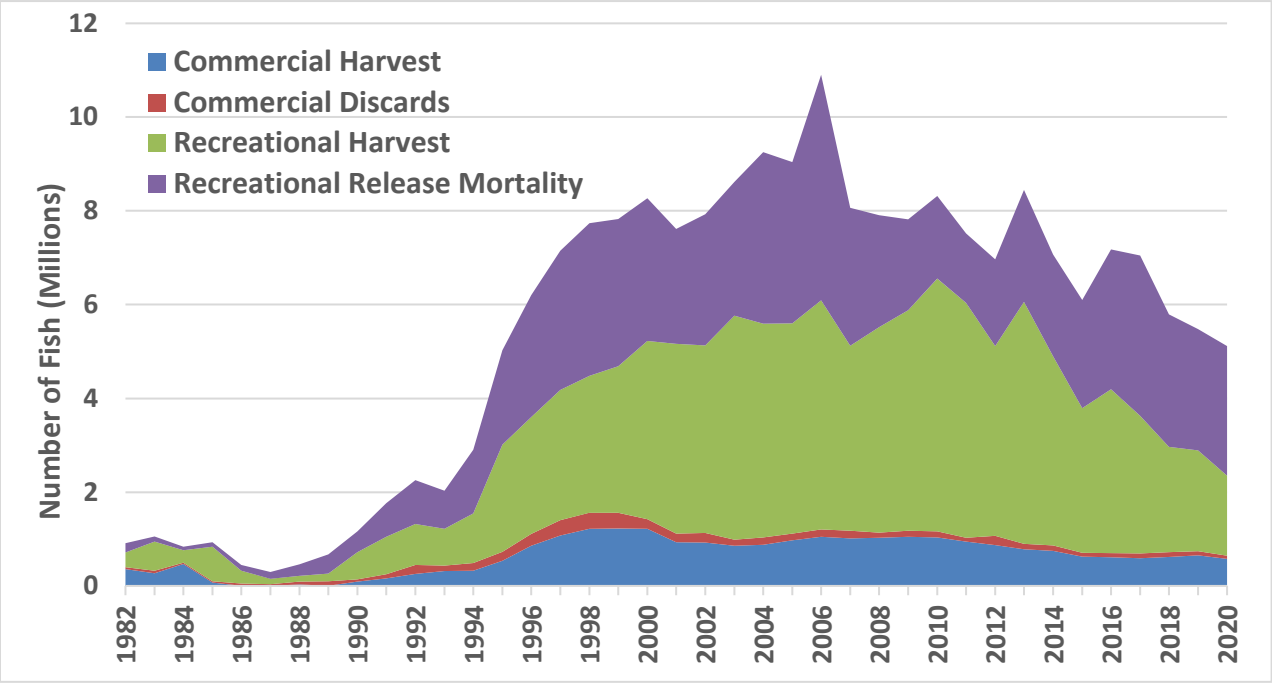


Figure 12. Commercial Atlantic striped bass landings by state in pounds, 1990-2020. Source: State compliance reports. Commercial harvest and sale prohibited in ME, NH, CT, and NJ. NC is ocean only.

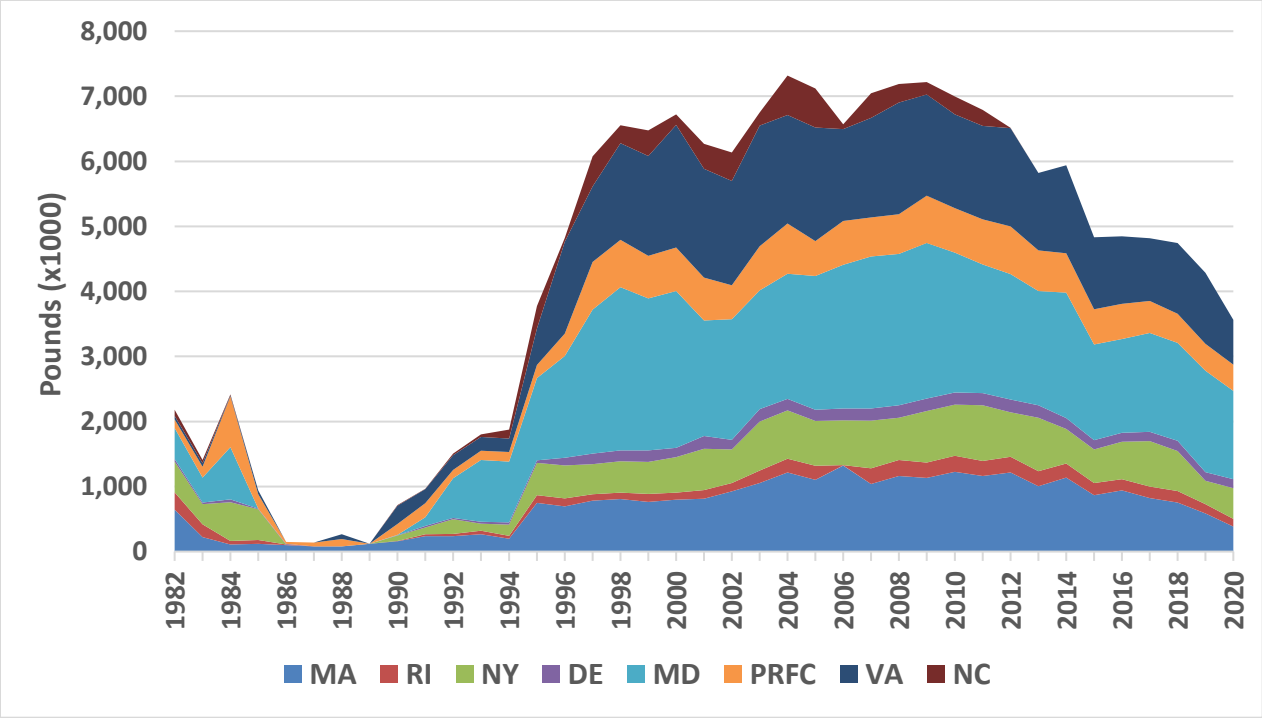
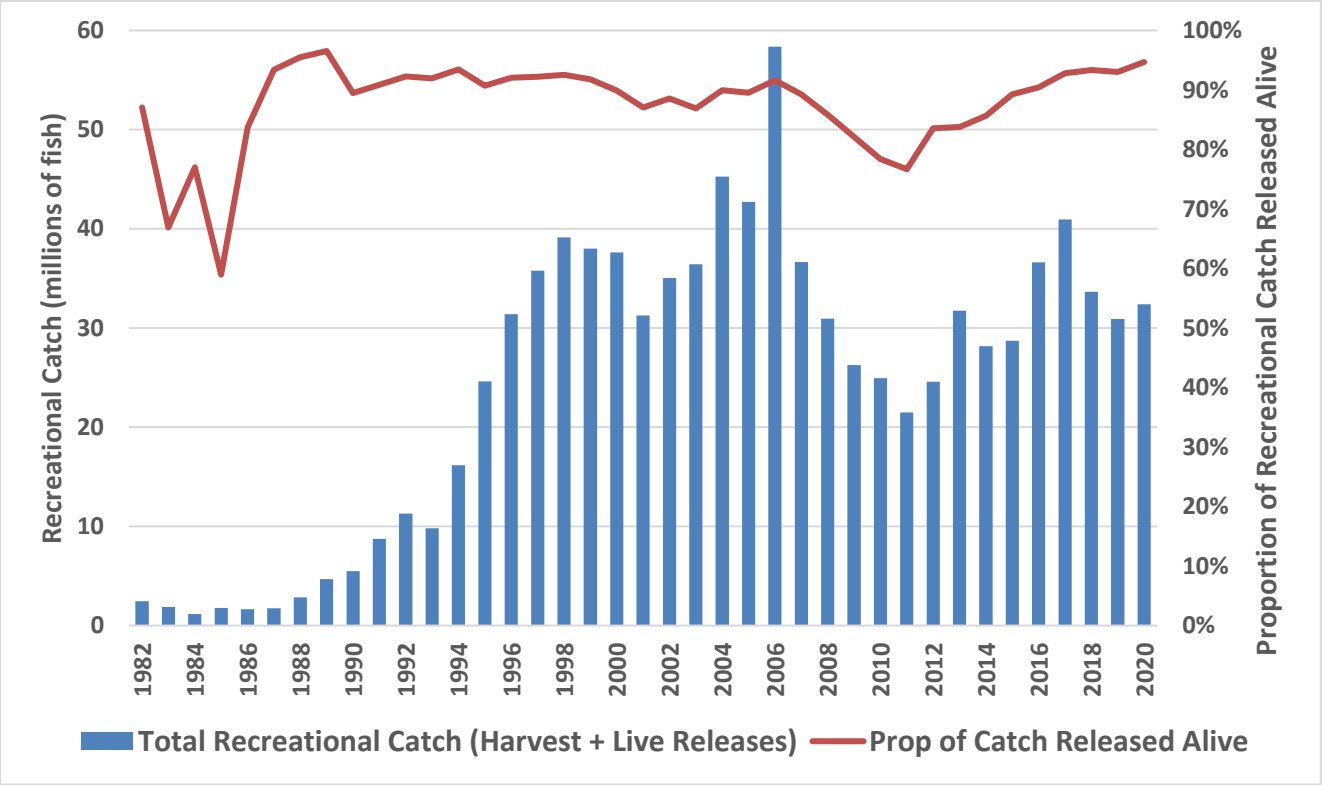


Figure 13. Total recreational catch and the proportion of fish released alive, 1982-2020. Source: MRIP/ASMFC. Estimates exclude inshore harvest from Albemarle Sound-Roanoke River.



APPENDIX 1. Projection Results and Technical Committee Findings for Recreational Size Limit Options to Protect Strong Year Classes

Projection Scenarios

The TC discussed the importance of developing stock projections to evaluate the potential impact on SSB and stock productivity of changing the size/slot limit, as compared to the status quo. While changing the size/slot limit may protect a year class from harvest in the near-term, the potential effects on long-term stock productivity need to be considered.

Projections were developed to compare the impacts of alternative size/slot limits on SSB over the next 12 years (timeframe allowing all three year classes of interest to reach age-14) by changing the selectivity for each size/slot limit.

In September 2021, projections were developed for the alternative ocean slot/size options assuming the Chesapeake Bay recreational measures would remain status quo (Table A-1). In December 2021, projections were developed for combinations of alternative ocean and Chesapeake Bay slot limits to compare to the status quo scenario (Table A-2). Each scenario uses a combined selectivity comprised of ocean and Bay length-based selectivity vectors for the size/slot limits of interest. This second set of projections focused on scenarios in which both the Chesapeake Bay and ocean size/slot limits changed from the status quo. As recommended by TC members, the projection scenarios highlight combinations of Chesapeake Bay and ocean size/slot limits that would protect the widest range of sizes from harvest in both the Chesapeake Bay and the ocean. For example, the combination of an 18” to <28” slot in the Chesapeake Bay with a 35” minimum size in the ocean would protect fish between 28” and <35” from harvest across both fisheries.

Table A-1. Ocean-only change projection scenarios and selectivity vectors developed in September 2021.

		Period			
		Add VI 2020-2022		Amendment 7 2023-forward	
Scenarios	**Description**	**Ches Bay**	**Ocean**	**Ches Bay**	**Ocean**
Status Quo 1	Ocean status quo slot (Ches Bay status quo)	selectivity from 2018 assessment	28-<35	selectivity from 2018 assessment	28-<35
2	Ocean min size (Ches Bay status quo)	selectivity from 2018 assessment	28-<35	selectivity from 2018 assessment	35 min
3	Ocean large slot (Ches Bay status quo)	selectivity from 2018 assessment	28-<35	selectivity from 2018 assessment	32-<40
4	Ocean narrower slot (Ches Bay status quo)	selectivity from 2018 assessment	28-<35	selectivity from 2018 assessment	28-<32

Table A-2. Chesapeake Bay and ocean change projection scenarios and selectivity vectors developed in December 2021.

		Period			
		Add VI 2020-2022		Amendment 7 2023-forward	
Scenarios	Description	Ches Bay	Ocean	Ches Bay	Ocean
Status Quo 1	Ches Bay status quo with ocean status quo slot	selectivity from 2018 assessment	28-<35	selectivity from 2018 assessment	28-<35
2	Ches Bay small slot with ocean large slot	selectivity from 2018 assessment	28-<35	18-<23	32-<40
3	Ches Bay small slot with ocean min size	selectivity from 2018 assessment	28-<35	18-<23	35 min
4	Ches Bay large slot with ocean large slot	selectivity from 2018 assessment	28-<35	18-<28	32-<40
5	Ches Bay large slot with ocean min size	selectivity from 2018 assessment	28-<35	18-<28	35 min

Projection Discussion

The projections were developed based on certain assumptions, including an assumption of fishing at constant F target for 2018 forward and assuming constant effort for all scenarios. Changes in effort associated with different size/slot limits cannot be predicted. If effort were to increase relative to the status quo in response to a size/slot limit change, SSB levels may be less than projected. If effort were to decrease relative to the status quo in response to a size/slot limit change, SSB levels may be higher than projected.

For 2020 forward, the projections use new selectivity values generated from the length-at-age analysis described above. These length-based selectivity values will be reviewed as part of the next stock assessment update, which will generate updated selectivity values based on new data years added to the stock assessment.

It is important to note that these projections assume both the commercial and recreational sectors adopt the alternative slot limits, due to the difficulty of developing sector-specific selectivity vectors. If only the recreational sector implements the new slot limits, the change in SSB would likely be less than the projection results indicate.

The projection analysis indicates the following key findings for all scenarios:

- The stock recovery timeline (i.e., the year SSB exceeds the threshold and the year SSB exceeds the target) is the same for all scenarios, including the status quo scenarios.
- The projected overall change in total SSB (all year classes combined) relative to the status quo is positive for most scenarios (Table A-3; Figures A-1-2); however, the

percent change in total SSB is not statistically significant since it falls within the confidence interval of the SSB estimates from the status quo projections.

- Under all scenarios, the 2015 year class will have a higher contribution to stock productivity than the 2017 and 2018 year classes.
- The projected change in year-class-specific SSB (total SSB for each year class over time) relative to the status quo is mostly positive with some negative changes for the 2015 year class SSB for some scenarios (Table A-3; Figures A-3-4).
- These results indicate that changing the selectivity does not have a significant impact on rebuilding the stock if the F rate remains constant. If the goal is to expedite stock rebuilding, controlling the overall F rate is more important than only changing the selectivity.

The TC notes that for all scenarios, there is uncertainty around how angler behavior and effort will change in response to change in size/slot limit. Additionally, slot limits are associated with higher discards, particularly for narrower slot limits. A large minimum size limit could also result in higher discards. While discard mortality is included in the projections through the selectivity patterns, the projections assume that total effort is the same across all scenarios.

The TC emphasized that while these projections can inform a comparison between the relative impacts of different size/slot options, these projections are not intended to inform discussion about the recovery timeline for the stock. For example, the projection analysis indicates that all the scenarios evaluated in the projections, including the status quo, will result in the same stock recovery timeline; however, the estimated year in which SSB exceeds the target or threshold may change after additional data from recent years are incorporated into the assessment model during the next stock assessment update. If the Board would like to see projections to inform the stock rebuilding plan, the TC can be tasked to develop those projections as part of the next assessment update.

Table A-3. Percent change in median total year-class-specific SSB relative to the status quo and maximum percent change in total SSB (all year classes) relative to the status quo for projection scenarios developed for changing both the Chesapeake Bay and ocean size limits (green) and changing only the ocean size limit (blue) assuming implementation by both the commercial and recreational sectors. SQ=Status Quo.

	Chesapeake Bay and Ocean Size Limit Change Scenarios				**Ocean Only Size Limit Change Scenarios**		
Ches Bay	**18-<23**	**18-<23**	**18-<28**	**18-<28**	**SQ**	**SQ**	**SQ**
Ocean	**32-<40**	**35 min**	**32-<40**	**35 min**	**32-<40**	**35 min**	**28-<32**
2015 YC SSB	-2%	+11%	-2%	+11%	-4%	+6%	+4%
2017 YC SSB	+6%	+24%	+4%	+22%	+2%	+17%	+2%
2018 YC SSB	+14%	+35%	+9%	+29%	+8%	+22%	-0.5%
Total SSB	**+5%**	**+14%**	**+1%**	**+8%**	**+1%**	**+5%**	**-3%**

Note: If only the recreational sector implements the new slot limits, the change in SSB would likely be less than the projection results in this table.

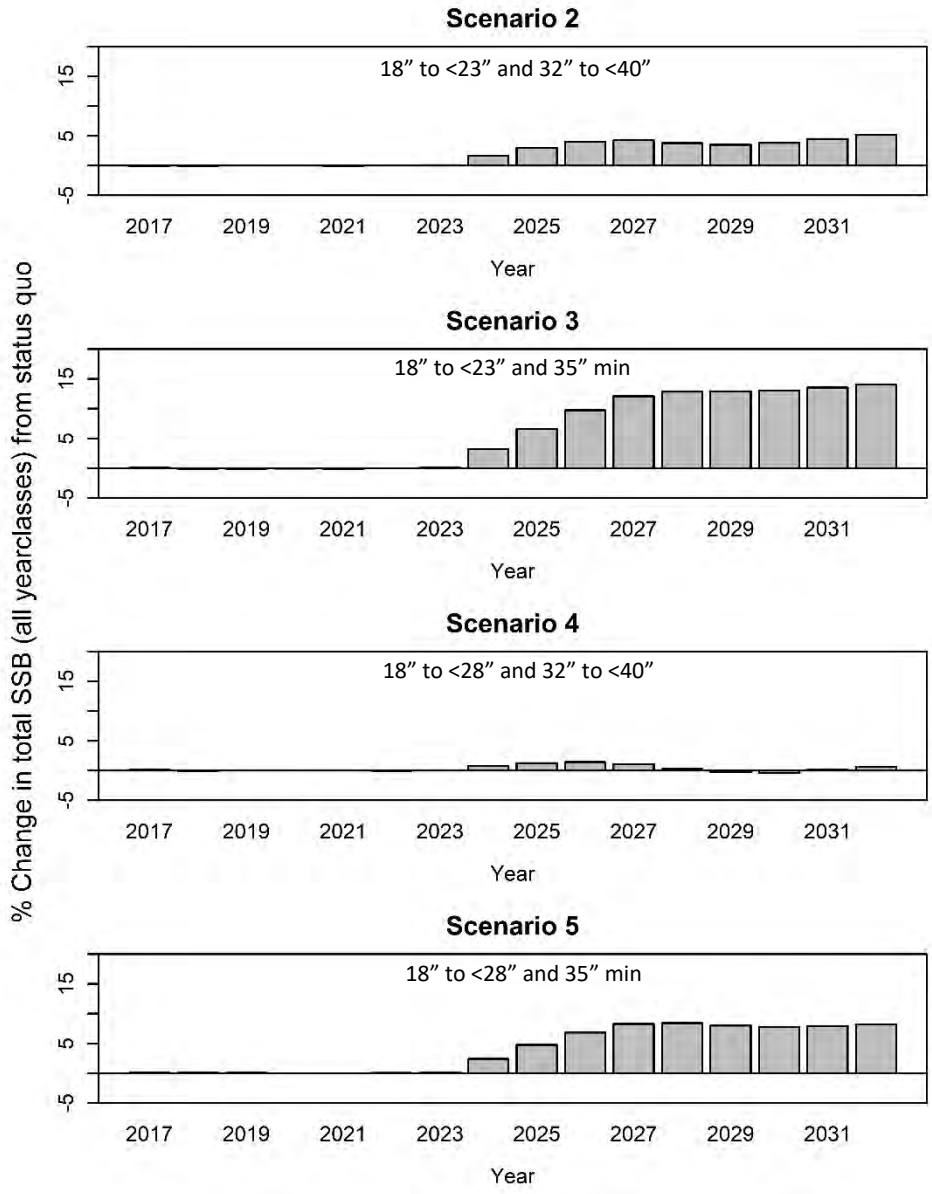


Figure A-1. Change in total female SSB for all year classes under scenarios 2-5 (Chesapeake Bay and ocean size limit changes compared to scenario 1 (status quo).

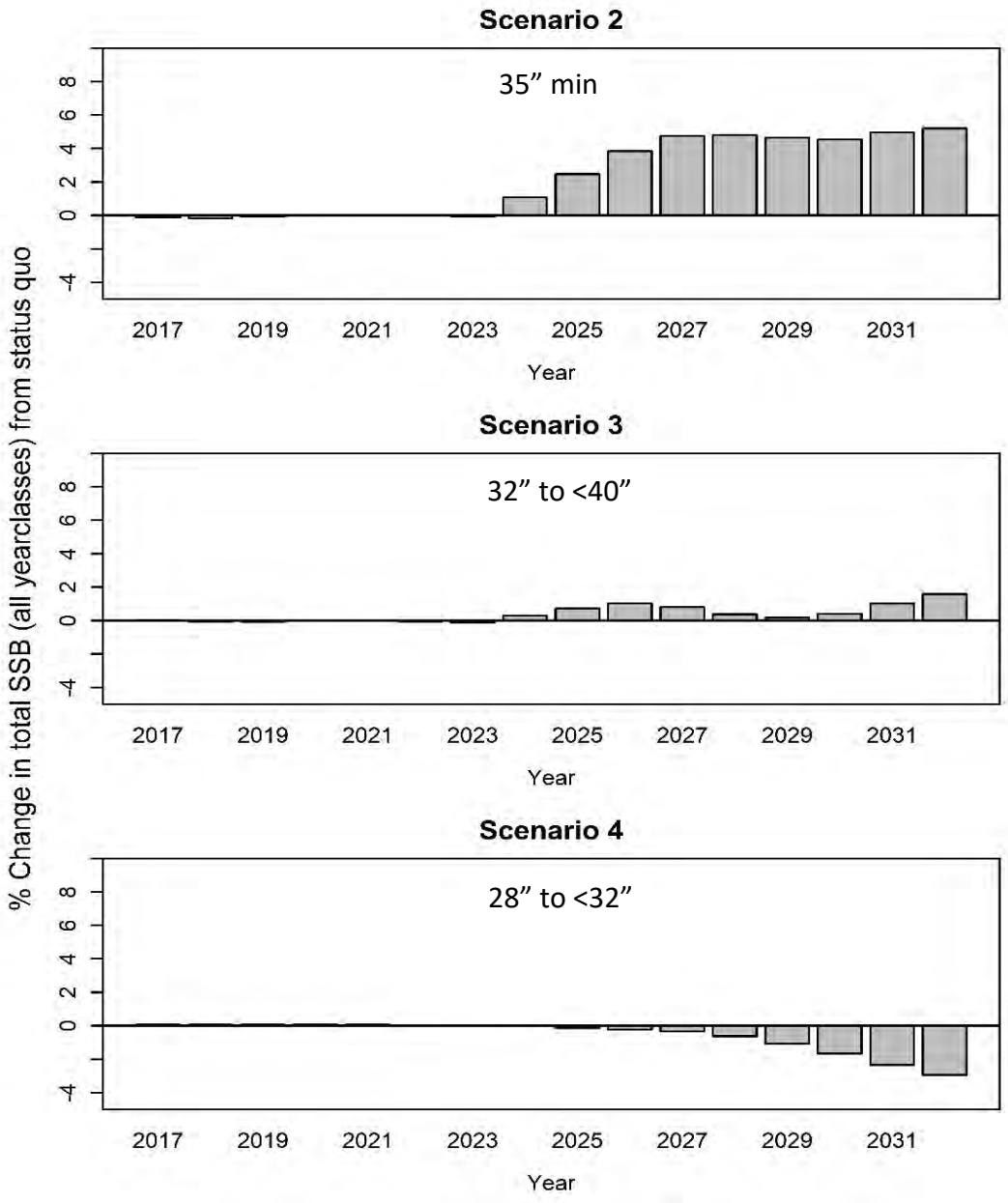


Figure A-2. Change in total female SSB for all year classes under scenarios 2-4 (ocean only size limit changes) compared to scenario 1 (status quo).

Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

January 27, 2022
8:30 a.m. – 12:00 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 (*M. Bell*)	8:30 a.m.
2. Board Consent • Approval of Agenda • Approval of Proceedings from October 2021	8:30 a.m.
3. Public Comment	8:35 a.m.
4. Update on 2020-2021 Atlantic Menhaden Mortality Events (*J. Brust*)	8:45 a.m.
5. Consider Draft Addendum I to Amendment 3 for Public Comment **Action** (*K. Rootes-Murdy*) • Advisory Panel Report (*M. Lapp*)	9:00 a.m.
6. Elect Vice-Chair (*M. Bell*) **Action**	11:55 a.m.
7. Other Business/Adjourn	12:00 p.m.

The meeting will be held via webinar, click here for details.
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

MEETING OVERVIEW

Atlantic Menhaden Management Board
Thursday, January 27, 2022
8:30 a.m. – 12:00 p.m.
Webinar

Chair: Mel Bell (SC) Assumed Chairmanship: 10/21	Technical Committee Chair: Josh Newhard (USFWS)	Law Enforcement Committee Representative: Robert Kersey (MD)
Vice Chair: Vacant	Advisory Panel Chair: Meghan Lapp (RI)	Previous Board Meeting: October 19, 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 October 19, 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 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. Update on 2020-2021 Atlantic Menhaden Mortality Events (8:45-9:00 a.m.)

Background

- 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

- 2020-2021 Atlantic Menhaden Mortality Events by J. Brust

5. Consider Draft Addendum I to Amendment 3 for Public Comment (9:00-11:55 a.m.) Action

Background

- 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 based on the Board work group report
- The PDT met multiple times from October to January 2022 to develop Draft Addendum I and recommendations for the Board's consideration.

• The Advisory Panel will meet in January to review the Addendum and provide input on options that should be considered in the document but have not been listed or developed.
Presentations • Overview of Draft Addendum I to Amendment 3 by K. Rootes-Murdy **(Briefing Materials)** • Advisory Panel Report by M. Lapp **(Supplemental Materials)**
Board Actions for Consideration • Approve Draft Addendum I to Amendment 3 for public comment

6. Elect Vice-Chair

7. Other Business/Adjourn

Atlantic Menhaden

Activity level: High

Committee Overlap Score: High (SAS, ERP WG overlaps with American eel, striped bass, northern shrimp, Atlantic herring, horseshoe crab, weakfish)

Committee Task List

- TC, SAS, ERP WG – various taskings relating to management response to the 2019 benchmark stock assessments
- TC,SAS, ERP WG- begin work to complete 2022 stock assessment update
- TC – April 1st: Annual compliance reports due

TC Members: Josh Newhard (USFWS, Chair), Corrin Flora (NC), Joey Ballenger (SC), Jason McNamee (RI), Eddie Leonard (GA), Jeff Brust (NJ), Matt Cieri (ME), Ellen Cosby (PRFC), Micah Dean (MA), Kurt Gottschall (CT), Caitlin Craig (NY, Vice-Chair), Shanna Madsen (VMRC), Chris Swanson (FL), Ray Mroch (NMFS), Amy Schueller (NMFS), Alexei Sharov (MD), Jeff Tinsman (DE), Kristen Anstead (ASMFC), Kirby Rootes-Murdy (ASMFC)

SAS Members: Amy Schueller (NMFS, SAS Chair), Matt Cieri (ME), Micah Dean (MA), Robert Latour (VIMS), Chris Swanson (FL), Ray Mroch (NMFS), Jason McNamee (RI), Alexei Sharov (MD), Jeff Brust (NJ) Kristen Anstead (ASMFC), Kirby Rootes-Murdy (ASMFC), Joey Ballenger (SC)

ERP WG Members: Jason Boucher (NOAA), Matt Cieri (ME,ERP Chair), Michael Celestino (NJ), David Chagaris (FL), Micah Dean (MA), Rob Latour (VIMS), Jason McNamee (RI), Amy Schueller (NFMS), Alexei Sharov (MD), Howard Townsend (NFMS), Jim Uphoff (MD), Kristen Anstead (ASMFC), Katie Drew (ASMFC), Sara Murray (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC MENHADEN MANAGEMENT BOARD

Webinar
October 19, 2021

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

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for Pat Keliher (AA)
Sen. David Miramant, ME (LA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Nichola Meserve, MA, proxy for Dan McKiernan (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Conor McManus, RI, proxy for Jason McNamee (AA)
David Borden, RI (GA)
Justin Davis, CT (AA)
Rob LaFrance, CT, proxy for B. Hyatt (GA)
John Maniscalco, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
G. Warren Elliott, PA (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Lynn Fegley, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
Allison Colden, MD, proxy for Del. Stein (LA)
Steve Bowman, VA (AA)
Shanna Madsen, VA, proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Mel Bell, SC, proxy for P. Maier (AA)
Malcolm Rhodes, SC (GA)
Sen. Ronnie Cromer, SC (LA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Erika Burgess, FL, proxy for J. McCawley (AA)
Marty Gary, PRFC
Max Appelman, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Joshua Newhard, Technical Committee Chair
Matt Cieri, ERP Work Group Chair

Staff

Bob Beal
Toni Kerns
Laura Leach
Lisa Carty
Maya Drzewicki
Tina Berger
Pat Campfield
Emilie Franke
Lisa Havel
Chris Jacobs
Jeff Kipp
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Caitlin Starks
Deke Tompkins

Guests

Karen Abrams, NOAA
Bob Andersen
Steve Atkinson
Pat Augustine, Coram, NY
Jerald Ault, Miami Univ
Alan Bianchi, NC DENR
Rob Bourdon, US FWS
Jeff Brust, NJ DEP
Andrew Cathey, NC DENR
Mike Celestino, NJ DEP
Matt Cieri, ME DMR
Heather Corbett, NJ DEP
Nicole Lengyel Costa, RI DEM
Jessica Daher, NJ DEP
Lennie Day
Jeff Deem
Taylor Deihl, Omega Protein
Montgomery Deihl
Greg DiDomenico
John Duane
Bill Dunn
James Fletcher
Tony Friedrich, SGA
David Frulla, Kelley Drye

Guests (continued)

Jeanne Fuller
Alexa Galvan, VMRC
John Gans, TRCP
Pat Geer, VMRC
Shaun Gehan, Gehan Law
Lewis Gillingham, VMRC
Jim Gilmore, NY (AA)
Angela Giuliano, MD DNR
Pam Lyons Gromen, Wild Oceans
Brendan Harrison, NJ DEP
Hannah Hart, FL FWC
Marin Hawk, MSC
Matthey Heyl, NJ DEP
Jaclyn Higgins, TRCP
Helen Takade-Heumacher, EDF
Peter Himchak, Cooke Aqua
Carol Hoffman, NYS DEC
Jesse Hornstein, NYS DEC
Asm. Eric Houghtaling, NJ (LA)
Michael Jarbeau
Jeff Kaelin, Lund's Fisheries
Carrie Kennedy, MD DNR
Adrienne Kotula, Ches. Bay Comm.
Ben Landry
Wilson Laney
Tom Lilly
Tom Little, Ofc. Asm. Houghtaling
Chip Lynch, NOAA
Genine McClair, MD DNR
Dan McKiernan, MA DMF
Kevin McMenamin
Jason McNamee, RI (AA)
Steve Meyers, Williamsburg, VA
Drew Minkkinen, US FWS
Chris Moore, CBF
Patrick Moran, MA DMR
Lindsey Nelson, NOAA
Robt. Newberry, DelMarVa Fisheries
Bradley O'Bier, NOAA
Gerry O'Neill, Cape Seafoods
Derek Orner, NOAA
Alexis Park, MD DNR
Nick Popoff, FL FWS
Will Poston, SGA
Jill Ramsey, VMRC
Harry Rickabaugh, MD DNR
Jocelyn Runnebaum, TNC
Amy Schueller, NOAA
Tara Scott, NOAA
Alexei Sharov, MD DNR
Ethan Simpson, VMRC
Melissa Smith, ME DMR
Somers Smott, VMRC
Rene St. Amand, CT DEEP
David Stormer, DE DFW
Jim Uphoff, MD DNR
Chris Uraneck, ME DMR
Beth Versak, MD DNR
Mike Waine, ASA
Meredith Whitten, NC DENR
Kate Wilke, TNC
John Williams
Wes Wolfe, *The News-Leader*
Chris Wright, NOAA
Horace Wynn
Sarah York, NOAA
Darrell Young
Phil Zalesak
Erik Zlokovitz
Rene Zobel, NH FGD

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Tuesday, October 19, 2021, and was called to order at 1:15 p.m. by Chair A.G. "Spud" Woodward.

CALL TO ORDER

CHAIR A.G. "Spud" Woodward: Good afternoon, everyone, this is Spud Woodward, Governor's Appointee from the state of Georgia and Chair of the Atlantic Menhaden Management Board. I'm going to call our October 19, 2021 meeting to order. Unfortunately, we're once again doing this virtually, which has been a test of all of our patience.

I know hopefully there is a bright light on the horizon, and maybe this will be the last time we have to do this in a virtual format. I'll do my best to keep us moving. Before we have approval of the agenda, I just want to make a couple of comments on and affirm that in the interest of hopefully keeping things flowing smoothly this afternoon we have until 5:15 allocated for this meeting.

We've got a couple of agenda items, both of which can consume a vast amount of time. What I would like to do on our Number 4 agenda item, is hopefully limit that discussion to about 2:10, 2:15. This will be the third time when we've actually seen information, and then the second time we've had some discussion.

In fact, there is about 11 pages in our proceedings from our last meeting, where we discussed this agenda item. Certainly, don't want to constrain the discussion, but hopefully we can move forward. I know the TC and the ERP Workgroup would certainly like for us to make a decision at this meeting. If we just can't reach consensus or something close to it, we can certainly move this forward to the next meeting. But I would like for us to do that if possible.

After a break we'll go into a progress update on the development of Draft Addendum I to Amendment 3. We've got a couple hours allocated for that. What we really want to do with this is we're going to present an overview of it, go through each item, then take some general questions about the overview.

Then sort of work our way back to the beginning and start dealing with each item individually, because there is a series of questions. Unfortunately, you didn't get this until last week. I wish everybody had a little more time. We will certainly give it the amount of diligence that we need.

MODIFICATIONS TO AND APPROVAL OF AGENDA

CHAIR WOODWARD: With all that said, are there any recommendations for modifications to the agenda? If so, please raise your hand.

MS. TONI KERNS: I see no hands, Spud.

CHAIR WOODWARD: All right, thank you, any objection to the agenda as presented?

MS. KERNS: I see no hands.

CHAIR WOODWARD: All right, we'll consider the agenda adopted by unanimous consent.

APPROVAL OF PROCEEDINGS

CHAIR WOODWARD: Next item will be approval of the proceedings from our August, 2021 meeting. I've pointed out at least one thing to Kirby that was a minor change, but are there any modifications or edits, corrections to the proceedings that need to be made a matter of record?

MS. KERNS: I see no hands.

CHAIR WOODWARD: All right, will there be any objections to accepting the proceedings as presented in the briefing materials?

MS. KERNS: I see no hands.

CHAIR WOODWARD: We will consider the proceedings adopted by unanimous consent.

PUBLIC COMMENT

CHAIR WOODWARD: This is a time on the agenda for public comment. Kirby, we have at least one person who would like to make comment, is that correct?

MR. KIRBY ROOTES-MURDY: Yes, that is my understanding. We had Tom Lilly, who has indicated he wants to provide public comment.

CHAIR WOODWARD: All right, Mr. Lilly, and again just a reminder. This is an opportunity for comment for things that are not on the agenda for this meeting. We're pretty busy, so I'll certainly allow you three minutes to comment, and we've got a time keeper up there on the screen. If you'll proceed.

MR. KERNS: Spud, just really quick. I just want to let you know that you have three folks with their hands raised, Tom, Phil Zalesak and Captain Robert Newberry.

CHAIR WOODWARD: Okay, well we will take them in order then. All right, go ahead, Mr. Lilly.

MR. TOM LILLY: All right, Board members, will you please start the process today, to make sure the menhaden schools coming into the Bay in the spring and summer to feed our striped bass spawning stock and ospreys, are protected from the eight to ten purse seiners that target them. It's a question. That's the time of year when our spawning striped bass are in the Bay.

They need the high energy of menhaden, and the extra demands of spawning. As you know, any other prey is a poor substitute. That these fish, according to Chesapeake Bay Foundation and Director Beal, are in poor condition, malnourished. Menhaden in their diet has declined from 70 percent to 8 percent. You should know that the Maryland juvenile survey counts are the lowest in 55 years. The Bay cap does nothing, nothing to protect this vital forage. It operates if at all, after all the damage that is done. This continuing and worsening spawning situation failure is harming millions of people in each of your states. It's not just Maryland's problem. Ask yourself this, am I standing by while one or two delegates are blocking what you know and what I believe every person in Maryland that values Chesapeake Bay knows that action needs to be taken to solve this problem right now.

Just going along for the last 50 years has gotten Chesapeake Bay in the shape it's in right now. Both the spring/summer menhaden and at least 50,000 metric tons of forage are now being taken directly from the Bay's food chain. This can be protected by moving the purse seine fishing into the U.S. Atlantic, just as every state but Virginia has done.

If you do this, three owners of the purse seine boats in Virginia will still be getting 150,000 metric tons of free menhaden. They will be getting three times as much menhaden as all the other fishermen in all the other Atlantic states combined. If the Board acts at this meeting to start a process to protect the flow of forage in the Chesapeake Bay, and protect the forage base that that creates, this day, Tuesday, October 19, will go down as a very good day for Chesapeake Bay. Thank you.

CHAIR WOODWARD: Thank you, Tom. I appreciate you keeping it within the time. Next up Phil Zalesak, go ahead.

MR. PHIL ZALESAK: Chairman Woodward, I just have one question. In support of what Tom Lilly just said, what are you going to do about the destruction of the Chesapeake Bay marine environment today, not five to ten years from now? I see no science which supports removing over 26 percent of the Atlantic coast total allowable catch of Atlantic menhaden from the Virginia portion of the Chesapeake Bay.

I see no empirical data indicating a vibrant commercial harvest of key predators of Atlantic menhaden in the Chesapeake Bay, such as striped

bass, bluefish, and weakfish. I have read Commission science that says there are not enough Atlantic menhaden on the Atlantic coast to ensure the survivability of key predator fish, such as striped bass, bluefish and weakfish.

I have read the letter from Dr. Brian Watts from William and Mary to the Governor of Virginia, stating that there are not enough Atlantic menhaden in the main stem of the Chesapeake Bay to feed the osprey. The conclusion was based on 50 years of research. I've seen the data documenting the steady decline in commercial catch in striped bass, bluefish and weakfish in the Chesapeake Bay, as documented by Maryland, Virginia, and the Potomac River Fisheries Commission.

I've seen data documenting the steady decline in commercial fishermen in both Virginia and Maryland, as documented by the Maryland Department of Natural Resources and the Virginia Marine Resources Commission. You, as Chairman, are responsible for leading the Board and focusing on strategic matters.

Your first order of business is to end the destruction of the Chesapeake Bay marine environment. Are you going to put forth a motion to end reduction fishing in the Virginia waters as other states have done, and start a discussion based on science and empirical data, yes, or no? The benefits where this has occurred have been enormous. Commissioner Woodward, I yield my remaining time for response from you.

CHAIR WOODWARD: Thank you, Mr. Zalesak. However, I guess my response would be that this is a public comment period, certainly not a question-and-answer session. I will refrain from any sort of response. I do appreciate your passion and your commitment to this issue, and I assure you the Board takes very seriously the issues of the Bay and the menhaden within it. Our next commenter is Captain Robert Newberry.

CAPTAIN ROBERT NEWBERRY: Captain Robert Newberry, Chairman of DelMarVa Fisheries here in Maryland. I've been hearing there has been a lot of doom and gloom talked about the Chesapeake Bay. We represent the menhaden fishermen, which is a stationary fishery here in the state of Maryland.

We do not hunt and chase. A few do gillnet, but the majority of it are pound netters. Over the past several years, yes, our catch, we've had to leave a little bit on the table. But that is because our market has basically been kind of sidelined for us. You know the majority of our fish were going to the New England states, and now with this episodic event going on up in Maine, it's really hurt our market.

I would certainly hope that this Commission would also take a look at the financial side that is adversely affecting our menhaden fishermen. The comment on the health of the Chesapeake Bay. I also run a charterboat, and represent many people in the charterboat industry, and we've had a good fishing season this year in the Chesapeake Bay. Once again, it's gotten better, even with the pandemic moneywise for the charter fishing.

But the health of the fish seems to be in a good shape. We understand that there is a low amount of young of the year index this year, but that could be because of the change in the climate that we're experiencing right now, and we will address that with the department. But to hang it on the hat of saying that the menhaden fishery in Virginia is affecting and adversely affecting the Chesapeake Bay. I've got to firmly and very honestly disagree with that, because it does not affect my menhaden fishermen in any shape, form or manner.

There are days that they catch them and there are days that they don't catch them, because they are not a hunt and chase fishery. But knowing the upper Bay and the Chesapeake Bay like I do; I am seeing loads and loads of fresh year class and two-year class menhaden. As far as the poor ospreys, we've got more ospreys, just for example on my farm we've got eight nesting pairs, and we picked up two more eagles this year. I just can't see that

there is all this doom and gloom about the Chesapeake Bay.

I know that the Commission will move forward in a good move to address the problems. But everything in the science we're seeing is it's a sustainable fishery, and I think blaming the state of Virginia for decimating the Chesapeake Bay, and not addressing the real problem with pollution that we have, specifically in the upper Bay is the main issue, and I thank you very much for letting me comment, and you all have a good day, thank you.

CHAIR WOODWARD: Thank you, Captain Newberry, we appreciate it. All right, Toni, Kirby, anybody else in the queue that want to comment?

MS. KERNS: That's it, Spud.

PROVIDE GUIDANCE TO THE TECHNICAL COMMITTEE AND ECOLOGICAL REFERENCE POINTS WORK GROUP ON THE PRIORITIES FOR COMPLETING THE NEXT BENCHMARK STOCK ASSESSMENT

CHAIR WOODWARD: All right, I appreciate it. Thanks everybody for the comments, thanks for keeping within your allotted time. I do appreciate it. Our next agenda item is Providing Guidance to the Technical Committee and Ecological Reference Points Work Group on the Priorities for Completing the Next Benchmark Stock Assessment.

As I mentioned earlier, I had an opportunity to look at a lot of background material. We've had some pretty robust discussions about it. Obviously, this is a challenging thing for the Board to come up with, you know a consensus opinion. We all want to advance ecosystem-based management. We certainly want to maintain our forward progress on the use of ecological reference points for Atlantic menhaden.

But we also have to be cautious and not let our ambitions overwhelm our reality. I know Dr. Cieri has got a presentation for us that I think maybe will help us focus our questions today, so that we can give guidance back to the TC and the Working Group the guidance they need, so that they can move forward. With that, Matt, are you ready to go?

DR. MATT CIERI: Yes, I think so. My name is Matt, I'm a scientist in the Maine Department of Marine Resources, and I'm also the Chair of the Ecological Reference Point Working Group. To get this ball rolling, as you guys know, in our peer review document, as well as in the assessment document itself, there was a research recommendation to develop a spatially explicit model.

Back in 2021 in the winter, you guys asked us to really provide further details, including the data needs, timeline for development and implementation, you know as well as whether or not a spatial model will help resolve some of those vexing questions that you guys have on regional based management and Chesapeake Bay management questions.

We came back and gave you a preliminary list of potential spatial approaches that covers like a wide range of spatial complexity and data needs. With different levels of sort of management support to give you guys an idea of what could be provided, as far as to support the management. I will say that all of these data needs, the model considerations, and everything that we put out, you know is subject to our current understanding of feasibility, based on what we know currently. This can be subject to change.

The approach, or probably the best approach to help you guys make informed decisions is kind of going to depend on your goals, you know as well as the data and funding that goes along with it. Well, again, as you guys remember from the memo, the goals from the other presentations. We've got a whole range here.

You know from four spatial models with minimal data requirements, to much more fine scale, needing a lot more information on diet and that kind of information. There is a range of approaches as you go through that. As you go from coarser to more fine scale, you know there is that potential for increased cost as well as increased time involved for getting this kind of stuff done. Getting an idea of your objective is going to help us move both. Whatever is the most appropriate approach that is ultimately going to be the most useful for you guys. To get right down to it, I'm going to ask you guys a series of questions.

I'm going to pause after each question for you guys to discuss, and so that we can get a better handle on what your goals and objectives really are, and so that we can move forward with the best tool that is going to be useful for you guys for making a decision. Question Number one, are you guys interested in a spatially-explicit model for menhaden, at any time, any scale? Is anybody really opposed to having a spatially explicit model for that? I'll let you guys discuss that for a minute.

CHAIR WOODWARD: All right, we've had a question posed to the Board. I will open it up for responses to this question. If you'll raise your hand, Toni will be monitoring hands and I'll be doing my best to make sure I get them in the proper order.

MS. KERNS: I'm waiting for that onslaught of hands to come to us, Spud. All right, we'll start with Conor McManus.

CHAIR WOODWARD: All right, go ahead, Conor.

MR. CONOR McMANUS: I guess simply put; I would be interested in such an effort. I see there is value in better capturing the dynamics for the stocks in doing so, without turning it too much into another question. I suppose it comes down to just priorities, and doing so at the expense of what other tasks we may have coming up, whether it's future benchmarks, future reference point workgroup work on alternative models, revisiting ones that have been looked at in the past. In simple terms, yes, but I guess it would depend on the priorities.

DR. CIERI: Yes, we've got other questions to go through to hopefully help nail some of that other stuff down. But this is a base level question. Is anybody really opposed to doing a spatially explicit model for menhaden?

MR. McMANUS: Great, thanks Matt. I guess my answer would be yes.

MS. KERNS: A few more, Lynn Fegley and Rob LaFrance.

CHAIR WOODWARD: Go ahead, Lynn, and then Rob you're next.

MS. LYNN FEGLEY: Thank you, Matt, and hopefully we'll be able to get through, I know we want to do this quickly. I think in my mind the answer is, I certainly would not be opposed to a spatial model. But I guess what I would like for you to maybe help us understand is. I know since the benchmark.

You know the scientists have been talking about adding seasonality and some spatial components to the model, to better refine the estimates, especially in relation to the overlap of menhaden with Atlantic herring. I guess in my mind I'm trying to understand what, so if you guys have your head and you wanted to keep this thing on schedule, in other words not delay the benchmark. What kind of spatial component, spatial seasonality would you be able to add, and what sort of increased resolution would that give us?

DR. CIERI: I think that would probably be informed by my next series of questions. After we get this sort of thing out of the way. You know we can talk a little bit more about what we're planning on and what we're thinking about. You know as far as where we see this direction needs to get. You're correct, we're definitely considering seasonality affects, or whether or not that translated into

spatial resolution is something that we certainly can discuss.

But for now, I think I want to focus everyone in on kind of a yes or no question. Is there anyone really opposed to pursuing this spatially, first of all? If not then we can move on. If you guys don't want to do this, we can end the presentation and I can go have a slice of pizza. But for right now, this simple question will get into how much, if you guys do want a spatially explicit model, we can get into the kind of tradeoffs of what that will be in our next couple of questions.

CHAIR WOODWARD: Maybe I can help put us back on track with this. Before I call on you, Rob, does anyone on the Board have serious reservations or opposition to moving forward with some level of spatially explicit modeling? If so, raise your hand and express your concerns.

If not then we will assume that some level of spatially explicit modeling integrated into the current approach is the will of the Board. Rob, you had your hand up so go ahead. I'll call on you after that. I'll be looking for raised hands from those who have concerns about using some sort of spatially explicit component.

MR. ROBERT LaFRANCE: I think we're going to ask Matt not to have pizza, and continue his work and move forward here. That is all I wanted to say. I just think it's really important to get the spatially explicit model, so we understand the dynamics of this fishery, certainly with regard to where it moves given climate change.

CHAIR WOODWARD: All right, Toni, got any hands?

MS. KERNS: I have no hands.

CHAIR WOODWARD: Okay, I think that answered your question, Matt, so let's move on.

DR. CIERI: Excellent, yes. This is the problem that actually working from home is you are right next to your refrigerator. This one is a little bit more of a detailed question. Are you guys willing to delay the next benchmark in order to explore spatially explicit models for menhaden? To give you guys a clue, our next benchmark is in 2025.

Before that we're doing an update of the single-species model in 2022. We will start doing a benchmark right after that in 2023. The 2025 benchmark for both the ERP model, as well as the single species model, lined up pretty well with a lot of these other species in the ERP model. The question for you guys is, do you want to delay that next benchmark in 2025? How long will depend on the answer to the next few questions, but do you want to delay that model, that benchmark assessment, in order to move forward with spatially explicit stuff? Before you answer that question, if you're not willing to delay the next benchmark, we will go ahead with the 2025 benchmark as we had planned, and we will consider spatially explicit stuff after that. As I alluded to earlier, we have some other things in the assessment model that we need to deal with.

In particular like Lynn brought up, you know the issue of seasonality to include Atlantic herring consumption, and some other aspect that we would like to take a closer look at before we bounce it off here. If the answer is yes to this question, then we're going to postpone this 2025 benchmark assessment.

We have further questions that we're going to ask you guys to help guide us in that process, so that we can try to figure out what's the best approach to get to the information. I'm going to stop here, and I'm going to let you guys have a discussion about whether or not you're willing to delay the next benchmark, how long that delay will be will be dependent on the answers that you have to the next few questions.

CHAIR WOODARD: Thanks, Matt, I've just got a question maybe that will help, of the Board. If we do not delay and we go forward, we will be

continuing to advance the use of ecological reference points for Atlantic menhaden, by refining the model and the data inputs that we're using. Is that a reasonable statement?

DR. CIERI: That is. As you guys know, we still have a lot of work, in particular with that spatial issue with Atlantic herring, but for some other things as well. We have plenty of work for the next benchmark, you know in addition to considering spatially explicit stuff, you know to begin with.

That is the reason that it's going to take us almost two years in the next benchmark. You've got to remember; we're updating a single species model with all the tweaks and bells and whistles that go with that. But also, you know we have to redo that ERP model, and so that will be an endeavor. It will mean that we will have to refine some of our estimates.

CHAIR WOODWARD: What I would like now is I would like to hear from Board members who are in favor of postponing the 2025 benchmark, in the interest of incorporating spatially explicit modeling elements. If you feel strongly that that is the right course of action, I would ask that you raise your hand and explain your position. Any hands, Toni?

MS. KERNS: I have no hands at this time. Wait, Tom Fote and then followed by Conor.

CHAIR WOODWARD: All right, go ahead, Tom.

MR. THOMAS P. FOTE: I just have a question. If we did not do the single species update, would that give us more time to get the 2025 in, without running over it to get the spatial planning?

CHAIR WOODWARD: Go ahead, Matt.

DR. CIERI: It will depend on your answer to the next few questions, largely, depending on how complicated of a model and a framework you want. The answer is possibly, but you also need to remember that the terminal year for that last benchmark is 2017, so it's getting old. I think you guys will be making management decisions by quotas. I would have to go back to the ERP and probably the TC to get a more definitive answer on that question.

But I will allow you guys to cogitate a little bit on that particular issue, 2017 is quite a long way, you know before getting an update of a single species. In general, depending on the choices that you have in front of you, it might be a while, even with not doing a single species. There is a lot of work involved, depending on your choices in the next questions. Does that hopefully answer your question, Tom?

MR. FOTE: As best as you can, I guess.

DR. CIERI: Yes, sorry. I mean I can't speak for the TC. We would have to ask. But unless there is a Katie Drew somewhere running around, or a Sarah who would like to answer that question off the top of their head.

MS. SARAH MURRAY: This is Sarah, I'll just chime in if I may, Spud.

CHAIR WOODWARD: Certainly, go right ahead, Sarah.

MS. MURRAY: I just want to note that in the timelines we laid out in the memo, which it may have been a while since folks worked at that with a fine-tooth comb. But the timelines for development for a lot of these spatial approaches, we're looking at something in the range of 5-7 years, and I will note that we only have well, a little bit over 3 years to go between now and 2025, I guess 4 if you push it to the end of 2025.

Based on the timelines that we worked with, with the ERP, I don't think the 2025 deadline was feasible. We could get maybe closer to that, but even if there was less work on the single species side, there is a lot of development that would be needed for ERP, based on their last assessment of

timelines, which again caveat that those are subject to change.

DR. CIERI: With that in mind, I think the crux is, not doing a single species assessment, and only do it by the year.

CHAIR WOODWARD: All right, Conor, go ahead.

MR. McMANUS: Matt, just one real quick question first, and sorry if you have said this and I missed it. If the answer were no, is the plan for the benchmark would be both the BAM and the Ecological Reference Point Working Group to go concurrently to evaluate the same suite of models for the ecosystem components that was done previously, or are we just speaking to the single species?

DR. CIERI: No, we're speaking about both the ERP models and the single species BAM model, so both models for the benchmark.

MR. McMANUS: Excellent, thank you. I guess to help the conversation. I guess my preference would be to not delay the 2025 benchmark. I think as we've talked about in a number of meetings now, we've seen changes in the dynamics of the stock in the last few years that are included in our inference for the species that I think are important to get updated information on as fast as possible.

As well as I would like to take another evaluation as time permits for the ERP working group model suite, and again take a look at some of the things we've learned about the seasonality and such for the EWE model, since it was brought forth to the Board a couple of years ago, and that further, again take another look at some of the models that we're using to base our ecological reference point decisions on. With that I would suggest, from my perspective it would be to not delay the assessment would be the best approach.

CHAIR WOODWARD: Any other hands, Toni?

MS. KERNS: No.

CHAIR WOODWARD: Okay Matt, I think you have an answer question that is pretty definitive.

DR. CIERI: Yes, excellent. Also, just to remind you guys, it's not like we're going to stop working on spatial issues. I mean we're going to go through this next benchmark, but we're hoping to work on more spatial issues for the following benchmark. It's not like this is going away forever, you guys will see it eventually.

With that kind of incentive sort of in mind, we can move to the next question. Given your consensus so far, you know the next couple of questions aren't really critical. But there is something for you guys to just sort of keep in the back of your mind, and in particular to sort of concentrate on as we go through this benchmark, and as we set up for the next benchmark.

The first of this question is, do you want Chesapeake Bay specific information to take precedence, or do you want a coarse spatial model that will include the Chesapeake Bay? The pros and cons of this type of an approach are, you know if we do something just for the Chesapeake Bay, a sort of simplified Chesapeake Bay approach might be done a little bit more quickly than something that is more regionally based.

Incorporating some of those coastwide spatial dynamics, in and of itself the reasonable approach for our ERP work, just to begin with. But getting at sort of an idea of whether or not you guys are interested in doing something that is just for the Chesapeake Bay versus the Chesapeake Bay and the region wide, would give us a better idea about timelines. Again, this isn't really critical, given your consensus on the last question, so I'll shut up now and let you guys talk.

CHAIR WOODWARD: A clarifying question on that, Matt. You were referring to what would be the next step after the 2025 benchmark. In other words, where would we go next, in terms of priority?

DR. CIERI: Right, and again, you guys don't have to come to consensus about this now, considering your answer to the last question. But it is something to keep in the back of your mind, for maybe for you guys to discuss a little bit.

CHAIR WOODWARD: Well, and also, I think it's very helpful, because one of the things that we continue to struggle with is, we need to be able to see ecosystem-based management with a lot of data. Nobody is just giving us money willy-nilly, and if we believe that some sort of Chesapeake Bay focused approach is necessary, I think that may help us focus funding requests, and maybe use some existing funds. With that I will open the floor for those who would like to comment in response to this.

MS. KERNS: Spud, you have Lynn Fegley, followed by Emerson Hasbrouck.

CHAIR WOODWARD: All right, go ahead, Lynn.

MS. FEGLEY: You actually read my mind and asked the exact clarifying question that I was going to. Now we know we're talking this question and refer to what will happen after the benchmark. I think a lot of that really depends on what sort of data gathering program, you know we can muster in the interim. I'll leave it at that and thank you for being an adept mind reader.

CHAIR WOODWARD: You're welcome. Go ahead, Emerson.

MR. EMERSON C. HASBROUCK: From my perspective, I think it's a little premature to ask this question and then to answer this question. I would rather revisit this question once we know what the next benchmark assessment shows. You know I don't want to provide some direction for something that is not going to happen for maybe two or three years from now, and then when we get there, we've got a different perspective on things. I think it's too premature to answer this question, thank you.

CHAIR WOODWARD: I appreciate that Emerson, and I think this is certainly not intended to be a binding recommendation from the Board, more than just a sense of the direction that the Board would like our scientific advisors to go with. Is that a correct way of phrasing that, Matt?

DR. CIERI: Yes, with the caveat of depending on the answer to the next question, along those lines is, the benchmark after this one, it seems like it's a long time to that, right? Except that you've got to somehow get funding for surveys and get them completed by the benchmark after next. Then you start talking about, you know that does become important.

As we move through this next question, we can sort of get an idea. It might take getting a survey off the ground, for example. In order to get if you're interested in the Chesapeake Bay then a survey may be required, and therefore we will need to start that well before the benchmark after that. Hopefully that, if you want this kind of stuff then we need to start thinking about it now, and finding the money.

CHAIR WOODWARD: Right, if you're going to build a house you've got to have materials. Any hands up right now, Toni? If not, I think maybe we would move to the next slide to help inform this discussion.

MS. KERNS: All of a sudden, we've got a bunch of hands. Steve Bowman, followed by Allison Colden, Max Appelman, and Emerson, I think your hand might be left over from before. Yes, it was, so Steve, Allison, Max. Go ahead, Steve.

MR. STEVE BOWMAN: Good afternoon, Mr. Chairman. As you well know, I've many times gone on record hoping for some more definitive information that we could gleam from the Chesapeake Bay, and this question hits right to the point. I was just going to wait until some of my very informed colleagues answered first.

But I think it would be a disservice to not be in keeping with the consistency that I've always

advocated for, and that is the need to understand the dynamic of what is going on in the Chesapeake Bay. The rest of the aspect for modeling of course from feed with it, but I really, honestly, and we've heard everything from what's so important about the Bay.

It would really, really be, at least from our perspective as we are now responsible at the Marine Resources Commission for managing the menhaden fishery in the Chesapeake Bay, for us to have the best science that we possibly can, and I think this is a step forward in that direction. I would certainly be in support of it.

CHAIR WOODWARD: Allison, go ahead.

DR. ALLISON COLDEN: I'm just wondering if there are some opportunities. I know the memo included a couple of interim options or indicator index type of options, and I'm just sort of wondering. In addition to identifying and getting additional surveys and data collection on the ground, are there other efforts that we could possibly dual track, maybe at the state level, in the interim while the benchmark is being developed?

I agree that it is important for that to move forward on time. I share Matt's concerns about the terminal year of the previous assessment, and being too far behind the eight ball there. But with respect to either, like ecosystem indicators or the aerial survey or, you know I think that there is an assessment that was funded for Chesapeake Bay specifically that has not moved forward. Would you recommend any of those options that could possibly be dual tracked, so that we could be ready with some other options at the state level before or soon after the next benchmark?

CHAIR WOODWARD: Go ahead, Matt, you can respond to that, or Sarah, whoever is most comfortable doing it.

DR. CIERI: We can. As we go through the next benchmark we certainly will talk about these types of issues. I think what's kind of really important though is, and we'll get to the data question a little bit later. But really, are you guys interested in just doing something for the Chesapeake Bay, or are you guys interested in doing something that will help you inform your regional allocations? I think that is what this question, to get us back on track. I think that is what this question really is trying to get at.

CHAIR WOODWARD: Okay, so with that sort of refreshing our perspective on it, I'll call on Max, and certainly would like to hear from anybody else in response to this. Go ahead, Max.

MR. MAX APPELMAN: I think Matt might have answered my question. I guess I'm getting a little confused on the timing of all of this, given I've heard a couple different things. On the one hand, given our last decision to not delay the benchmark, spatial modeling is really not going to be the focus of that benchmark.

But I think I heard that given what our answers are on these next set of questions, the TC and ERP Work Group will start working on some of that stuff. Although again, it's not going to be the focus of the next benchmark. Then I think I heard a little later that it's a much more stepwise fashion, where this will not be worked on in the interim, it will be preserved until after the benchmark is completed.

I guess I'm looking just for a little clarification, my own understanding. The guidance that we might be able to provide today is that even though we're not delaying the benchmark, is the ERP Work Group going to try to make some progress on that stuff during the next benchmark, so it's sort of more fluid, or is it really going to be this stepwise fashion? I think I heard the answer, but it's a little hazy.

DR. CIERI: Let's face it, we'll probably end up talking about it. My gut tells me it will probably end up being yet another research recommendation at the end of the next benchmark. Hopefully that we'll get some more direction for the peer review about how to do that and kind of accomplish that. The answer is in the form of it will be discussed.

We won't work on it, it won't part of the next assessment. Nobody is going to come up with a magical analysis last minute, hopefully that will resolve a spatial issue, so we won't be working on it. But if in the benchmark after next, you know given the answers that you guys had. Then we will start working on some spatial issues.

Prior to that we're going to meet to discuss things, depending on your answers to my questions, you know about sort of what that spatial component looks like, and how it can best fit into your management plan. You guys don't have to, you know as somebody suggested, you don't have to do this now. You can provide us input along the process, so that it becomes a lot more fluid. Does that answer your question, Max?

MR. APPELMAN: Yes, it does, thank you, Matt. I think just to hammer on that last point that I don't think the intent here is to not try to provide the input that you're seeking, just because we bought ourselves some time with our last decision, obviously we want to keep this thing moving forward, and give you guys as much intel as we can so you can get started with this next benchmark during the next benchmark.

CHAIR WOODARD: Toni, any raised hands?

MS. KERNS: We have two last hands up, Lynn Fegley and then Conor McManus.

CHAIR WOODARD: Go ahead, Lynn.

MS. FEGLEY: Thank you for letting me speak again. Just to step through this. Does the information for Chesapeake Bay take precedence? I would say absolutely yes. It's the biggest estuary on the east coast, and one of the most important nursery areas, of course it takes precedence.

But I don't think that it's really about regional allocation at this point. I think it's about understanding the dynamics of the fishery, so we understand the impact of menhaden harvest within the Bay. I think it's really about getting a better idea of the fishery and stock dynamic within the Bay, but that is going to take data.

We really are going to need new data streams to drive that. But think that that needs to be a priority from today. As for the simplified Chesapeake Bay only approaches that could take less time. I think without that additional data, what we're going to have if we go into this index-type management, which I'm not opposed to.

But that is going to be a bit of a value judgment. It's going to take a pretty intensive process to come to agreement on what sort of action you take with a given index outcome. I want to say that I really appreciate all of our public commenters, and I think what we've heard are a couple of very different perspectives about what is happening in the Bay.

That right there tells us that without really hard information, it's going to be not impossible, but difficult process to come to agreement, using sort of a traffic light approach if you will. Yes, the Bay should take precedence and we need data. Thank you.

CHAIR WOODARD: Before I go to Conor, when approximately would the next benchmark be after the 2025 benchmark?

DR. CIERI: If I'm not mistaken, and Kirby can probably or somebody else can probably correct me. I believe it's six years between benchmarks. Is that correct?

MS. MURRAY: Yes, that is correct, so that would be 2031, believe it or not.

CHIAR WOODWARD: Wow, okay. All right, Conor go ahead.

MR. McMANUS: Lynn spoke to a lot of the points that I was going to reinforce, but I just wanted to provide or let it be known that we use a similar standalone approach year-round for Narragansett

Bay, when it comes to managing what we would call menhaden management area within the Bay. It's a standalone analytical tool that could be of use, at least as an example for if there were interest in applying a similar approach to other estuaries. I guess I would just add that it does take data, and at that pretty fine temporal scale. If that was of interest, it probably isn't worth going through all the details of that here, but I would be happy to follow up with folks offline, so that the TC or what not can help relay some of that information for people to take a look at if it's useful. But again, the take home being that it does require a commitment to sampling the reef.

CHAIR WOODWARD: Toni, any other hands?

MS. KERNS: We have Tom Fote.

CHAIR WOODWARD: All right, go ahead, Tom.

MR. FOTE: Well, I'm just sitting here looking at timelines. I was going to ask the same question he just did, 2031. Well, let me see where we're going to be in 2031, it will be eight more years or nine more years of global warming. By 2031 we'll probably have a couple of thousand windmills out in the ocean at that time, if everything proceeds as we're going here.

Most of us sitting around the table, since I will be 85 in 2031, and a lot of other people that are younger than me will be retired by that point. It will be a whole new Board members handling these problems, so we are pushing it down the track. Sometimes you need to look at where we are and where we're going and how long it's going to take us to get there. Eight years from now, it's a long time.

CHAIR WOODWARD: Yes, yes, I agree. It's just pretty sobering when you think about that far into the future, when your outlook is out mature age, Tom. I know it's frustrating to folks who would like to see things change in what they believe is a necessary positive direction much quicker.

But I do think we have always hung our hat on quantitative Bay science the best we can, and admittedly that we implemented a Bay Cap out of the precautionary measure. Okay, just in the interest of moving forward, is there anybody that has strong opposition to maybe focusing on this simplified Chesapeake Bay approach for the rest of the discussion?

MS. KERNS: I see no hands. No hands for that.

CHAIR WOODWARD: Okay Matt, do you have what you need to move along?

DR. CIERI: Yes. Speaking of data. This sort of gets back to the sort of funding priorities. If you're looking at a Chesapeake Bay specific information, we're going to need to fund abundance surveys that include the Chesapeake Bay. If we're moving more towards a coastwide spatial information is desired, then we'll have to fund some spatially explicit diet data to do that

The funding for model development may shorten our timeline, based to the more money you throw at this problem the shorter the timeline. This is question 4, sorry. Question 4 comes around, you know is a rough approximation of Chesapeake Bay, based on historical tagging going to be sufficient, or are you guys going to want updated specific Chesapeake Bay information? The reason why this is really important is, you know the historical tagging information is great, but it's a little long. Chesapeake Bay specific information recent is going to require funding and new abundance surveys to provide that data to, and if we're going to be doing that, even though it seems like it's eight years away, we're going to have to start thinking about what those surveys look like, and who is going to pay for them, probably fairly soon.

CHAIR WOODWARD: I think I probably know the answer to this question, but I will certainly offer the Board opportunity to weigh in on this. Just a little heads up, we're encroaching in on our planned first break. I don't want to rush anybody, but we are winding down. But this is where the rubber hits the

road here. If you've got a comment in response to this, please raise your hand.

DR. CIERI: With that caveat again, this isn't going to be binding for this assessment, and if you guys can't really decide right now that's okay, we'll profit off this program.

MS. KERNS: I don't have any hands.

CHAIR WOODWARD: I think folks are as committed as they want to be, Matt.

DR. CIERI: That's okay.

CHAIR WOODWARD: On behalf of the Board, I do think that we're always interested in the most recent information that can be acquired, and that what the Board really needs is where are the priority data needs? What exists now that could be continued or enhanced? What needs to be started that hasn't been or ever been, or hasn't been done for a long time? We can apply our efforts to get in resources necessary to do that.

DR. CIERI: That's a really good point, what I will bring up is something the Chair has prodded me to say. To the effect of, if this is important. If getting recent research information to inform this sort of approach is something that you guys want, you need funding sources. We need people's time in order to be able to do this kind of stuff. That is the other thing to keep in mind. It might be good to say that you want the most recent spatial information possible, but we're not going to be able to bring that to you if there is not a funding source identified for it.

CHAIR WOODWARD: All right, thank you. Matt, are you comfortable with where you are with Board input?

DR. CIERI: I think so. We can just skip to the next slide and just throw out the questions, unless sorry I overrode Toni.

CHAIR WOODWARD: Go ahead, Toni.

MS. KERNS: I just had one hand up with a question from Robert LaFrance.

CHAIR WOODWARD: All right, go ahead Rob.

MR. LaFRANCE: I just wanted to kind of relay my interest in finding out more, and making certain as we look at this, we look at the experience in Rhode Island in the Narragansett Bay. I think there may be some really good information they've been working in that program. I'm so happy to hear we put that on the table. I just want to support us looking at that as we start to think about the Chesapeake Bay. Narragansett/Chesapeake Bay, I think there is some potential good overlap between the two.

DR. CIERI: Yes, Jason McNamee is on our committee, so he's been harping on this too. We'll definitely take a look at this.

CHAIR WOODARD: All right, Matt, what do you need to wrap us up here?

DR. CIERI: If we can move two slides forward. That is the end of the presentation. I want you guys to ask any other further questions that you guys have, and other than that I'm done.

CHAIR WOODWARD: All right, thanks, Matt, it's been good. That really helped us focus in on the decisions we needed to make. I appreciate the Board's forbearance and participation in this. Are there any last questions for Matt? Here is your opportunity to.

MS. KERNS: We now have Justin Davis and Roy Miller.

CHAIR WOODWARD: Go ahead, Justin.

DR. JUSTIN DAVIS: Matt, to summarize. If between now and when the technical group was ready to begin working on the next benchmark. If no new data were collected, no new data programs were started, no new studies. Would it be fair to say that the only thing that might be able to be done is that coarse spatial BAM with the coastwide ERPs, which

if I read the memo correctly could be attempted with existing data?

But it would not provide resolution of the Chesapeake Bay separate from Maryland and Virginia coastal waters, and obviously wouldn't include any new information about abundance in Chesapeake Bay. I mean, I guess that is my first question. No new data are generated, no new studies are started. Is that the only possibility? Then, to what degree would you think that approach would be useful at all in answering questions about localized depletion in Chesapeake Bay, or the appropriateness of the Bay Cap?

DR. CIERI: Yes, you're pretty much on track. We'll try to do something, based with whatever data that we have it in from the benchmark after next. But we will be hamstrung by the amount of data. Ultimately, whatever we come up with will have to pass the peer review, which is a fairly high ball.

I don't want to rule anything in or anything completely out, if you understand where I'm going. Well, we'll have to get there when we get there. But if you guys want something that is more spatially explicit, particularly for the Chesapeake Bay, then we need to start thinking about what data streams we need to get them. Hopefully that answers your question.

DR. DAVIS: Yes, thanks, Matt.

CHAIR WOODARD: All right, Roy, go ahead.

MR. ROY W. MILLER: I confess, Mr. Chair, the more I've listened to this the more I'm getting some cold feet, or maybe it's buyers' remorse. I'm just wondering, until 2025 and then another six years beyond that. Since I'm in the same year class that Tom Fote is, I won't be around probably for that 2031 assessment. Between now and then, are we annually going to struggle with the question of what is an appropriate Chesapeake Bay quota? How do we answer questions raised by advocates like Tom Lilly and Phil?

How do we answer those questions between now and then? Now, I was interested in the response of Justin Davis's question, and I think Matt gave me a little more assurance that we're not totally going to ignore these questions between now and then. Anyway, I just wanted to say that I'm somewhat uncomfortable with delaying everything until 2031, with regard to Chesapeake Bay. Thank you

MS. KERNS: Spud, I have Bob that might be able to address this 2031 question.

CHAIR WOODWARD: All right, go ahead, Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: All this talk about 2031 is kind of getting depressing. The benchmark timeline that the Commission uses, you know it's a five- and six-year trigger. We try not to go much more beyond that without making sure we do a benchmark for all the species.

That's really just to distribute the work and sort of the realization that anything significantly shorter than that, maybe the data hasn't changed and the world hasn't changed very much, so it probably doesn't make sense to do benchmarks more frequently. But you know that timeline is variable.

If the Policy Board thinks that they want a benchmark in three years following the next benchmark, and the technical folks think they can get the spatial work completed in that time, then we can prioritize that and make it work. A six-year number is just a guideline to give, to make sure we address all of our species.

But there is the ability of the technical folks to get the work done, and the interest of getting it done faster, then that is up to the Policy Board to prioritize that. We can speed things up and maybe have a couple Commissioners still at the table. But I get that 2028 versus 2031 is not that different, but there is some flexibility in the system, I guess is my point.

CHAIR WOODWARD: Thanks, Bob. That was a useful perspective. Just to bring us back to reality is that we've got to have data collection processes in place, and sustain them to produce the kind of data inputs that are necessary for this type of management approach. We've talked about that for years and years about a lot of our other management plans, is that we always fight to maintain existing data collecting processes, and to add new ones as science evolves. You know to me that is where I see the biggest limiting factor is are we going to have the data we need for the Technical Committee and the ERP Work Group to do what we expect of them? With that I will be quiet. Any further questions for Matt?

MS. KERNS: I have Dennis Abbot, and Tom Fote, I don't know if you're a leftover hand or not, Joe Cimino. Then I have a member of the public.

CHAIR WOODWARD: Go ahead, Dennis.

MR. DENNIS ABBOTT: I was interested in Tom Fote's remarks about how old he will be in 2031. In 2031 if I'm fortunate, I'll be 91, so I don't expect to be having any part in this final decision-making process. However, it seems to me that the very fact that we're even looking at the Chesapeake Bay and populations of menhaden in the Bay, and listening to the remarks of Tom Lilly and Phil Zalesak.

Just the fact that we're doing this, to me is admitting that there is a problem in the Chesapeake Bay, and if there isn't a problem in the Chesapeake Bay, if people believe that, then why are we even doing this? If we do believe that there is a problem in the Chesapeake Bay, I think we should be taking some more immediate action to change things there, as opposed to waiting five to ten years down the road to come up with something.

We're living in such a world now, as Tom says with climate change. The decisions that we make are always going to be subject to further change. Matt talked earlier about, what do you want? Do you want something rough? Well, how do you describe rough or better or best, or whatever? We will never have the best science.

We're always going to be at some intermediate point. I think that at some point we have to make some practical decisions about what we should do in Chesapeake Bay. Should we be cutting down, making an effort to cut down on the 51,000 metric tons taken in the Chesapeake Bay as a precautionary measure?

You know, it just seems logical that none of us have talked about trying to reduce the overall quota, there just seems to be an interest in moving that quota outside of Chesapeake Bay. It would seem like that shouldn't be such a hard decision to make. But those are just the comments that I would make, and I also note during Matt's presentation that I don't know how many times he mentioned funding, funding, funding. You know, is it a worthwhile expenditure of how much money? Anyway, that's what I wanted to say, thank you for your time.

CHAIR WOODARD: Go ahead, Joe.

MR. JOE CIMINO: I've kind of been hinting at this the last couple of meetings, but I'll put it out there again, and that's just as we talk about environmental conditions changing. My concern for us keeping track of stock contribution from nontraditional areas and areas outside of the Bay. I'll just put this out to Matt Cieri and others that, you know thinking of ways that we can kind of think of, and start to think about, you know if they are one-time studies as done in the past, or if there is ongoing work that we can do to kind of get to the contribution of different producer areas for this stock. I think it's very important. Thanks.

CHAIR WOODARD: All right, we've sort of encroached in on our plan. Are there any other raised hands, Toni?

MS. KERNS: You have Tom Fote and then that's it.

CHAIR WOODWARD: All right, go ahead, Tom, I'll give you the last word on this.

MR. FOTE: Yes, I'm listening to Dennis and I'm listening to Joe, and that's my concern. We're in an expedited global warming concern. Every year the data seems to get faster and faster. Sea level rise in the last ten years is getting faster and faster every year that we pass by. When I'm looking at what's going on ten years from now, it might be that the Gulf of Maine is the major producing area for menhaden, I don't know.

I think we have to be adaptable enough to handle that. That is, I think more important to how we do spatial planning is how we do the spatial planning to basically handle the changes that are going to go on in the next eight years, because we all know there is going to be a drastic amount of change. We've seen the last 10 years or last 20 years, and seen what's happened since 1989 when I first started noticing global warming for the bluefish. It's now moving at a very fast rate. That's what my concerns are.

CHAIR WOODWARD: Yes, I think all of us share those concerns, Tom. I mean I've oftentimes described just population dynamics is trying to describe the shape of a lava lamp, it's constantly moving, constantly changing, in ways that we oftentimes didn't foresee or certainly didn't predict.

A good discussion, thanks everybody. Thank you, Matt, for helping lead us to a conclusion on this. We're going to take a break right now. We're going to reconvene at 2:40, then we'll start discussing the Update on the Draft Addendum I for Amendment 3. We'll see everybody back at 2:40.

DR. CIERI: Thank you, I'll be around if you need me.

(Whereupon a recess was taken.)

CHAIR WOODWARD: All right, I have 2:40. Hopefully everybody is back from our short break. Our next agenda item we've got a couple hours, and certainly if we need to carry that into our Menhaden Mortality Events, we can. But I would like to try to make progress, so just a few comments before I turn it over to Kirby, just to review what was said earlier at the beginning of the meeting.

What we want to do is provide an overview of what the PDT has done thus far, based on the work of the Work Group, which was great. It greatly helped the PDT focus in. The way they've got the document organized, you've got a statement of the problem, four for each topic, and objectives on how to address the stated problem. Then there is a series of questions pursuant to that. What Kirby is going to do is sort of go through it, and I want to focus on the problem statement in the objectives first. We can make sure that those come forth with the will of the Board, and the understanding of the Board that we can best equip. Kirby, are you ready to go?

PROGRESS UPDATE ON DEVELOPMENT OF DRAFT ADDENDUM I TO AMENDMENT 3

MR ROOTES-MURDY: I'm just going to get the controls squared away, so I can present to the Board, make sure that you guys can see my presentation all right. Good afternoon, everyone. I have a long presentation as Spud noted, to provide a progress update on the PDTs work in developing Draft Addendum I to Amendment 3, and to get Board guidance in continuing work on this Addendum, so please get comfortable.

First, I wanted to provide a brief background. The Board issued a Draft Addendum in August. The PDT was formed at the end of the month, and has met six times over the last two months. The Board Working Group report served as basis in developing management alternatives that the PDT has developed.

The PDT has encountered a few challenges, most notably time constraints, complexity of the issues to be addressed in the Board motion, and the need for the Board to provide further guidance. The PDT

developed a memo to highlight work done, and focus Board attention on areas for further development.

The three main topics that I'll be talking about today are allocation, incidental catch in small scale fisheries, and the episodic set-aside program. I wanted to make sure everyone is aware, as Chairman Woodward noted, the memo that he referenced was included in supplemental materials, and I will be referring to the document in page numbers throughout the presentation.

Specifically, the Plan Development Team had developed for each topic a statement of the problem, an objective to address that problem, initial management alternatives and goals, as well as key questions and recommendations. Today, the PDT Is looking for the Board to confirm that draft statement of the problem and objective for each topic.

Consider the Plan Development Team's recommendations, and address the key questions that have been put forward in that memo. In terms of my presentation outline, I'm going to work through the memo today by briefly going through the current management program for each topic, then the statement of the problem, the objectives, the management alternatives, the Plan Development recommendations.

The Board can consider each of these issues in their entirety. At that point I'll take any questions from the Board overall on what I've presented thus far. Then we will revisit the topic for the Board to confirm under each of the three main ones I have mentioned, allocation, incidental catch in small scale fisheries, and the episodic set-aside, to get the Board to confirm the statement of the problem and objective, consider the Plan Development Team recommendations, and then provide answers to the key questions.

The first issue, allocation. Quickly I just wanted to make sure that everyone is going off of the same information to begin with. This is our current allocation from Amendment 3, and the formula is set out that each jurisdiction gets a 0.5 percent allocation, and then the remaining TAC, the total allowable catch, is allocated based on the three-year average of historical landings from 2009 to 2011. To help at this stage briefly, I wanted to remind the Board of general trends in recent landings.

On the screen right now is a table you've seen from a previous presentation I gave a few meetings ago, and is not included in the memo, but it highlights landings both before Amendment 3 was implemented, so from 2013 through 2017, and since 2018 through 2020. This information is based off of preliminary compliance reports.

I'll just note that there is one small change to this to what I had presented before, which is I have a percentage for New Hampshire's landings, and they've indicated that through 2020 that information is no longer confidential. An additional consideration that the Board has seen before is how quota transfers have changed over time, with changes in allocation.

You can look at the last slide, this has been presented and was included in the Menhaden Work Group report. Just to make sure people are aware of what they're seeing again, the gray cells indicate transfers that increase quota, and bolded cells indicate states that transferred quota every year since the implementation of Amendment 3.

For this first topic, allocation. The statement of the problem reads that the current allocations have resulted annually, and the 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 episodic event set-aside program and incidental catch provision to maintain their fisheries, while

other jurisdictions regularly do not land their allocations. For the allocation objective to address that statement of the problem, allocations should be adjusted to align with recent availability, not long-term average availability of the resource.

Ensure jurisdictions can maintain directed fisheries with minimal interruptions during the season. Reduce the need for quota transfers, and fully utilize the annual TAC without overage. Again, both the statement of the problem and the objective for this topic, and the next few topics we'll get through, have been drafted by the Plan Development Team, and we're going to be looking for the Board to confirm that these match with what the Board feels are correct and needed.

In terms of the allocation management alternative, the Plan Development Team used the same two-step approach as outlined in Amendment 3. To first consider the fixed minimum allocation, and then second allocate remaining TAC made from timeframe. For the fixed minimum allocation, the PDT centered on two main alternatives.

First, reducing the fixed minimum and the current 0.5 percent between 0.1 to 0.3 percent for all jurisdictions. Doing so in combination with a more recent timeframe allocation would redistribute a latent quota away from jurisdictions not fully using their current allocation. The other idea is to create a tiered fixed minimum allocation. For example, Tier 1 could include jurisdictions landings 0.1 percent or less of the average coastwide landings. Tier 2 could include jurisdictions landing more than 0.1 percent or less than 0.2 percent of the average coastwide landings, and Tier 3 could include jurisdictions landing 0.2 percent or more of average coastwide landings.

In this example, percentages have been tagged so that Tiers 1 through 3 could be 0.01 percent, 0.2 percent, and 0.5 percent respectively. What it outlined on the screen is just an example, and it's important to note that these breaks are arbitrary. If the Board is interested in this approach, the Plan Development Team needs guidance on what the criteria should be used to set these different tiers.

I'm going to outline each of the alternatives under this second step, again, which is considering the timeframe to allocate the remaining TAC. First is to use a longer time series average. This approach considers the broader landings history from all jurisdictions, including times higher and lower landings, incorporates more recent years in the timeframe.

However, this option could dilute more recent changes in the fishery, given the rate of change. The second is to consider a more recent time-series average. This approach reflects the most recent landings information, and is more likely to align with current stock distribution. The strategy does not take into account past landings that likely represent previous stock distribution.

The third would be to use a weighted allocation approach. This approach considered both recent and historical timeframes. Similar to the longer time series average approach, this may then dilute more recent changes in the fishery, given the later change possibly to a lesser degree, due to averaging over a few years.

Weighting of the time periods could be even, you know at 50/50, or uneven, either at 75/25 in either direction. The fourth is a moving average concept. This would utilize a three-year moving average lagged by one year, to allow finalizing the data in time to inform jurisdictions of their quota.

The 2019 through 2021 average was needed to set the 2023 allocation. This option would reduce the uncertainty the jurisdictional allocations provide as we currently have in Amendment 3, but could also alleviate the need to revisit allocations as often than you might be doing so with some of these other approaches.

I'll note that there are some key questions for each of these steps, the fixed-minimum allocation and allocating the remaining timeframe, that we'll get to later on in the presentation. Now I'll go through other allocation management alternatives listed in the memo. The pooled quota concept is where you would group jurisdictions that have small based fisheries, no directed fishery, no recent landings.

The benefit of this approach is that it could reduce the administrative burden on these jurisdictions, by not having them have in-season monitoring, and also by pooling them together like landings would be low to no allocation with an added buffer. The Work Group report proposed this strategy, but the Board had not expressed interest in moving away from jurisdictional allocation, so the Plan Development Team is looking for the Board to clarify whether this should be pursued further. The next two strategies are alternatives I'll go through briefly. A second-best year approach is trying to use a similar concept as the weighted allocation, but would utilize the jurisdictions best landings year from 2009 to 2020 to determine an allocation.

The idea behind this strategy is that it may be less of a controllable outlier than best year, and therefore better representative of current fishing needs. A period of high abundance or availability for a particular jurisdiction, could potentially coincide with restrictive measures for another jurisdiction, and vice versa.

It becomes very difficult to try to compare each jurisdiction's best or second-best year against each other over time. The other one is an open fishery approach, where the fishery would not have any set allocation for several years, and then based off of each jurisdiction's landings during this period, and allocations could be based.

This would include as an idea that the Plan Development Team discussed, because it was initially thought that there could be some additional TAC, so to speak under the current TAC. You would still have recent years landings. But looking at the data further, we commented this was not truly a viable or feasible option, because of limitations in that cap.

The Plan Development Team recommends that both the second-best year strategy and open fishery not be included in that Draft Addendum. I just wanted to include for this presentation some of the timeframe allocations, in terms of what they would look like for the states. These tables I'm going to go through are on Pages 6 and 7 in the memo.

The first one is basically using our 0.5 percent base minimum allocation established in Amendment 3. Then combining that with different timeframes, you've got a longer timeframe, a slightly shorter but more recent timeframe, and then two more recent shorter timeframes. Towards the end you can see there are weighted allocations as well.

For Example, 2, so choosing the same 0.5 minimum allocation approach, but then is trying to use a three-year moving average. Again, this can be found on Page 7 in the memo. Then the last one that I wanted to highlight is just the pooled quota alternative, which again is found on Page 7, and just indicates what the pooled approach could look like for some of the more southern states.

In terms of recommendations, the Plan Development Team is highlighting that the tiered approach needs further guidance from the Board on what to set those tiers at. Additionally, we need to get clarification on whether to include a pooled quota alternative. When it comes to the weighted allocation idea, we need the Board to help us limit the number of weighted allocation options.

As noted, it could be 50/50, 75/25, or 25/75. Using one of those would likely to be best, to limit the universe of potential options. Then again, to not include in the draft addendum, a longer time series given its similarity to the weighted allocation approach, second best year strategy, and the open fishery, and then reallocate approach. That wraps

up allocation. The second issue topic is incidental catch and small-scale fisheries. I'm going to just highlight again for the Board, in terms of our status quo right now. After a quota allocation is met for a jurisdiction, the fishery moves to an incidental catch fishery where small-scale gears and non-directed gear types can land up to 6,000 pounds per trip, and up to 12,000 pounds for two authorized individuals working from the same vessel, fishing stationary multi-species gear.

This list of eligible gear types for both of these are listed in Amendment 3. To help in considering recent incidental catch, the Plan Development Team put the following table together to highlight the increase of landings attributed to purse seine. In 2017, which again is before Amendment 3 was finalized and since the 2018 through 2020.

Shown on the screen the percentage of landings coming from purse seine has increased to 88 and 89 percent in 2019 and 2020. Both this table and the next one I'll cover can be found on Page 11 in the memo. The table on the screen now show that that the total number of incidental landing trips per year, and by quota landings in pounds have incidental landings per trip.

The top row in the table shows the trips being by landings and pounds, so the 1,000 pounds from 1,001 to 2,000 pounds. Since the provision was first implemented under Amendment 2, at present the majority of their trips fall within 1 to 1,000 pounds, so about 56 percent. But since the implementation of Amendment 3, there has been a rise in trips landing between 5 to 6,000 pounds.

The greatest percentage of landings during this time period have come from trips landing this again. For the incidental catch, in terms of the statement of the problem. The PDT had drafted that the intent of this provision was to provide continued access for low-volume landings of menhaden, once the jurisdiction's directed fishery was met.

In recent years availability at the northern end of the range has resulted in directed fishery quotas being met earlier in the year, coastwide landings under this category have exceeded a number of jurisdiction's directed quotas, and have ranged from 1-4 percent of the annual TAC. The Amendment 3 language has led to various interpretations, of which landings fall under this provision.

In particular, once a sector allocation is met or whether it's the full jurisdiction allocation that could be met. Without changes, landings under this provision may remain at high levels or could increase, which may jeopardize overall management objectives. The Plan Development Team has drafted the following objective to address that and it presents a problem, which is sufficiently constrain landings to achieve overall management objectives, such as meeting the needs of existing fisheries.

Reducing discard mortality by limiting eligible gear type, indicating which landings can occur, and those landings are not part of the directed fishery, and establishing trip and seasonal limits. To the incidental catch management alternative, the Plan Development Team focused on four sub issues based on the Work Group report. First adjusting which gear types are allowed to count towards the provision. One current alternative would eliminate purse seines as an eligible gear type, the other would remove small-scale gear types from the provision, and allow only landings from non-directed gear. The second sub-issue topic is the timing of when incidental catch can occur. Again, this is included given some states are entering into the incidental catch prior to their full allocation being met, which impacted the duration that landings were occurring in this category.

Some issue alternatives are trying to make the language more clear on when incidental catch can begin. The first to codify this incidental catch could occur after a jurisdiction sub-divided allocation, either by sector or fishery or gears is met. The

second alternative will clarify that the incidental catch and state can occur only after the full state allocation is met.

The third alternative is that once an entire jurisdiction's quota allocation is met, the management fishery for the jurisdiction will be closed, and no incidental catch would be allowed. The third sub-issue is the incidental catch trip limit. It proposes changes to reduce the annual volume of incidental catch.

The two alternatives under this sub-issue are to reduce the trip limit to either 4,500 pounds up to 9,000 pounds for two individuals, or 3,000 pounds and up to 6,000 pounds for two individuals. Using that same authorized individuals' approach is outlined in the Amendment 3. The Plan Development Team is looking for clarity from the Board on whether adjusting the trip limit is a priority, as it's unclear if these changes alone would result in significant reductions in landings.

The fourth sub-issue that the Plan Development Team developed is catch accounting. This strategy was highlighted in the Work Group report, and the PDT developed some alternatives on how this could potentially work. The first alternative would create a catch cap similar to that used in the American eel plan, but it would be equal to 1 percent of the annual TAC, with a 10 percent management trigger.

Landings as reported from compliance reports would be evaluated, and if the landings exceeded the cap by more than 10 percent in a single year, or exceeded the cap two years in a row, the Board would need to take action to reduce incidental landings. The second alternative will create an actual set-aside at the annual TAC similar to the episodic event set-aside program.

Landings under this provision would count against that set-aside, and if the set-aside is exceeded in a given year the overage would be deducted from the subsequent year's set-aside.

The third and fourth alternatives are the same two concepts that I just covered, but would apply only to the small-scale directed gear type.

In considering this sub-issue, the Plan Development Team recommends that it not be included in the Draft Addendum, due to the complexity of potential options about the goal of catch accounting could be achieved through a combination of reallocation alternatives, and other incidental catch sub-issues, such as gear restrictions with trip limits.

Since the Plan Development Team's recommendation is to summarize, clarify whether adjusting the trip limit is a priority, and also the PDT recommends not including catch accounting in the Draft Addendum. The third issues that I'm going to go through before we take questions is the episodic event set-aside program. As you all are aware, our status quo sets up a 1 percent of the TAC set-aside with episodic events defined as any instance for a qualified state reaches its quota allocation prior to September 1, and the state can prove the presence of unusually large amounts of menhaden in state waters.

Qualifying states include Maine through New York, and then there are additional provisions that limit how those states participating in the program do harvest. The Plan Development Team put together the following figure on the screen to highlight the availability of menhaden in the Gulf of Maine, using a combination of historical landings information, and the Fishes of the Gulf of Maine by Bigelow and Schroeder, as well as ACCSP records.

The number of consecutive years in either a high or a low category are labeled. For years between 1840 and 1949, which is the gray line in the first part of this figure, it is reconstructed from the description of menhaden occurrence in Fishes of the Gulf of Maine. The second portion is based off of ACCSP records of menhaden landings from Maine, New Hampshire, and Massachusetts.

Overall, what this shows is that there are extended periods of low and high availability of menhaden, without a clear pattern of when those shifts occur,

or when they will occur. Because of the statement of the problem the Plan Development Team had drafted, over 90 percent of the episodic set-aside has been utilized in all years since 2016.

With the increase in Atlantic menhaden in the northeast, the program has become a secondary regional quota for several jurisdictions. Their dependency on the episodic set-aside program highlights the mismatch between the biomass and current commercial allocation. The Plan Development Team has drafted the following objective, which is to ensure sufficient access to episodic changes in regional availability, in order to minimize in-season disruptions to reduce the need for quota transfers and incidental harvest.

When it came to developing management alternatives, the Plan Development Team has put forward the following, which first is the idea of removing the episodic set-aside program from the management program. While this was not strategy outlined in the Work Group report, the Plan Development Team wanted to include it for completing and eliminating the 1percent set-aside in combination with redistributing minimum allocation changes in the incidental catch provision.

It may address regional needs to still meet the landings and increase availability that have been seen in the area in recent years. The second alternative would be to increase the set-aside. The goal in doing this is that it may reduce the need for in-season quota transfers, or the reliance on Incidental and Small-Scale landings.

From this alternative there are really two main considerations the Plan Development Team is looking for feedback from the Board on. The first is how much to increase the episodic set-aside to. Currently, instead of 1 percent of the TAC, a preliminary review of landings data indicates that at least for Maine through Massachusetts, setting the set-aside at 3 percent of the TAC may have covered errant episodic landings plus quota transfers. But to address incidental landings in addition to that, a higher percentage above 3 percent would be needed. The second consideration is the source of increased set-aside. The Plan Development Team has set three approaches for supplying this increase that included either increasing the set-aside off the top of the TAC. Second is considering whether to allow or require relinquished quota to be redirected to the set-aside program, or utilizing latent quota for restructuring that fixed minimum allocation from the earlier allocation section.

The PDT also drafted other alternatives based on the strategy, listed in the Work Group report. They included adjusting the date, which unused set-aside gets redistributed back to the rest of the states. Consider additional restrictions on the participants in a set-aside program, and allow access at less than 100 percent of the jurisdiction's allocation being met.

In terms of Plan Development Team recommendations, they had recommended through all those additional alternatives that were outlined in the Work Group report not be included, given that they don't appear to be able to fully address some of the issues identified in the statement of the problem.

At this point, the Plan Development Team is looking to clarify the language on whether a state can apply to the episodic set-aside program prior to fully landing their allocation. I've gone through the three main issues, and tried to provide an overview of the management alternatives for this Draft so far. I'll take any questions at this point. Thank you.

CHAIR WOODWARD: Thanks, Kirby, great job at summarizing that. Obviously, the PDT has done the usual great work, and given us some clear statement of the problem, make a clear objective of obviously a suite of alternatives that we can consider. But I also want to make sure that folks understand that if you think there is something that they've missed, an alternative that we lack, that is certainly in bounds, and we'll get to that. But at

this point, you've got to raise your hand if you have questions for Kirby. Toni, you can give me the names.

MS. KERNS: Right now, I just have Ritchie White.

CHAIR WOODWARD: All right, go ahead, Ritchie.

MR. G. RITCHIE WHITE: I guess I have a concern on reading the objective, and then looking at the potential solutions of a quota adjustment. My question is, the objective to have the states have enough quota to meet their needs, their present needs, without using the small-scale fishery, the episodic event and transfers, so that's my first question. Then I would follow up if I could, Mr. Chair.

CHAIR WOODWARD: All right, Kirby, do you want to respond to that?

MR. ROOTES-MURDY: Sure, so again, the Plan Development Team drafted the statement of the problem and the objectives off of the Work Group report, and then trying to basically address/work with the issues that were identified through that. To that end, if you don't think that your concern is coming through clear enough in the current drafted language, that's what we want to get feedback on, and adjust it as needed, if there is Board consensus on that.

CHAIR WOODWARD: I will pine a little bit on it. I think yes, in a perfect world the goal would be to establish allocations that do meet the needs of the perspective jurisdictions, so that we do not have to depend on quota transfers and the other elements of the plan to just satisfy the needs of the jurisdictions. But we all know that obviously things are fluid, things change, and that we've got to have more than one tool in the toolbox. But you have got a follow on you were going to say?

MR. WHITE: Yes, given that answer, and that was my assumption of what the objective says. It seems to me that there are limited options if any options that provide quota to the New England states to the level at which they're presently harvesting. I could be wrong on that. But for example, New Hampshire harvested 1 percent in the previous two years, and we're over 1 percent this year.

There is very little, I think there is only one option in all of it that would provide 1 percent. I looked at Maine and Massachusetts and I think the same situation is there. That when you add up Maine's transfers, episodic event in the small-scale fishery, and their starting quota. I am not sure there is any option in there that comes close to that. That is my concern.

Given comment on the next couple of issues will be very hard for me, without knowing what quota you start with. Knowing whether we shrink or expand the episodic event will, I think we will need to know that this New England state have enough quota to harvest what they have been harvesting first, before we decide. Then yes, episodic can be X, Y, or Z. Thank you.

CHAIR WOODWARD: I think that's one of the biggest challenges that the PDT has faced, and certainly we think as a Board that there are these combinations that produce an if this/then that result, and it's very difficult to predict what all those combinations are. Kirby, would you like to comment back to Ritchie's concern about his projected allocation scenarios, based on the different alternatives?

MR. ROOTES-MURDY: Sure. I think maybe the best way I can put it; is we're going off of empirical information. What we've put together, in terms of potential alternatives is drawing from recent year's landings. You have up on the screen right now and also as I said in the memo, what the status quo allocation is, and what the allocation could be based off of timeframes.

While I hear Ritchie's concern that there is a mismatch currently between the allocation and

recent landings. There are alternatives in here that are trying to address that. There are additional combinations that you highlighted, Spud, of you better adjusting the episodic set-aside, or changes to the incidental catch provision.

These things could also further impact how this plays out. But we are trying to find a balance of what to base these alternatives on. If there are different ones, different percentages that the Board wants the Plan Development Team to consider, we need to get that guidance from them.

MR. WHITE: Mr. Chair, third follow up if I may. Sorry.

CHAIR WOODWARD: It's quite all right, this is complicated business. I certainly want to make sure we fully illuminate it through discussion. Go right ahead.

MR. WHITE: Would it not make some sense to ask each state for them to project what they are harvesting? Obviously, it may not be exactly precise. But then you could see how each state lines up with the projections in the chart list, I think. It almost seems like we're doing it backwards. We're trying to come up with some scenarios, as opposed to backing in from what the states believe they need. Thank you, that will be it.

CHAIR WOODWARD: Yes, I think we're sort of looking at a what do we want/need approach, versus what have we always gotten. Kirby, what are your thoughts about that, in terms of if each jurisdiction was queried as to what their desired allocation was? Probably even need more than 100 percent. How could that be useful in interpreting these various alternatives here, and helping the Board give the PDT guidance on where to focus its efforts?

MR. ROOTES-MURDY: I think this actually speaks well to the problem we ran into, in trying to evaluate the best year approach that kind of supported the work group report, which is that if you just go off on the best year of each state, then you would get over 100 percent, so to speak. That's where I think it becomes problematic.

Ritchie's question on projecting landings. I think there would be a number of follow up questions of what you were asking to project. What I have up on the screen right now is average landings once a 0.05 set for a 0.56 minimum, so this is showing for comparison purposes what your status quo allocation is, again alternatives so you can draft it up based off of recent years information.

Again, if there is interest in pursuing other ideas, we would need to know what they would be based off of, and if there is going to be projections, what they would be projecting out. Are we talking about just 2021 landings? Are you talking about projecting out previous years or future years? There would be a number of, I think kind of follow up questions to try to better understand what that idea is trying to get at.

CHAIR WOODWARD: Also, isn't it correct to say that if for instance the Board agreed that it wants to examine the pooled for a concept, and you had it on illustrations where you had it for some of the states. That would obviously affect the percentages in this table, you know in terms of what could be redistributed. Is that right?

MR. ROOTES-MURDY: Yes, exactly. That plot, I moved further down, and since there are different alternatives that have been considered, the pooled approach up on the screen right now shows slightly different allocations, when you combine those four states below, North Carolina through Florida into a regional approach.

Again, this is just off of the Plan Development Team discussions. If there is an interest in pursuing this, we would also want the Board to kind of codify this. It would make sense to have those four states in a region, or if there are other pooled approaches, or other parts of the coast that the Board would want to see that, we would want to get that information.

CHAIR WOODWARD: I'm not exactly sure what to do with that one right now, but any additional questions?

MS. KERNS: We do, we have Emerson Hasbrouck, John Clark, and then Lynn Fegley.

CHAIR WOODWARD: Go ahead, Emerson.

MR. HASBROUCK: I have two questions, one of which was just kind of partially answered by Kirby. For the tables that were in the document, one of which you have on the screen right now, as well as the other ones. Let's see, you go to what was Table 1. Is this what was Table 1 in the document, in the memo?

MR. ROOTES-MURDY: Yes, I had them up on the screen.

MR. HASBROUCK: Okay, so for this table then, the allocations are in all the different columns, other than status quo, are based on an initial allocation, which is then modified, but was actually landed in the state in those different timeframes? Is that correct or incorrect?

MR. ROOTES-MURDY: Yes, for comparison purposes this table shows what using a 0.5 base minimum allocation is in combination with more recent timeframes. Status quo is 0.5 plus the three-year average of 2009 to 2011. So, 2009 to 2020, that column is showing what a 0.5 base allocation is with that timeframe, in terms of each states landings as a percentage.

MR. HASBROUCK: Right, the actual landings.

MR. ROOTES-MURDY: Yes.

MR. HASBROUCK: Right, okay. Then my second question in a way was kind of similar to what Ritchie was getting at. At the beginning of your presentation, you showed a table that was not in the meeting materials, it came from, I guess some place else, that showed, I think percentage of TAC for each state over different time periods. Was that what it was? It was only up on the screen for a short period of time.

MR. ROOTES-MURDY: Yes, I included this table in a previous memo for the Board. It just shows based off of compliance report data what percentage each state landed in recent years of the coastwide total.

MR. HASBROUCK: That includes from all sources, so that's landings in the directed fishery plus incidental landings, as well as episodic events? Is that correct?

MR. ROOTES-MURDY: Correct.

MR. HASBROUCK: I'm looking at New York, for instance, right. New York had 0.69 percent allocation. But if we go all the way across to 2020, New York actually landed 1 percent of the coastwide landings from all three sources, right, initial allocation, incidental catch and episodic, although I don't think New York was in episodic in 2020, but for any state it would be from all three sources, is that correct?

MR. ROOTES-MURDY: Correct.

CHAIR WOODWARD: Okay, John Clark. I think you're up next, and then Lynn.

MR. JOHN CLARK: Thank you for the very thorough presentation, Kirby. I'm just curious as to if the PDT had considered lower minimums for minimum allocations, because the state that actually has a small menhaden fishery, even 0.1 percent is, if my math is correct here, you're still looking at what about 400,000 pounds of quota. Did you consider having like a 5/100ths of a percent minimum, or even lower?

MR. ROOTES-MURDY: As I said, we had the idea of going below 0.5 as your fixed minimum to 0.1 through 0.3, and looked at some different combinations of that. Then the other idea was to have a tiered approach, where you could have as low as a 0.1. We haven't explored anything less than a 0.1. If there is interest in the Board wanting to pursue that, we want to get that on the record,

and so we could pursue it further. But right now, that was the range, our status 0.5.

MR. CLARK: As I said, some of the states like not to pick on Pennsylvania, but obviously they're not going to land half a percent, they're not even going to land 100th of 1 percent. It just seems like maybe we do have a little more flexibility. I know that's not going to create a lot more quota to allocate to other states.

But I think you know as we've seen since we did a minimum allocation of half a percent to every state, that it results in a kind of complicated system of either transfers or giving up quota before the fishing year starts. You know again, just to tie it in more with what is actually being caught. Thanks.

CHAIR WOODWARD: John, are you recommending that that be considered by the PDT that this first tier it says 0.1 percent or less. Is that they explore the less part of that?

MR. CLARK: I would suggest exploring the less. As I said, we do have a fishery, we have landings every year. But the half percent, that's why we relinquish most of our quota every year, because we're never going to land it, and we would like to see it go to states that need the TAC.

CHAIR WOODWARD: Let me ask one more question, just to make sure I understand it right, maybe this will help both Kirby and I get this straight, leads to that. Right now, that is included in the fixed-minimum tier approach. Would you like for it to stay there, and we get a little bit ahead of ourselves, or are you really talking about maybe it even being included in the step above it, where it says reduce fixed minimum allocation. That that 0.1 percent actually be less than 0.1 percent.

MR. CLARK: Yes, thank you, Mr. Chair. I would like to see whatever we consider for a fixed minimum is to have it less than a tenth of a percent, because I think less than a tenth of a percent would take care of several of the states, and the fixed minimum tier I think is a great idea to have, depending on what the states actually catch. Anything that would free up the TAC, so it doesn't have to be transferred or relinquished, I think reduces bureaucratic burden, and also makes sure that the TAC goes to where it's most needed.

CHAIR WOODWARD: All right, Lynn, you're next.

MS. FEGLEY: Thanks, I actually think I'm out of order. I don't have a question. I'm assuming we're going to go through these issue by issue, right? We're going to have to get feedback.

CHAIR WOODWARD: This is just questions to make sure that we sort of understand what the PDT has brought to us, and then we're going to have to go back and nob deeper into each hole.

MS. FEGLEY: I'll hold then, thank you.

CHAIR WOODWARD: Toni, any other hands up?

MS. KERNS: One last hand, Conor McManus.

CHAIR WOODWARD: Go ahead, Conor.

MR. McMANUS: Just a quick question for Kirby. I guess given where we are at now, with timelines and those things in the document. Has there been discussion about including 2021 landings in this? I only ask in the context of how fisheries may have been impacted by 2020, as well as trying to get the most up-to-date perspective as to where states given fisheries are. I understand jobs come as well; I'm just trying to think in the context of states that may have 2021 landings that are better reflective of their fisheries. Thanks.

MR. ROOTES-MURDY: The Plan Development Team has not discussed that. If there is interest by the Board, and you wanted to use 2021 landings information, I would just offer maybe a couple considerations. Right now, in terms of the alternatives that have been drafted, especially for the allocation section, have been crafted using validated landings from ACCSP.

That matched in with that basis the jurisdictions to get confirmation of it's the best to terrible data. If there is interest in using landings information through 2021, then we may be dealing with a longer timeframe to get this Addendum completed. Compliance reports are due by the spring, the Board reviews them, so there would be probably at the earliest, if there was an interest in just using compliance reports data, the May meeting.

But even then, at our spring ASMFC meeting would be challenging. I would just offer that if there is an interest in looking at 2021 data, keep in mind that it would change the timeline of when this Addendum could be finalized for public comment or for the Board's review, to consider public comments on.

CHAIR WOODWARD: Yes, that's a good point, Kirby, and just to make sure I'll reiterate what he said, just to make sure everybody understands that. We're on a timeline for any changes that result for final approval of Addendum I be effective for the 2023 fishing year. If we do make a decision that we want to include 2021 landings information in the analyses, then I guess it could potentially jeopardize our ability to have the results of the Addendum affective for the 2023 fishing year. Is that a fair statement, Kirby?

MR. ROOTES-MURDY: Yes.

CHAIR WOODWARD: Any other hands up, Toni?

MS. KERNS: David Borden.

CHAIR WOODWARD: All right, go ahead, David.

MR. DAVID V. BORDEN: Kirby, under de minimis, what does a state qualify for, for landings? How many pass?

MR. ROOTES-MURDY: That's a good question that I don't know off the top of my head, but give me a minute, I'll double-check.

MR. BORDEN: You don't need to answer immediately, but I'm just following up on the point that John Clark made. I may want to discuss that when we get to the next phase, Mr. Chairman.

CHAIR WOODWARD: Any hands up, Toni?

MS. KERNS: That's all, Spud.

CHAIR WOODWARD: All right, Kirby, are you ready to move on to the next phase of this?

MR. ROOTES-MURDY: Sure thing, just one note for de minimis. To be eligible, state-to-state landings must be less than 1 percent of the total coastwide base landings for the most recent two years.

CHAIR WOODWARD: Any follow up on that, David Borden?

MR. BORDEN: Not now, Mr. Chairman.

CHAIR WOODWARD: All right, Kirby, proceed.

MR. ROOTES-MURDY: Okay, great. What we are going to do now is revisit each of the topics that I went through, and we're looking for the Board to confirm the statement of the problem and objective, and consider the Plan Development Team recommendations and provide answers to some of the key questions that were posed in the memo.

On the screen for the allocation topic, I put basically the statement of the problem bullet. If you're looking for the exact wording, it is on Page 2 in the memo, and again what we're looking for is for the Board to confirm that this is addressing, really the issues that the Board feels are key in being identified with this issue into the fishery. When it comes to the objectives, again, we are listing out what we, the Plan Development Team based off of those issues, identified in the Work Group report, seen through the old "need to be addressed" through the management alternative. As a way of kind of checking to ensure that the alternatives that have been drafted up are addressing the statement of the problem.

We are trying to check those against this objective. For allocations, whether those allocation alternatives align with the recent availability of the resource, ensure jurisdictions can maintain their directed fisheries with minimum interruptions, reduce the need for quota transfers, and deploy/utilize the annual TAC without overages.

CHAIR WOODWARD: Let's go back, let's kind of work through this. Please, go back to the statement of the problem, and we'll sort of work our way back down. Is there anyone that feels like this statement of the problem needs to be modified, does not adequately capture the issue? We could probably wordsmith to minutia all day, but if you've got strong feelings that this needs to be modified, please raise your hand. Any hands, Toni?

MS. KERNS: I have one hand, Lynn Fegley.

CHAIR WOODWARD: All right, go ahead, Lynn.

MS. FEGLEY: Yes, just really quick with this first bullet. States do not have enough quota to maintain directed fisheries. I wonder if an important part of that has to do with maintain current directed fisheries, because as a Board, I wonder if it is our intention to always ensure that states can maintain directed fisheries that are not limited in capacity.

You know if they have fisheries that are able to grow through the roof, for whatever reason or another, and that's a little bit of a different issue than maintaining sort of the current infrastructure. I just throw that out there, because I think there is a nuance there that is pretty important.

CHAIR WOODWARD: It's sort of like art, it's in the eye of the beholder. What you're proposing is basically insert the word current directed fisheries, and that would imply that it was current at the time that the, I guess the Addendum was adopted. Is that correct?

MS. FEGLEY: That's what I'm thinking.

MS. KERNS: Chair, you have Joe Cimino and Emerson Hasbrouck.

CHAIR WOODWARD: All right, go ahead, Joe.

MR. CIMINO: I appreciate all the PDTs work on this, but I think just saying that we need to get allocation right based on current availability makes me a little nervous, although it's obviously an important consideration. There are other reasons why the TAC wasn't being utilized, and tied up a lot of quotas, in places that didn't have any fisheries. We heard a public comment today that talked about markets, and the fact that they can no longer sell fish as easily as they used to, because other states are simply catching their own quota. We've had discussions on what do states need. Well, we've done some very tough reallocations for other species, and we didn't get to just base it on what we needed. I think there needs to be some sort of socioeconomic considerations to all this as well.

CHAIR WOODWARD: Emerson.

MR. HASBROUCK: Relative to the suggestion that Lynn just made. I would suggest that we want to maintain current fisheries, not necessarily current directed fisheries, right? Because some of our current fisheries come under the episodic catch, as well as the incidental catch. I know we're going to be talking about incidental catch in a few minutes, but incidental is not necessarily directed.

What we want to make sure is that the states have enough to cover their current fisheries. Similar to the question that I was asking previously about the table that was on the screen, those percentages that each state caught were from all three sources, right? The directed fishery, the incidental catch, and the episodic catch. I know we don't have a motion here, and I think you're probably trying to go through this without motions. But I would rather see enough quota to maintain current fisheries, not necessarily directed fisheries.

CHAIR WOODWARD: All right, yes. I think one of the things also with this, that is confusing about this, is we've got a situation where the TAC, it says here the TAC not being fully landed, but then the incidental catches don't count against the TAC, or they've been made a matter of record, in terms of what the jurisdiction has landed. But they're not counted against the TAC.

Well, that's another sort of peculiarity of this. I think that it makes this problem statement a little bit difficult somehow. What we've had is a suggestion basically replacing the word directed with the word current, to encompass all of the sources of the landings. Is there any, well before I ask that, I guess are there any other hands up, Toni?

MS. KERNS: We have one hand, Ritchie White.

CHAIR WOODWARD: Go ahead, Ritchie.

MR. WHITE: Just quickly, I support either of those changes, Lynn's or Emerson's. Thank you.

CHAIR WOODWARD: All right, in the interest of moving forward, is there any heartburn or opposition to replacing the word directed with current fisheries in this statement of the problem? If so, raise your hand and state your reason. Any hands, Toni?

MS. KERNS: I don't see any hands.

CHAIR WOODWARD: Any other concerns about the statement of the problem? Any hands? Okay, Kirby, I think we've got concurrence on the statement of the problem, if you want to move on to the objectives slide. Okay, the same process here. We want to hear input from the Board on the language of the objectives here. This is an opportunity to interject. Do you like it, not like it? If you don't like it, what would you like to see changed? All right, Toni, any hands?

MS. KERNS: No hands, Spud.

CHAIR WOODWARD: All right, then we're going to consider that good to go. All right, Kirby.

MS. KERNS: Slow hands today, I guess. Lynn Fegley, followed by Adam Nowalsky.

CHAIR WOODWARD: All right, go ahead, Lynn.

MS. FEGLEY: All right, Mr. Chair, I was trying to count to ten, so I wouldn't be the first hand. I just think that first objective is a little dangerous. I think it would be better served to just add the word better in front of align. I think it's important to add that caveat that we need to consider infrastructure and past fishery performance. I don't think we can turn our back, given the way this stock moves up and down, I don't think we can turn our backs on stuff that's happened in longer term history.

CHAIR WOODWARD: All right, so you suggested putting the word better in front of align. What else would you like to do?

MS. FEGLEY: I would suggest adding the word better at the beginning. I would suggest striking what's in parentheses, and adding while considering fisheries infrastructure, oh while considering existing infrastructure and past fishery performance.

CHAIR WOODWARD: All right, Kirby, are you getting that?

MR. ROOTES-MURDY: Yes, I'm getting that down, and I'll be sure to return to these proceedings and make sure we've got a couple things.

CHAIR WOODWARD: Go ahead, Adam.

MS. KERNS: Adam, why don't you hang up and then call back in, and then we'll come back to you.

MR. ADAM NOWALSKY: I just got a note that I was unmuted by organizer, and that allowed me to be unmuted.

CHAIR WOODWARD: Go ahead, Adam.

MR. NOWALSKY: Regardless of the technical challenges, thanks everyone for your help. My comments were going to be the same as Lynn. I think she did a great job of answering them. Lynn, if you count to eleven next time I'll save you the trouble, but I share Lynn's concerns, and echo her recommendation. Thank you.

CHAIR WOODWARD: Any other hands, Toni?

MS. KERNS: Nichola Meserve and then Chris Batsavage.
CHAIR WOODWARD: All right, go ahead, Nichola.

MS. NICHOLA MESERVE: I also support Lynn's revisions there, and wanted to let you note that we are using landings as a proxy for availability in the options that look at the allocations. The landings are really a product of availability as well as the effort, which is controlled by a number of factors. While I'm not suggesting that the objective statement here needs to change, but I think it may be important somewhere within the Addendum to recognize that landings do not equal availability, without considering some other factors as well, like effort.

CHAIR WOODWARD: Good point, good point. All right, Chris, go ahead.

MR. CHRIS BATSAVAGE: I was just thinking about the discussions we had about the statement of the problem, looking at the second objective. Should we replace the word directed with current, to make sure that we're kind of capturing the whole range of fisheries that are seen in the different states, or is this a little different issue than what we were talking about under the statement of the problem?

CHAIR WOODWARD: No, I think that's a good catch. I'll defer to Kirby. Perhaps we're mixing things here, but I think yes, consistency between the statement of the problem and the objective in describing that would be prudent, so we would be replacing the word directed on the second bullet with current, so it would say, ensure jurisdictions can maintain current fishery with minimal interruption during the season. Do you see any issue with that, Kirby?

MR. ROOTES-MURDY: The only other consideration with this is, you know when we talk about directed fisheries we're talking about a state landing under the allocation, and the previous from the statement of the problem, people were referring to fisheries that are occurring kind of outside of the allocation, either incidental catch, small-scale fishery.

That's just the main consideration is, if there is interest in wanting to for consistency between the two, I get it, that makes sense. But what we're trying to address with allocation then in this section is it goes to things that are being applied to the states, their landings being applied to the state's quota. That's that distinction.

CHAIR WOODWARD: Yes, I can see where it might be a bit confusing. Does anybody else have an opinion on this? This is sort of a predicament of wordsmithing things.

MS. KERNS: I have Lynn and then Emerson.

CHAIR WOODWARD: All right, go ahead, Lynn.

MS. FEGLEY: I think Chris is right. I think it should change, and I sort of understand the confusion about incidental versus directed. But the bottom line is, right now that we don't know, you know what is going to be the fate of all these different tools. Right now, those tools are in place, in order to allow these non-directed multispecies gears to continue fishing with minimal interruptions during the season. I think that is what we want to do for our fisheries, and the tools that we use to get there, if it's these tools that sort of allow the allocation to flex up and down the coast during the course of the season, so be it. But I think the overall objective is current fishery.

CHAIR WOODWARD: All right, Emerson.

MR. HASBROUCK: I agree with Lynn and Chris. I think we need to change that. Also, for incidental catch. Incidental catch in small scale fishery, so some of those small-scale fisheries may at some time, I'm going to say be directing on menhaden, because the catch that day just happened to have more menhaden than other species, a pound net on a beach head, for instance.

In those cases, it was landed under the incidental small-scale, but perhaps just because the states quota allocation had been met. Yes, depending on what happens with small-scale and incidental, we may want to maintain what our current fisheries are, as I mentioned before in the statement of the problem.

CHAIR WOODWARD: Does anybody have heartburn on replacing the word directed with current, in Bullet Number 2? If so, speak now, or forever hold your peace.

MS. KERNS: No hands, Spud.

CHAIR WOODWARD: All right, very good. Okay, any further comments on this objective, if not we'll move on. Okay, move on. All right, Kirby.

MR. ROOTES-MURDY: Okay, so next we wanted to get the Board's feedback on the Plan Development Team recommendations, in particular the tiered approach. We need guidance in setting those tiers. Clarify whether a pooled quota operative should be pursued. Get agreement from the Board on whether to limit the number of weighted allocation options, and not include in the Draft Addendum the following. A longer time-series average for allocating the TAC, second best year strategy, and the open fishery and then reallocate.

CHAIR WOODWARD: All right, okay let's sort of work from the bottom up here. We've got the PDT has recommended that we not include some alternatives in there. Is there anyone that would like to speak in the favor of keeping those in? If so, please raise your hand.

MS. KERNS: Megan Ware has her hand up.

CHAIR WOODWARD: All right, go ahead, Megan.

MS. MEGAN WARE: I would speak in favor of keeping the second-best year strategy. At this point my understanding is that a lot of that analysis has been completed. I would kind of hate for the Board to throw out that option, without actually seeing the numbers, if the numbers have been run.

My suggestion would be that we see those numbers, and if next Board meeting, we don't like them, then we throw it out. But if the work's been done, I think it's prudent to at least look at those numbers. I think there was a comment earlier about effects of 2020 on landings. I think that's why this option is attractive for me, is that I do think that there were some states that had detrimental effects from COVID on their fisheries. There were other states where that had no impact. But if we are using a more recent time series for allocation, those impacts are going to be incorporated in a state's allocation. You kind of get around that issue with a second-best year strategy, where if a state did have detrimental COVID impacts, that likely it wouldn't be their second-best year of landings. To me, I would keep that one in.

CHAIR WOODWARD: Kirby, what Megan said about the analysis largely being done. If that's correct then it really wouldn't be that burdensome at this point to leave this in.

MR. ROOTES-MURDY: Yes, we've had three together, four together.

CHAIR WOODWARD: Okay, so we've kind of voiced some support of keeping the second-best year strategy in. Anyone else supportive of the other two that are under that last bullet on the slide?

MS. KERNS: I have Rob LaFrance.

CHAIR WOODWARD: Go ahead, Rob.

MR. LaFRANCE: I just want to support Megan on this. I think she raises an interesting question here

about what the second-best years actually look like. Listening to some earlier conversations, it may be also helpful for us to understand what states really want, based upon their second-best year. I think this is important for us to take a look at.

CHAIR WOODWARD: Anybody just adamantly opposed to including that at this point? If so, raise your hand.

MS. KERNS: I don't have any hands, Spud.

CHAIR WOODWARD: All right, then we'll leave it on the list. All right, well let's work our way down from the top. We've got the tiered approach. Kirby, we may have to bounce back with some of that other reference information as we talk about this. How does everybody feel about that one, in terms of leaving a tiered approach in? If so, we need some feedback on setting the tiers.

MS. KERNS: You have Lynn Fegley and then Megan Ware, and then Nichola, and then Conor.

CHAIR WOODWARD: All right, sounds like the Partridge family. All right, go ahead, Lynn.

MS. FEGLEY: I feel like I'm in a Suzy R. adventure novel here. I think I would support leaving the tier in, but I would suggest that it be simplified, in that there only be two tiers, and that there be a tier for the "no harvest" states. I think there is three of them, and they get a tier of the 0.1 percent or less, and then everybody else gets an equivalent fixed minimum that's maybe between 0.3 and 0.4 percent. That would be my suggestion, and not try to play the game of setting criteria to fit states into three tiers.

CHAIR WOODWARD: All right, Megan.

MS. WARE: Yes, I mean I would be interested to see what one's approach shows. I think one of the questions was, you know what criteria do we use for this, or for size average landings and something that I would recommend considering if we stick to that three-tier approach would be, not just the average of landings, but the variability of those landings from year to year.

Because I think a state who is really consistent in their landings, they are going to feel a different impact of a lower fixed minimum than a state, who maybe have a low average, but has quite a lot of variability in their landings. I would throw that up there for a PDT consideration.

CHAIR WOODWARD: Okay, Nichola.

MS. MESERVE: I think Megan kind of stole my thunder on the concern about using average landings, and instead looking more at a distribution of the landings, at the frequency distribution of landings for assigning the tiers. I'm also interested in what Lynn suggested, and that really highlighted for me, that I think this tiered approach is the way that the Board needs to be moving forward.

I don't think that there is a single fixed minimum that is really going to achieve the objectives that we've set for ourselves here, and I'd be willing to simplify the document by focusing on the tiered approach, as opposed to just a single tier for all states that is different from the 0.5.

CHAIR WOODWARD: Conor.

MR. McMANUS: I guess I would just stress that as a state that is primarily operating on the fixed minimum. I just wanted to stress that while reducing that may have benefits. I think it does, especially at the coastwide level, and I think it will make it challenging for some states to be able to maintain their current fishing, which I think as we discussed prior to the objectives of the Addendum, to reflect current harvesting, and the availability of the fish.

I know there was discussion earlier about even going lower in options, but I guess if they were going to be looking at concerns as lower than what was presented by the PDT, I would also then suggest looking at even more of a gradient across

the fixed years, across the minimum. I guess just kind of stressing to the fact that with the minimums where they are now, for fisheries that are operating off that.

Significant reductions to that for an active fishery could have ramifications in their ability to operate. At that 0.5 percent, you're already operating on a rather small quota with an active fishery. I just wanted to stress that. I understand the goal is to try and reallocate where we can, where there aren't active fisheries. But I just wanted to stress that some significant reduction could actually go against some of the goals of trying to maintain some of the active fisheries in the region.

CHAIR WOODWARD: Kirby, have you got all this?

MR. ROOTES-MURDY: Yes, I'll just highlight, you know part of what we're trying to get to with this memo is honestly just trying to remove items that are not helpful, and further develop items that are. What I'm hearing is an interest in further pursuing the tiered fixed minimum approach. But I heard two different approaches for that.

I heard Lynn suggested two tiers, and I heard Megan and Nichola suggest a three-tiered approach, and then I heard Conor offer up an additional level of what that minimum is should be considered. I would just maybe reiterate to the Board something that I started to talk about at our last meeting, and I think I'm going to be harping on over the next few Board meetings, which is we want to make sure this document is addressing what you guys want it to, and providing all the options you are hoping for.

But do keep in mind what the benefit is in having these slight modifications to alternatives that are being brought up. Is there true benefit in looking at the slices of a percentage? I want to get clarity that we are to develop at least two alternatives that have different tiered approaches, one being two and the other being three.

But I would ask if there is interest in pursuing more than that, what the benefit of that is, and maybe the other point could bring out this. Nichola, I think had mentioned an interest in moving away from the uniform fixed minimum, and if there is interest from other Board members to pursue that, and just focus on this tiered approach, we can do that.

CHAIR WOODWARD: All right, thanks, so let's address that question. We've got interest in this tiered approach. What is the Board's sense on, is this thing going away? As Kirby said, going away from the fixed minimum, and going to this tiered approach, in whatever form it may actually take place, and that's we might have some alternatives that will be analyzed, and we'll have to evaluate. But is there a strong, I guess majority feeling of abandoning the fixed minimum in favor of this tiered approach? I would like some feedback on that, please.

MS. KERNS: I have Justin, Dennis and then Lynn.

CHAIR WOODWARD: All right, go ahead, Justin.

DR. DAVIS: At the beginning of today's meeting, I was sort of ready to advocate for getting rid of the option for a tiered approach, and just leaving in the option for settling on one fixed minimum allocation. I think at this point I've been swayed by the discussion that it's unlikely that we're going to be able to find a single fixed minimum allocation that's going to sort of meet these competing goals of sort of freeing up latent quota.

But at the same time providing a minimum allocation that's large enough to allow states that are operating a fishery under that allocation to continue to do so. I think I've come around to favoring getting rid of the single-fixed default minimum allocation approach in favor of a tiered approach. But I really liked what Lynn suggested.

I've sort of felt like trying to come up with a three-tiered approach for the minimum allocation is just

trying to split things too fine, and allocating too much effort into making a decision that ultimately may not have a lot of impact. I kind of like the compromise of settling on a two-tiered approach, where you have one tier for states that do not have a history of harvest, then another fixed minimum for states that do. At this point I would be in favor of going with the tiered approach, but trying to keep it simple, and maybe just having two tiers.

CHAIR WOODWARD: All right, Dennis.

MR. ABBOTT: A question I would have for Kirby and an answer might be enlightening for everyone else. When we talk about the tiered approach, what percentage of the total TAC are we talking about, percentage wise? It seems to me that we're talking about dividing up crumbs. You know fooling around with a tenth of a percent, one tenth of one percent and whatever numbers you want to attach to it.

It doesn't seem to me to get us to the real problem. I think I can use Maine as an example. They obviously have an availability of menhaden, and they have a need for menhaden, and therefore they should have a quota that goes along with that, instead of the piecemeal approach that we're taking.

I can understand that states do not want to give away some amount of their quota. We need a system that is more flexible in some way, that allows say your state, Spud, if menhaden show up and there was a fishery to be had. You should have access to that fishery, and I don't think you want to relinquish that. That goes the same with any of the other states.

The real gorilla in the room is the fact that there is one or two states, two states we'll say, that are now have allocated to them 85 to higher than that, 87 percent of the total quota, while we sit here and argue about how we're going to divide up the remainder, the 12 percent between another dozen states. The whole thing just doesn't make sense.

Years ago, when we came up with a half a percent, if I recall, to each state. That was a compromise. That was buying votes. We came up with that number so that people would find a number that they could support. Whether they were going to use it or not, but that carried the day some years ago. I don't know where we're going, but I know that right now we're talking fighting over crumbs, and we're not really being realistic what the needs of the states are, and their entitlement to a fish that lives in the ocean.

CHAIR WOODWARD: I think when we set those minimum quotas before, we sort of put ourselves on the path to where we are now. Which is, we set expectations, and now we're trying to reconcile expectations to reality. Lynn, go ahead.

MS. FEGLEY: I'll just say, you know we are fighting over crumbs, but they are incredibly important crumbs. I think what two tiers does, is it allows the states with no harvest access to the fish. If they have some bycatch or some occurrence, they will have access to the fish. It does provide several percentage points back to divide up.

That fixed minimum does provide flexibility, because it serves as a buffer if the fish arrive in your state, and suddenly you have a few more fish than the allocation scheme would project you to have. Like to Conor's point, this does allow their fisheries to operate. You know I think that the two tiers just take that decision that was made for Amendment 3, and just fine tunes it a little bit to be more appropriate from state's needs. In that second tier, that fixed minimum for the states who harvest.

You know there can be a range, it can go back up to 0.5 percent. You know that number I think is open for debate. But I do think this idea of trying to divide it into three tiers is going to be difficult, trying to explain that to the public, and one more thing to frankly fight over.

CHAIR WOODWARD: We've had some discussion in advocating for narrowing it down one tier for further consideration. I guess, Kirby that would be

helpful. I assume if that is the will of the Board to narrow it down to that?

MR. ROOTES-MURDY: I mean I've heard an interest in moving forward with at least a two-tier, and then obviously a three-tier. To Dennis' earlier question, 8 percent of the TAC is tied up in this fixed minimum approach. What would be helpful is, if there is interest in pursuing this tiered approach.

I would like to get confirmation that we would drop out the kind of uniform fixed minimum approach, which is also in the memo, because I want the Board to be conscious of the universe of alternatives that are potentially going to be drafted up further. You know you are kind of adding more things in, but not really removing anything.

CHAIR WOODWARD: Back to that question that I asked. Is there anyone that feels strongly that we need to continue that fixed minimum alternative? Any other hands?

MS. KERNS: No hands.

CHAIR WOODWARD: Kirby, I'm going to take that as the will of the Board to delete that from further consideration, and to focus on the tiered approach.

MR. ROOTES-MURDY: Okay, got that noted. Then earlier I asked, based off of feedback from Lynn, Nichola and Megan, I have some guidance on generally where to try to draft those tiers up. The other question for the Board is whether to continue having a pooled quota alternative in this Addendum moving forward. The other question for allocation that's key is, limiting the number of weighted allocation searches.

CHAIR WOODWARD: All right, so let's take the pooled quota alternative first. Is there interest in further pursuing that one as an alternative? I know there are a lot of questions that arrived out of that. As one of the states that were included in that scenario, we have to have agreement amongst ourselves that if one of those states wanted to harvest menhaden, we all have to agree. Then if we wanted to do a transfer, we would have to do an agreement on a transfer out of our pooled quota. There is some, the devil is in the details, but I'm still at this point neutral on it. But I would like some feedback from the Board.

MS. KERNS: I have Joe Cimino, Mel Bell, and then Ritchie White.

CHAIR WOODWARD: All right, go ahead, Joe.

MR. CIMINO: Only fitting my hand is up first. I kind of brought this to the PDT through the Work Group. PDT didn't have much time to get us all of this information that they have provided, and I think you have a lot of questions for good reason. This was a thought process that we really aren't there yet, and I don't think needs to be a part of this. You know maybe sometime in the future it's a discussion. We're supposed to look at reallocation every three years, but I feel comfortable with having it dropped at this time, thanks.

CHAIR WOODWARD: All right, Mel.

MR. MEL BELL: I originally thought that was kind of an interesting concept, but then kind of like Joe was saying, I got to thinking about it. It seems like it could be administratively burdensome and a little more complicated. At this point, I think we could find something to live under, but go ahead and just delete that one, set it aside. First it had some appeal, but then I got to thinking that the devil is in the details and there are probably too many details to deal with.

CHAIR WOODWARD: All right, Ritchie.

MR. WHITE: I agree, it should be taken out, too many potential issues that I can see.

CHAIR WOODWARD: Any comments in support of keeping it in?

MS. KERNS: I'm not sure if they're in support, but David Borden has his hand up, and then Cheri Patterson also.

MR. BORDEN: I agree with all three of the prior speakers. I just see this as the administrative burden and nightmare for the state agencies. I concur, it should be taken out.

CHAIR WOODWARD: Cheri.

MS. PATTERSON: I also agree, pooled quota should not be considered for this particular scenario or this particular species. We do this in the northeast with dogfish, and it is an administrative burden.

CHAIR WOODWARD: It sounds like the general consensus of the Board is to have it removed, Kirby.

MR. ROOTES-MURDY: Okay, I've got that noted. Thank you.

CHAIR WOODWARD: Next one might be a little more complicated, and that is, how would we like to limit the number of weighted allocation options, if they are going to stay in. Even the scenario that was presented in the progress reports, we've got 50/50, 75/25, 25/75, depending on the different time series. This is one that can be difficult to sort out. I expect there might be some questions on what changing one means over another. I'll open it up for that.

MS. KERNS: I don't have any hands so far. Megan Ware, and then followed by Cheri.

CHAIR WOODWARD: Go ahead, Megan.

MS. WARE: Maybe I'll start with the timeframe, Kirby, because it looks like you have three combinations of timeframes for the weighted approach. Looking across those three, kind of where I'm seeing the shift in quota is Maine, Mass, New Jersey, and Maryland. I hope we can pare it down to two. My goal in paring it down to two is just preserving the range that the states had, if they have like a higher value and a lower value, making sure that those try to stay in.

I think we can accomplish that with the first two allocation time periods, which means removing this 10-12, 18-20 option. Then in terms of the 50/50, 75/25, I struggle to see how a 75/25, where 75 is on the historic data. I'm struggling to see how that is going to create enough delta of a difference for the New England states. I would recommend removing that.

MR. ROOTES-MURDY: I have one more timeline which is a weighted tier one.

MS. WARE: I think it's the very furthest right one.

MR. ROOTES-MURDY: Yes, yes, I've got the 2010-2012, 2018 to 2020, but in terms of the weighting, 50/50, 75.

MS. WARE: Oh, one of the 75/25s where the 75 is on the more historic set of years. Does that make sense?

CHAIR WOODWARD: Remove that one and leave in the 50/50 and the 25/75, right?

MS. WARE: Yes, I think so.

MR. ROOTES-MURDY: Weighted more towards recent landings, and that way I'd have it.

CHAIR WOODWARD: Cheri.

MS. PATTERSON: I agree with Megan, I think we need to go with the more recent time series, if our objective is to address quota where the fish are, and I think we need to stay with the closer time series to recent. I agree with what Megan had indicated.

CHAIR WOODWARD: All right, Kirby, just to make sure everybody is clear on what those recommendations are, if you would just restate them, the two-time series, and we know it's 50/50

or 25/75 with the time series that have been recommended.

MR. ROOTES-MURDY: Yes, just give me a minute so I can pull it up so people can see what we're talking about. It might be helpful.

MS. KERNS: While he's doing that, I'll just let you know that Steve Bowman, followed by Pat Geer have their hands up.
CHAIR WOODWARD: Go ahead, Steve.

MR. PAT GEER: Mr. Chairman, this is Pat Geer. I'm going speak on behalf of Steve Bowman.

CHAIR WOODWARD: All right, go ahead, Pat.

MR. GEER: We would disagree with the 75/25 split, we think it should be equally split, simply because we've already talked about, as Nichola said earlier, landings do not indicate availability. We need to address those historical values as well, there is infrastructure in place, and doing anything less than a 50/50 split would be something that we could not support.

We do support those years of 2009-2011, those are years before there was a TAC in place, and we realize you know using the most recent years are important as well. We support the years, we just don't' support anything other than the 50/50 split.

CHAIR WOODWARD: All right, so Kirby's got up the timeframes. All right, so go ahead, Kirby, just make sure everybody knows what they're looking at here.

MR. ROOTES-MURDY: Sure, so again, what I got guidance on from Megan was removing when it came to the weighted approach, removing their last one on the last column, which was 2010 through 2012, and 2018 through 2020, as it falls in the middle of the two others. I also got preference noted from her that the weight towards more recent landings, so 25/75 split.

I just heard from Pat Geer an interest in having a version that has a 50/50 split on that, and then what I wanted to make sure I had corrected was one of the recommendations from the Plan Development Team. That if there is an interest in using these weighted timeframes, these far-right ones.

That in turn using a timeframe of 2009 to 2020 would not be needed, as it produces similar types of percentages. If there is agreement to want to pursue a weighted timeframe approach, then I wanted to get confirmation that there are a couple of members in agreement who did not have a 2009 top 2020 timeframe alternative in the document.

CHAIR WOODWARD: Is there any concern about what Kirby has just described, or is there need for clarifying the questions on that?

MS. KERNS: I have Lynn Fegley and Pat Geer and Steve Bowman.

CHAIR WOODWARD: Okay, go ahead, Lynn.

MS. FEGLEY: Okay, so I think Kirby just helped me out. Somehow, I was under the impression that we had already sort of agreed by consensus to remove the 2009/2020 option, but that doesn't seem true. It seems like that is still in there. I would say to Megan's point and to Pat's point. If we are maintaining options in the document, like the 2018-2020 reference period, there is no need, I don't think, to go to the weighted time period that weighs heavily towards the recent year. I would rather replace that with keeping the long time period, or using the 50/50 that produces similar results. I think as long as we have these options that have these recent timeframes, we need to remember that we've put in our objectives that we wanted to better align, and we still want to consider infrastructure and past fishery performance. To Nicholas's point that "landings are more than just availability."

You know they are about what a state is doing with its effort. I think if we don't do the 75-weight to recent years, maintain the recent year timeframe,

and maintain that long average, we're going to have a coverage of all of those interests. I hope I articulated that okay.

CHAIR WOODWARD: Yes, I'm trying to follow that. I'm a little fuzzy exactly what this table would look like under that scenario. But maybe, Kirby, you can help un-fuzz this for me.

MR. ROOTES-MURDY: I think I got confused by what Lynn is looking for. We will move forward with getting this far column removed, and I was trying to get confirmation that in having a weighted approach in this document, that there wouldn't be the need for a full 2009-2020 timeframe. Lynn just spoke in favor of keeping that in, so I would like to better understand if there is agreement with other Board members to keep in 2009-2020. If that is something that you guys want to add as an explicit timeframe option that would be helpful.

CHAIR WOODWARD: Lynn, would you follow up, maybe, and help us get out of this little fog we're in here?

MS. FEGLEY: Yes, I'm sorry. I certainly didn't mean to create that. I agree, that last column to the right should be removed. I'm trying to agree with what Pat Geer said, that anything weighted more than 50/50 in recent years, I would not support. I was trying to say that if there is an option that provides similar results to that long time series, then that long time series I would support removing.

CHAIR WOODWARD: Yes, and I think this is the inherent problem of two divisional steps here, because we're trying to reconcile weighting to time series. Trying to figure out a way to get ourselves out of this for the war we've got going on between weighting and time series.

MR. ROOTES-MURDY: Well, I think in the interest of time we will leave this in. What I've heard is an interest in two different variations on the weighted approach, 50/50 and 25/75. There are a number of other items I want to get to in this document, and I just am going to reiterate that if you guys don't want to remove things now, I understand. But there will come a point in which to simplify the Addendum, things will need to be removed.

CHAIR WOODWARD: All right, Pat, sorry I left you hanging there.

MR. GEER: I just wanted to clarify. I'm not opposed to keeping all three options to go forward into the plan, I just didn't want it to just be one or the other. I think all three options, the 25/75, 75/25 and the 50/50, so with all three of those moving forward.

CHAIR WOODWARD: All right, thank you, Pat. Now, was Steve going to talk or are you talking for Steve?

MR. BOWMAN: No, Sir, we're just having a little difficulty, as far as technical stuff if you're concerned, but we're going to get broadband here before long.

CHAIR WOODWARD: I remember you all saying you all were pooled together in there, so thank you, Steve, no problem whatsoever. All right, Kirby, so are we good on that slide? I can't remember.

MR. ROOTES-MURDY: Yes, I'm just going to bring back to, I think some of the timeframe questions that we were hoping to get some clarity on for the Board. Some of the other questions that were important to probably get answered were, we had a moving average method in this document as well. I wanted to get confirmation from the Board that there is interest in keeping that alternative in the Addendum.

CHAIR WOODWARD: All right thanks, that one I think is interesting in the concept may be good or bad in execution, so would anyone like to comment on that, Board?

MS. KERNS: Conor McManus.

CHAIR WOODWARD: All right, go ahead, Conor.

MR. McMANUS: I would be in favor of keeping that in. I think in thinking about the issue at hand and the objectives of the Addendum. It really tries to get towards what landings are distributed to date, and also allow for a dynamic nature of the base, in terms of variability, either to harvest or just in terms of where landings are occurring.

I think it is worth noting, especially as the TC noted that they are in that example figure towards the end, because there can be somewhat of a cyclical nature, in terms of where landings happen and where the resource is. I think this is probably one of the more adaptive and responsive tools towards addressing that thought. I would be interested in seeing it move forward, primarily in the spirit of the objective of the Addendum.

CHAIR WOODWARD: Any other hands, Toni?

MS. KERNS: No other hands.

CHAIR WOODWARD: All right, Kirby, so at least we have one person in favor of keeping it in there. Does anybody want to register their concerns about leaving it in there, or are you fine with leaving it in? If you're opposed let me know, just raise your hand.

MS. KERNS: You have Emerson Hasbrouck.

CHAIR WOODWARD: All right, go ahead, Emerson.

MR. HASBROUCK: I'm thinking, Mr. Chairman. I've kind of lost my place here. Which of these bullets are we discussing right now about leaving in or taking out?

CHAIR WOODWARD: At the bottom, leaving in the moving average method.

MR. HASBROUCK: Okay, I'm not opposed to that. I mean yes, I'm not opposed to keeping it in.

CHAIR WOODWARD: This is a lot to keep straight in your head, I know, it's difficult, especially in a virtual environment. Thank you, Emerson. All right, Kirby, I think you've heard from the Board on that one.

MR. ROOTES-MURDY: I think we've read most of the main questions for allocations, and I think in the interest of time it would be good to get Board feedback on the incidental catch in small-scale fisheries.

CHAIR WOODWARD: All right, okay.

MS. FEGLEY: Mr. Chair.

CHAIR WOODWARD: Yes.

MS. FEGLEY: I'm sorry, this is Lynn Fegley. I wanted to just throw out there about removing the reopen for three years and then reallocate. I think that's in the allocation.

CHAIR WOODWARD: Can you take us back to that, Kirby?

MR. ROOTES-MURDY: Yes, I would, not having heard any agreement from the Board to keep it in, it would be good to get confirmation to remove this.

CHAIR WOODWARD: Which one are we looking at? Remind me, I kind of got lost there. Say what you said again, Lynn.

MS. FEGLEY: Yes, I'm sorry, it was the open fishery then reallocate. I wanted to make sure there was a consensus to remove that.

CHAIR WOODWARD: Yes, that one is gone. All right, Kirby, take us back. All right, we have a statement of the problem here under incidental catch. I would like some Board feedback on the language here.

MS. KERNS: Ritchie White.

CHAIR WOODWARD: Go ahead, Ritchie.

MR. WHITE: As I said initially, I guess I can't support changing this until I see volumes of quotas that the New England states will get, because now they depend on this, so cutting this back substantially would have severe implications if they do not have adequate quotas up front. That would be my sense is, that I see what the other end is before you make a decision here.

CHAIR WOODWARD: I guess my question is, do you agree that this language adequately describes the problem that we're having to address in the Addendum?

MR. WHITE: Yes, it is a problem, absolutely, thank you, sorry.

CHAIR WOODWARD: Any other hands?

MS. KERNS: You have Justin Davis, followed by Lynn Fegley.

CHAIR WOODWARD: All right, go ahead, Justin.

DR. DAVIS: I just wanted to offer that I thought the second to last bullet here, the one that starts with Amendment 3 language, isn't maybe as clear as it could be, particularly the sub-bullet underneath it. Maybe I'm the only one who feels that way, but I thought maybe a little bit of clarification there of what exactly is being communicated could be helpful.

CHAIR WOODWARD: I was going to look at the actual, this is obviously bulleted. The statement of the problem in the actual memo is much, much more detailed. Maybe if you could look at that, and see whether or not you still have the same concerns. It says the Amendment 3 language has led to various interpretations of which landings fall under this provision. If it needs to be further expanded that's fine.

MR. ROOTES-MURDY: Justin, we can work on perfecting this, but the issue that the PDT was trying to highlight here is that you've got in states that start to land under the incidental catch provision before their full jurisdictional obligation is met. They do it based off of the sector or gear having met their subdivided jurisdictional allocation. It's been flagged by the Plan Review Team in three FMP review in recent years.

DR. DAVIS: Thanks, Kirby, and I do see that the language in the actual memo document is much more descriptive, so I would retract my earlier statement, thanks.

CHAIR WOODWARD: No problem, just trying to make sure the bullets capture the essence of it. Sometimes that means losing some of the detail. All right, Lynn, you're next.

MS. FEGLEY: I would just add to the intent that the other part of this was to minimize regulatory discards for non-directed multispecies fisheries.

CHAIR WOODWARD: Okay, so you want to add that as an additional sentence under the intent statement, is that correct?

MS. FEGLEY: Correct.

CHAIR WOODWARD: You've got that, Kirby?

MR. ROOTES-MURDY: Yes.

CHAIR WOODWARD: Very good. All right, any further comments on the statement of the problem?

MS. KERNS: You have Emerson Hasbrouck and Bob LaFrance.

CHAIR WOODWARD: Go ahead, Emerson.

MR. HASBROUCK: Relative to the last bullet there. Without changes to these landings, by these landings I think we're talking about incidental catch small-scale fisheries overall. Without changes these landings may remain at high levels or increase. This could jeopardize management objectives. I'm not completely following how the incidental catch small-scale fisheries landings can jeopardize our

management objectives. Can somebody help explain that to me, please?

CHAIR WOODWARD: I'll take a shot at it. I think the concern is that at the rate they're increasing, as you see in that third bullet they've exceeded state quotas range to 1-4 percent of the annual TAC, since they don't get counted against the TAC. If we reallocate, in order to fully utilize the TAC, then I think an unintended consequence could be that the incidental catches cause a climb in exceedance of the TAC, which means that we're removing more menhaden from the water than we intend to do under our management approach. Kirby, is that an accurate description, or I'm off?

MR. ROOTES-MURDY: No, you're correct.

MR. HASBROUCK: Follow up on that, please?

CHAIR WOODWARD: Go ahead.

MR. HASBROUCK: But if our intent here is to change the underlying allocation to each state, then hopefully states are not going to revert to the incidental catch in small-scale fisheries allocation, because their quota is still open. All right, now if you've got a small quota, then you start going against the incidental catch quicker.

But if you've got a larger quota, then you're not going to start fishing against the incidental catch as early on in the year. I don't know that that is going to jeopardize our management objectives. It kind of depends on how things shake out with our reallocation.

CHAIR WOODWARD: I think that's what I guess the statement without changes, if things were to stay at status quo and we did not have a change in the way that the incidental catch provision is being further utilized, then we could result in exceedance to the TAC overall. But I think it became, as has been stated multiple times this afternoon.

All these things are connected together. It's kind of hard to touch one without touching the other ones, and understanding what that means for the first one. That is part of the inherent problem in these sorts of situations. I certainly understand your concerns. Okay, Rob, go ahead.

MR. LaFRANCE: This is really just a question for Kirby under the Amendment 3 language that we're talking about, in terms of different interpretations. What you're looking for is clarification that we need to make certain that either one gear type, in other words, you exceed the quota for the whole of your state before you can get into this program, versus exceeding it for a particular gear type. I just want to make certain that that is the question.

MR. ROOTES-MURDY: The statement of the problem again is trying to outline the issues that need to be addressed. The next slide is going to go over the objectives. In terms of ways of addressing this, the Plan Development Team has put forward alternatives to make the language more clear on whether a jurisdiction can go into incidental catch, whether it's based on their full allocation or subdivided sector user specific allocations.

MR. LaFRANCE: Thank you, Kirby, you answered my question, I appreciate it.

CHAIR WOODWARD: All right, any further questions or comments about this statement of the problem, anything that we just find unacceptable and needs to be changed. We need to move on, we're running out of time.

MS. KERNS: No other hands.

CHAIR WOODWARD: Okay, Kirby, let's move on to the objectives slide.

MR. ROOTES-MURDY: Again, we wanted to make sure that the Board feels that this objective statement, or this objective will address their statement of the problem.

CHAIR WOODWARD: All right, I'm just going to bring this up, because it's come up in earlier

discussions, and that is under bullet one it says meeting the needs of existing fisheries. Do we want that to be changed to current, or is existing a suitable synonym for current? I'll throw that out there, then just open it up for general questions and comments.

MS. KERNS: You have Megan Ware.

CHAIR WOODWARD: All right, go ahead, Megan.

MS. WARE: To answer your question, Mr. Chair, I think existing is fine filling in for current. I'm fine with existing. I think they mean the same thing. I had a couple concerns with these, and I think my overarching concern is I felt like some of these objectives veered into actual management tools, as opposed to objectives.

For example, Number 4, establishing trip limits and season limits. That is something we're considering in this document, and I think we should consider, but to me that's a management tool to achieve an objective, not necessarily an objective. Similarly, Number 3, indicating what landings can occur.

I agree we need to answer that, and that those landings are not part of the directed fishery. To me that is like a management tool. I think that is what we're trying to answer that's a question too, right? But I really think it's indicating when landings occur, and if those landings are not a part of the directed fishery. We develop a range of alternatives to answer these different objectives. My final comment on Number 2. I fully support an objective about reducing discards, and when mentioned previously, I think that is a really important part of this provision. I'm not actually sure if limiting eligible gear type achieves that objective.

I'm not opposed to alternatives in the document that limit gear types, because I can sense that there is a strong desire for that. But I actually think on the one extreme, if you limit gear types all the way, then you would actually be increasing discard. To me there was a bit of a mismatch there for in the Number 2 objective, and my recommendation would be just to simply say reduce discards as Number 2.

CHAIR WOODWARD: All right, thank you, good comments. I think sometimes we do have a tendency to blur the lines between objectives and actionable items pursuant to objectives, so we've had a recommendation that we would modify Bullet 2, to only include reducing discard mortality, and then actually remove Bullet 3 and Bullet 4, based on Megan's utterance. Other comments from the Board, questions?

MS. WARE: Mr. Chair, just to clarify, if I may on Number 3. I don't think it needs to be removed necessarily, although it can be. I think if we keep it in it should just state, indicating when landings can occur, and if those landings are a part of the directed fishery, so pose it more as a question than a directive.

CHAIR WOODWARD: Okay, thank you for clearing it up for me. We've had some suggested modifications from Megan. Any other raised hands, Toni?

MS. KERNS: Nichola Meserve.

CHAIR WOODWARD: Go ahead, Nichola.

MS. MESERVE: I'm struggling a little bit with the first one, actually, saying meet the needs of existing fisheries. If that was the overall objective, I don't think we would have an option that would consider removing purse seines from the allowance, because that's certainly not going to meet the need of that fishery. I just don't know if that is there as the objective is to constrain the landings, while continuing to minimize discards. I see those two, but I don't know if we're trying to meet the needs of all the existing fisheries under the incidental catch provision.

CHAIR WOODWARD: All right, would you recommend that statement be removed or modified?

MS. MESERVE: I mean thinking on the fly a little bit. I would say remove it. But the PDT may be able to put some more thought into this one, and come back at the next meeting to gander consideration, a lot of Board comments today.

CHAIR WOODWARD: Yes, I think one of the challenges to this is that we almost have to give them a time machine and go back to whenever we had the original discussions about getting this built, it's provisions and what the purpose of that was. I think one of the primary focuses of that provision was to just reduce discard, period. Certainly, we know folks that were there back in those years. If that's what the real objective of the incidental catch provision is, or has it grown to much more than that over time? I welcome comments about that.

MS. KERNS: Lynn Fegley, and then Emerson Hasbrouck.

CHAIR WOODWARD: Go ahead, Lynn.

MS. FEGLEY: Yes, as indeed, I think one of the architects of this cockamamie idea. The intent of this provision originally was to allow low volume, non-directed, multispecies gears a mechanism to continue working without creating large amounts of menhaden discards, or having to shut down an entire multispecies fishery to preserve menhaden. Those were the conversations that we were having during Amendment 2.

CHAIR WOODWARD: All right. Go ahead, Emerson.

MR. HASBROUCK: Yes, similar to what Lynn just said. As I recall our discussion, however many years ago on this, was to have this allocation for, not just an incidental catch, which to me is when somebody is fishing for something else, they catch some menhaden. Not to have just an allocation for incidental catch, but also small-scale fisheries.

I don't recall how we defined small-scale fisheries, but I'm sure that we did. Even if that small-scale fishery caught more menhaden than it did other species, it's still a small-scale fishery. I think the discussion in the allocation here was for both. To allow an incidental catch and to allow small-scale fisheries to harvest menhaden.

CHAIR WOODWARD: All right, Kirby, could you back up to the statement of the problem again? I think maybe some of our difficulties kind of reconciling the objectives are stated here in the statement of the problem. Really what we've got is a set of objectives that need to be pursuant to the problem as described here, with the additions that were offered earlier.

We really aren't talking about the objectives of the incidental catch provisions, per say, we're talking about the objectives to deal with this problem. I think that may be a little bit of our issue here. Kirby, do you have any suggestions to lead us out of this, the situation we're in right here?

MR. ROOTES-MURDY: Yes, so I've gotten feedback to remove this one bullet to actually work with the Plan Development Team was either modifying this first bullet, or this first item, or removing it. I might need to go to Nichola for some more clarity on that. I've gotten some language on adjusting the third item as well. But if there aren't any other comments that people have on this that's fine, we can move on to the recommendations and the key questions.

CHAIR WOODWARD: Okay, do we have any raided hands, Toni?

MS. KERNS: One, Steve Bowman.

CHAIR WOODWARD: All right, go ahead, Steve.

MR. BOWMAN: Shanna Madsen will be speaking, go ahead, Shanna.

MS. SHANNA MADSEN: Thank you, Mr. Chair, sorry about us all being in the same room. I think it gets a bit confusing. But just kind of wanted to speak to

both what Lynn had said and what Emerson had brought up. In going back and just to pull, just to let everybody know, I am serving on the PDT currently. I just wanted to kind of disclose that.

I did go back when we were sort of developing some of these options, and read through the draft amendment for Amendment 2 and Amendment 3. I did want to note that I think that there is discrepancy sort of between what Amendment 2 had discussed as what an incidental catch bycatch looks like, and kind of what we put forward in Amendment 3, like Emerson was saying.

You know that sort of enclosed a more small-scale fisheries to be included as well as that incidental catch provision. However, I would note that in Amendment 3, we state very specifically that should a specific gear type show a significant increase in landings under that incidental catch provision, or it becomes clear that a non-directed gear type is directing on menhaden under the incidental catch provision. The Board has the authority through adaptive management to alter the trip limit or remove that gear from the incidental catch provision.

I think that kind of leads to some of the thoughts that we're trying to put forward to with this objective with the incidental catch program. I think that you know I've heard a lot from Board members, as far as whether or not they want that to actually encompass the small-scale fisheries as well as incidental catch, or if we just want to go back to bycatch incidental catch provision like we had in Amendment 2. I just kind of wanted to bring up that that was the stuff in the Draft Amendment 3.

CHAIR WOODWARD: Thank you, Shanna that is helpful context I think for us, as we sort of wander our way through all of this. I think we're going to leave this for right now and move on to the next slide, Kirby.

MR. ROOTES-MURDY: Okay, so in terms of recommendations for the PDT, it was to adjust the trip limit, whether that is the priority, because as noted, just adjusting the trip limit may not significantly reduce landings under the incidental catch and small-scale fishery provision. The other was not to include catch accounting as this appeared to be feasible, in terms of addressing the concerns raised about increasing landings under this category for either reallocation or it could be addressed through changing gear types that are in the current provision, as well as trip restrictions.

CHAIR WOODWARD: All right, so is the Board interested in continuing to have trip limit adjustments in this Addendum, or to leave them just where they are, and focus on the other perhaps more important issues?

MS. KERNS: You have Megan Ware and then Joe Cimino.

CHAIR WOODWARD: Go ahead, Megan.

MS. WARE: I would recommend that we keep this in. I guess I would kind of disagree with the PDTs conclusion that changes to trip limits may not significantly reduce landings. When I read the memo, it said 60 percent of trips were above 3,000 pounds. If we went down to 3,000 pounds, 60 percent of trips would be impacted, which to me suggests that it would significantly reduce landings.

Just knowing what Maine kind of distributes in a trip limit looks like, I know it would have significant impacts in Maine, which is kind of the reason we're having this conversation. I would recommend keeping it in. I do recommend, you know I think the change in trip limit has to be for directed gears. I know there are states in the Mid-Atlantic where they have stationary multispecies gears that are reliant on those 6,000 pounds, 12,000-pound trip limit, so I think that the change in trip limit needs to be narrowed just to directed gear type, thank you.

CHAIR WOODWARD: Okay, Joe, go ahead.

MR. CIMINO: Yes, I'm okay with everything Megan said. I think if we do want to have discussions on trip limits, eventually it would be important to get public comment on that. As for the catch accounting. I think it's important to revisit at some point in time, but I do not think it needs to be in this Addendum.

I think as of right now, you know it's something that we are operating well within our safe harvest limits. I don't enjoy having any catch that isn't accounted for under a total allowable catch. I spent some time thinking about this. I don't think this is an issue that we need to try and tackle right now, with all the other stuff on this.

CHAIR WOODWARD: Is anyone strongly opposed to leaving in the trip limit element in the Addendum? Likewise, is anybody, excuse me, Toni, go ahead.

MS. KERNS: Max has his hand up in opposition, I think.

CHAIR WOODWARD: All right, so Max, do you want to?

MR. APPELMAN: Sorry, Mr. Chair. I wasn't putting my hand up in the queue for opposition of the trip limit, but I did want to speak to the second bullet. I can hold on to that comment.

CHAIR WOODWARD: No, go ahead.

MR. APPELMAN: Well, I appreciate what Joe is saying, but I do kind of think this concept should stay in the document at least for scoping. I also, I think I'm following what the PDT is thinking here, that if we get reallocation right, then reliance on the incidental catch provision will go down, and so those landings will be sort of minimal. But I do think the concept of ensuring all landings that are counting towards the TAC should be part of this draft document for scoping. I would like to see that in there.

CHAIR WOODWARD: We've got support. Go ahead, Toni.

MS. KERNS: You have, I think the order that they came up was Allison Colden, Lynn Fegley, Rob LaFrance and then Justin Davis.

CHAIR WOODWARD: Go ahead, Allison.

DR. COLDEN: I just wanted to weigh in and support Max's comments about catch accounting. I think it's an important concept to keep in the document at this point. We've talked a lot throughout this afternoon about how incidental catch is increasing over time. It is not counted towards the TAC.

I know our intention here with our reallocation efforts are to move more of these landings into the directed fishery under the state-by-state allocation. But since we are at a point where we don't yet know how other parts of this management document are going to shake out, and what that means for final allocations for the state by state, I think it's important that we keep this in here. I do think you know there may be some more flexible options that could be considered.

I know the PDT has put a lot of time into thinking about this, and you know concerns that they might have. But at least making sure that if the inclusion of the incidental catch results in an overage of the coastwide TAC, that there is a management trigger that is tripped, and we have to take action and treat it just like an overage in any other portion, either the EESA or the state-by-state allocations. I think that would be appropriate, and like Max said, I would support keeping this in the document at this point.

CHAIR WOODARD: All right, Lynn.

MS. FEGLEY: Maybe being somewhat at odds with my colleague and my delegation. You know I agree with the importance of accountable catch. I really am starting to dislike this idea that this harvest is being characterized as unaccountable, because we do account for it. We know exactly what we're catching. We do compare the total harvest that

includes incidental catch to the TAC each year, and the numbers are included in the stock assessment.

I mean those numbers are accounted for. My concern is that the options that we have in the document are extremely complicated. I will say honestly, that one of the saving graces of the incidental catch is the administrative burden, you know on the state. I think Maryland would wind up paying more than the Maryland menhaden fishery is worth, in staff resources that we don't have, to meet some of the monitoring requirements. But that said, by the end of the year, you know we are fully accounting.

I feel like the public is going to be confused. It's going to be difficult to implement. I would rather replace it with even language that says something like, you know if we do exceed the cap. We've never lost our way with where we are in the annual harvest, versus the cap. Maybe we just say, if we exceed the TAC in a year, then the Board has to take some sort of action. The problem that we have is the growth. It's the sort of big growth that's happening in this sector. That is coming from that purse seine. I think the problem, we need to fix the problem and not just throw the whole baby into a different dimension. I really think it's for another conversation for another day. We have not exceeded the TAC since it's been put in place.

CHAIR WOODWARD: All right, Rob.

MR. LaFRANCE: I just want to align my comments with Allison, and just also say a couple things in terms of, we keep referring to incidental catch, and I think it's important to recognize that it's not just incidental catch. Incidental catch is small-scale fisheries. It's really that small-scale fishery that we're really trying to make certain gets accounted for under the TAC.

I understand that we look at it as part of the projections, but actually accounting for it, and making certain it's accounted for like any other directed fishery, should be what we're looking at, which is why I think we should maintain it in this particular document at this time. We still don't know how this is all going to shake out. I think at the end of the day we want to make certain we leave this in here, to make certain that we are accounting for the small-scale fishery in how we look at the reported data as it relates to the TAC.

CHAIR WOODWARD: All right, Justin.

DR. DAVIS: I'll keep it brief, because a lot of good points have been made on both sides of this. I am in favor of keeping this in the document at this time. I am fairly optimistic that when everything is said and done that the need for this won't be there anymore, through a combination of reallocation and some adjustments to this program that will negate the conditions that have led to the growth and catch under this category. But for me at this point, I would prefer to see it stay in.

CHAIR WOODWARD: Any more hands, Toni?

MS. KERNS: One more hand, Emerson Hasbrouck.

CHAIR WOODWARD: All right, go ahead, Emerson.

MR. HASBROUCK: I think some of the issue here is semantics. This second bullet does not include catch accounting in the draft addendum, and even in the draft addendum the category is catch accounting, but what it really speaks to is accountability. We already are accounting for the incidental catch. As Lynn said, we know what it is, and we compare it, we add it to the landings and compare it against the TAC.

We account for those landings, right? But I think the issue is, what are we going to do about accountability, right if the incidental catch increases by whatever we might come up with here? I just noticed that the slide changed here to catch cap and so forth. I think if we're going to go forward here. I think we need to change the category here

to accountability rather than accounting, unless I've got it backwards.

CHAIR WOODWARD: Well, obviously there is split meanings on this one. I guess I would recommend that we leave it in, but we'll have another chance to address this. But Kirby could use a little bit of guidance on these alternatives here. Let's take a little time here, and or even those who would like to see it go away, maybe help Kirby out here. Kirby, certainly weigh in on what we need to do to help you and the PDT, with regard to these.

MR. ROOTES-MURDY: I think one of the tough things is, a key question that this Board continues to wrestle with is, given the trend in landings, does the Board want to continue having this provision be an incidental catch only provision or to continue allowing directed small-scale fisheries under it?

If it's to allow directed small-scale fisheries, would the Board rather constrain landings and not count them against the TAC, or to constrain landings or not constrain landings but have them count against the TAC? Trying to get at that, you know the Plan Development Team thought through, at least a couple of alternatives to address this.

But to the point raised earlier about complexity. Without the Board providing some kind of guidance on what the priority is, this is going to be frankly a monster to try to explain to the public. You've got at least two different approaches. You either have a set-aside or you take a percentage of the TAC that you're monitoring, and then have a management trigger too.

Those are two different alternatives. But then it could be further subdivided into being just specific to small-scale directed tier sites or for both. Again, the Board I think, is going to need to, not today down the road, make a decision on what the priority is when it comes to accounting for this incidental catch landings. They want to have this type of program in place.

CHAIR WOODWARD: The day is getting long, and I think we're all getting a little fatigued in our brains, especially to deal with things of this nuance, so it doesn't want us to make decisions that we're not comfortable with. Are there any strong feelings about these alternatives here, or does Kirby's comments change anybody's opinion regarding whether we need to keep this in the Addendum or we put in something that is going to be very difficult for us and the public to understand the consequences of? I'll throw that out. We're about to bump up against our time, so we don't want to go any farther than we have to. I want to keep this discussion going.

MS. KERNS: You have Allison Colden, followed by Lynn.

CHAIR WOODWARD: Go ahead, Allison.

DR. COLDEN: Hopefully what I'm offering is a helpful suggestion. I was just thinking as maybe an option to simplify this a little bit. Could we not have the incidental catch sector sort of operate as it does now? It is evaluated post hoc right now. Then account for overages from the TAC in a following year, without having a specific set-aside or catch cap?

CHAIR WOODWARD: I certainly think that's a viable alternative. Are you suggesting that we replace what we have with that or add it in?

DR. COLDEN: I guess that would make it more complicated, but I wouldn't want to say to replace all of these, if other members of the Board were interested in moving those forward as well.

MS. ROOTES-MURDY: Allison, could you just maybe one more time reiterate what it is you're proposing, because again, this catch accounting in the memo outlines based on what the PDT has thought through, a catch cap that is a percentage of the TAC versus a set-aside, which comes off the TAC. You're proposing what?

DR. COLDEN: Basically, that the small-scale fishery operates similar to the status quo that it does now, and then there is a post hoc evaluation of whether or not we've exceeded the TAC. Then the overage from the TAC exceedance caused by the incidental catch fishery comes off of the next year's TAC.

MR. ROOTES-MURDY: Just so it's clear, that would mean that there are no changes to the gear types it outlines in Amendment 3, that combined incidental catch small-scale fishery gear type, if those landings coastwide cause the TAC to be exceeded that that produces the following year's TAC. Is that what you are proposing?

DR. COLDEN: Yes.

MR. ROOTES-MURDY: Okay, if that's the will of the Board to have that as an alternative then that can be included in the Addendum.

CHAIR WOODWARD: All right, I would like to hear from some of the proponents of keeping in catch accounting in response to that, and even opponents, please.

MS. KERNS: I have Lynn, followed by Max and then Nichola.

CHAIR WOODWARD: Go ahead, Lynn.

MS. FEGLEY: I'm not sure, I totally understand what Allison was getting at. But I think looking at the memo, it seems because we know that the issue, you know the trouble here is really with the soft-scale directed gears. It seems to me like the compromise here is to keep 3 and 4, Actions 3 and 4 in the document.

I think Option 4 might be what Allison was getting at, where they have a 1 percent set-aside, and if they go over it, it is deducted from next year's set-aside. It parses out the place where the problem is, and lets out the little low volume non-directed gears continue running as they are. That would be my recommendation, is to keep 3 and 4 in, and maybe not 1 and 2.

CHAIR WOODWARD: All right, we don't have those presented, so that we have to reference back to the memo to see what Lynn specifically is talking about, unless it's combined under this sub-option version specific to small-scale directed gear type. Let's see, I had Max next.

MR. APPELMAN: I am looking at the time, and I apologize, because I feel like I'm about to throw a wrench, given what Lynn was just proposing. But I actually saw this being simplified the other way, keeping Options 1 and 2, which are somewhat simple concepts, in my opinion. They are not gear specific, and then also adding Allison's proposal. My understanding about Allison's proposal, which I think is a good option, is that it's not gear specific.

The incidental catch provision would continue as it does. We would just tally up whatever those landings are, and if that plus directed landings exceeds the TAC, you deduct it from next year's TAC. I think that's another simple concept that we could add here. I apologize, Lynn, but I think it simplifies things in my mind to get rid of 3 and 4, and add Allison's proposed option to 1 and 2.

CHAIR WOODWARD: All right, we almost seem to be at an impasse here, I'm afraid, Kirby, with this one. We've obviously got divided opinions about leaving it in, and certainly divided opinions about what to leave in. At this point.

MR. ROOTES-MURDY: Spud, I would chime in. I think Max's suggestion, you know from staff viewpoint makes sense. One of the concerns I do have about 3 and 4 is specific by small-scale directed gear type. If those were removed, that is easy enough to sound board. The incidental catch landings are submitted annually through compliance reports.

Trying to parse out which ones would count and which ones wouldn't, I think would get at this point a little complicated for the public. Back to the suggestion of just having three alternatives, the

third being what Allison proposed, of just the incidental catch landings being combined with all the other landings to evaluate the TAC annually makes sense. We can include that in the Addendum.

CHAIR WOODWARD: All right. Well, I think unless there is some adamant opposition to that course of action, that's what we'll do. We can move on, hopefully get to the last item in the report from the PDT. Anybody can't go to sleep tonight because of that?

MS. KERNS: I have Joe Cimino and Erika Burgess with their hands up.

CHAIR WOODWARD: All right, Joe, go ahead.

MR. CIMINO: Yes, sorry, Spud. It's just, you know being on the Working Group, and trying to follow the PDT through some of this reasoning. It goes back to that decision tree. Right now, we have an issue in New England, where there is kind of a directed fishery in what used to be incidental catch.

That is what might put this TAC in jeopardy. A 1 percent set-aside is a situation where maybe that covers it. With Allison's suggestion, we could come up in a situation where we reduce or eliminate fixed minimums, and all of that goes back up towards New England, and we have an issue that does make me uncomfortable. I'm not necessarily saying I can't sleep at night, but things are getting so complex. I'm not sure if I can sleep at night.

CHAIR WOODWARD: Well, and I think that is the inherent problem with this. It's become like sitting in a restaurant with a 17-page menu, and trying to figure out what you're going to eat. You're almost paralyzed, and you starve to death sitting there trying to decide what to eat. I think in the interest of moving forward again.

We're going to see this again, you know Kirby was just trying to help the PDT pare things down, so that they can work most efficiently, but obviously there is divided perspectives on this within the Board, so I'm hesitant to just throw it out. Kirby, is where we are going to be okay, in terms of keeping things moving forward on this Addendum?

MR. ROOTES-MURDY: Yes, I mean I hear Joe's concern. Like we've talked about before, when the Board sees the draft addendum, if there is an interest in removing that, the Board can do so at that point.

CHAIR WOODWARD: All right, Erika.

MS. ERIKA BURGESS: With Number 2 in the document and what Allison suggested, I would just encourage the PDT to include discussion of the potential pitfalls that come with a payback scenario, which is in both of these, for a portion of the fishery that's only accounted for at the end of the year.

I'm not speaking in favor or against either Number 2 or what Allison proposed, but just knowing what has happened in the Gulf of Mexico with this type of setup. All things with good intentions can have some unexpected and undesirable consequences. Just that that could be included in the discussion by the PDT In the next document, I would appreciate it.

CHAIR WOODWARD: Thank you, Erica. I would say unintended consequences is the very nature of marine fisheries management these days. All right, Kirby, it is 5:23. We've exceeded our allocated time, and Jeff, I'm sorry, we had you queued up for your presentation. I guess we'll hold that over for our next meeting.

I would like to, maybe if we can dispense with the episodic event set-aside, which probably usually means I think in the next few minutes. Unless folks really just want to have a hard stop. Is there anybody who thinks we just need to cut right now and leave this for the PDT? Can everybody hang in for a while?

MS. KERNS: No hands up.

CHAIR WOODWARD: All right, well I'll tell you what, let those that can stay and those that have to go break, thank you for hanging in with us. Kirby, let's move ahead so we can get done. I'll let you to your EESA.

MR. ROOTES-MURDY: Okay, I'm just trying to get it up onto the screen really quick, so the statement of the problem.

CHAIR WOODWARD: Okay, we've got a problem statement here. Obviously, it's a somewhat abbreviated version of what's in the memo. But it gets all pretty much most of the content, with the paragraphs in this. Does anybody have any recommended changes to this, or are we okay with it?

MS. KERNS: I have no hands.

CHAIR WOODWARD: Okay, one more chance, in case it takes a few minutes to read it. I don't want to rush us. No hands?

MS. KERNS: No hands.

CHAIR WOODWARD: Okay, all right, Kirby, let's move on to the objectives, or objective, in this case.

MR. ROOTES-MURDY: This is action to the episodic changes in regional availability in order to minimize in-season disruptions, and reduce the need for quota transfers and incidental harvest.

CHAIR WOODWARD: Okay, any questions/concerns with this?

MS. KERNS: No hands.

CHAIR WOODWARD: All right, we're on a roll here, Kirby.

MR. ROOTES-MURDY: I think maybe it would be helpful, given some of the discussion on our last issue, is to maybe go through these key questions, which is what the intent of the episodic set-aside program is for the Board consideration. Should it continue to serve as it has been? It's kind of regional, secondary regional quota.

Should there be an alternative to remove the episodic set-aside? There are three questions really, if there is interest in increasing the set-aside, what should the maximum value be, where should that increase come from, and the PDT has considered either off the top as a consideration, relinquished quota, or through adjusting the fixed minimum, no change to set-aside from this off the top, from reductions in the fixed minimum.

CHAIR WOODWARD: Okay, so we've got some questions proposed regarding the EESA, so I'll open it up for responses and comments.

MS. KERNS: You have Joe Cimino.

CHAIR WOODWARD: All right, go ahead, Joe.

MR. CIMINO: I guess this is an issue of stamina at this point. I always ask those first two questions, but I don't think this is the time to address them, so I'm fine with not having consideration of alternatives to EESA at this point. I don't know what a maximum value should be. Maybe that's something we put out there. Maybe the needs of recent years can help answer that. But I think where should the increase come from are all things that should kind of move forward in the document, because I think those are all reasonable places if there is an increase.

CHAIR WOODWARD: Anyone else?

MS. KERNS: You have Megan Ware and Nichola Meserve.

CHAIR WOODWARD: All right, go ahead, Megan.

MS. WARE: In terms of the maximum value, I would be interested in something like 5 percent as the maximum value, and the reason I say that is, if the only thing the Board does to address some of the issues in New England is increase episodic, I think it

would need to be that high to cover what the new ones are kind of collectively landing. I would put that in there as a maximum, just for that reason.

In terms of where the increases come from, I don't think it should come from Number 2, relinquished quota, just for the simple reason that I don't actually think there is enough relinquished quota making a difference right now, and if we're potentially changing the fixed minimum in a tiered approach.

I think maybe the states that are relinquishing quota won't be relinquishing as much. To me that doesn't seem to be really a solution. I'm thinking 1 and 3 are actually a wash, and the reason I'm saying that is, if we have a decrease in the amount of quota that is tied up in the fixed minimum, so let's say it goes from 8 to 5 percent as an example.

That 3 percent, if it's just reallocated among the states, most of that is going to go to the states with the highest percentage of allocation. Similarly, if we take a set-aside off of the top, that deducts the most from a state with the greatest proportion of allocation. I actually think the two options will result in very similar numbers at the end.

CHAIR WOODWARD: All right, thank you. All right, Nichola.

MS. MESERVE: I agree on the 5 percent as a maximum value to be considered. Because of the objective that we just reviewed, I don't think that an alternative to remove the set-aside is appropriate to that objective, and would suggest that we remove it. I agree that, while I think that an initial set-aside from the overall TAC is the most straightforward and transparent way to increase the set-aside.

As Megan said, not have it based on relinquished quota that would be variable from year to year potentially, and much lower than the amount of quota that has been relinquished in recent years. However, I did want to suggest that the Addendum address allowing states to transfer their quota directly into the set-aside, because this is essentially already taking place in years where there has been an overage of the set-aside, states have transferred quota to cover that overage, so it would just be nice to put that into the plan and make it clear that that could be done, even before an overage occurred.

CHAIR WOODWARD: We've got a recommendation to set the maximum value at 5 percent. We have a recommendation that we delete Number 2, and possibly Number 3, so that the EESA is set from the overall TAC. A recommendation that we do not have an alternative to remove it, that it's a useful tool in menhaden management. Then the recommendation that Nichola just made to account for existing episodic. Further comments/recommendations? Is anyone opposed to the recommendations that I just described that have been made by the previous speakers?

MS. KERNS: I don't have any hands at this time.

CHAIR WOODWARD: I think everybody is just wore down. I'm starting to get a little hoarse myself.

MS. KERNS: One hand just went up, Tom Fote.

CHAIR WOODWARD: All right, Tom, go ahead.

MR. FOTE: I mean, I don't agree with some, but I mostly go, and then we're going out to public hearings with this, so we should be getting a lot of comments on how the public feels on this. Except for the recommendations, when we probably get to the public hearing.

CHAIR WOODWARD: At this point we're certainly not binding ourselves to any final result, but we're trying to make sure that what we do take out to the public is understandable by the public, and certainly understandable by us. Kirby, have we got that?

MR. ROOTES-MURDY: Yes, I've got those down, obviously appreciate you summarizing. I would say maybe just to help with simplifying just one last set

of things for consideration. You know the Plan Development Team recommended not including an adjustment to the date for redistributing our new episodic set-aside, or consider additional restrictions on it, and not allow jurisdictions to fish under the set-aside prior to exhausting their state allocations.

If there is Board agreement not to have those items in there, again that would just add more complexity to this document. I think we should be in pretty good shape. The last thing that was highlighted was just, there was interest in having the Board clarify whether a state can apply for episodic set-aside prior to fully landing their allocation.

CHAIR WOODWARD: All right, thanks, Kirby, all right some feedback on these. Anyone opposed to the deletions recommended by the PDT, as listed here?

MS. KERNS: I'm not sure what the hands are for, but both Nichola and Max raised their hands when you asked for feedback, and then you asked for opposition, so you have those two hands.

CHAIR WOODWARD: Okay, go ahead, Nichola.

MS. MESERVE: Thank you again. On that last bullet there, I'm interpreting it as a state having a projection that they're going to utilize their quota, you know within three days' time, and at that time asking to be able to access the episodic once they've closed their state fishery, quota managed fishery. I would encourage that to be a part of the plan, so that the states cannot have to wait for something that they know is going to happen, using all their quota to actually happen before being able request access to the set-aside. I would also like to request that the PDT continue to include, at least for the time being, an option that would allow jurisdictions to enter into the set-aside before exhausting their state allocation.

What I mean by that is say, like 95 percent of quota use. I think there is a lot of benefit to doing that, because it would allow a state the ability to preserve a small percentage of their state quota to use after the set-aside is exhausted, so that they're not reliant at that time on either a quota transfer or use of the incidental provision, or having to close down small-scale purse seine activity, which is an option in the document.

I think there is a lot of benefit, potentially, to a minor tweak to the set-aside provision, and you know I think that the PDTs concerns about the catch accounting is overstated. In Massachusetts, we're able to account for those landings, in the right category, whether we close a fishery at 95 percent or 100 percent of the quota use.

CHAIR WOODWARD: Let me get this straight. What you're proposing is to leave in that third bullet under the top, but to propose some modifications to the criteria for which (unheard), is that correct?

MS. MESERVE: That's correct, to continue to develop an option to address a slightly early entry into the set-aside, so that a state can preserve some of its quota for after the set-aside is exhausted.

CHAIR WOODWARD: Okay, all right, do you have that, Kirby?

MR. ROOTES-MURDY: Yes, it would be good to make sure we've got a clear alternative in here set at 95 percent. I think that's what I heard you say, Nichola. I would caution the Board not to think about having too many alternatives of percentage, because that starts to get confusing and you have diminishing return.

CHAIR WOODWARD: Yes, I think 95 percent, I guess some reasonable range without getting too carried away would be useful. Max, I think you're next.

MR. APPELMAN: The comment might be a little nuance, but I was a little surprised to see the recommendation to not revisit the date unused EESA quota is redistributed, because it was my understanding that there are some administrative

concerns with how that data is currently set, and how new distribution happens within the same year.

Can you just, Kirby, if you don't mind, just elaborate a little bit more on to why the recommendation is to not include that? I think I get that it definitely complicates things a little bit, but I'm concerned if you keep it the way it is, you still have those administrative challenges that will continue to occur.

MR. ROOTES-MURDY: Yes, thanks. The thought process was from the PDT, that the episodic set-aside program has been, if not fully utilized close to fully utilized, for the last few years, and that moving that unused set-aside redistribution date to sooner, there wouldn't necessarily be much benefit to it.

We were talking about a very small percentage of landings. That was the general thought process that including an alternative date, without having a clear indication that there is a better date for, and a small amount of landings be redistributed. The PDT thought it would be helpful to include multiple alternatives under that idea.

CHAIR WOODWARD: Do you have a follow up on that, Max?

MS. APPELMAN: Yes, I guess that's an interesting perspective. I was considering maybe a potential option would be to not have a redistribution date, and I don't know where that would leave any remaining EESA in there. You know if there is any quota left what would happen to that, if it was pulled back into the pool next year, or something?

But I know that the date as it is poses challenges, because states are still sort of accounting for all the landings that have occurred, and you know the Commission staff is essentially doing the best they can to guess where landings are under the EESA at that point in time, and redistributing. That number can change come final auditing.

I know there are challenges there that have been addressed or have been posed, or raised. I was just surprised to see recommendations to revisit that date. If the PDT feels that there is no reasonable alternative, then that is fine, I'm fine leaving it out. But I felt like I needed to at least bring it up.

CHAIR WOODWARD: Yes, thanks, Max. I think they identify it as an issue, but I don't know how to mitigate the problem. Since the situation is so dynamic. Short of a policy, any date, then that opens up another set of problems. Toni, hands?

MS. KERNS: No other hands.

CHAIR WOODWARD: All right, Kirby. Are you good to go on this?

MR. ROOTES-MURDY: Yes, I am. I really appreciate the Board working through this memo, obviously it's well beyond the meeting time. Feedback is helpful, and we'll continue developing this Addendum, so thanks all for bearing with us on this today.

CHAIR WOODWARD: Yes, and I want to hack on his thanks too. I know this is quite a feat to try to work through this, and reference back between the presentation, the document. There is a lot of uncertainty about how these various elements relate to each other, and I appreciate everybody's forbearance sticking with it.

This will help improve the efficiency of the PDTs activity, so at the next meeting, which will be late January of 2022, then there will be something to react to, and then there will be another chance to help perfect a public information document that goes out. Jeff, again, I apologize for having to bump you off the agenda. But certainly, if you will hold that presentation in queue, we'll hopefully get it the next time we meet. Is there any other business to come before the Menhaden Management Board? No hands, Toni?

MS. KERNS: Spud, I don't see any hands.

CHAIR WOODWARD: Is there any objection to adjournment of the Atlantic Menhaden Management Board?

MS. KERNS: I see no hands.

CHAIR WOODWARD: All right, Kirby, do you have everything you need?

MR. ROOTES-MURDY: I think I've gotten from the Board some guidance, so I appreciate that, thank you.

ADJOURNMENT

CHAIR WOODWARD: All right, very good. Well, thanks everybody and we will stand adjourned, and the Commission will meet again, I think first thing in the morning is Executive Committee, so everybody have a pleasant evening, and thanks again for sticking with us.

(Whereupon the meeting adjourned at 5:44 p.m. on October 19, 2021.)

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Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM I TO AMENDMENT 3 OF THE ATLANTIC MENHADEN INTERSTATE FISHERY MANAGEMENT PLAN FOR BOARD REVIEW

Commercial Allocations, Episodic Event Set Aside Program, and Incidental Catch/Small-Scale Fisheries

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

This draft document was developed for Board review and discussion at the January 2022 meeting week. This document is not intended to solicit public comment as part of the Commission/State formal public input process. However, comments on this draft document may be given at the appropriate time on the agenda during the scheduled meeting. Also, if approved, a public comment period will be established to solicit input on the issues contained in the document.

January 2022

Atlantic States Marine Fisheries Commission Seeks Your Input on Atlantic Menhaden Management

The public is encouraged to submit comments regarding this document during the public comment period. Comments will be accepted until 5:00 p.m. EST on **DAY, MONTH 2022**. Regardless of when they were sent, comments received after that time will not be included in the official record.

You may submit public comment in one or more of the following ways:

1. Attend public hearings pertinent to your state or jurisdiction; given COVID-19, it is likely most hearings will occur via webinar.
2. Refer comments to your state's members on the Atlantic Menhaden Board or Atlantic Menhaden Advisory Panel, if applicable.
3. Mail, fax, or email written comments to the following address:

Kirby Rootes-Murdy
Senior Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 North Highland St., Suite 200 A-N
Arlington, VA 22201
Fax: (703) 842-0741
comments@asmfc.org (subject line: Atlantic Menhaden Draft Addendum I to Amendment 3)

If you have any questions please call Kirby Rootes-Murdy at 703.842.0740.

Commission's Process and Timeline

August 2021	Atlantic Menhaden Board Tasks Staff to Develop Draft Addendum I
August 2021 – January 2022	Staff Develops Draft Addendum I for Board Review
January 2022	**Atlantic Menhaden Board Reviews Draft Addendum I and Considers Its Approval for Public Comment**
February – March 2022	Board Solicits Public Comment and States Conduct Public Hearings
May 2022	Board Reviews Public Comment, Selects Management Options and Considers Final Approval of Addendum I
TBD	Provisions of Addendum I are Implemented

1. INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC) is responsible for managing Atlantic menhaden (*Brevoortia tyrannus*) in state waters (0–3 miles from shore) under the authority of the Atlantic Coastal Fisheries Cooperative Management Act, and has done so through an interstate fishery management plan (FMP) since 1981. The states of Maine through Florida have a declared interest in the fishery and are responsible for implementing management measures consistent with the interstate FMP. Management authority in the Exclusive Economic Zone (3-200 miles from shore) lies with NOAA Fisheries. For the purposes of this Addendum, the term "state" or "states" also includes the Potomac River Fisheries Commission.

At its August 2021 meeting, the ASMFC's Atlantic Menhaden Management Board (Board) approved the following motion:

Move to initiate an addendum to consider changes to commercial allocation, the episodic events set aside, and the small-scale/incidental catch provision. The purpose of this action is to address the issues outlined in the Atlantic Menhaden work group memo and the PDT should use the strategies provided in the work group memo as a starting point.

The Addendum proposes options to adjust states' commercial allocation to better align with availability; provide more flexibility for states declaring into the episodic event set aside (EESA) program; and reduce incidental catch and small-scale fisheries (IC/SSF) landings from recent levels.

2. OVERVIEW

2.1 Statement of the Problem

Since the implementation of Amendment 3 (2017), dynamics in the commercial menhaden fishery have changed, most notably the rise of landings in the Gulf of Maine and an increase in quota transfers to the New England region; an increase in landings under the IC/SSF provision; and an annual reliance by some states on the EESA program. To sufficiently address the issues posed by these changes, the addendum addresses three separate but related components of the management program: 1) commercial allocation, 2) the IC/SSF provision, and 3) EESA program.

2.1.1 Commercial Allocations

The current allocations have resulted in the Total Allowable Catch (TAC) not being fully used coastwide, while some states do not have enough quota to maintain current fisheries. Quota transfers alone are not enough to ameliorate this issue. Some states have become reliant on the EESA and IC/SSF provision to maintain their fishery while other states regularly do not land their allocation.

2.1.2 Episodic Event Set Aside (EESA) Program

Over 90% of the EESA has been used in all years since 2016. With the increase in Atlantic menhaden availability to the Northeast, the program has become a secondary regional quota for several states to continue fishery operations in state waters. The dependency on the EESA highlights the mismatch of Atlantic menhaden distribution and availability to current commercial allocations.

2.1.3 Incidental Catch and Small-Scale Fisheries (IC/SSF)

The IC/SSF provision was intended to provide continued access for low-volume landings of menhaden once a state's directed fisheries quota was met and reduce regulatory discards. In recent years, menhaden availability at the northern part of its range has resulted in directed fishery quotas being met earlier in the year. Additionally, the coastwide landings under this category have exceeded a number of states directed fishery quotas and ranged from 1-4% of the annual TAC. Landings under this provision have never caused the overall TAC to be exceeded but without changes, landings could remain at high levels or increase, leading to a potential exceedance of the TAC. Finally, the language in Amendment 3 has led to different interpretations of when landings fall under this provision (*i.e.* once a state's sector allocation is met or only once the full state allocation is met) and should be clarified.

2.2 Background

2.2.1 Allocation

Under Amendment 3, each state is allocated a 0.5% minimum quota and the remainder of the TAC is allocated based on a three-year average of landings from 2009-2011. On an annual basis, states have the option to relinquish part of or all of their fixed minimum quota by December 1st of the preceding fishing year. Any quota relinquished by a state is redistributed to other states that have not relinquished their quota, based on landings data from 2009-2011. Any overage of quota allocation is determined based on final allocations (inclusive of transfers), and the overage amount is subtracted from that state's quota allocation in the subsequent year on a pound-for-pound basis.

Amendment 2 (2012) also based state allocations on the three-year average of landings from 2009-2011; however, there was no fixed minimum. Table 1 shows a comparison of state quotas under Amendments 2 and 3, and highlights the influence of the 0.5% fixed minimum on states' allocations.

Table 1. A comparison of state allocations under menhaden Amendment 2 and Amendment 3. Both Amendments used a 2009-2011 allocation timeframe; Amendment 3 included a 0.5% fixed minimum. While under Amendment 2, Pennsylvania was not a part of the Board and did not have an allocation, therefore is noted with a "-".

State	Amendment 2 Allocation (%)	Amendment 3 Allocation (%)
Maine	0.04%	0.52%
New Hampshire	0%	0.50%
Massachusetts	0.84%	1.27%
Rhode Island	0.02%	0.52%
Connecticut	0.02%	0.52%
New York	0.06%	0.69%
New Jersey	11.19%	10.87%
Pennsylvania	-	0.50%
Delaware	0.01%	0.51%
Maryland	1.37%	1.89%
PRFC	0.62%	1.07%
Virginia	85.32%	78.66%
North Carolina	0.49%	0.96%
South Carolina	0%	0.50%
Georgia	0%	0.50%
Florida	0.02%	0.52%

From 2018 to 2020, total landings (directed, IC/SSF, and EESA) have increased among the New England states of Maine, New Hampshire, and Massachusetts (Table 2). From 2016-2020 Maine and Massachusetts have increased their percentage of coastwide total landings every year. A number of states have maintained directed fisheries while their landings have represented less than 0.1% of coastwide total landings (Rhode Island, Connecticut, and Delaware). In 2020, Maine, Massachusetts, New York, and New Jersey increased their percentage of coastwide total landings, relative to the previous year. Virginia's percentage of the coastwide landings decreased greatly in 2020 relative to 2019 because the state's largest fishery and processing plant was shut down for several weeks due to the COVID-19 pandemic.

Table 2. State total landings as a percentage of coastwide (CW) landings, 2016-2020. Total landings include directed bait, reduction, IC/SSF, and EESA landings. Amendment 3 allocations for directed bait and reduction landings were implemented beginning in 2018. To protect confidentiality, information for New Hampshire, Pennsylvania, South Carolina, and Georgia have been removed.

State	Amendment 3 Directed Landings Allocations (%)	% of 2016 CW Landings	% of 2017 CW Landings	% of 2018 CW Landings	% of 2019 CW Landings	% of 2020 CW Landings
Maine	0.52%	1.50%	2.31%	3.48%	4.91%	6.33%
New Hampshire	0.50%				0.99%	1.02%
Massachusetts	1.27%	0.76%	0.96%	1.37%	1.51%	2.17%
Rhode Island	0.52%	0.00%	0.45%	0.17%	0.01%	0.05%
Connecticut	0.52%	0.02%	0.05%	0.20%	0.03%	0.03%
New York	0.69%	0.37%	0.40%	0.11%	0.21%	1.09%
New Jersey	10.87%	11.47%	12.15%	11.97%	10.96%	12.22%
Pennsylvania	0.50%					
Delaware	0.51%	0.02%	0.02%	0.04%	0.02%	0.04%
Maryland	1.89%	1.40%	0.76%	0.74%	0.73%	0.64%
PRFC	1.07%	0.63%	0.55%	0.79%	0.51%	0.54%
Virginia	78.66%	83.66%	82.08%	80.85%	79.93%	75.66%
North Carolina	0.96%	0.10%	0.20%	0.17%	0.12%	0.15%
South Carolina	0.50%					
Georgia	0.50%					
Florida	0.52%	0.07%	0.07%	0.06%	0.05%	0.06%

Since implementation of Amendment 3, the number of quota transfers has increased over time with 7, 17, and 15 quota transfers occurring in 2018, 2019, and 2020, respectively. Over this timeframe, all but three states were involved in either giving or receiving quota. However, not every state transferred quota consistently; only Maine, Connecticut, New York, Maryland, and Florida either gave or received quota every year from 2018-2020. Maine, New Hampshire, and Massachusetts had a net increase in quota through transfers in all three years. The net increase in quota over the three years ranged from 1.3 to 6.57 million pounds (Table 3). While the transfer of quota away from a state does not necessarily represent a decrease in abundance of menhaden, the transfer of quota to the New England states has coincided with increasing availability of menhaden regionally and the need for bait fish as the availability of Atlantic herring has decreased.

Table 3. Quota transfers in pounds by state for 2013-2020.

State	2013	2014	2015	2016	2017	2018	2019	2020	2018-2020 Net Total	2018-2020 Average
ME				+1,800,000	+195,180	+5,400,000	+6,573,592	+5,450,000	+1,742,3592	+5,807,864
NH							+3,373,592	+2,300,000	+5,673,592	+1,891,197
MA	-500,000	-260,000	-508,685	-35,986			+1,300,000	+2,350,000	+3,650,000	+1,216,667
RI	+15,000	+50,000	+33,685	+35,986			-400,000	-1,800,000	-2,200,000	-733,333
CT						-500,000	-2,400,000	-2,000,000	-4,900,000	-1,633,333
NY	+1,000,000	+210,000	+475,000	+492,823	+300,000	-1,000,000	-1,900,000	+500,000	-2,400,000	-800,000
NJ										
PA								-500,000	-500,000	-166,667
DE						-150,000		-100,000	-250,000	-83,333
MD						-1,500,000	-1,000,000	-1,350,000	-3,850,000	-1,283,333
PRFC										
VA				-1,500,000		-1,000,000	-1,000,000		-2,000,000	-666,667
NC	-575,000			-877,823	-495,180		-600,000	-1,800,000	-2,400,000	-800,000
SC							-2,347,184	-1,650,000	-3,997,184	-1,332,395
GA										
FL	+60,000			+85,000		-1,250,000	-1,600,000	-1,400,000	-4,250,000	-1,416,667

2.2.2 Episodic Event Set Aside Program (EESA)

The EESA Program was first implemented under Amendment 2 and clarified under Technical Addendum I later that year. Amendment 3 made no additional changes to the program. Annually, 1% of the TAC is set aside for episodic events, which are defined as any instance in which a qualified state has reached its quota allocation prior to September 1st and the state can prove the presence of unusually large amounts of menhaden in its state waters. To demonstrate a large amount of menhaden in state waters, a state can use surveys (e.g., aerial, seine) to indicate high biomass; landings information; or information highlighting the potential for fish kills, associated human health concerns, and that harvest would reduce or eliminate the fish kill. The goal of the program is to add flexibility in managing menhaden by allowing harvest during an episodic event, reduce discards, and prevent fish kills. States eligible to participate in the EESA program are limited to Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and New York. When a state declares into the EESA, they are required to implement daily trip level harvester reporting and submit weekly reports to the ASMFC; restrict harvest and landings to state waters; and implement a maximum daily trip limit no greater than 120,000 pounds per vessel.

From 2013 through July 2021, the EESA has been used by Maine (6 years), Rhode Island (5 years), Massachusetts (2 years), and New York (2 years). Up to three states have participated at the same time. The starting date of states declaring into the program has ranged from mid-May to mid-August, with New York and Rhode Island opting in earlier than Maine and Massachusetts. Over 90% of the set-aside has been used in all years since 2016. In 2018 and 2019, Maine was the only state to declare into the EESA program and landed approximately 4.6 and 4.4 million pounds, respectively. In 2020, Maine and Massachusetts declared into the EESA program and combined the two states landed approximately 4.5 million pounds. Multiple states

have implemented harvest control measures beyond the FMP's 120,000-pound trip limit, including: lower daily landings limits, weekly limits, limited landing days, and biomass thresholds for when the commercial fishery can operate.

The increasing reliance on the EESA program by some states has coincided with the decline in Atlantic herring and the increased availability of Atlantic menhaden in the Gulf of Maine. For more than a hundred years, 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). In order to use the EESA and minimize disruptions to fishing activities, some states have sought creative ways at keeping their directed fishery open. In 2021, a number of states requested quota transfers as a group while fishing in the EESA, allowing for multiple quota transfers to be processed while the states continued to participate in the EESA program, in an effort to enable their directed fishery to resume after exiting the EESA with minimal interruption.

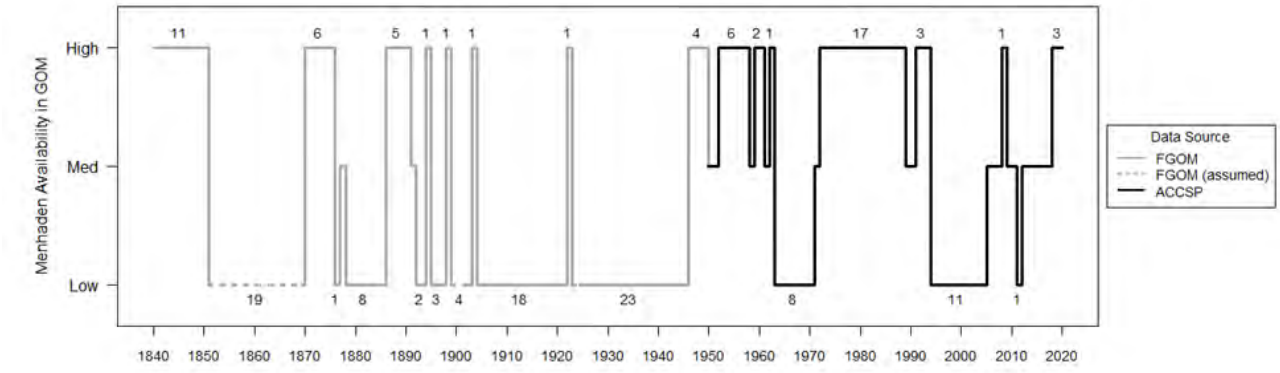

Figure 1. Reconstructed history of availability of Atlantic menhaden to the Gulf of Maine. The number of consecutive years in either a "High" or "Low" availability state are labeled. Data sources: *Fishes of the Gulf of Maine* (Bigelow and Schroeder 2002) and the Atlantic Coastal Cooperative Statistics Program (ACCSP).

2.2.3 Incidental Catch and Small-Scale Fisheries (IC/SSF)

A bycatch allowance was first implemented under Amendment 2, modified under Addendum I to Amendment 2 (2016), and modified again under Amendment 3. As outlined in Amendment 3, under the IC/SSF provision, after a state's allocation is met, small-scale directed and non-directed gear types may continue to land up to 6,000 pounds of menhaden per trip per day. The following gear types are identified in Amendment 3 as eligible to participate:

Small-scale gears: cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathoms long and 8 fathoms deep.

Non-directed gears: pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

Since Amendment 2, not all states transition from a directed fishery to an incidental catch or small-scale fishery under the same conditions. Both New Jersey and Virginia subdivide their quotas among sectors and have done so since state quotas were implemented in 2013. Virginia allocates its annual quota to three sectors: the reduction sector, the purse seine bait sector, and the non-purse seine bait sector. New Jersey allocates the majority of its annual quota to the purse-seine fishery, and the remaining quota is allocated to all other gear types. Once the non-purse seine bait sector or "other gears" fishery has harvested its portion of the state's allocation, that fishery moves into an IC/SSF regardless of whether the entire state's quota has been harvested. This has resulted in Virginia and New Jersey reporting IC/SSF landings when they have not harvested their overall quota allocation for a given year. Since the inception of the IC/SSF provision, both states have reported landings following the closure of Virginia's non-purse seine bait fishery and New Jersey's "other gears" fishery as IC/SSF.

Prior to 2016, several states' IC/SSF landings are considered confidential, therefore only information from 2016-2020 is included in Table 4. From 2016-2020, 11 different states have had IC/SSF landings, with the most number of states (8) reporting IC/SSF in a year occurring in 2016 and the fewest (1) occurring in 2019. The annual coastwide total IC/SSF landings ranged from approximately 2.1 million pounds to 13.9 million pounds. The highest amount occurred in 2020, when Maine landed the majority at 13.6 million pounds, representing 53% of Maine's total landings that year. From 2016-2017 and 2018-2019, landings in this category increased by over 200%, with Maine being the only state with IC/SSF landings in 2019. From 2018-2020, the TAC remained constant at 216,000 mt while IC/SSF landings as a percentage of the annual TAC rose from less than 1% (2018) to nearly 3% (2020).

Table 4. IC/SSF landings in pounds from 2017-2020. Only states with these landings in this time period are included in the table. Source: state compliance reports

State	2016	2017	2018	2019	2020
Maine		5,373,940	2,995,145	10,750,929	13,605,497
Massachusetts		0	0	0	49,350
Rhode Island	39,540	135,748	0	0	0
Connecticut		126,986	0	0	0
New York	281,017	807,392	0	0	282,169
New Jersey	195,523	0	204,240	0	20,190
Delaware	20,823	29,285	0	0	0
Maryland	995,698				
PRFC	105,669	670,447	0	0	0
Virginia	325,692	0	110,281	0	0
Florida	111,165	263,643	0	0	0
Total	2,075,127	7,407,441	3,309,666	10,750,929	13,957,206
Percent Change		257%	-55%	225%	30%

Since 2013, a majority of landings under this provision occur on trips that land either 1,000 pounds or less (56%), or greater than 5,000 pounds but less than 6,000 pounds (19%). However, landings per trip has increased in recent years (in 2020, 24% of trips < 1,000 pounds; 49% of trips >5,000 pounds; Figure 2). The majority of these landings have been caught by purse seine (80%), followed by fixed gill nets (12%). The share of IC/SSF landings using purse seine gear has increased from 57% in 2017 to approximately 88% in 2019 and 2020 (Table 5).

Figure 2. Percent of incidental trips by size in pounds, 2013-2020. Source: state compliance reports

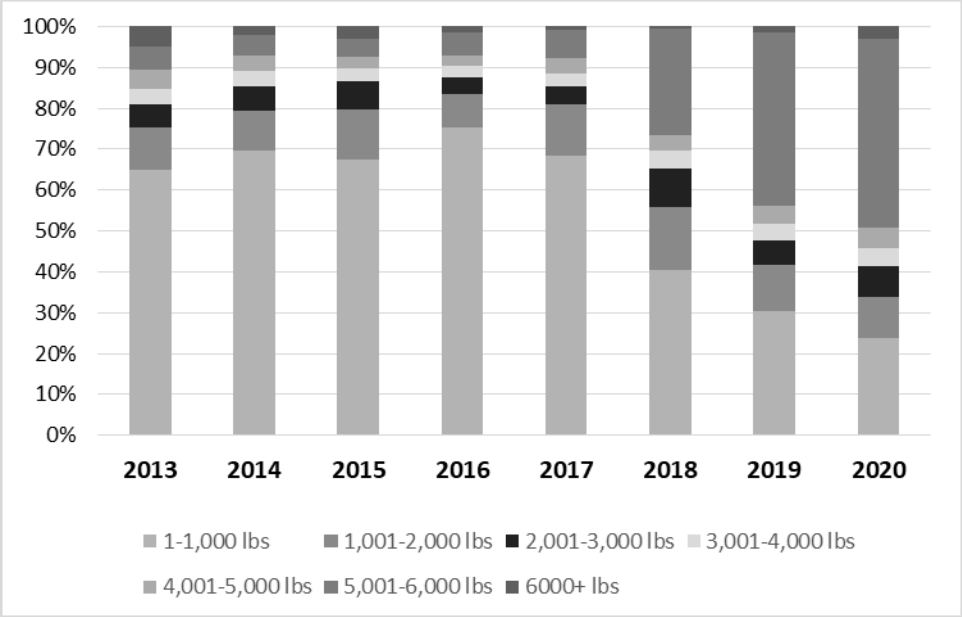

Table 5. Annual summary of total IC/SSF landings in pounds as a fraction of coastwide TAC; and the fraction of total IC/SSF landings coming from small-scale directed purse seine fishing. Source: state compliance reports

Year	Total landings	% of TAC	Landings from purse seine	% from purse seine
2013	4,376,741	1.2%	0	0%
2014	6,831,462	1.9%	0	0%
2015	5,991,612	1.5%	0	0%
2016	2,075,127	0.5%	0	0%
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%

3. PROPOSED MANAGEMENT PROGRAM

This addendum considers modifying the following components of the management program: 1) commercial allocations, 2) IC/SSF provision, and the 3) EESA program. An objective is listed for each component to guide evaluation of proposed options for addressing the issues identified in the statement of the problem. The Plan Development Team (PDT) has marked some management options with * which indicates options the PDT recommends the Board eliminate to focus on key solutions and reduce the complexity of the document. Taking these steps will ensure the public will be able to understand and comment on proposed changes to the management program more effectively. Recommendations can be found in an accompanying memo (M22-05).

3.1 Commercial Allocation

Objective: Allocations should be adjusted to 1) align with the availability of the resource 2) enable state to maintain current directed fisheries with minimal interruptions during the season; 3) reduce the need for quota transfers and; 4) fully use the annual TAC without overage.

To account for the various combinations of allocation methods and timeframes the following management options have been divided into two steps. The first step outlines the method for setting the minimum allocation, and the second step outlines the approach used to allocate the remaining TAC. An option must be chosen in each step to complete an allocation package. Options under each of the following steps were developed using total landings information including quota transfers, landings under the IC/SSF or EESA program.

Step 1:

3.1.1 Allocation options for addressing the minimum allocation.

The current fixed minimum allocation of 0.5% has been consistently underutilized by several states, with some states transferring or relinquishing some or all of their quota, and others keeping their unused quota. The Amendment 3 provisions of EESA, IC/SSF, and quota transfers have been utilized every year since the Amendment was implemented, indicating the latent quota created by the fixed minimum could be adjusted to reduce reliance on these provisions. Some states have highly variable landings, which will likely lead to them rarely exceeding their allocation under some allocation option below. It is important to keep in mind nearly all states have the potential to reach their quota prior to the end of the year under any allocation strategy under the current TAC.

> Option 1. Status Quo: Each state is allocated a 0.5% fixed minimum quota. Total TAC assigned under this option is 8.0% (i.e. 16 states x 0.50%= 8%).
>
> Option 2. Two-tiered fixed minimum approach: This option would assign states into one of two tiers (0.01% or 0.50%) based on total landings. This approach would reduce

latent quota, but not reduce the percent allocation to states currently using their fixed minimum quota. The states of Pennsylvania, Delaware, South Carolina, Georgia, and Florida would be included in tier one and receive 0.01%, and the remaining states would be in tier two and receive 0.5% of the TAC. The five states in tier one have consistent small scale, bycatch fisheries, or have harvested no menhaden from 2009-2020. The 0.01% allocation coupled with the timeframe allocation assigned in Step 2 below would have covered their limited landings from 2009-2020 under most combinations. The few instances of overages would have been minor, and could have been accounted for in the current IC/SSF provision, with little increase to total landings under that provision. Total TAC assigned under this option is 5.55% (i.e., 5 states x 0.01% + 11 states x 0.50% = 5.55%).

Option 3. Three-tiered fixed minimum approach: This option would assign states into three tiers (0.01%, 0.25%, or 0.50%) based on total landings. This approach further reduces latent quota compared to Option B. The states of Pennsylvania, Delaware, South Carolina, Georgia, and Florida would be included in tier one and receive 0.01%. Tier two includes Connecticut, New York, and North Carolina, with each state receiving 0.25%. The remaining states would be in tier three and receive 0.5% of the TAC. The five states in tier one have consistent small-scale, bycatch fisheries, or have harvested no Atlantic menhaden from 2009-2020. The 0.01% coupled with the timeframe allocation assigned in Step 2 below would have covered their limited landings from 2009-2020 under most combinations. Depending on the selection made in Step 2 below, the tier two states would have had sufficient quota to cover their landings every year from 2009-2020, except for New York and North Carolina. Each state could have had up to one year that would have not been covered, but in nearly all other years they would have used less than half of their allocation. Total TAC assigned under this option is 4.8% (i.e., 5 states x 0.01% + 3 states * 0.25% + 8 states * 0.50% = 4.8%).

Step 2:

3.1.2 Timeframes to base allocating the remaining TAC.

Option 1. Status Quo: Three-year average of landings from 2009-2011. This option only incorporates landings from a short unregulated time period and does not reflect current Atlantic menhaden distribution or fishery performance.

Option 2. 2009-2020*: The quota allocation timeframe is based on the average landings from 2009 to 2020. This timeframe includes the 12 most recent years of data and encompasses years before and after the implementation of a quota system. This option may dilute more recent changes in the fishery given the rate of change in landings, and may not reduce the need for transfers and reliance on the EESA program and IC/SSF provision.

Option 3. 2018-2020
The quota allocation timeframe is based on the most recent average landings from 2018 to 2020. This timeframe reflects the most recent landings history and is more likely to align with current stock distribution, but does not reflect previous stock distribution or fishery performance.

Option 4. Second Highest Year*
This option uses each state's second highest landing year from 2009- 2020 divided by the sum of all states second highest year of landings during that time period to determine a state's allocation. The idea behind this option is that the second highest year of landings may be less of a historical outlier than the year with the highest landings and therefore better represent each state's fisheries needs when Atlantic menhaden are available to them. The approach does base allocations on a total harvest that is much greater than the current TAC and a theoretical stock distribution that likely never existed. Lastly, states with more inter-annual variability in landings are likely to receive higher allocations than they can use in most years.

Option 5. Moving Average
This option uses a three-year moving average to annually adjust allocations as the stock and fishery dynamics change. The three-year average is lagged to allow for finalizing data and time to inform states of their quota (i.e. 2019-2021 average used to set 2023 allocation). This option continually adjusts allocations to recent stock distribution and fishery performance, potentially reducing the need for reallocating in the future.

Option 6. Weighted Time Frames
These options consider both recent and historical timeframes with sub-options of different weighting values. These options are similar to a long term average but focus on a shorter overall timeframe, and can emphasize either more recent or historical fishery performance.

- 6A. Weighted Allocation Timeframe #1 (2009-2011 and 2018-2020) includes the three most recent years and the first three years of quality bait fishery data during the unregulated time period.
  - Sub-Option 1. 25% 2009-2011 / 75% 2018-2020 – This weighting strategy emphasizes the more recent timeframe.
  - Sub-Option 2. 50% 2009-2011 / 50% 2018-2020 – This strategy weights both timeframes evenly.
  - Sup-Option 3. 75% 2009-2011 / 25% 2018-2020 - This weighting strategy emphasizes the older timeframe.

- 6B. Weighted Allocation Timeframe #2* (2009-2012 and 2017-2020) includes the four most recent years and the first four years of quality bait fishery data during the unregulated time period.
  - Sub-Option 1. 25% 2009-2012 / 75% 2017-2020– This weighting strategy emphasizes the more recent timeframe.

Sub-Option 2. 50% 2009-2012 / 50% 2017-2020 – This strategy weights both timeframes evenly.
Sub-Option 3. 75% 2009-2012 / 25% 2017-2020 - This weighting strategy emphasizes the older timeframe.

Table 6. A1-4. Percent annual allocation by state using the 0.5% fixed minimum (Step 1, Option A) allocation and the 2009-2011, 2009-2020, 2018-2020 and second highest year timeframes (Step 2, Options 1-4).

State	Timeframe			
	A1 Status Quo 2009-2011	A2 2009-2020	A3 2018-2020	A4 Second Highest Year
ME	0.52%	1.90%	5.00%	4.37%
NH	0.50%	0.66%	1.14%	1.21%
MA	1.27%	1.38%	2.04%	1.69%
RI	0.52%	0.61%	0.57%	0.80%
CT	0.52%	0.53%	0.58%	0.53%
NY	0.69%	0.79%	0.92%	0.77%
NJ	10.87%	11.54%	11.25%	13.23%
PA	0.50%	0.50%	0.50%	0.50%
DE	0.51%	0.52%	0.53%	0.53%
MD	1.89%	1.82%	1.15%	1.83%
PRFC	1.07%	1.15%	1.06%	1.07%
VA	78.66%	76.32%	73.07%	71.05%
NC	0.96%	0.73%	0.63%	0.86%
SC	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%
FL	0.52%	0.55%	0.55%	0.55%

Table 7. A5. Percent annual allocation by state using the 0.5% fixed minimum allocation (Step 1, Option A) and the three year moving average allocation (Step 2, Option 5), as it would have changed through time, and the year the timeframe would have been used to set allocations.

State	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
ME	0.52%	0.51%	0.51%	0.51%	0.51%	0.97%	1.64%	2.76%	3.85%	5.00%
NH	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.52%	0.85%	1.14%
MA	1.27%	0.91%	0.77%	0.95%	1.09%	1.13%	1.24%	1.46%	1.69%	2.04%
RI	0.52%	0.52%	0.52%	0.55%	0.71%	0.72%	0.82%	0.71%	0.69%	0.57%
CT	0.52%	0.51%	0.51%	0.51%	0.51%	0.51%	0.53%	0.59%	0.59%	0.58%
NY	0.69%	0.67%	0.68%	0.70%	0.77%	0.79%	0.85%	0.77%	0.72%	0.92%
NJ	10.93%	13.45%	13.94%	12.81%	10.67%	10.89%	11.25%	11.41%	11.23%	11.25%
PA	0.50%	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%	0.53%
MD	1.90%	2.18%	2.33%	2.52%	2.16%	2.02%	1.71%	1.38%	1.18%	1.15%
PRFC	1.07%	1.20%	1.30%	1.41%	1.23%	1.15%	1.06%	1.11%	1.06%	1.06%
VA	78.60%	76.18%	75.57%	76.30%	78.57%	78.04%	77.15%	76.08%	74.92%	73.07%
NC	0.96%	0.83%	0.80%	0.64%	0.68%	0.67%	0.66%	0.64%	0.65%	0.63%
SC	0.50%	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%	0.50%
FL	0.52%	0.52%	0.54%	0.55%	0.57%	0.57%	0.57%	0.56%	0.55%	0.55%
Year in Use	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**

Table 8. A6. Percent annual allocation by state using the 0.5% fixed minimum allocation (Step 1, Option A) and weighted timeframe options. Each of the two timeframe combinations of 2009-2011/2018-2020 (Step 2, Option 6A), and 2009-2012/2017-2020 (Step 2, Option 6B) are weighted 25% earlier /75% recent (Sub-Option 1), 50% recent /50% earlier (Sub-Option 2) and 75% earlier/ 25% recent (Sub-Option 3).

State	2009-2011/2018-2020			2009-2012/2017-2020		
	A6:A-1 25%/75%	A6:A-2 50%/50%	A6:A-3 75%/25%	A6:B-1 25%/75%	A6:B-2 50%/50%	A6:B-3 75%/25%
ME	3.88%	2.76%	1.64%	3.47%	2.48%	1.50%
NH	0.98%	0.82%	0.66%	0.87%	0.74%	0.62%
MA	1.85%	1.66%	1.46%	1.70%	1.52%	1.33%
RI	0.56%	0.54%	0.53%	0.62%	0.58%	0.55%
CT	0.56%	0.55%	0.53%	0.56%	0.54%	0.53%
NY	0.86%	0.81%	0.75%	0.85%	0.79%	0.74%
NJ	11.17%	11.09%	11.01%	11.60%	11.85%	12.10%
PA	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.52%	0.52%	0.52%	0.52%	0.52%	0.52%
MD	1.34%	1.53%	1.71%	1.42%	1.68%	1.94%
PRFC	1.06%	1.07%	1.07%	1.09%	1.13%	1.17%
VA	74.46%	75.84%	77.22%	74.56%	75.36%	76.16%
NC	0.71%	0.79%	0.88%	0.70%	0.75%	0.81%
SC	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%
FL	0.54%	0.53%	0.53%	0.55%	0.54%	0.53%

Table 9. B1-4. Percent annual allocation by state using the two tier minimum (Step 1, Option B) allocation and the 2009-2011, 2009-2020, 2018-2020 and second best year timeframes (Step 2, Options 1-4).

State	Timeframe			B4 Second Best Year
	B1 2009-2011	B2 2009-2020	B3 2018-2020	
ME	0.52%	1.94%	5.12%	4.48%
NH	0.50%	0.66%	1.15%	1.23%
MA	1.29%	1.40%	2.08%	1.72%
RI	0.52%	0.61%	0.57%	0.81%
CT	0.52%	0.53%	0.58%	0.54%
NY	0.70%	0.80%	0.93%	0.77%
NJ	11.21%	11.84%	11.54%	13.57%
PA	0.01%	0.01%	0.01%	0.01%
DE	0.02%	0.03%	0.04%	0.04%
MD	1.94%	1.85%	1.17%	1.87%
PRFC	1.09%	1.17%	1.08%	1.08%
VA	80.68%	78.34%	75.01%	72.93%
NC	0.97%	0.73%	0.64%	0.87%
SC	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%
FL	0.03%	0.06%	0.06%	0.06%

Table 10. B5. Percent annual allocation by state using the two tier minimum allocation (Step 1, Option B) and the three year moving average allocation (Step 2, Option 5), as it would have changed through time, and the year the timeframe would have been used to set allocations.

State	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
ME	0.52%	0.51%	0.51%	0.51%	0.51%	0.98%	1.67%	2.82%	3.94%	5.12%
NH	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.52%	0.86%	1.15%
MA	1.29%	0.92%	0.78%	0.97%	1.10%	1.15%	1.26%	1.48%	1.73%	2.08%
RI	0.52%	0.52%	0.52%	0.55%	0.72%	0.73%	0.82%	0.72%	0.69%	0.57%
CT	0.52%	0.51%	0.51%	0.51%	0.51%	0.51%	0.53%	0.59%	0.59%	0.58%
NY	0.70%	0.67%	0.69%	0.71%	0.78%	0.80%	0.85%	0.77%	0.72%	0.93%
NJ	11.21%	13.80%	14.29%	13.14%	10.94%	11.17%	11.54%	11.70%	11.51%	11.54%
PA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
DE	0.02%	0.03%	0.03%	0.04%	0.05%	0.04%	0.03%	0.04%	0.03%	0.04%
MD	1.94%	2.23%	2.38%	2.58%	2.20%	2.06%	1.74%	1.41%	1.20%	1.17%
PRFC	1.09%	1.22%	1.33%	1.44%	1.25%	1.16%	1.08%	1.12%	1.08%	1.08%
VA	80.68%	78.20%	77.57%	78.32%	80.65%	80.11%	79.19%	78.09%	76.90%	75.01%
NC	0.97%	0.84%	0.81%	0.64%	0.68%	0.67%	0.66%	0.65%	0.65%	0.64%
SC	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
FL	0.03%	0.03%	0.05%	0.06%	0.08%	0.08%	0.08%	0.07%	0.07%	0.06%
Year in Use	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**

Table 11. B6. Percent annual allocation by state using the two tier minimum allocation (Step 1, Option B) and weighted time frame options. Each of the two timeframe combinations of 2009-2011/2018-2020 (Step 2, Option 6A), and 2009-2012/2017-2020 (Step 2, Option 6B) are weighted 25% earlier /75% recent (Sub-Option 1), 50% recent /50% earlier (Sub-Option 2) and 75% earlier/ 25% recent (Sub-Option 3).

State	2009-2011/2018-2020			2009-2012/2017-2020		
	B6:A1 25%/75%	B6:A2 50%/50%	B6:A3 75%/25%	B6:B1 25%/75%	B6:B2 50%/50%	B6:B3 75%/25%
ME	3.97%	2.82%	1.67%	3.55%	2.54%	1.52%
NH	0.99%	0.83%	0.66%	0.88%	0.75%	0.63%
MA	1.88%	1.69%	1.49%	1.74%	1.55%	1.36%
RI	0.56%	0.55%	0.53%	0.62%	0.59%	0.55%
CT	0.57%	0.55%	0.53%	0.56%	0.54%	0.53%
NY	0.87%	0.81%	0.75%	0.86%	0.80%	0.74%
NJ	11.46%	11.37%	11.29%	11.90%	12.15%	12.41%
PA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
DE	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%
MD	1.36%	1.55%	1.75%	1.45%	1.71%	1.98%
PRFC	1.08%	1.08%	1.09%	1.10%	1.15%	1.19%
VA	76.42%	77.84%	79.26%	76.53%	77.35%	78.18%
NC	0.72%	0.80%	0.89%	0.70%	0.76%	0.82%
SC	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
FL	0.05%	0.05%	0.04%	0.06%	0.05%	0.04%

Table 12. C1-4. Percent annual allocation by state using the three tier minimum (Step 1, Option C) allocation and the 2009-2011, 2009-2020, 2018-2020 and second highest year timeframes (Step 2, Options 1-4).

State	Timeframe			C4 Second Highest Year
	C1 2009-2011	C2 2009-2020	C3 2018-2020	
ME	0.52%	1.95%	5.16%	4.51%
NH	0.50%	0.67%	1.16%	1.23%
MA	1.30%	1.41%	2.09%	1.73%
RI	0.52%	0.61%	0.57%	0.81%
CT	0.27%	0.28%	0.33%	0.29%
NY	0.45%	0.55%	0.68%	0.53%
NJ	11.29%	11.93%	11.63%	13.68%
PA	0.01%	0.01%	0.01%	0.01%
DE	0.02%	0.03%	0.04%	0.04%
MD	1.95%	1.87%	1.17%	1.88%
PRFC	1.09%	1.17%	1.08%	1.09%
VA	81.32%	78.96%	75.60%	73.50%
NC	0.72%	0.49%	0.39%	0.63%
SC	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%
FL	0.03%	0.06%	0.06%	0.06%

Table 13. C5. Percent annual allocation by State using the three tier minimum allocation (Step 1, Option C) and the three year moving average allocation (Step 2, Option 5), as it would have changed through time, and the year the timeframe would have been used to set allocations.

State	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
ME	0.52%	0.51%	0.51%	0.51%	0.51%	0.99%	1.68%	2.83%	3.97%	5.16%
NH	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.52%	0.86%	1.16%
MA	1.30%	0.92%	0.78%	0.97%	1.11%	1.15%	1.27%	1.49%	1.74%	2.09%
RI	0.52%	0.52%	0.52%	0.55%	0.72%	0.73%	0.83%	0.72%	0.69%	0.57%
CT	0.27%	0.26%	0.26%	0.26%	0.26%	0.26%	0.28%	0.34%	0.34%	0.33%
NY	0.45%	0.42%	0.44%	0.46%	0.53%	0.55%	0.61%	0.53%	0.48%	0.68%
NJ	11.29%	13.90%	14.40%	13.24%	11.02%	11.25%	11.63%	11.79%	11.60%	11.63%
PA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
DE	0.02%	0.03%	0.03%	0.04%	0.05%	0.04%	0.03%	0.04%	0.03%	0.04%
MD	1.95%	2.24%	2.40%	2.59%	2.21%	2.07%	1.75%	1.42%	1.21%	1.17%
PRFC	1.09%	1.23%	1.33%	1.45%	1.25%	1.17%	1.08%	1.13%	1.08%	1.08%
VA	81.32%	78.82%	78.19%	78.94%	81.29%	80.74%	79.82%	78.71%	77.51%	75.60%
NC	0.72%	0.59%	0.57%	0.40%	0.44%	0.43%	0.41%	0.40%	0.40%	0.39%
SC	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
FL	0.03%	0.03%	0.05%	0.06%	0.08%	0.08%	0.08%	0.07%	0.07%	0.06%
Year in Use	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**

Table 14. C6. Percent annual allocation by state using the three tier minimum allocation (Step 1, Option C) and weighted timeframe options. Each of the two timeframe combinations of 2009-2011/2018-2020 (Step 2, Option 6A), and 2009-2012/2017-2020 (Step 2, Option 6B) are weighted 25% earlier /75% recent (Sub-Option 1), 50% recent /50% earlier (Sub-Option 2) and 75% earlier/ 25% recent (Sub-Option 3).

State	2009-2011/2018-2020			2009-2012/2017-2020		
	C6:A1 25%/75%	C6:A2 50%/50%	C6:A3 75%/25%	C6:B1 25%/75%	C6:B2 50%/50%	C6:B3 75%/25%
ME	4.00%	2.84%	1.68%	3.57%	2.55%	1.53%
NH	0.99%	0.83%	0.66%	0.88%	0.75%	0.63%
MA	1.90%	1.70%	1.50%	1.75%	1.55%	1.36%
RI	0.56%	0.55%	0.53%	0.62%	0.59%	0.55%
CT	0.32%	0.30%	0.28%	0.31%	0.29%	0.28%
NY	0.63%	0.57%	0.51%	0.61%	0.55%	0.49%
NJ	11.54%	11.46%	11.37%	11.99%	12.25%	12.50%
PA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
DE	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%
MD	1.37%	1.56%	1.76%	1.45%	1.72%	1.99%
PRFC	1.08%	1.09%	1.09%	1.11%	1.15%	1.19%
VA	77.03%	78.46%	79.89%	77.13%	77.96%	78.80%
NC	0.47%	0.55%	0.64%	0.46%	0.51%	0.57%
SC	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
GA	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
FL	0.05%	0.05%	0.04%	0.06%	0.05%	0.04%

3.2 EESA Program

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 IC/SSF landings.

3.2.1 Increase the Set-Aside

Goal: In combination with reallocation or separately, ensure the states of Maine to New York have increased bait quota for this program to reduce the need for in-season quota transfers or reliance on the IC/SSF provision in response to the increased presence of Atlantic menhaden biomass in the Northeast.

For both Options 1 and 2, the mandatory provisions, declaring participation, procedure for unused set aside, and procedure for set aside overages (Sections 4.3.6.1- 4.3.6.4) as outlined in Amendment 3 (Section 4.3.6.3) will remain in effect.

Option 1. Status Quo (1%) – The EESA would remain at 1% of the total coastwide TAC. Should any quota remain unused after October 31st, annually, it would revert back into the common pool.

Option 2. Increase up to 5% - This option would allow the Board to increase the EESA to a specific percentage greater than 1% and less than or equal to 5%. The designated percentage of EESA would be subtracted from the total coastwide TAC prior to the distribution of allocation to states. Depending upon the option(s) chosen under Section 3.1, re-adjusting the fixed minimum quota could offset the possible increase in the EESA (see note below).

Note (only applies if a tiered minimum approach is selected): The 0.5% fixed minimum from Amendment 3 allocated 8.0% of the TAC prior to timeframe based allocation of state quotas. If the fixed minimum was replaced by either the two-tiered or three-tiered minimum allocation strategy, the 8.0% would be reduced to 5.55% (two-tiered) or 4.80% (three-tiered), respectively. The amount of quota left by selecting either of these tiered options, 2.45% (two-tiered) or 3.20% (three-tiered), could be applied to an increase in the EESA, should that option be selected.

3.2.2 Establish the Set-Aside during Specifications

Goal: To allow more flexibility in managing the EESA depending on states' allocations and reduce the need for quota transfers, the following includes options to set the EESA during the TAC-setting process, rather than through adaptive management as outlined in Amendment 3.

Option 1. No change in Amendment 3 language (Status Quo): The percentage of quota for the EESA program is established through this addendum, and will be maintained until adjusted by the Board through and addendum under adaptive management (Amendment 3, Section 4.6).

Option 2. Set the EESA during Specifications at an amount between 1-5%: Under this option the Board will be set the EESA at an amount between 1 to 5% during the Specification process as part of approving the TAC. The TAC and EESA may be set annually or on a multi-year basis depending on Board action.

3.3 IC/SSF Provision

Objective: Sufficiently constrain landings to achieve overall management goals of: 1) meeting the needs of existing fisheries, 2) reducing discards, and 3) indicating when landings can occur and if those landings are a part of the directed fishery.

In this section, there are five sub-topics to address IC/SSF landings. They include proposed changes to the timing of when states can begin landing under this provision (3.3.1); permitted

gear types (3.3.2); changes to the IC/SSF trip limit (3.3.3); considering a new accountability system for IC/SSF landings (3.3.4); and changes to when states can access the EESA (3.3.5).

3.3.1 Timing of IC/SSF Provision

Goal: Address the timing of when a state begins fishing under the provision since it impacts the duration that landings occur.

Option 1. No change (Status quo): Once a quota allocation is reached for a given state, the fishery moves to an incidental catch fishery. Currently, individual states interpret "*after a quota allocation is met for a given state*" differently (i.e., whether this refers to the entire allocation or a sector, fishery, or gear allocation).

Option 2. Sector/fishery/gear type allocation within a state is met: Currently, states such as New Jersey and Virginia further divide their state 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 state, that state's sector/fishery/gear type fishery can begin landing catch under the provision.

Option 3. Entire states allocation met: Once the entire quota allocation for a given state is reached, regardless of sector/fishery/gear type fishery allocations, the menhaden fishery moves to landing under the IC/SSF provision.

Option 4. Full closure when allocation met, no IC/SSF provision: Once the entire quota allocation for a given state is reached, regardless of sector/fishery/gear type fishery allocations, the menhaden fishery is closed, and no landings of menhaden are permitted by that state. If this option is selected, Sections D, E, and F below are no longer needed.

3.3.2 Permitted Gear Types of the of IC/SSF Provision

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

Option 1. No changes to permitted gear types (Status quo): The provision would apply to both small-scale directed gears and non-directed gears. Small scale directed gears shall include cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathoms long and eight fathoms deep. Non-directed gears include pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps.

Option 2. 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 option is included due to the growth of directed landings from small-scale purse seine gears in recent years (Table 6). Landings from purse seine gears would count against a state's directed fishery quota.

Option 3. 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.

3.3.3 Trip Limit for Directed Small-Scale Fisheries of IC/SSF Provision

Goal: Limit the annual volume of IC/SSF landings by reducing the trip limit.

The options below modify the trip limits for directed small-scale fisheries. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets. A trip is based on a calendar day such that no vessel may land menhaden more than once in a single calendar day. The use of multiple carrier vessels per trip to offload any bycatch exceeding the daily trip limit of Atlantic menhaden is prohibited. If Option D3 was selected above, this section is no longer needed.

Option 1. No change to trip limit (Status quo): small-scale gears and non-directed gear types may land up to 6,000 pounds of menhaden per trip per day. Two authorized individuals, working from the same vessel fishing stationary multi-species gear, are permitted to work together and land up to 12,000 pounds from a single vessel – limited to one vessel trip per day.

For both Options 2 and 3 below, the proposed change in the trip limit would only apply to small-scale directed gears which include cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, bait nets, and purse seines which are smaller than 150 fathoms long and 8 fathoms deep. Non-directed gears and stationary multi-species gears would still be able to land up to 6,000 pounds of menhaden per trip per day, with two individuals working from the same vessel fishing stationary multi-species gear, permitted to work together can land up to 12,000 pounds.

Option 2. 4,500 pound trip limit for directed gear types: The trip limit for the directed small-scale fishery shall be 4,500 pounds of menhaden per trip per day.

Option 3. 3,000 pound trip limit for directed gear types: The trip limit for the directed small-scale fishery shall be 3,000 pounds of menhaden per trip per day.

*3.3.4 Catch Accounting of IC/SSF Provision**

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

For Options 2-4, any adjustments to the TAC or possible IC/SSF set aside will not take effect in the following year if there is an overage. This is due to the timing of when preliminary landings are available, the fishing season, and the annual process of finalizing initial state quotas. For example, in Options 3 or 4, if reported 2022 total landings from state compliance reports exceeded the 2022 TAC or IC/SSF set-aside, then the TAC or set aside in 2024 would be reduced based on the overage.

Option 1. IC/SSF landings do not count against a state allocation nor the annual TAC (status quo): Landings under this provision will be reported as a part of the annual FMP Review (Amendment 3, Section 5.3: Compliance Report). Landings are reported by states to as a part of Annual Compliance Reports. Should a specific gear type show a continued and significant increase in landings under the provision, or it becomes clear that a non-directed gear type is directing on menhaden under this provision, the Board has the authority, through adaptive management (Amendment 3, Section 4.6), to alter the trip limit or remove that gear from the IC/SSF provision.

Option 2. Catch cap equal to 1% of the annual TAC and 10% exceedance management trigger: Landings under the IC/SSF 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 states to 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 to reduce IC/SSF landings.

Option 3. 1% set-aside of the annual TAC with set-aside payback provision: 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 will be deducted on a pound-for-pound basis from the next subsequent year's set aside (e.g., an overage from 2022 would be applied to 2024 set-aside).

Option 4. Total landings with payback provision: Total landings under this provision would be evaluated against the annual TAC. If total landings exceed the TAC, the overage will be deducted on a pound-for-pound basis from the next subsequent year's TAC (e.g., an overage from 2022 would be applied to 2024 TAC).

*3.3.5 Allow access to EESA at <100% state allocation**

The following two options can only be chosen if under section 3.3.2 Permitted Gear Types Options 2 or 3 are selected.

States are currently required to fully use their allocated quota before entering the EESA program. Several states currently have small-scale purse seines that operate under their directed fishery and again under the IC/SSF provision once a state's quota has been fully harvested. Options 2 and 3 above under 3.3.2 Permitted Gear Types would remove small-scale purse seines from the IC/SSF provision. This could potentially cause negative impacts to current small-scale purse seine operations in several states. Allowing states the opportunity to fish under the EESA before reaching 100% of their directed fishery quota could allow for their directed small-scale purse seine 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 may be challenging.

> Option 1. No change in when states can apply to participate in EESA (Status Quo). The following language from Amendment 3 will be maintained, with the exception of the percentage set aside if option B2 is chosen in Section 3.2 above:
>
> *1% of the TAC is set aside for episodic events, which are defined by any instance in which a qualified state has reached its annual quota allocation available to them prior to September 1 and the state can prove the presence of unusually large amounts of menhaden in its state waters*
>
> Option 2. Qualified states can begin fishing under the EESA once they have landed or are projected to land 95% of their quota. – Under this option, a state could participate in EESA without having fully used their allocation. The 5% reserve of a state's allocated quota could then to be used once the EESA has closed and allow a state to remain operating under directed landings rather than proceeding directly to the IC/SSF. The process for declaring participation into the EESA as outlined in Amendment 3 would be changed to the following:

The applying states has harvested 95% of its annual quota allocation prior to September 1.

The state must include in their letter declaring interest in harvesting under the set aside the date they will request to start fishing under the EESA, the projected quota the state has remaining at the time the letter was submitted, and confirmation that the state will notify the ASMFC Executive Director the date which the state ends fishing under the EESA.

4. COMPLIANCE SCHEDULE

If the existing Atlantic menhaden management plan is revised by approval of this draft addendum, the measures would be effective January 1, 2023. Unless otherwise directed by the Board, allocations will be revisited no more than 3 years (2025) following implementation of this addendum, as outlined in Amendment 3.

5. LITERATURE CITED

ASMFC. 2012. Amendment 2 to the Atlantic Menhaden Fishery Management Plan. ASMFC, Arlington, VA 114 p.

ASMFC. 2016. Addendum I to Amendment 2 to the Atlantic Menhaden Fishery Management Plan. ASMFC, Arlington, VA 7 p.

ASMFC. 2017. Amendment 3 to the Atlantic Menhaden Fishery Management Plan. ASMFC, Arlington, VA 111 p.

Bigelow, H.B., and Schroeder, W.C. 2002. Fishes of the Gulf of Maine. 3rd ed. Edited by B.B. Collette and G. Klein-MacPhee. Smithsonian Institution Press, Washington, D.C.

Atlantic States Marine Fisheries Commission

ISFMP Policy Board

January 27, 2022
1:00 – 3:00 pm
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)* 1:00 p.m.
2. Board Consent *(S. Woodward)* 1:00 p.m.
   - Approval of Agenda
   - Approval of Proceedings from October 2021
3. Public Comment 1:05 p.m.
4. Executive Committee Report (*S. Woodward*) 1:15 p.m.
5. Review and Discuss 2021 Commissioner Survey Results (*D. Tompkins*) 1:30 p.m.
6. Consider Policy on Information Requests **Action** (*R.* Beal) 1:50 p.m.
7. Update on East Coast Climate Change Scenario Planning (*T. Kerns*) 2:05 p.m.
8. Committee Reports **Action** 2:15 p.m.
   - Habitat Committee (*L. Havel*)
   - Atlantic Coast Fisheries Habitat Partnership (*L. Havel*)
9. Review Noncompliance Findings (If Necessary) **Action** 2:40 p.m.
10. Other Business/Adjourn 2:45 p.m.

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

MEETING OVERVIEW

ISFMP Policy Board
Thursday January 27, 2022
1:00 – 3:00 p.m.
Webinar

Chair: Spud Woodward (GA) Assumed Chairmanship: 10/21	Vice Chair: Joe Cimino (NJ)	Previous Board Meeting: October 21, 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 October 21, 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. Executive Committee Report (1:15- 1:25 p.m.)

Background

- The Executive Committee will meet on January 26, 2022

Presentations

- S. Woodward will provide an update of the Executive Committee's work

Board action for consideration at this meeting

- none

5. Review and Discuss 2021 Commissioner Survey Results (1:25-1:45 p.m.)

Background

- Commissioners completed a survey of Commission performance in 2020 (**Briefing Materials**). The survey measures Commissioner's opinions regarding the progress and actions of the Commission in 2021.

Presentations

- D. Tompkins will present the results of the 2021 Commissioner survey highlighting significant changes from the previous year.

Board discussion for consideration at this meeting

- Determine if any action is required based on the survey results

6. Consider Policy on Information Requests Action (1:45-2:00 p.m.)

Background

- ASMFC member states have committed to transparent and open ASMFC decision-making, record-keeping, and public meeting processes. A policy had been drafted to provide clarity to the public on making information requests for information that is not available on the Commission's web page.

Presentations

- R. Beal will present the policy on information requests (**Briefing Materials**)

Board action for consideration at this meeting

- Approve Policy on Information Requests

7. Update on East Coast Climate Change Scenario Planning Initiative (2:00-2:15 p.m.)

Background

- In November 2020, the Northeast Region Coordinating Council (NRCC) initiated a region-wide scenario planning initiative. Through this East Coast Climate Change Scenario Planning Initiative, fishery managers and scientists are working collaboratively to explore jurisdictional and governance issues related to climate change and shifting fishery stocks.
- The specific focus of this scenario project is (i) to assess how climate change might affect stock distribution, availability and other aspects of east coast marine fisheries over the next 20 years, and (ii) to identify what this means for effective future governance and fisheries management.
- A scoping process was conducted in August-September 2021 to introduce the initiative to stakeholders, to seek input on the draft project objectives, and to solicit input from stakeholders on factors and issues that might shape the future of East Coast fisheries. Scoping consisted of a series of three kick-off webinars and an online questionnaire. A summary of the scoping process and input received can be found here.

Presentations

- T. Kerns will provide an update of the initiative

Board action for consideration at this meeting

- None

8. Committee Reports (2:15-2:40 p.m.) Action

Background

- The Habitat Committee met in the fall of 2021
- The Committee updated the Commission's Submerged Aquatic Vegetation (SAV) Policy (**Briefing Materials**)
- In the Fall of 2021 the ACFHP Steering Committee met and provided update on endorsed projects and a summary of FY2023 National Fish Habitat Partnership project applications

Presentations

• L. Havel will present a summary of the HC fall meeting • L. Havel will present updates to the Commissions SAV Policy • L. Havel will present an overview of ACFHP activities
Board action for consideration at this meeting • Approval of the update SAV Policy

9. Review Non-Compliance Findings, if Necessary Action

10. Other Business

11. Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ISFMP POLICY BOARD

Webinar
October 21, 2021

These minutes are draft and subject to approval by the ISFMP Policy Board.
The Board will review the minutes during its next meeting.

Draft Proceedings of the ISFMP Policy Board Webinar
October 2021

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October 2021

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Dan McKiernan, MA (AA)
Raymond Kane, MA (GA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Sen. Craig Miner, CT (LA)
Jim Gilmore, NY (AA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Warren Elliott, PA (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Bill Anderson, MD (AA)
Russell Dize, MD (GA)
Pat Geer, VA, proxy for S. Bowman (AA)
Shanna Madsen, VA, proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Bill Gorham, NC, proxy for Rep. Steinberg (LA)
Mel Bell, SC, proxy for P. Maier (AA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Erika Burgess, FL, proxy for J. McCawley (AA)
Marty Gary, PRFC
Karen Abrams, NMFS

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

Staff

Robert Beal
Toni Kerns
Tina Berger
Laura Leach
Lisa Carty
Maya Drzewicki
Pat Campfield
Kristen Anstead
Emilie Franke
Lisa Havel
Chris Jacobs
Jeff Kipp
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Caitlin Starks
Deke Tompkins

Guests

Katie Almeida
John Almeida, NOAA
Max Appelman, NOAA
Mike Armstrong, MA DMF
Pat Augustine, Coram, NY
Julia Beaty, MAFMC
Adam Belk, NEFMC
Rick Bellavance, Kingstown, RI
Bill Biswanger
Sarah Bland, NOAA
Ellen Bolen, VMRC
Bonnie Brady
Jeff Brust, NJ DEP
Thomas Burrell, PA F&B
Mike Celestino, NJ DEP
Peter Clarke, NJ DEP
Heather Corbett, NJ DEP
Carson Coutre, MAFMC
Jessica Daher, NJ DEP
Kiley Dancy, MAFMC
Lennie Day
Greg DiDomenico
Michelle Duval, MAFMC
Dan Farnham
Emily Farr, Manomet
Lynn Fegley, MD DNR
Skip Feller
Marianne Ferguson, NOAA
Cynthia Ferrio, NOAA
Lewis Gillingham, VMRC
Bob Giordano
Angela Giuliano, MD DNR
Willy Goldsmith, SGA
Robert Groskin, Teaneck NJ
Sonny Gwin
Brendon Harrison, NJ DEP

Guests (continued)

Hannah Hart, FL FWC
Dewey Hemilright
Jay Hermsen, NOAA
Helen Heumacher, US FWS
Jaclyn Higgins, TRCP
Harry Hornick, MD DNR
Asm. Eric Houghtaling, NJ (LA)
Peter Hughes, Atlantic Capes
Jacob Jaskiel
Jeff Kaelin, Lund's Fisheries
Emily Keiley, NOAA
Moira Kelly, NOAA
Adam Kenyon, CMRC
Wilson Laney
Scott Lenox
Tom Little, Ofc. Asm. Houghtaling
Mike Luisi, MD DNR
Dee Lupton, NC DENR
Chip Lynch, NOAA
John Maniscalco, NYS DEC
Chris McDonough, SC DNR
Kim McKown, NYS DEC
Conor McManus, RI DEM
Nichola Meserve, MA DMF
Steve Meyers
Mike Millard, US FWS
Jose Montanez, MAFMC
Chris Moore, MAFMC
Brandon Muffley, MAFMC
Allison Murphy, NOAA
Lindsey Nelson, NOAA
Willow Patten, NC DENR
Mike Pentony, NOAA
Nicholas Popoff, FL FWS
Will Poston, SGA
Kathy Rawls, NC (AA)
Paul Risi, Kingsborough CC
Scott Sakowski, NOAA
Tara Scott, NOAA
Somers Smott, VMRC
Scott Steinback, NOAA
David Stormer, DE DFW
Rustin Taylor
Marek Topolski, MF DNR
Wes Townsend
Carolyn Tyson
Carrie Upite, NOAA
Mike Waine, ASA
Kate Wilke, TNC
Angel Willey, MD DNR
Derri Williams
Sara Winslow
Horace Wynn
Sarah York, NOAA
Erik Zlokovitz, MD DNR
Renee Zobel, NH FGD

The ISFMP Policy Board of the Atlantic States Marine Fisheries Commission convened via webinar; Thursday, October 21, 2021, and was called to order at 12:45 p.m. by Chair Patrick C. Keliher.

CALL TO ORDER

CHAIR PATRICK C. KELIHER: Welcome everybody to the October meeting of the Interstate Fisheries Management Program Policy Board. My name is Pat Keliher, the current Chair of the Commission, the outgoing Chair of the Commission. We're going to work down through this agenda as efficiently as we can.

As folks involved noticed, we do have members of the Mid who have joined us, and we will open that portion of being up as Item Number 4.

APPROVAL OF AGENDA

CHAIR KELIHER: Before we get to that, I've got a little bit of business to go through, first being Board Consent for Approval of the Agenda. Does anybody have any items that they would like added to the agenda under Other Business?

APPROVAL OF PROCEEDINGS

CHAIR KELIHER: Seeing no hands, I'm assuming that the agenda is fine as presented, so I will proceed to Approval of Proceedings from the August 2021 meeting. Does anybody have any additions, deletions, or comments on those proceedings? Seeing no hands, we will consider those approved.

PUBLIC COMMENT

CHAIR KELIHER: Item Number 3 is Public Comment. Is there any member of the public who would have a comment on something that is not on the agenda? Do you have any names, Toni?

MS. TONI KERNS: I have no names and I see no hands.

UPDATE ON DRAFT AMENDMENT AND FRAMEWORK ON THE HARVEST CONTROL RULES FOR BLUEFISH, SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS

CHAIR KELIHER: At this time, we are going to move on to Item Number 4, which is a joint meeting with the Mid-Atlantic Fisheries Management Council, and it is an update on Draft Amendment and Framework on the Harvest Control Rules for Bluefish, Summer Flounder, Scup, and Sea Bass. Before I turn it over to Toni to kick this off, I just recognize Mike Luisi, and Mike, do you have any comments before we kick this off?

MR. MIKE LUISI: No, I don't have anything in addition. I'm looking forward to the discussion. I just want to welcome the Council members who were able to make it here today. Hopefully next time we get together we'll be able to be together in some capacity. Thanks though, for a good opportunity, and I guess I'll turn it back to you for Toni's presentation.

CHAIR KELIHER: Thank you, Mike. Just so the members of the Policy Board and the Council are aware. If we do get to a vote situation, Mike and have discussed this prior to, and we will proceed for this particular meeting as we have in the past with like motions, if it comes to that. With that, I'm going to turn it back over to Toni Kerns.

MS. KERNS: Thank you Mr. Chair, and I just wanted to let everyone know that Savannah Lewis and Julia Beaty have been here meeting the PDT and FMAT. The group has been working very diligently on the Harvest Control Rule for the past several months. We're going to have a little bit of a team presentation. I think, Savannah, did you have any additional things you wanted to say, or are we going to go straight to Dustin?

MS. SAVANNAH LEWIS: Hey Toni, thanks for that. Yes, we're going to go straight to Dustin, and it will be myself, Dustin and Julia Beatty from the Council presenting. We're just looking forward to sharing what we've been working on, so I'll turn it over to Dustin to kick us off.

MR. DUSTIN COLSON LEANING: As has been alluded to, we'll be covering the Harvest Control Rule throughout the Addendum Framework. I'll begin with the review of the draft options, then I'll be followed up by Julia, who will provide some overview caveats of the different options, and then also she'll follow up with accountability measures under all of the options.

Then Savannah will provide a recap of the Science and Statistical Committee's Sub-Group Peer Review Report on the two models which are currently being developed to help inform the recreational measure setting process. Savannah will then close out with PDT/FMAT recommendations for next steps, and then after questions on the presentation, the Policy Board and the Council will have time to provide feedback and guidance on the options and next steps.

I'll open with goals of the draft addendum framework, just to kind of jog your memory here. But the goals are to establish a process for setting recreational bag and season limits for summer flounder, scup, and black sea bass and bluefish, such that measures aimed to prevent overfishing are reflective of stock status, appropriately account for uncertainty in the recreational data, take into consideration angler preferences, and provide an appropriate level of stability and predictability in changes from year to year.

I'll start with the status quo action option, Option A that is within the fishery management plans for summer flounder, scup, and black sea bass, as well as within the FMP for bluefish. This process currently in place, aims to prevent overages of the recreational annual catch limit or ACL, and the acceptable biological catch limit or ABC, not through the implementation of recreational measures that are reasonably expected to achieve, but not exceed the recreational harvest limit.

The Monitoring Committee and the Technical Committee have considerable flexibility when doing this, and how they develop the measures for federal and state waters. But generally, MRIP data from one or more recent years are used to predict impacts of bag, size and season limit on harvest.

The TC and MC can also focus on other factors that can be considered. For example, the resource's availability, changes across the coast, stock status, changes in recruitment, or as the different year classes recruit through the fishery, and data considerations, such as the variability in MRIP estimates. Now getting into the heart of the options for the harvest control rule. You have Option B, which is the percent change option. This starts with an MRIP to RHL comparison. Management responses are narrowed down, depending on if the RHL is within, above or below the 80 percent joint distribution confidence interval of the MRIP estimates. The RHL will ideally be a two-year average, and the confidence interval will consider the two most recent years of harvest, because the intent is to have a multi-year measure setting process.

It is synced up with the two-year stock assessment cycle that we're now on with the management track assessments run by the Science Center. The PDT/FMAT analyzed a variety of different approaches for generating a confidence interval, and settled on the joint distribution method, which takes into account both the PSE values of each individual estimate for a given year, as well as the variability between the two years of estimates.

The PDT/FMAT also discussed the possibility that this MRIP versus RHL comparison could be replaced with a statistical model-based estimate of harvest and an associated confidence interval, which would be compared to the RHL. The standard MRIP to RHL comparison assumes same measures are likely to achieve the same level of harvest, even if stock dynamics are changing.

Using statistical models could take into consideration metrics such as recruitment, and biomass trends potentially produce a more

predictive and robust estimate of harvest, considering changing stock dynamics. The next step of this approach is to compare spawning stock biomass to the target.

In years that responses differ, depending on if biomass is below the target, between the target and 150 percent of the target, or more than 150 percent of the target. Essentially, the magnitude of the difference between the MRIP estimate and the RHL in biomass relative to the biomass target, determined the percentage liberalization, reduction, or status quo.

I know that there is a lot of information I just walked through, so for visual thinkers out there maybe this will help. Here we have a visualization of what I just talked about. First, we compare the future two-year average RHL, the MRIP estimates confidence interval, to determine if we are in Row A, B, or C.

Then we look at where biomass is relative to the target, moving over to the next column. Then the right most column provides the associated percent change in measures. I will note here that an analysis was conducted, to help determine the appropriate percent change in measures for each row. This analysis took into consideration historical comparisons of MRIP to the RHL within the black sea bass and summer flounder fishery.

We can get into more details on that if there are follow up questions, I have a back-up slide prepared, but just in the interest of time I'll move on to other considerations. Like I said, there are some additional considerations related to this option, which should be resolved before this is finalized for public comment, and the PDT/FMAT will continue to discuss these.

The first consideration relates to the boxes outlined in red, specifically for the lower red boxes. Some PDT/FMAT members had concerns about always allowing status quo when biomass is above 150 percent of the target, and an RHL overage is expected. Regardless of the magnitude overage, things would still be held at status quo. One suggestion was maybe to change that to a 10 percent reduction, rather than keeping it at status quo. But really, the PDT/FMAT has not yet reached consensus on the best approach for this. There are considerations about mirroring things up and down, and what really is the most appropriate, considering the RHL comparison, as well as stock status.

Some PDT/FMAT members thought status quo would be appropriate, given that biomass is still high above the target. The results of some consideration and discussions about the top red box, specifically, is it appropriate to always maintain status quo when biomass is below the target, but an RHL underage is expected. These things will need to be resolved.

For the boxes outlined in orange, the PDT/FMAT discussed whether the change in measures should be capped such that the percentage liberalization reduction does not exceed the percentage difference between the two-year average RHL and the two-year average MRIP estimate. This would prevent the use of larger changes, when otherwise needed.

But it also brings this option a lot closer to the no-action alternative, in terms of how this process is done. Moving away from a binned approach and more of a targeted, more precise percentage change approach. Another thing to note here is that this alternative considers changes from a starting point.

The current management measures may not be appropriate for a starting point, for a variety of different reasons. For example, there is widespread angler dissatisfaction with some of these measures, and there is also potential for notable ACL overages for some species under the current allocation.

The FMAT/PDT is considering ways to define the appropriate starting point for each species under each option, by using statistical models and other methods. Additional time is again needed to further develop these ideas, and updates will be

provided at a future Council and Policy Board meeting.

Before I move on to the next Harvest Control option, I thought it would be great to highlight this infographic that Savannah created with the PDT/FMATs help. The hope is that someone who used this infographic, along with the previous table that I showed on the last slide, they will gain a basic understanding of the control rule option.

This infographic, along with all the other infographics with the other options, were included in supplementary materials, which may be helpful to view if Policy and Board and Council members have trouble viewing this with the small font, or would like to provide feedback at the end of the presentation.

Option C is the fishery score approach, where multiple metrics are combined at the one fishery score value, to determine what each bin or what bin each stock falls into, and which predetermined set of measures should be specified. High scores are reflective of good stock status, with a maximum score of five, and then a minimum score of one. The first metric considers fishing mortality, or F relative to the threshold fishing mortality, which is defined as maximum sustainable yield or the relevant proxy for each stock. The F over Fmsy metric was updated to three categories, where F is at least 5 percent less, at least 5 percent greater, or within 5 percent of Fmsy. Essentially, the lower the ratio of F over Fmsy, the higher the score. Then moving on to the second metric., which is spawning stock biomass relative to the spawning stock biomass target.

Biomass from the most recent stock assessment would be given a value of 1 through 5, depending on the ratio of biomass to the target, and the higher the biomass is relative to the target, the higher the resulting score. The third metric considers recruitment. The most recent three-year average estimate of recruitment is compared to the 20th, 40th, 60th, 80th, and 100th percentiles of the distribution of the time series of recruitment used in stock projections.

The higher the three-year average recruitment value is relative to the historical percentile, the higher the score for this metric. Then the last metric is fishery performance, or more specifically, a comparison of the two-year average upcoming RHL with a confidence interval of the most recent two years of MRIP harvest.

If the RHL is above the confidence interval it scores a 5, if RHL is within the confidence interval it scores a 3, and then following if the RHL is below the confidence interval it scores a 1. This metric could potentially be calculated by comparing the average RHL to the confidence interval associated with a statistical model-based estimate of harvest. We'll get into that later.

Each metric will have a specific weighting, but the Monitoring and Technical Committee will have the opportunity to recommend adjustments to the weightings during the specifications process. Once the metric values are calculated, and the appropriate weightings are applied, the stock will receive a corresponding fishery score and associated bin that will be reflective of stock status and fishery performance outlook.

Each bin will have a predetermined set of measures, as I said before, and the higher the fishery score the more liberal the measures, and then in reverse, the lower the fishery score the more restrictive the measure. Here we have an infographic that was recreated to help visualize the steps that are reviewed on the previous slide.

I recognize that this may be a very small font for some people, especially if you're looking on a cell phone or a small laptop. But this again was also made available through supplemental materials, and this graphic just highlights the two-year specifications cycle that begins with a new stock assessment result, then calculates fishery score metrics, uses the formula to calculate the fishery score, and then determines the appropriate

management bin in measures based on the fishery score.

Option D is the biological reference point approach, and there are two primary metrics that determine which bin the stock should be assigned to. The first spawning stock biomass relative to the biomass target in fishing mortality, relative to the fishing mortality threshold, are both pulled from the most recent stock assessment. If a stock is entering its second specification cycle in the same bin, then secondary metrics are used to determine if the measures should be liberalized, restricted, remain status quo, or whether the default measures should be reevaluated. These secondary metrics are recruitment compared to the time series median, biomass trend, and expected catch or harvest compared to the ACL or RHL respectively. Fishery performance relative to ACL or RHL is only considered when the latest stock assessment indicates that overfishing was occurring in the terminal year of the assessment.

This again is a visual representation of what I just walked through. In total there are 13 sets of predefined measures. Bins 1 and 2 in green have default measures, and a more liberal set of measures if biomass trend is increasing. Bins 3 through 6 in yellow have a default set of measures and a more restrictive set of measures if either recruitment or biomass are increasing, and if the stock is entering its second specification cycle in Bins 4 through 6 on the right-hand side, which is where F exceeds the threshold, and catch or landings exceed the ACL or RHL.

Then the default measures within that Bin would be reevaluated and reassigned. Lastly, if a stock is overfished it falls into Bin 7 there at the bottom, with the most restrictive measures assigned until the rebuilding plan is implemented. The fish pictures on the screen indicate which bin each stock will be placed in based on the current stock status.

Again, we have another infographic that provides visual representation of the biological reference point approach. This again was included in supplementary materials, and the nuances of this option were a little challenging to capture, so the PDT/FMAT is open to feedback on how to improve this infographic, and of course you are welcome to provide feedback on all of the infographics that we show here today.

Option E is the biomass-based matrix approach. This alternative has remained largely unchanged since it was last presented in August. A stock is assigned a bin based on two factors, spawning stock biomass compared to the target, and second the most recent trend in biomass. As can be seen on the table, stock status is defined as abundant, healthy, below the target and overfished, and biomass trend would be classified as either increasing, stable or decreasing.

Each Bin would have a predetermined set of measures assigned, with the most liberal assigned to Bin A, and the most restrictive assigned to Bin F. Again, the fish pictures on the screen help indicate which bin each stock would be placed in based on the most recent stock assessment information coming out of the June, 2021 management track assessment.

Again, we have the infographic for the biomass-based matrix approach, and again any and all feedback on this graphic is welcome at the end of our presentation. The PDT/FMAT also created an option comparison table to help summarize the options and differentiate them from each other. The first column lists the option, the name of the option, and columns 2 through 6 list which metrics are used in which of the options.

Just to clarify here, expected harvest refers to expected harvest under status quo measures compared to the upcoming year's RHL. This could also be based on past MRIP estimates, including consideration of confidence intervals for those estimates, or in model-based estimate of harvest, including consideration related to uncertainty in that estimate. The methods range from the no

action status quo option that only compares expected harvest to the upcoming RHL to the more complex biological reference point option that uses all five metrics. Under Column 6, we can see that measures are not predetermined under the no action option, nor the percent change option, but are for the remaining option. Then the seventh column lists the expected number of sets of predetermined measures under each option, and lastly, measures are ideally specified for two years under all options, excluding status quo. Now I'll turn it over to Julia, who will cover some additional aspects of the Harvest Control Rule options, along with information on the accountability measures under each option.

MS. JULIA BEATY: Thanks, Dustin. First, we wanted to emphasize some things about stock under a rebuilding plan. I want to say this is most relevant for bluefish right now, hopefully never relevant for the other species. But we do have everything in the draft, pretty much an addendum set up, so that it's clear that when the stock is under a rebuilding plan, the rebuilding plan dictates what the measures are, not the Harvest Control Rule.

Plus, the options in this action, they will not replace those rebuilding plan measures, but in some instances the options could include measures that would be implemented as temporary measures until a rebuilding plan can be implemented, because once a stock is declared overfished, it can take up to two years until the rebuilding plan is implemented.

During that up to two-year time period, there is room for, for example the most restrictive measures under a Harvest Control Rule option to be implemented. But once the rebuilding plan is in place, then whatever the rebuilding plan says goes. Then once the stock is no longer in a rebuilding plan, then measures can be set based on the Harvest Control Rule.

We thought this would be a reasonable way to kind of address what would happen on the rebuilding plan, and set the stage so that when bluefish gets out of a rebuilding plan the process can be ready to go that these options could be used when the rebuilding plan is not in place any longer.

The next topic is how will we go about setting measures for each bin? This only applies for the options that you bin, so specifically the fisheries score, biological reference point and the biomass-based matrix options. Those all have bins with predetermined measures associated with them. The FMAT and PDT has agreed that the measures for each bin will aim to achieve a range of harvest that is appropriate for stock conditions associated with each bin.

For the most part the bins already have a clearly defined stock status associated with them, for example, based on biomass compared to the target level. But for options that consider multiple other metrics in addition to biomass compared to the target, so for example the fishery score that Dustin described. That contains consideration of multiple different metrics.

But we have worked in some examples into the document in the briefing materials about how we would go about specifying the stock status that is associated with each bin, and the expected level of harvest associated with that bin, even though deciding which bin you're in is based on multiple factors. The measures with each bin would be based on stock status considerations.

For all of the options the PDT and FMAT are still discussing the details, or how to define the appropriate level of harvest from each bin, and how to take measures to go along with that level of harvest, including considerations for how this relates to the ACL or the RHL. This can include considerations related to confidence intervals and other statistical metrics and models, and it can be assumed that each set of measures will result in a range of expected harvest, which is what we've seen in reality is that you keep the same set of measures in place over time it will result in varying levels of harvest.

Even though we're saying that each set of measures will aim to achieve a range of harvest that is appropriate for stock status. That doesn't mean that we're trying to pinpoint an MRIP estimate on an RHL, that we can take in these other considerations. But again, I think these are really important details that the FMAT and PDT will continue to work through over the next few months.

Then also, all the measures under any of these bins will be informed by a combination of quantitative analysis and stakeholder input. Ideally, we will have a statistical model that we could use to help inform our setting of measures, and Savannah will later describe two models that we're hoping to use.

We can also use other quantitative methods to help us pick the measures that might be appropriate. But we're not going to pick it just based on a model, or just based on quantitative analysis. Stakeholder input is still going to be very important here, because a model is not going to be able to answer all of our questions for us.

A model might be able to tell us something like, if you're aiming to achieve a certain level of harvest here are ten different combinations of measures that you could use to get you there. Then stakeholder input can be a very important way to help us pick which of those ten to use, or even if we don't have a model, or we want to consider something beyond what the model tells us. Stakeholder input will be very important for that.

We will definitely have a role for the Advisory Panel in this, because this action is establishing the process that we will use to set the measures, when it's not setting the specific measure, because those will be implemented and can be modified through the specifications process, and the Advisory Panel already has a clearly definable in the specifications process. That's just one example of how stakeholder input will play into this.

Also, the measures will be regularly reevaluated, to ensure that they remain appropriate. Again, they can be modified through the specification process. Next, we just wanted to touch on the Magnuson Stevens Fishery Conservation Magnuson Act requirements. There are some details relating to these specific requirements, so specifically ACLs.

Like I said in the previous slide, there are still some details that we're going to work through, in terms of how does the ACL play into the measures associated with each bin, for example. But just wanted to kind of say up front that all of the options that the Council would consider for implementation to the Council's framework, have to comply with the Magnuson Act.

The Council's framework action must be approved an implemented by NOAA Fisheries, and NOAA Fisheries will not approve measures that are inconsistent with the Magnuson Act. NOAA Fisheries provides guidance throughout development of Council actions, to help ensure that we're getting to a place where we're putting forward something that is consistent with all applicable laws. The first two bullets on the screen here are the Magnuson Act requirements that we think are probably the most directly relevant to this action.

First of all, no matter what management program we come up with, we have to prevent overfishing. We also have to have annual catch limits and measures to ensure accountability. I'll describe accountability measures in a little bit more detail over the next few slides. In terms of accountability measures, the only language in the Magnuson Act is that we need annual catch limits, including measures to ensure accountability.

The language on the screen here comes from the National Standard Guidelines, which provides more guidance on how we go about having measures to ensure accountability. There are two different types of accountability measures or AMs. The first type is reactive AMs, which are measures to prevent ACLs from being exceeded in the first place.

Those are the proactive AMs, and then the reactive AMs are measures to correct or mitigate for ACL overages if they do occur. Also, AMs should address and minimize both the frequency and magnitude of overages, and correct the problems that cause the overage in as short a time as possible.

In terms of proactive accountability measures, we don't think there are any changes needed to our current proactive AMs, because under each option measures would be set based on considerations related to stock status. Like I previously said, measures would be expected to achieve a level of harvest appropriate for stock status, and the considerations that go into that vary by options, as listed on the screen here.

But just the fact of having measures that attempt to constrain harvest to appropriate levels, that in and of itself is a proactive AM. The FMAT and PDT didn't see a need to build in specific options related to proactive accounting doing that, just because we felt that that is already covered under the options as they are.

In terms of reactive accountability measures, so measures that are used if an ACL overage did occur. There are some recommended tweaks to the current reactive AMs under each option, and I'll go through them for each of the options. In general, there are two steps for the reactive AMs, and the first step is to determine if a reactive AM was triggered, and then the next step is if it was triggered then what is the appropriate response?

We're not recommending any changes at this point in time to Step 1, because especially for summer flounder, scup and black sea bass, the FMAT and PDT thought that's an appropriate comparison, where we look at a three-year average ACL compared to a three-year average of recreational dead catch to determine if the ACL was triggered.

The FMAT and PDT thought it was appropriate to see a three-year average, a current regulation that's been in place for several years, and the three-year average helps to kind of deal with some interannual variability and uncertainty in the MRIP data. For bluefish it is actually single-year comparison at this point in time. With the recent bluefish amendment, the fishery will move towards separate commercial and recreational ACLs, so it may make more sense to consider using a three-year average comparison for the recreational accountability measure for bluefish in the future. But at this point in time, it is a single-year comparison.

Again, Step 2 is what is the appropriate response if this trigger has been met in Step 1? That's what I'm going to walk through in the next slides. But in general, the FMAT and PDT tried to have the response as closely matched to the current AMs as possible, with modifications as necessary to fit with the intent of the alternative, so to address things like if you have a binned approach, we need to change some of the language so that it makes sense, logic with that.

This slide summarizes the current reactive accountability measures of the recreational fishery, and I am going to walk through this in detail, because it sets the stage for the next few slides, so just bear with me while I walk through the amount of text on the screen here. First of all, this is assuming that an AM was triggered.

First there is consideration given to stock status, which is what the 1, 2, and 3 is here. Already this sounds some similarities to some themes that are considered through some of the options in this action. If you're in Category 1, that is the worst stock status. The stock is overfished under a rebuilding plan, or stock status is unknown.

This requires the most strict response to an ACL overage, or an exact overage amount must be paid back as soon as possible. If you're in this middle category, Number 2, that's when biomass is above the threshold but below the target, and the stock is not under a rebuilding plan. Then there is consideration given to, if only the recreational ACL was exceeded or if the ABC was also exceeded.

If only the ACL was exceeded, then the bag size and season limits should be adjusted, taking into account performance of the measures and conditions that precipitated the overage. It doesn't specify exactly how they will be adjusted, or what new level of harvest they are aiming to achieve. It just says that they have to be adjusted because there was a problem, and stock status is not great, so a change needs to be made moving forward.

If the ABC was also exceeded, then a more strict response is required, where there is a payback required, but it's not the full overage amount. The payback is calculated based on biomass, and the formula shown on the screen here, such that the payback is lower when biomass is closer to the target and it's higher when biomass is further below the target.

Again, it kind of scales so that the response is more strict at lower biomass. Then if you're in Category Number 3, biomass is above the target. You had an ACL overage, but stock status is good. There is actually no change required. Adjustments to the bag size and season just need to be considered, but it's not requiring any change.

Again, you should take into account the performance of the measures and the conditions that precipitated the overage. Again, these are the current reactive accountability measures, and then on the next slide I'll summarize just the changes from this that the FMAT and PDT is recommending for each option. The first option, other than no action, is the percent change alternative. As Dustin described that, this does not have predetermined measures, it's just kind of has the bins of, are you making 10, 20, or 40 percent liberalization or reduction, or no change based on the considerations outlined in that option.

The only change recommended to these regulations is to say that when a payback is needed that it can be spread equally across two years, to help allow for constant measures across two years. But everything else would stay the same, other than the current regulations for the reactive AMs. Things get a little more complicated.

We need a little bit more changes for the fishery score and biomass-based matrix options, because those are two options that use bins. To make it so the accountability measures kind of fit more with the intent of the binned approach, we changed the language so it's not saying things like payback in a certain number of pounds, it's based more on the existing bins.

If you're in stock status category Number 1, which is bad, stock is overfished, under a rebuilding plan, or stock status is unknown. Then the most restrictive measures would be implemented. This would be whatever the most restrictive bin is under these options, those are the measures that would be implemented, except if the stock was already in that bin.

If those measures were already implemented and an ACL overage still occurred, or if those measures are otherwise expected to continue to result in overages. Then they must be further restricted, such as they aim to prevent future overages. This kind of gets at the idea that the most restrictive measures under the bins are kind of set forward as an intention, but they're not a hard bore, that we will go below them if we need to, if stock status is bad, and an AM restricted.

If you're under the middle category here, Number 2, if biomass is above the threshold but below the target, and the stock is not under a rebuilding plan. Again, you give consideration to if only the ACL was exceeded, or if an additional metric was also exceeded. If only the ACL is exceeded, then basically the measures associated with all bins needs to be reevaluated.

This is trying to keep it in line with the current regulations, where when you're in this category it says the measures need to be adjusted, and it doesn't specify how. This is the same thing, just saying that the measures for the bin you were

previously at, you know if they caused an overage, so they need to be reevaluated, with the intent of preventing future ACL overages.

We also indicated that measures for all other bins also need to be reevaluated, because the bins are set relative to each other. If you change one bin, then the other bins might not logically be related to each other any longer. You need to consider whether the measures for all bins could be reevaluated.

Then if you're under that second bullet point under Number 2, where an additional metric is also exceeded, and it exceeds the ACL, then you need a more strict response. Instead of having a scaled payback under the current regulations, you would instead drop down a bin, compared to where you would otherwise be. Then again, you would need to reevaluate measures for all bins, with the intent of preventing future ACL overages. Then if biomass is above the target, you're under Number 3, then this part of the regulations would basically stay the same. You just need to consider whether you should adjust measures, but you're not required to adjust measures. With the tweak that this would apply to all bins, because again like I said before, the bins are relative to each other, so you should consider all of them into a change, but an action is not required.

This slide is for the biological reference point option, which is the one that had the big matrix, and it had like the bins within bins. To address that it needed really one major difference compared to the previous slide, to reflect the fact that in the instance where you're under the second bullet under Number 2, the language couldn't say that you just step down to the next bin, because it's dependent on where you are to start with.

You would either be stepping down to the next bin or stepping down within a bin, depending on your starting point. The language here would say that you stepped down to the next most restrictive set of measures, which like I said, could be down a bin or down within a bin. Then under Number 3, the only tweak in the language there is just to again reflect the bin structure, but it's the same intent considering adjustments.

Basically, everything here is the same as on the previous slide, but just with some tweaks that kind of deal with the bin or within a bin approach. This is the last slide related to AMs. You may have noticed that I've glossed over one detail on the previous few slides, where under that second bullet under Number 2. It says that if stock status is in that medium category, then you consider if only the ACL was exceeded, or if the ABC was also exceeded or the Fmsy or fishing mortality threshold was also exceeded.

Under the current regulations that consideration is for the ABC. Again, there is a more strict response if the ABC was exceeded in addition to the ACL than if just the ACL is exceeded. The FMAT and PDT thought it would be appropriate to consider swapping out the ABC with Fmsy, or the fishing mortality threshold for this specific part of the reactive AMs.

The reason that they thought this would be worth considering as an option to choose from, is that it considers its total removals negatively impacted the stock. It uses more recent data than the data used to set the ACL and the ABC. The ACL and the ABC are set based on stock assessment projections, and then when we get to the point where we're evaluating ACL overages, we're looking back in time to say, did we actually exceed that amount just based on catch?

By the time we get to that point where we can look back in time on that, we might have an updated stock assessment information that could help us understand, you know if we did exceed the ACL what was the actual impact on the stock? Sometimes we're in situations where we get to that point and we have a few more years of data than we had when we set the ACL and the ABC.

That could tell us that maybe the ACL wasn't set quite right, because maybe there was a year class that moved through, and that was a lot bigger or smaller than average, or the fishery performed a lot differently than we predicted that it would, or for some other reason, the impact on the stock was different than what we thought it might be when we first set the ACL and ABC. This would allow us to consider that. Maybe you exceeded your ACL, but something changed in the fishery that it didn't actually have a negative impact on the stock. This would allow for a less strict response to occur in that case.

This relies on us having regularly updated F estimates, which we think will occur, given that we're anticipating that we'll get management track stock assessments for these species every other year moving forward. But if for some reason we're not able to get regularly updated F estimates, then we would just default back to that ABC comparison.

Again, in both cases, regardless of which option you use here, that AMs are set up such that there is a more strict response if the ABC or F threshold was exceeded, than if just the ACL was exceeded. That was my last slide, and Savannah is going to take it over for the next few parts of this.

MS. LEWIS: All right, thank you, Julia. Now I'm going to walk through some of the specific recommendations coming out of the PDT and FMAT since the last update we provided in August, as well as a brief overview of the SSC report. In September, a subgroup of the Council's Scientific and Statistical Committee met to review two recreational models, in order to identify the potential utility, benefits, uncertainties and limitations of each model, for use by the FMAT and PDT during the Harvest Control Rule development.

They also provided any guidance as to whether these models represented an improvement to the current process by which we set recreational measures. Overall, two models were proposed and reviewed. The first model was a recreational fleet dynamic model, or the RFDM. This is a statistical model that estimates harvest in discards from MRIP data, while utilizing and incorporating a variety of explanatory variables, such as bag, minimum size, even length and weight.

The SSC recommended additional work prior to the use of this model for management, including work on model specification, as well as some further exploration on the correlation between harvest and discards within the model. The second model that the SSC looked at was the recreational economic dynamic model or the REDM.

This is a bio-economic model that is currently in development for use with the summer flounder MSE. The SSC did find that this model was properly specified, but did provide recommendations to improve the model for use with the harvest control rule. Overall, the SSC concluded that both models should be considered for use to set measures within the Harvest Control Rule methodology, and even used in tandem after recommended improvements are made.

This quote from the report which was provided in supplemental materials, I thought summed up what they found very well. Both models have value for management upon revision, and that their limitations are accounted for in management decision, 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 regulation from the harvest and discards, and angler welfare. The PDT and FMAT will continue communicating with the model developers, to incorporate recommendations from the SSC, and further refine the models for use within the Harvest Control Rule methodology. Moving on to recommendations from the FMAT and PDT. The first recommendation that was provided in the memo with meeting materials, is about revising the proposed timelines.

The initial timeline proposed for the Harvest Control Rule intended to have a finished draft addendum for the Board to review and approve today for public comment. However, due to additional work needed for the model, following the SSC review, as well as specifics for the Harvest Control Rule options themselves, as Dustin walked through.

The PDT and FMAT recommended against approving the Draft Addendum for public comment at this time, and instead reviewing it in either December 2021, or in January or February 2022. The Draft Addendum provided to you in the meeting materials represents the work that the PDT and FMAT has done up until this point.

As my colleagues presented earlier, there are still some small but very important details that we feel need additional work and attention. With that said, I have here on the screen a proposed an updated timeline for the Board and Council. The Policy Board and Council will review and approve a final range of options in the Draft Addendum for public comment later this year, with public hearings on the document to follow soon after in the new year.

At the same time there will be continued development of the models to inform measures with the measure setting process. The PDT and FMAT and the advisory panels will meet to consider public comments and recommendations for final action following completion of public hearings. The Policy Council and Board will then take final action on the draft framework and addendum in spring, 2022.

Immediately following the development of a NEPA document, federal rulemaking will begin. In addition, in the spring and summer, a socioeconomic survey by the Northeast Fishery Science Center will begin and be completed, and the data can be used to update models and inform measure setting. I'll touch on that in these slides. The Monitoring Committee and the Advisory Panels will again meet to provide input on 2023 measures next fall, and then following that, based on whichever Harvest Control Rule option is selected, measures will be set for 2023.

The Advisory Panel will be an important venue for stakeholder input on the measures to be implemented throughout the Harvest Control Rule for 2023 and beyond. As Julia said, the models are going to help us determine which measures will be appropriate, but they will not be the only source of information used. Another recommendation from the PDT and FMAT was to not include example measures in the Draft Addendum.

After much discussion and review of previous actions, the PDT and FMAT hopes the preferred option from the Harvest Control Rule options will be selected based on the merits of the approach, rather than the resulting measures. The Draft Addendum and framework are meant to only put into place the methodology of the Harvest Control Rule and not the measures themselves. The measures themselves will be discussed and selected after a selection of a Harvest Control Rule option, and the measures selected can be revised through processes built in through different options. As such, the PDT and FMAT hope for stakeholder input on which options incorporate metrics they feel are the most appropriate for management in the long term, and the mechanism in which those metrics are used, rather than the option that may seem to provide short term beneficial measures.

The group did not want to mislead the public in any way, and the inclusion of example measures may be misleading, in that they may not be the final measures selected. The Monitoring Committee and the Technical Committee will also play a part in refining the methodology to select measures during a specifications process.

While the Harvest Control Rule option that is selected will stay constant, the way that measures are set, may change as more data becomes available and as models progress. Again, the Advisory Panel and the Monitoring Committee will be important venues for stakeholder input on

measures to be implemented through the Harvest Control Rule.

Another recommendation coming out of the PDT and FMAT is regarding the stakeholder workshop. The initial timeline presented included an opportunity to host fall and winter stakeholder workshops, to provide updated angler preference data, to better inform the models, as well as decisions of the Council and Board.

The only other available angler preference data is from a 2010 survey. However, based on the revised timeline I just presented, the PDT and FMAT felt that it would be more valuable to use the results from the upcoming Northeast Fishery Science Center socioeconomic survey, the North Atlantic Recreational Fishing Survey, instead of the stakeholder workshop.

The survey, which I'll cover in the next slide, will reach a wider audience than the workshops that the PDT and FMAT would be able to conduct. The only concern raised by the PDT and FMAT regarding these workshops, and moving to the use of this North Atlantic Recreational Fishing Survey, is that bluefish is not included in this or on prior surveys.

However, once bluefish is no longer under a rebuilding plan, angler preference information could be gathered utilizing stakeholder workshops. Gathering this data at a later time will allow for better angler preference data on the stock, after it is allowed some time under the rebuilding plan, and hopefully the completion of the ongoing bluefish research tracked stock assessment.

Just a brief overview of what survey we're looking at using. This is the North Atlantic Recreational Fishing Survey. It will be sent out in early 2022 to target saltwater anglers that fish for summer flounder, scup, and black sea bass throughout the North Atlantic. Surveys will be sent to anglers that's are randomly drawn from 2021 saltwater recreational fishing licenses through state level license frames.

A survey of this design reaches a wider audience, and captures differences in fishery utilization in a way that workshops cannot. Surveys like this are conducted across the United States, and the best example of the application of such as survey in our area is with the cod and haddock model up in New England, and incorporates survey data into measure setting. In addition, the random sample of anglers is designed to reduce biases among the angler preference data as much as possible, by preventing one single group from influencing the direction of management measures. The purpose of the North Atlantic Recreational Survey is to provide information necessary to quantitatively estimate angler preferences for summer flounder, scup, and black sea bass.

Some of the specific topics that the survey tries to understand, includes the value of keeping or releasing additional fish caught once the bag limit has been reached, so what is the value assigned to an additional summer flounder caught or black sea bass. It helps to understand what role minimum size may play in fish value, such as what is the value of an 18-inch black sea bass compared to a 15-inch black sea bass, and what are the angler tradeoffs among these species, such as what is the value of keeping the summer flounder compared to keeping a black sea bass or scup.

Additionally, the survey will help to tell how angler behavior will change under different regulatory scenarios among summer flounder, scup and black sea bass. This data will be able to feed directly into that REDM model that I described earlier, which currently uses the 2010 survey data.

However, the data collected doesn't need to go into a model directly, but can be used to infer things from other models, such as the RFDM model, which is the other model I presented. Overall, this survey will provide a lot of different information surrounding these fisheries, including tradeoffs between species, and that's currently not

accounted for in our current measure setting process.

As a note, work has been underway on the survey since 2019, including several focus groups in which key facts was collected to ensure consistent interpretation of survey questions, and to make sure that questions were realistic and straightforward, in order to evaluate angler tradeoffs amongst species. I know that we covered a lot of information today, so I want to thank everybody for their patience.

But before I get to the question slide, I just want to highlight two main discussion points. We're not looking for any major decisions today, but we are hoping to receive some input on the revised timeline presented, as well as any further guidance that Council and Board members want to provide on the development of the options presented today, before we prepare the document for your approval for public comment. With that, the staff are ready to take any questions that members may have, and we thank you for your time.

CHAIR KELIHER: Great, thank you very much. I would like to thank Dustin, Julia and Savannah for these presentations. There is a lot of information there, so why don't I open up the discussions. Does anybody have any questions for staff? The first hand is Tom Fote.

MR. THOMAS P. FOTE: There was a lot of great information there, and put through pretty fast. They spoke as fast as I usually do. People say they have a hard time understanding because it's done so fast. But I was thinking, if we're going to send out a survey like that to 4,000 individuals, before the people complete the survey and the questionnaire. Is there going to be a page they can go to, to see a video and a presentation like we just got here, so they have a better understanding of what we're asking them? I mean we hand out surveys to 4,000 people randomly, and we don't know how much they're involved in the process of the questions, or really understand. Without doing something like that it's very hard. I mean my background is not fisheries, my degrees are in marketing and advertising. We always wanted to make sure people understand the message you are putting out.

CHAIR KELIHER: Next hand is Kate Wilke.

MS. LEWIS: Mr. Chair. May I have a moment to respond to Tom's question, just to clarify, if that's all right.

CHAIR KELIHER: Sure, go right ahead.

MS. LEWIS: Tom, just to clarify a bit on that. It's not actually our group that is going to be doing the survey, so the survey that I described is actually already being conducted by the Northeast Fishery Science Center, so it's an ongoing survey that was already planned, that it just kind of works out really well with our timeline that the survey will be conducted and completed at a great time for us to really utilize it. It's more of the Northeast Fishery Science Center's survey, and it's not something that we're going to be sending out.

CHAIR KELIHER: Thank you for that. We've got two more hands up. I've got Kate Wilke and then Michelle Duval.

MS. KATE WILKE: I have a question about Option B, the percent change approach. Maybe if you could bring up the slide that has the table on it. Number 17, they are nicely numbered. Oh no, that's not the right number. Option B. Yes, my question is, so in the upper left column there is a comparison of the future RHL versus the MRIP estimate.

I assume the MRIP estimate is another way of saying catch. This method compares the average catch from the previous year's towards the confidence interval, with the average RHL for the upcoming two years. I'm just wondering why the offset in the timing. Why doesn't the method compare the catch from the previous two years with the RHL that was specified for those years?

Yes, and I might have a follow up, depending on the answer. Thanks.

MR. COLSON LEANING: Mr. Chair, this is Dustin, I can take this.

CHAIR KELIHER: Yes, please do, Dustin. Thank you.

MR. COLSON LEANING: Yes, so our current process takes into account recent MRIP harvest. Actually, when doing the MRIP landings comparison to the RHL, you typically use the landings rather than catch value. But just sticking to your question specifically. Like under the current process you use recent years of landings, sometimes like a few years, sometimes MRIP projections for the current year, and then compare it to the next year's RHL. This process that's outlined in Option B is very similar, except that it establishes the two-year timeframe. Let's say this year we're in 2021, and we're trying to determine measures for '22 and '23. We would look at 2019 and 2020 landings, find the average estimate and the confidence interval for that, and compare it to the recreational harvest limit for 2022 and 2023, the average of those. That would help us determine what the appropriate measures are, if the landings value is well or the RHL is well within the confidence interval of the landings estimate. Maybe that's indicative that we should keep measures at status quo.

That's all well and good, but let's say the RHL for the upcoming two years is much higher. Then maybe that's indicating that we can liberalize some. It's a very similar system that we already have in place, but it just establishes that two-year timeline, to fall in line with the assessment cycle. That is on a three-year cycle currently.

MS. WILKE: Okay, thanks for that clarification. I guess I was just slightly worried or wondering. Like if there is no looking back to see how you did, only looking forward to estimate how you should set measures, then I'm thinking in terms of like a feedback loop with the stock assessment.

If you keep exceeding limits, then a high amount of recreational catch goes into the stock assessment, which thereby increases the estimate of the biomass, and ultimately increases the upcoming year's ABC. I don't know, maybe I'm getting it too far into the weeds, and if it's better to talk offline we can do that too, if you're not following what I'm asking.

MR. COLSON LEANING: No, I think I am, and it's a good question. We definitely wanted to think through these situations. I think what you're talking about when it comes to like overages or whether we're able to react in time, the changing biomass. That really comes into play when we're looking at accountability measures.

You know if there is a payback that's needed, that payback is tacked on to future years RHL. When you are doing the comparison of recent MRIP harvest to the future of RHL, you're incorporating that payback, so like the necessary reductions would kind of be factored in that way. Does that make sense?

MS. WILKE: Okay, yes, yes that helps, thanks, Dustin.

CHAIR KELIHER: Okay, let's move right along to the next folks with hands up. I've got Michelle Duval and then Erika Burgess. Michelle.

DR. MICHELLE DUVAL: A huge thanks to the FMAT and PDT for all of the hard work that they've been putting in on this. I know that everyone has been really focused on really defining the bins or the steps for each of these approaches so far, and hasn't had time to consider how measures would be developed and what are the next steps.

My question is, so Dr. Paul Rego, who is the Chair of the Mid-Atlantic Council's SSC, had developed a little ensample analysis after we talked about this, I think at the Council's June meeting, evaluating the risk of applying a Harvest Control Rule, sort of when you get to the edges of each of those bins or steps.

I think mainly that there is a higher risk when you're at a transition point between those steps, that they particularly as the population status decreases. You know my question is, is this something that the models that were reviewed can help address, and if not, I do think that we need to find a way to do this as the FMAT and PDT think about how to set those measures. I think it's important to incorporate, or to at least address this analysis of risk that Dr. Rego put forward. Again, is that something that you guys think the models could address?

CHAIR KELIHER: Anybody on staff willing to take that one?

MS. LEWIS: I can take that, this is Savannah. We are still working through the measure setting process, and so the paper is something that we will consider moving forward. I will say that there have been some discussions about how when we were trying to determine what measures would be appropriate, and what kind of our starting point would be in each bin, to try to set measures around.

That we do want to make clear that there is some uncertainty associated with that. We can make sure of that whenever we're trying to set measures that we feel pretty confident that they'll fall within that range. But that is something that we are going to consider, and it's part of the work that we do anticipate doing here in the near future.

CHAIR KELIHER: Are you all set, Michelle?

DR. DUVAL: Yes, Mr. Chair, thanks for now. I might have some follow up after, depending on questions that other Board and Council members ask. Thank you.

CHAIR KELIHER: Great, thank you. I've got two more. I've got Erika Burgess and then Eric Reid.

MS. ERIKA BURGESS: Thanks to staff for putting together a great presentation. I can tell you've put a lot of work into this, and to see it develop from where you were before to now is very impressive. I like how it was laid out today, and the graphics and figures really help me understand and compare the different options better.

If we could go to Option B. I have some questions. I don't mean to get in the weeds too much, but given the next step is public hearings, I want to be prepared to discuss things with the public, and I have questions about this particular one. I think you have put together options here that are really responsive to what we've been hearing from the recreational fishery at large, a way to provide a transparent process for setting regulations and understanding where we're going.

But one challenge I still have, and I raised this the last time we talked is, what does a percent liberalization for recreational fishing regulations mean? Can staff provide an example? Not to say, give a theoretical example for bluefish or scup, but just what does a percent liberalization regulation mean?

CHAIR KELIHER: Staff, do you have a response?

MR. COLSON LEANING: Yes, I was trying to think about that. You're saying, what does the liberalization meet? I'm not sure if I'm hearing you correctly.

MS. BURGESS: Percent liberalization, so we set regulations for fishing with bag limit, size limit, seasons et cetera. What does a 40 percent change or 20 percent change? Go to that table, it might be helpful. If you're in the situation you have 40 percent liberalization, 20 percent liberalization, 10 percent. What does that look like?

MR. COLSON LEANING: Got you. Okay, yes thanks that's helpful. Under the current process that we have, the Technical Committee and the Monitoring Committee meet together and perform analyses, looking at basically what harvest has been in recent years, and if something is being considered like a change in bag limit.

There is analysis that is conducted to look at like the frequency of anglers who catch different amounts of fish. Let's say anglers are encountering 10 fish, but are limited by a 4-fish bag limit. If you were to increase the bag limit to let's, say 6 fish, then there would be like an X percent increase in harvest expected.

There are also evaluations that are done for like frequency distributions that we're looking at minimum size, changes, and then there is seasonal analyses that can be conducted, all of which are really pulled from MRIP data. There is inherent in that process a lot of uncertainty and variability, and so that's factored in as well through the different statistical methods.

It's a process that's already kind of used by the Monitoring Committee and the Technical Committee under the traditional kind of response that's been given. It's kind of, based on these analyses we expect that these new measures will result in a 20 percent liberalization, 40 percent liberalization and so on.

That's one way that it could be handled. The other way is you know really using these statistical models at the peer review, to help inform what a 40 percent liberalization would look like. Really from there you would probably set like a catch level or a landings level that you're hoping to achieve, and then what sets of measures are reasonably expected to achieve that level of catch or harvest.

This all being said, you know there has been some like retrospective look at how well this has performed, the traditional method, and it's maybe not as precise as what we would have hoped. In some cases, you may see like a 60 percent increase in harvest without even changing the measures, or you change the measures and you see no change in harvest.

It's a challenging process, but that is basically the crux at what this whole management action is trying to address, helping us to better target changing levels of biomass, changing catch levels and how do we do that? I think the statistical models are a real improvement in that direction, and the FSD kind of said some support for that, some language to that effect, given adjustments to those models and further refinement.

CHAIR KELIHER: Great, thanks, Dustin. We're going to move right down the list. I've got Eric Reid.

MR. ERIC REID: My question is about the SSC and the modeling. It said the SSB reviewed the models. Is that the full SSC, or was that the peer review subgroup?

MR. COLSON LEANING: Good catch there, Eric. I used the word SSC there. It was a subgroup of the SSC.

MR. REID: Was it three people from the SSC or something like that?

MR. COLSON LEANING: I believe it was four, correct me if I'm wrong, other staff.

MR. REID: Three or four that's fine. Later on in the presentation it was mentioned that the SSC, which I wasn't clear on what that was. They were going to be able to review the changes that were made on those models. Then in the presentation about the timeline the SSC was mentioned again. My question would be, one, is that going to be a full SSC with the economists and the whole lot of them that are going to review this, and will that be before we send this document out to the public, or sometime later on in the timeline?

MS. LEWIS: Mr. Chair, this is Savannah. I'll. Take that one. Thanks for the question, Eric. I apologize for any confusion. The SSC that reviewed this was a subgroup of the SSC, as Dustin clarified, with three individuals that contributed to the report. Right now, we don't have anything set up for the SSC Subgroup to review things again. They've provided their recommendations and have left it up to the PDT and FMAT to ensure that those revisions are made, and that we fall in line with the

recommendations that they have before we present these for management use.

MR. REID: Okay, so yes, you did mention that the SSC was going to review these things, but I needed the clarification on what that was going to look like, so they're not going to get another look at it. I would be concerned that they're not going to get another look at this before this is ready for primetime.

CHAIR KELIHER: Next on my list is Dewey Hemilright.

MR. DEWEY HEMILRIGHT: I appreciate and thank everybody for this in-depth presentation. There is a lot to wrap around here. One thing in particular I noticed throughout the presentations, there was the word if and could. I was wondering if this gets Bubba developed. Would they be changed to a shall and known, to create a lot of the – it's not wiggle room – but a lot of the ambiguity of how is it going to work?

Also, I expect the public is going to have a lot of questions about, you know the ifs and the coulds, because in my world of fishing, if and could don't really exist, it's shall and known, and it's more of I would like to see the outcome. I know in the inner workings here of this getting developed, maybe that's how it kind of works out. But there needs to be a template that is to me a lot clearer, and also would be in favor of the full SSC getting this before it went out for public consumption, because I don't know if the due diligence has been done to the point of development of this, for it to go out to the public. My last question would be, could we use this template to be the same use for the commercial industry as fishing up and down the biomass?

CHAIR KELIHER: Staff.

MR. BEATY: Hi, this is Julia. I'll take a first stab at that and maybe Savannah or Dustin can jump in if I miss some things. I guess in general with like the if and shall language. When we get down to the point where we're finalizing the language that will be used in the final addendum and the final framework, and the federal regulations. We are really careful about the language that we use for that.

I know some of that comes into play with the accountability measures, for example. There are some `coulds' built in there, you know along the same lines for situations where biomass is above the target, for example, so there is more flexibility there but it's more strict. There are more `ifs' and `shalls' when biomass is not so great.

I guess without knowing what specific examples that you're thinking of, that just to say that when this is like final, final week we'll be very careful about what language we use. Related to the SSC review. I just wanted to point out that on the Council side of things we don't normally have the SSC review framework actions, and we did have a subgroup of them review two recreational fishing models that could be used under the current process.

Even if this framework and the Addendum doesn't move forward, we could still use those models, and we cut that review and really focused on the models and not on the options that are in this action. But we are planning to have the Technical and Monitoring Committees weigh in on these options.

They will provide very valuable input, based on their technical expertise, and also they seem really knowledgeable about how the measures process actually works, in terms of the realities of setting recreational management. I think that will be a very important thing to get the Technical and Monitoring Committee input on that.

I guess the short answer for this is being concerned for the commercial fishery, I mean the answer is you've probably heard like almost everything and you heard the answer would be no, and that this is focused on the recreational fishery due to inherent differences, and the data that we have and our ability to manage the fishery in different ways. I

don't know if any other staff want to add in on any of that, or if there is a question that I missed, I'm happy to try again.

MR. HEMILRIGHT: One more question, please.

CHAIR KELIHER: Go ahead, Dewey.

MR. HEMILRIGHT: It was could the commercial industry be managed the same way of fishing the stock up and down, according to the methodology here. I understand that this is a recreational initiative, is what it's been called. But I am curious, could that be the same way, because it would probably help us be able to achieve the same parity appears like maybe. That was my question, could that be possible?

MS. BEATY: I think I might need more clarity on which specific methodology. In regards to the accountability measures, the same types of things, at least in terms of the current accountability measures where it is more strict when biomass is lower than when it's higher.

That is already part of the commercial accountability measures, when it comes to discard overages, but not on some of the landing's overages. It gets back to the different data that we have and the confidence that we have in that data. But if you're talking about a different methodology besides that, then I might need more clarity on that.

CHAIR KELIHER: It sounds like because Dewey is going in the direction of kind of the what if son using for the commercial sector. It might be a better conversation to take off line. I've got several more hands coming up, so is there any more specific part to your question, Dewey, you want addressed?

MR. HEMILRIGHT: That will be fine, thank you.

CHAIR KELIHER: Thank you, appreciate that. I've got three more hands up, David Stormer, Rick Bellavance and then back to Kate Wilke. David.

MR. DAVID STORMER: Thanks so much for the presentation, really amazing effort all around, and a lot of great information. I just was wanting to clarify, and I think I got it, but I thought maybe I mistakenly heard a couple of plans for species that are overfished, like bluefish. An overfished species would be subject to the Harvest Control Rule upon implementation of a rebuilding plan, just placed in the most restrictive bin? Is that correct?

MS. BEATY: This is Julia, I'll take that one too. Kind of, but it really says the most restrictive bin is just what you use until the rebuilding plan is all the way implemented, and then the rebuilding plan decides what the measures are. It's kind of saying that once the rebuilding plan is implemented then the Harvest Control Rule is not used.

It could be used temporarily until the rebuilding plan is fully developed and all the way implemented. Then once it gets out of the rebuilding plan, then the Harvest Control Rule could be used. While it's in the rebuilding plan there would be nothing like these binned approaches or options in here. It's totally up to the rebuilding plan what the measures would be.

MR. STORMER: Okay, okay, thanks. A follow up if I could.

CHAIR KELIHER: Go ahead.

MR. STORMER: But angler input wouldn't be considered until an overfished species is out of a rebuilding plan, thus not included in the recreational economic model until it's out of a rebuilding plan. Is that right?

MS. LEWIS: Mr. Chair, I'll take this one. That's a good question, David. Right now, we're collecting data on summer flounder, scup, and black sea bass through that survey. We'll be using data that they provide. We really haven't settled on a final path, and rebuilding plan you traditionally take into consideration angler input.

The one instance here is bluefish, in which we don't really have a survey, so we would have to do extra

angler workshops. Again, the survey is not the only way, it just lined up well with our timeline. We are looking for angler input at all stages right now, and then if we did need to transition into a rebuilding plan for any of these species, additional angler input would be taken at that time.

MR. STORMER: Got you, great, thank you so much.

CHAIR KELIHER: Rick Bellavance.

MR. RICK BELLAVANCE: Hats off to the staff for a really good presentation with a tremendous amount of information. It was very helpful to me. I did have a question. If I understood it right, I think the PDT/FMAT recommendation is to not include any example fishery measures in the document before it goes out to the public. Did I understand that right? Then if I could have a follow up.

MS. LEWIS: Yes, we did determine that we do not want to include, we're recommending against including example measures in the Draft Addendum, because we really want to make sure that it's understood that these are kind of two separate action. The Draft Addendum and Framework really focuses on the methodology and the mechanism of how this works. We would like to focus on what metrics are important to stakeholders when we're considering setting measures.

Then the flip side of that is going to be recreational measure setting. That's where the models, the Advisory Panel input Monitoring Committee, Technical Committee, all of those things come into play more on that side. That's where we wanted to do that to retain some flexibility to update our measure setting process, as we get more data in, and as our models continue to grow and update, and as the fishery changes as well.

MR. BELLAVANCE: Okay, thanks, and if I could follow up with one more quick question, Mr. Chairman.

CHAIR KELIHER: Sure, yes, go ahead, Rick.

MR. BELLAVANCE: I guess I feel like there might be some stakeholders that would probably kind of connect the two together, and would benefit from seeing example measures. But I can kind of understand the teams thinking there. I'm wondering if it would be possible to maybe include like the current measures.

We've had the current recreational measures for some of these stocks anyway for quite a while now, and if it's possible to maybe insert those particular measures into where that would fit on the different alternatives. If that is something that would be possible, to give folks a sense of kind of where we are now and then where the potentials are for us to go here, you know as the stocks increase or needs more conservation. Is that something that could be considered for the public to look at?

MS. BEATY: We've kind of done that in looking at, I put the slide up on the screen here for the biomass-based matrix. We did look at kind of look at kind of where stocks are right now, but we don't really have a starting point for these, so it's really hard to tell what measures would be, and how we would start and set things.

But we can kind of get an idea based on current stock status where things may be, but again, because this is still under development, we don't want to create a situation in which we mislead the public in any way, because we don't want to say one thing when we're presenting this draft, and then something else come out during the measure-setting process.

If there is a strong desire to have something included, we might be able to add it as an appendix. But we just really want to prevent confusion, and really focus on getting feedback on what metrics and what methodology the public would like us to

use when considering recreational measures for the species.

CHAIR KELIHER: I've got two hands left up, and I'm conscious of the time here. We're running a bit over. I've got a bunch of Commission business left, so we could try to keep our questions short and answers condensed, and then we'll move along. I've got back to Kate Wilke then Michelle Duval and then Ellen Bolen.

MS. WILKE: I don't know if we're still just in a question period of if we've moved into discussion. But I guess I can phrase mine as a question. On Slide 19, it says that the PDT and FMAT are still discussing details, including the role of the ACL or the RHL. I'm curious, what does that mean? What does the ongoing discussion entail? I guess depending on the results of how those conversations come out.

I mean I followed this process really quickly, and so if ACLs are going to be treated differently or employed differently than they have been in the past, it seems like that might be a big departure from how we would normally manage. In which case, SSC review may be warranted. I know Julia just said that the SSC usually doesn't weigh in on framework.

But it's kind of a lot in one framework, and depending on how those conversations turn out, I'm just thinking it may require some SSC review. Then there is a fairness component among sectors, depending on the outcomes of those ongoing discussions as well. If staff has any insight or more detailed explanation about what does that mean, I would appreciate it.

MS. BEATY: This is Julia, I'll start off. Sorry because I think that there is not much more to say at this point, beyond what we said in the presentation. It says on this slide that we're going to add measures that will aim for the level of harvest as appropriate for stock status, or stock conditions associated with each bin. The ACL and the RHL are already reflective of stock status, you know based on the best information available at the time that we set them, so if they couldn't set based on the ACL or the RHL, if it's a different way. We haven't worked through this discussion yet at the FMAT and PDT about how we will actually go about doing this. These are really important conversations that we will continue to have. But as we also noted on a different slide that we are required to have ACLs under the Magnuson Act. We're still going to have an ACL, we just haven't worked out the details of how does the ACL and or the RHL relate to the measures, specifically under the options where there are bins.

Under the current process our measures are really closely tied to the RHL. We predict that the measures will have a level of harvest, and we try to match it up so that level of harvest does not exceed the RHL. That's really closely tied into the current process, but if we move more to the binned approach, there are still conversations that we need to have about how exactly does the RHL or the ACL play into that.

CHAIR KELIHER: Next on my list is Ellen Bolen. I'm sorry, Shanna Madsen.

MS. SHANNA MADSEN: I actually had a question. I don't know if we're moving into comment section. My question kind of goes back to what David was discussing earlier, in that I was curious, Julia, during your part of the presentation you were discussing what would happen if we had a stock that was going to be in a rebuilding plan. Essentially, we have two years in order to get that stock into its rebuilding plan.

During that time, it sounds like that stock would be in like a really restrictive bin under some of these options. I guess my question sort of is related to while we're kind of in the pre-rebuilding plan, and knowing that that's what we're going to be shifting over to, is this restricted bin a bin that could only be reached by being in pre-rebuilding, I guess I'm calling it, or is it a bin that could be reached by other means?

MS. LEWIS: I'll take this one. When we were designing a lot of these options with the rebuilding

plan, taking into consideration stock that might be in a rebuilding. We were kind of trying to create, kind of almost a safety net. It's a catch-all to where we can put the stock until it moves to the rebuilding plan process. We didn't want to have the opportunity for a stock to remain in any bin that might lead to additional harm to the stock, so we tried to create kind of a catch place for stocks to go while that rebuilding plan was being constructed.

As Julia kind of explained, once the stock is in a rebuilding plan it gets pulled out of this Harvest Control Rule mechanism, and is strictly under the rebuilding plan until a time we think that it's going back. Until it's declared rebuilt and they can move back into the Harvest Control Rule. It's more of just a safety net as a place for stocks to go once they've hit that point. I hope that that kind of provides a little more clarity.

MS. MADSEN: Yes, I think it does. A quick follow up if you don't mind, Mr. Chair.

CHAIR KELIHER: No, that's fine, go ahead.

MS. MADSEN: It sounds like then in that case there is really no other way for a stock to fall into this more restrictive bin, other than sort of being in this pre-rebuilding zone.

MS. LEWIS: Technically, yes. If a stock, for example with the fisheries score, if it does end up in that lowest bin, based on a couple metrics combined. Then I think it would be pretty indicative that the stock is going to need to be in a pre-rebuilding plan. Those bins are worst case scenario bins.

There is kind of two ways they could get there, either it's overfished and it's put into that bin, or there is some sort of combination of metrics that is placed in that bin. That's kind of another way that this Harvest Control Rule mechanism can serve to really help provide more reactive management that we can see while the stock is not doing great, maybe we should consider looking into the rebuilding process.

CHAIR KELIHER: Great, thank you. We've kind of merged out of questions and there were kind of questions and comments section. Again, cognizant of time, but I do have four hands that are up. I think I owe Michelle Duval an apology. I think I skipped over Michelle, so I've got Michelle, Dan Farnham, Adam Nowalsky and Mike Pentony.

DR. DUVAL: No apologies necessary. I'll just be brief. I'll just note that I support the modification to the timeline that the PDT and FMAT have put forward. I thought this was an ambitious timeline to begin with, and this represents a pretty, potentially a huge shift in a management approach. I think it's important to get it right.

I also think it's going to be important to include in the draft addendum and framework some discussion of the survey that the Science Center is putting together to evaluate, you know those tradeoffs among angler preferences, so that there is some understanding and aware of that. I think there was some public comment on that.

Then I also would encourage reaching out to Dr. Rego about that uncertainty analysis that he provided back in June as the FMAT and PDT start to get into how to set management measures, because I think that risk could be transitioned from one bin to another, it's going to be really important.

Then I think the last thing, Mr. Chair, that I'll just throw out there is that, you know I mentioned this the last time we talked. But I didn't see any mention in the draft of being able to justify this to one stock, and I think I expressed some concern about that before. I would just encourage everyone to think about that, about just being able to apply a Harvest Control Rule to one stock before moving to such a wholesale change in management across all four stocks. I would recommend black sea bass, so thank you, Mr. Chair, I'm done.

CHAIR KELIHER: Thank you, Michelle. We're going to keep moving along on the list. Dan Farnham is next.

MR. DAN FARNHAM: I'm just going to make a brief comment. You know I know we're doing this through an amendment process on the Council level. But in the beginning I think it was kind of debatable whether or not we should go forward with an amendment or a framework. I think we shed some of the items off the agenda so we could make it frame-workable. But I'm still a little worried about, not the timeline, but just the magnitude of what we're doing here. I hate the thought that maybe we're rushing it. I agree that we should go forward with it. I'm pretty excited about all the different options here, and that something should be done with recreational reform. But I think Eric Reid hit the nail on the head there before. We really should reach out. I know we don't usually have an SSC review for a framework on the Council level, but maybe in this instance we might want to consider asking for that, due to the magnitude of this action.

CHAIR KELIHER: Great, thanks, Dan, those are good comments. I'm going to keep moving down the list. Next is Adam Nowalsky.

MR. ADAM NOWALSKY: I thank the FMAT and PDT for putting this presentation together, having had the pleasure of working with a lot of them over the last few months. I think the consolidation of information today was exceptional and (faded out) as well. Two questions at this point. One is, where does this leave us with 2022?

One of the purposes for this action was to try to address some concerns that we had regarding specifications that we're going to be setting jointly with the species board then the Council in just a couple of months. If the goal was to make progress and implement this, if we revise this timeline where does that leave us?

The second question would be building on Michelle Duval's comments. This was an action that initiated with a species board. Dr. Duval has suggested a limited approach. We've talked a lot about what we would do with bluefish here, potentially rebuilding species may or may not use elements of one or more of these options, particularly depending on which one we choose.

We know that the species throughout the years there are different fisheries management plans between bluefish and the other species. Are there benefits that there could be tweaks to this? We recognize that the modeling work that's ongoing for specification setting, bluefish is the farthest behind in both of those models. I understand they are on efficiencies, particularly from the staff perspective of trying to wrap this up from all four species at once.

But I would ask today, Mr. Chairman, is this the time to have the discussion about whether it's time to split this action directed to one of the species boards, following with Dr. Duval's comments it would seem the summer flounder, scup, and black sea bass might be the right place for it. Keeping an eye with what's going on with bluefish using the data, using the analyses, but is today the time to have that conversation, and again what does this imply for 2022 if we accept the delay as recommended?

CHAIR KELIHER: Thanks, Adam, for that. That question is obviously the Policy Board has wrestled with that particular question before. I think what I would like to do, so we can continue to get any remaining questions and last final comments in, is allow for some of the additional comments and questions received, and then park that question until the very end, since it is a really a Policy Board conversation. Is that all right with you, Adam?

MR. NOWALSKY: I would defer to your best judgment, and I appreciate your willingness to consider that question today.

CHAIR KELIHER: Sounds good, Adam. Let's come back to that larger question for the Policy Board. I've got on the list now Mike Pentony, Ellen Bolen, and I think Shanna Madsen, I think you put your hand back up as well. Mr. Pentony.

MR. MICHAEL PENTONY: Thanks to the tech team and the PDT for all the work putting this together. I think a lot of progress has been made over the last several months, thinking back to April and June, and the infographics I thought were excellent, in terms of explaining the basic principles behind each of the alternatives.

I really appreciate, and commend everybody who worked on those. I think that's a really good tool as we move through this, to educate the public about the different policy options that we're considering. I think all of the options that are on the table today, you know with the exception of status quo, obviously, could help us have a potential to help us move forward in a productive way for how we can manage the recreational fishery more effectively, and more responsibly.

However, I do have some concerns with some of the AMs as they were presented here today, in the sense that you know trying to think through the different potential outcomes of the AMs the way they were described today, may not actually fix the problems that we're trying to address if we are overly reactive in some cases.

You know as I kind of understand the Harvest Control Rule system, it's sort of fundamentally designed to have a set of measures and apply those measures under the appropriate conditions, and not be going back and changing the measures, you know frequently. I think there are ways to set up some AMs that are responsive to what we really care about, which is overfishing.

Any activity on the recreational side that could contribute to or lead to or result in overfishing would be an issue to address quickly. I would just ask the PDT, and it's not a question for today, so it's sort of moving into comments. But suggest that the PDT take another look at those AMS, think through those a bit more. Make sure that they are constructed in a way that focuses on overfishing as the thing that would trigger a response, and ensure that the AMs aren't structured in a way that puts us right back in the situation we're in now, but in a more complicated way, because obviously it would be better to simplify measures, simplify our process, but also provide the recreational fishery with options and a process moving forward that's more predictable and more responsive to stock status.

CHAIR KELIHER: I think your raised concerns about the AM have been noted, and the PDT can address those the next time they're back together. I appreciate the information. Let's move right along to Ellen Bolen and Shanna Madsen. Ellen.

MS. ELLEN BOLEN: Like everyone else, really appreciate and recognize all of the really hard work that staff put in on this. This is a pretty big issue and possibly a pretty big shift for both how the Council and ASMFC manage pretty critical stocks for the region. I know that you wanted to park the question about what's in and what's out, so that's why I raised my hand. I wanted to echo what Michelle Duval said, which I think is worth considering how we put this forward, for a couple of different reasons. One, the volume of the information we have will have, and will have in the Public Information Document, I'm concerned that what is going to happen with this is going to be similar to the feedback we have had around the commercial/recreational reallocation, which is people see a lot of information, it feels like too big of a change, and they go to status quo.

That's what they fall back on, and so it's hard to get meaningful public input, because it's overwhelming. I mean we are grappling with what this looks like on the water and what it would mean. I want to really think about how we're going to get meaningful input from the public. I think one of the options could be, building off of what Dr. Duval's point was is we have a couple different options for vehicles to move this.

We have framework and we have amendments, talking about the Council side. I think one of the

sweet spots to do this would be we could advance black sea bass under a framework, that would be a smoother process, would move faster. That stock is healthy, it's doing well. Then if we wanted to do all of the rest of them, then I think we should move it through an amendment process.

I think given the volume of information, the changes of how we're going to management, I think that would merit more of an amendment-based process. I think that is how we could split it up. But I think we need to give a lot of thought to how we're going to get meaningful public input on this, because right now it's a lot of information, and I think splitting up the species could be a way to do that.

CHAIR KELIHER: Yes, that certainly goes beyond the question that Adam brought up. I think it's the delay in timing and the additional work that it would take moving from one process to another, is something I think we're going to have to wrestle with. It's a bar conversation, maybe late in the day to start it.

But something we may continue offline, and then bring it back to one of our next meetings. Let's continue to chew on that and then circle back. Last person on my list is Shanna Madsen, and then I want to go back to the question Adam raised, and potentially have it bleed-into what Ellen has raised. Shanna.

MS. MADSEN: I guess I just want to start off with some light comments. I first just want to say that the PDT and FMAT has done an absolutely amazing job on this. It's a lot of work, and I really just want to give them a good shout out for everything that they've done. I want to say that I think that Table 1 is incredibly helpful for moving this along. As I was reading through all of the different options, the first thing I thought was, oh gosh, I just love to have something that compared all of them in a meaningful way. I think this does that.

I think making that really understandable to the public when this goes out, would be really useful, so I would encourage them to kind of think about how to frame this in a way that's public friendly. I think it's easy for some of us managers to understand. It might be a lot for the public to chew on. But I do think comparing all of the options is an incredibly useful tool. I would also like to echo Mr. Pentony's comments regarding these infographics, they are absolutely wonderful, and I think they really help to illustrate what each one of these actions does. To follow up on those comments, I just wanted to say that I agree with Dr. Duval's comments, and my colleague in Virginia, Ellen Bolen's comments, regarding thinking about the question on whether or not this should go forward with all four of these species, or whether we can think about doing this for something such as black sea bass, to really see how this works before we apply this across the board. It is a fundamental change in the way that we do things, and I think that bears a lot of consideration. I won't stress that point any longer, but thank you very much.

CHAIR KELIHER: Thank you for those comments, Shanna. There is definitely a lot to chew on here, and I would want to echo everybody's thanks to the staff. There is a lot of work that has gone into this, and obviously this is meant to be an update, and there is a lot more work that needs to go into this going forward. Before I shift to Adam's question, I just want to make sure that staff has what they need, as far as moving forward with next steps.

MS. LEWIS: I do think we have what we need. We just wanted to provide an update and make sure that there were no large red flags that were raised in any of the options as presented. We will continue work on those options, as well as for the accountability measures that have been discussed and a few other options, that we have some good news, so I think we're in a good spot.

CHAIR KELIHER: Okay that's great, thank you. With that, I do want to circle back to Adam Nowalsky's comment or question in regards to the Commission, and whether it remains the prerogative of the Policy Board or the work of the Policy Board to continue

on with recreational reform, or whether this should be remanded back to a species board.

There are a couple things at play here. I have talked to staff about that. Some real staff concerns have been raised if it does become a species board issue. If the bluefish issue is parked, because we're in a rebuilding mode, we then have the issue of the states to the north and the south that will not be at the table, as recreational reform continues, because they are not on the Black Sea Bass Board.

There are a few hurdles to that. The determination was made early on that this would be a policy board discussion, but I guess what I would ask for from the Commission's Policy Board perspective. I don't think we can resolve this issue today at this late hour, but is there a desire by other members of the Policy Board to revisit this issue? If there is, if I could have a couple hands. Tom Fote.

MR. FOTE: Yes, I just raised my hand to say you should revisit this issue, and that's why I raised my hand. I thought that's what you asked.

CHAIR KELIHER: Yes. Thank you. Adam, your hand is up.

MR. NOWALSKY: Just briefly, I appreciate you giving the time to this. I don't see the actions that we're taking here as the complete recreational reform package. Recreational reform is significantly more than what we have here. We trimmed things down to this. I almost feel like the process we're at right now should be renamed recreational specification setting, because that's really what we're focused on right now. I would heartily endorse the Policy Board remaining part of the broader aspect of recreational reform, including getting updates on what we do for these changes to the rec spec setting process, and certainly as we circle back to the other recreational reform issues, I certainly think there is a place for the Policy Board to be the decision making at those items. But again, given what we're focused on right now, which is these are options that focus on rec spec setting. I will remain confident that we would be most efficient at employing them at a species level, and this will occur particularly for species that need it.

CHAIR KELIHER: I don't have any other hands that are being raised on this particular issue, so unless I am taking this incorrectly, I'm assuming that there is no burning desire to split this right now and have this go back to the species board, remain at the Policy Board. What I'm going to do is just we'll make a determination that we will continue on as we have in the past, and then maybe ask at a future Policy Board meeting that this issue is revisited.

It's worth some time. To reiterate some of Adam's concerns, the size and scope of what is being discussed here, it deserves some check-ins from the Policy Board as we continue on with this. I think the next Policy Board meeting, the new incoming Chair may want to readdress this. With that I'm going to make the determination to just move on. With that, unless staff has anything they would like to end with, I'm going to move on with the agenda. Hearing none, Mike Luisi, do you have one final comment from a Council standpoint?

MR. MICHAEL LUISI: I would just thank the Council folks, just basically for their discussion, and yes there were a lot of good thoughts, a lot of good questions. I'll look forward to seeing the revised version of this initiative with the model development. The one thing I will bring up, just to put in everyone's mind.

The comment made regarding doing this for one species, and seeing how it works before we try it out with others. There could be some problems with that, and this gets to Adam's point about what to do in 2022. Well, we'll be in the same position in 2023, unless we apply this initiative to the three species excluding bluefish.

We'll find ourselves in a position where we would have to use more of the status quo approach for summer flounder and scup. Just something to think about as we move forward. The status quo I don't

think is anything we want to use right now. I'll just put that on everyone's radar for the follow up discussion at another time. But thanks everybody, and Pat, I'll turn it back to you to continue with Commission's work, so the Council is off the hook and it's all you, Pat, thanks.

CHAIR KELIHER: Great, thank you, Mr. Chairman, so this concludes the joint meeting of the Policy Board and the Mid-Atlantic Council, and we're moving along now to Item Number 5 on the Policy Board agenda. With that said though, I am going to ask everybody's indulgence for a three-minute recess, let everybody grab a glass of water, whatever they need to do, and we'll return back to the table in three minutes. If staff could put a clock up that would be great.

(Whereupon a recess was taken.)

CHAIR KELIHER: Welcome back everybody to the ISFMP Policy Board meeting. Toni, are you back, Bob are you back?

EXECUTIVE DIRECTOR ROBERT E. BEAL: I'm here, Pat.

EXECUTIVE COMMITTEE REPORT

CHAIR KELIHER: All right, we're going to jump right back into the business of the Policy Board. Moving down the agenda list to Item Number 5, which is the Executive Committee report. Yesterday morning the Executive Committee met for a few hours to talk about several topics. I'm going to give an overview of all of those topics, and at the end of my update, if there are any questions, I would be happy to entertain them.

The first item on the list was the review and consideration of the approval of the FY 2021 audit. Spud Woodward is the Chair of the AOC Committee for the Commission. The AOC had reviewed in detail with Laura Leach and Bob Beal the audit. No issues were identified, and the Commission continues with its strong fiduciary responsibilities. The Executive Committee did accept the findings of the audit and approved the audit.

The AOC is also continuing to look at our investments. This is an issue that came up a few meetings ago. We had a presentation by Laura Leach, and as I say, the AOC is going to continue to look at the investments in our investment policies. They do have more work to do on this, and it's an area they will continue to look at and reporting back to the Executive Committee, and ultimately back to the Policy Board.

The other issue that was discussed was the draft policy on responding to FOIA request. Bob Beal brought this to leadership's attention a few months ago. We do get more and more requests for information. We occasionally get them structured as a FOIA request, but because we are neither a state agency nor a federal agency, we don't have any laws governing that particular type of request.

Bob put together a draft document that would lay out a process or it's really a guidance document for the Executive Committee to consider. There were a lot of comments, especially from state directors, as it pertains to specific laws within their states, to help bring some language forward that would strengthen that document.

Then the question that came at the end of that is, are we really looking at a guidance document, or should this be a policy? I think the majority of the Executive Committee were Colson Leaning in the direction of developing a final policy. Bob at that time said that he had enough to do a rewrite of the policy. It will be brought forward to the next Executive Committee meeting.

Once it is finalized it will be brought back to the Policy Board for a Policy Board vote for at the winter meeting. Next item on the agenda was the discussion of involvement in wind energy. Joe Cimino brought this forward. As you all know, we have had some presentations on wind development in the past. The Habitat Committee has looked into this in the past as well.

But it's certainly an area of growing concern for many fisheries agencies, vital in the Mid-Atlantic and now up into the Gulf of Maine. We're all engaged at various levels. While the Commission has held some meetings on offshore wind, we were asked once again to look at whether we should become more engaged. The comments that we received at the Executive Committee certainly bear out the fact that we do need to have more of a presence in the wind conversation. The issue of even hiring a new number of staff that would be focused solely on wind, to help with coordination and data was brought up. Nothing was decided, and there was going to be further discussion on this issue with the Executive Committee, but it's obviously likely to come back before the Policy Board for additional input.

The next item on the agenda was the discussion of the seafood processors pandemic response safety block grant program through the USDA. The USDA announced the block grants for both agricultural and seafood processing. Coastal states will receive money ranging in the many millions, which Alaska I think is in the high 20 or low 30 million, to just a few hundred thousand dollars.

There are many states who did not have direct contacts with the USDA, and it was felt that we needed to have a better approach to help with the coordination. At this time, it was determined that Bob Beal would reach out to the USDA to see if they would be willing to give a presentation to states that would like to participate, and an overview of the program to help give additional guidance on how to distribute the funds.

Currently eight states have raised their hand who would like to participate, I'm sure it will be more in the end. But Bob will, he's going to have to pull that together very quickly, due to the deadlines that are coming up. States will be hearing more about that in the very near future. There was also a discussion on the appeals process. Bob brought forward a document on the appeals process, and we had some additional input from Delaware.

The discussion of the appeals process, as you all know, has been ongoing ever since the black sea bass appeal by the state of New York. The Executive Committee did review the policies around the appeals process, and have asked staff to give some thoughts to possible areas where changes in the clarity could be made. We had very good discussion, but there were no final decisions, and Bob is going to take the input that he received at the meeting and we'll revise the draft for additional considerations at a future Executive Committee meeting.

Those changes again, will come back to the Policy Board for any adoption, if the changes need to be made. Then what we thought was going to be the last agenda item was Laura Leach bringing up the future annual meeting updates. She updated the Executive Committed on the annual meetings that are now scheduled.

We are going to remain in New Jersey for 2022, Beaufort, North Carolina in 2023, Maryland in '24, and Delaware in '25. After brief conversations around those annual meeting dates, the question was asked about this January's meeting. Laura said that we had to make a decision this week regarding the contract that had to be submitted to the Westin in Alexandria. After taking several comments from the Executive Committee, it was determined that we will in fact plan on meeting face-to-face for our winter meeting at the end of January.

It was determined that the winter meeting will be a hybrid, where Commission members and staff will meet together. However, the public portions will be done virtually, to help minimize any potential risk with COVID. The Executive Committee is going to continue to discuss the approach for the face-to-face meeting as it pertains to vaccinations and masking. That concludes my update, but I would ask the Policy Board if they do have, besides the issue of the January meeting, if there are any thoughts or any questions on any other items that

I've addressed. With that I will open the floor for questions or comments. I'm seeing no hands.

REVIEW THE MANAGEMENT SCIENCE COMMITTEE TASK TO ADDRESS THE CONSERVATION EQUIVALENCY CONCERNS

CHAIR KELIHER: Seeing no hands and no questions, then we are going to move right along with the agenda to Item Number 6, which is review the Management Science Committee Task to Address the Conservation Equivalency Concerns. Toni Kerns.

MS. KERNS: Mr. Chair, if I could ask a favor. Mike Pentony has a timing conflict, and wanted to see if he could do his agenda item before CE tasks. He won't take long, he said.

CHAIR KELIHER: I certainly have no objections, and if there are no objections from the members of the Policy Board, we'll move right along. Seeing no hands, Mike, why don't you go ahead?

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

MR. PENTONY: Thank you, Mr. Chairman, and yes, thanks too for accommodating my schedule. I've got a number of issues I've got to wrap up by four o'clock today, so I'm going to get back to that. I appreciate the opportunity to talk with the Policy Board today about an issue. This is really just intended to give everyone a heads up about an outreach process that we're going to be starting later this year.

For those of you who participate or sit on either the Mid-Atlantic or New England Fishery Management Councils, you've heard me already mention this, and both Councils will be getting a full presentation and explanation of the background and the process for this issue. We would be happy to give a similar presentation, more complete presentation to the Commission at the February meeting.

But I wanted to make everyone aware that we are over the next few months going to be conducting outreach on potential measures to reduce the incidental capture of sea turtles in the various east coast trawl fisheries. We're starting up a public process to seek information from the fishing industry, researchers and others about ways that under the authority of the Endangered Species Act.

We could take actions to aid in the protection and recovery of listed sea turtle populations, by reducing the incidental bycatch and mortality of sea turtles in our Northeast and Mid-Atlantic U.S. trawl fisheries. We do see that bycatch is one of the highest threats, if not the highest threats to sea turtles in our waters.

In the greater Atlantic region, the highest level of sea turtle trawl bycatch occurs in the Atlantic croaker, longfin squid, and summer flounder fisheries. Therefore, we are focusing our efforts on looking at those fisheries. We have been, as many of you may know, evaluating, researching and addressing bycatch of sea turtles in trawl gear since at least the late eighties, so this isn't new.

We have developed various bycatch estimates, implemented regulations in certain fisheries such as turtle excluder devices in shrimp and summer flounder trawls, and we've hosted workshops, not for a little while, but back in 2007 and 2010, with the fishing industry and other interested parties, which have led to many suggestions for potential future gear measures to mitigate that bycatch. Then based on a lot of the ideas of the workshops we've conducted, gear research toward bycatch and mortality reduction, the gear research that's been going on for over 20 years in these fisheries. One of the things that we're going to be doing as part of these presentations, and the outreach is really just reporting on the progress made, and the various different types of gear modifications, and gear work

that has been done to inform the public, inform the industry and the Councils and the Commission.

But then we're also going to be looking for some suggestions on next steps, in terms of modifications or changes that we might make in these fisheries, based on this research, based on the experiences we've had that could further mitigate and reduce the bycatch of sea turtles in these fisheries. As I said, we'll be providing a full briefing by actual experts in this issue, rather than just me, at the December Council meetings, and then we'll certainly be happy to give a full presentation at the next Commission meeting as well.

Then we'll be soliciting comments from the public over a period of several months, starting in December, probably through the April timeframe. That's all I have, Mr. Chairman, thank you for the time. I guess if there are any initial questions, I can try to take those, but I really just wanted to give people a heads up to look for at the next meeting, you know a more in-depth presentation of these issues.

CHAIR KELIHER: Great, thanks, Mike. I do really appreciate the heads up. I'm going to get these on the early side, it gives us a chance to start thinking about this. Any preliminary questions for Mike Pentony? Seeing no hands, Mike, you're off the hook. Thank you very much, appreciate the update.

MR. PENTONY: Thanks, Mr. Chairman, and thanks to Toni for the schedule change.

CHAIR KELIHER: Great, that brings us back on track with the agenda for Item Number 6, so Toni, you're up.

MS. KERNS: In your briefing materials you received a memo that was addressing some conservation equivalency issues. Several Boards and the Executive Committee have raised concerns regarding the Commission's use of conservation equivalency in different FMPs. The Executive Committee put together a workgroup of individuals from the Committee, to put together a list of tasks to have the Management and Science Committee look at to address some of the concerns that have been raised by the Executive Committee and various species boards regarding conservation equivalency.

As you all know, conservation equivalency is something that is defined within the ISFMP Charter. It is actions that are taken by states that are different from those of the FMP, but achieve the same level of conservation. The application of conservation equivalency is described in the Commission's Conservation Equivalency Policy and Technical Guidance Document.

This document has some general policy guidance, and there are both recommendations and requirements on CE. There are some specific recommendations on the types of information that has to be included in proposals from states. These include a rationale, data needs, how the FMP goals are met, plans for the state to monitor and evaluate the program. There are also some specific guidelines for proposal submission and review process. Then the CE Guidance Document also has guidance on what happens after there is a proposal that states should describe and evaluate the CE program through the compliance reports.

The Plan Review Team evaluates all CE programs during their FMP review. A program can be suspended if a state is not completing monitoring to evaluate the program, and the PRT provides annual reports to the Board. Based on the Executive Committee's guidance, we're going to review the Guidance Document, and bring forward proposed changes to the Guidance Document itself.

As part of that we've asked the Management and Science Committee to look at a couple of issues. I want just the Policy Board to see these tasks that are being described, hear from you all if you see if there are any additional tasks that you would want the Management and Science Committee to look at today.

First is to develop a better way to characterize and address uncertainty of CE proposals. For example, could we develop a buffer to account for uncertainty. When thinking about a buffer, should stock status be accounted for when establishing buffers? You could have tiers, steps, maybe control rule.

We don't want a buffer that is overly burdensome on the fringe states. The buffer could maybe apply differently to those states. We've asked them to develop a retrospective analysis, to see how well conservation equivalency performs, and included in that retrospective analysis to look at the coastwide measure for comparison.

Maybe this could help inform the buffer, and we would also want to consider harvest versus total removals if that is consistent with the fishery management plan. For species and measures that are harder to evaluate equivalency should CE be allowed at all? Some measures are non-quantifiable, should those types of proposals be able to go through?

Should there be bounds on CE programs or is anything allowed unless specifically excluded by the FMP or the management board? We've asked the Management and Science Committee to reevaluate data standards. Are there minimum data standards that a CE proposal should have? Is there a required level of review of the datasets used, if they are not within the bounds of the minimum data standards?

Should things that cannot be quantified be permitted under CE under the data standard? Should there be a time limit on conservation equivalency programs? Should we set a specific number of years? Should it be following an assessment cycle? Maybe there are other ways that the MSC comes up with.

Should stock status impact the ability to use conservation equivalency, if so, how? You know if a stock is declared overfished and overfishing is occurring, then should CE be reevaluated for that FMP? These are the tasks that we have given the MSC to start to consider. But I want to see if there are any additional tasks that the Policy Board wants to bring forward to the Management Science Committee.

CHAIR KELIHER: Great, thank you, Toni. I've got a quick hand from Shanna Madsen. Shanna, go ahead.

MS. MADSEN: Thank you, Toni, I think this is a really comprehensive list. I got to take a sneak peek at it through our MSC member, and I must say it's a really good step in the right direction. There is one thing that I was thinking of, and it might be that I had looked at an old guidance document, so please, correct me if I'm wrong.

When I was going through the Guidance Document, I noted that while there were some timelines for submitting a proposal, there wasn't timelines set on how long a TC or PDT would have to actually review this proposal. I'm kind of thinking back to some of my days on TCs. Sometimes we would be given a proposal and two days to read it before a meeting, or a day to read it before a meeting, or things like that.

I kind of wanted to see if there is a way to have the Management Science Committee sit and think about timelines for how long folks on the TC and PDT should have to actually have that proposal in hand, have the appropriate amount of time to review it, because I think it's really important that we depend on our TCs to provide that sort of scientific insight on the analysis that are associated with these conservation equivalency proposals.

MS. KERNS: I've got that, Shanna. It's not currently in the document. Right now, we pretty much always pass along proposals as soon as we get them from a state, so we're just bound by when the state gets it to use to pass it along to the Committee, for the most part. We'll put that in the list.

CHAIR KELIHER: Thanks. Roy Miller.

MR. ROY W. MILLER: What I didn't see on Toni's list was how to handle or how to review preexisting

conservation equivalency measures. As this topic came up yesterday, with regard to striped bass, some of the conservation equivalency measures have been in effect since, well let's say the early 1990s. Is there a sunset rule for these measures, or when should they be reevaluated? Is it with every benchmark stock assessment, that kind of thing?

MS. KERNS: For measures that don't have, like if we do end up putting in guidelines for how long a plan should be in place for measures that are already there that are not being evaluated, or don't have a sunset clause. Should they get one or how to approach those.

MR. MILLER: Yes, that's the idea.

CHAIR KELIHER: Thanks for that, Roy. Any other hands on the issues of conservation equivalency and the task list? Seeing no hands, so Toni, you've got a couple more to add. That issue of prior CEs was something I was actually going to raise, so Roy stole my thunder on that. Unless anybody has got a last comment, I'm going to move right along to the next item.

UPDATE ON THE EAST COAST CLIMATE CHANGE SCENARIO PLANNING INITIATIVE

CHAIR KELIHER: Toni, we're going to move along to East Coast Climate Change Scenarios, so you're up.

MS. KERNS: This is just a quick update on the East Coast Climate Change Scenario Planning Initiative, and as a reminder, this is the initiative that we are conducting with all three East Coast Councils, NOAA Fisheries, GARFO, and the Southeast Regional Office, and the Northeast Fishery Science Center.

Just as a reminder, scenario planning can be used to explore and address a lot of different situations, particularly those challenges where the future is highly uncertain. The exploration that we are focusing on has two main objectives. One is about exploring and learning. We want to investigate how fisheries governance and management issues will be affected by climate driven change.

We expect that climate will affect stock availability in distribution. One of the project objectives is to explore what might change, in terms of availability. What this means for how we conduct fishery management and governance in the future. Our second objective is to take our learning and create an approach and a set of reusable tools, so that we can improve our fishery management strategies in situations of uncertainty.

We have conducted or done the first two steps in our multi-year initiative, both the orientation and the scoping step. We held three webinars this summer. We had over 250 participants, where we introduced the topic of scenario planning, the initiative itself, and we also provided participants the chance to review the project objective, and provide their own personal perspectives on climate change.

Following those webinars, we conducted an online questionnaire to gather input on the initiative and the forces of change that can be affecting fisheries over the next 20 years. We received 383 responses to the survey. We have a lot of information to dig through, and we'll be doing that over the course of the fall.

This sort of fall and winter we're going to dig through the questionnaire responses, and figure out, develop a full summary of the findings of that scoping phase. Then come winter, 2022 we're going to hold a small number of driving forces webinars. These are going to look at the research behind some of the possible driving forces.

For example, temperature change, sea level rise, shift in currents, consumer demand, some of the driving forces that came out of the questionnaire and the webinars. Then we will, later winter early spring, we're going to hold an in-person workshop to create a framework and set of scenarios that describe how climate change might affect stock

distribution, availability, and other aspects of east coast fisheries by 2024. I can take any questions.

CHAIR KELIHER: Any questions for Toni on the Climate Change Scenario Planning? Toni, I've got just a real quick question on scoping. The stakeholder input that you received, did you have a breakdown, by chance, you know from an industry perspective from commercial to recreational? We in Maine have a very big effort here going on with our Climate Council. What we found is we had very little input from stakeholders on the fishery side. Just wondering how that might have broken out, if you even had that information.

MS. KERNS: I know that we got responses from all, I believe it's all aspects of the industry, expect for maybe shore side support, Pat. But we did get commercial, recreational, dealers, some other folks involved in the questionnaire. I don't have the numbers in front of me though.

CHAIR KELIHER: That's fine, we can follow up later. Any questions for Toni on Climate Change Scenario? Seeing no hands, move along to other items on the agenda, which are Review Noncompliance Findings, which we have none. Is there any other business to be brought before the Policy Board?

I am seeing no hands, and with that I can tell you that because we have no noncompliance finding, the 4:30 Business Session will not be needed. We made up a lot of time, we're going to end early. With that I just want to thank, again, the Commission for all of their support the last two years, as you put up with me being your chairman. I look forward to the next two years under the leadership of Spud Woodward, who I am sure will do a bang-up job.

ADJOURNMENT

CHAIR KELIHER: With that, the meeting stands adjourned. Thank you very much for a very successful week.

(Whereupon the meeting adjourned at 3:15 p.m. on October 21, 2020.)

AMERICAN SALTWATER GUIDES ASSOCIATION
BETTER BUSINESS THROUGH CONSERVATION

December 9, 2021

Patrick Keliher, Chair
Atlantic States Marine Fisheries Commission (ASMFC)
1050 North Highland Street
Suite 200
Arlington, VA 22201

Mike Luisi, Chair
Mid-Atlantic Fishery Management Council (MAFMC)
800 North State Street
Suite 201
Dover, DE 19901

Dear Chair Keliher and Chair Luisi:

We are writing to express our continued concerns regarding the recreational Harvest Control Rule (HCR) effort being conducted as part of the joint ASMFC-MAFMC Recreational Reform Initiative (RRI). The HCR approach seeks to fundamentally change how the recreational fisheries for black sea bass, summer flounder, scup, and bluefish are managed—namely, by relying "less on expected fishery performance" and instead using an approach that "places greater emphasis on stock status indicators and trends."[1] While we recognize the continued challenges of managing recreational fisheries for these and other species, and appreciate efforts to improve management approaches, we continue to have doubts that the HCR approach in its current form will effectively prevent overfishing and maintain accountability as required by the Magnuson-Stevens Act.

In the last year, the HCR developed from an unsolicited idea to four potential alternatives today. At the June 8, 2021 Recreational Reform Initiative meeting, Dr. Paul Rago offered some thoughts on scaling risk associated with HCRs—management decisions will involve more risk when the stock nears a new step or box within an HCR framework.[2] And at the October 21, 2021 ASMFC meeting update, the joint ASMFC Plan Development Team (PDT) and MAFMC Fishery Management Action Team (FMAT) tasked with developing the HCR proposed four different HCR alternatives.[3] Initially planned for implementation for as soon as the 2022 fishing

[1] MAFMC. Recreational Reform Initiative. https://www.mafmc.org/actions/recreational-reform-initiative .
[2] MAFMC. Recreational Reform Initiative Update and Discussion (Joint Meeting with the ASMFC Policy Board). June 8, 2021. https://www.youtube.com/watch?v=smwlkWsGvGI.
[3] ASMFC. ISFMP Policy Board Proceedings. October 22, 2021. https://www.youtube.com/watch?v=PHfYxdHU6dc.

season, the HCR initiative has since been delayed to 2023 to allow for further development of two models and more time to refine key details, such as the role Annual Catch Limits (ACLs) and Recreational Harvest Limits (RHLs) will play in the four HCR alternatives.[4] The PDT and FMAT have made considerable progress: at their November 30th meeting, they began explicitly considering how measures will be set, the role of ACLs and/or RHLs, how conservation equivalency will or will not be employed, and the development of "guidelines" for how the HCR should function.

Given this delay in implementation and the fact that the HCR approach represents a significant departure from how recreational fisheries for these four species have been managed to date, we believe that this is an appropriate time to be deliberate in answering some of these questions and addressing the concerns of Council members and stakeholder groups across sectors. During the October 21, 2021 Interstate Fisheries Management Program Policy Board meeting, Council members and Commissioners raised concerns that the only scientific oversight of this initiative to date has been a three-member subgroup of the Scientific and Statistical Committee (SSC) regarding the two models that will be used to set measures.[5] Several Council members then suggested the idea of sending the entire HCR proposal in its current form to the full SSC for review. However, the meeting concluded without any formal consideration of tasking the full SSC with reviewing these HCR approaches.

We echo the perspective of those Council members and Commissioners and request that the full SSC review each of the four proposed alternatives and confirm that they can adequately prevent overfishing prior to any further management action. Full review is even more important considering the current HCR timeline that calls for no additional review of the draft alternatives by the SSC sub-group or by the Monitoring and Technical Committees.

It is worth noting that we do have additional concerns with this HCR proposal. These include: 1) the lack of public input and involvement to date; and 2) the Council's intention on moving forward with four species—one of which is overfished[6]—instead of first applying the HCR on a trial basis.[7] We consider a full SSC review the essential step to ensuring the scientific rigor of HCR approach in its current form, along with its compliance with the mandates of the Magnuson-Stevens Act.

Fishery managers around the country are closely monitoring the HCR's progress, as it could serve as a model for how other Councils apply so-called alternative management measures for the recreational sector. The Council and Commission are potentially setting a precedent with these actions that will guide other councils, and the process deserves greater scrutiny, transparency, and participation—both from a scientific and stakeholder perspective—than we have observed to date. Anything less would be doing a disservice to the larger fishing

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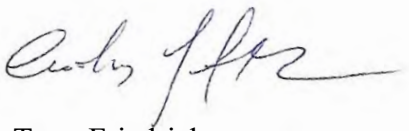
[4] Joint PDT/FMAT for Recreational Reform. Overview of work, major accomplishments, and timeline recommendations. October 1, 2021. http://www.asmfc.org/files/Meetings/2021FallMeeting/ISFMPPolicyBoard.pdf
[5] ASMFC. ISFMP Policy Board Proceeding Oct2021. October 22, 2021. https://www.youtube.com/watch?v=PHfYxdHU6dc
[6] Northeast Fisheries Science Center. Operational Assessment of the Black Sea Bass, Scup, Bluefish, and Monkfish Stocks Updated Through 2018. January 2020. http://www.asmfc.org/uploads/file/61546191noaa_23006_DS1.pdf
[7] Northeast Fisheries Science Center. Black Sea Bass Operational Assessment for 2021. July 2021. https://apps-nefsc.fisheries.noaa.gov/saw/sasi/uploads/BSB_Operational_assessment_2021-iii.pdf

community. We appreciate your consideration and urge you to ensure that any efforts to better align regulations with stock status don't undermine the Council's ability to ensure long-term stock health and stability.

Thank you for the opportunity to submit our comments.

Sincerely,



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Sustainable and Cooperative Management of Atlantic Coastal Fisheries

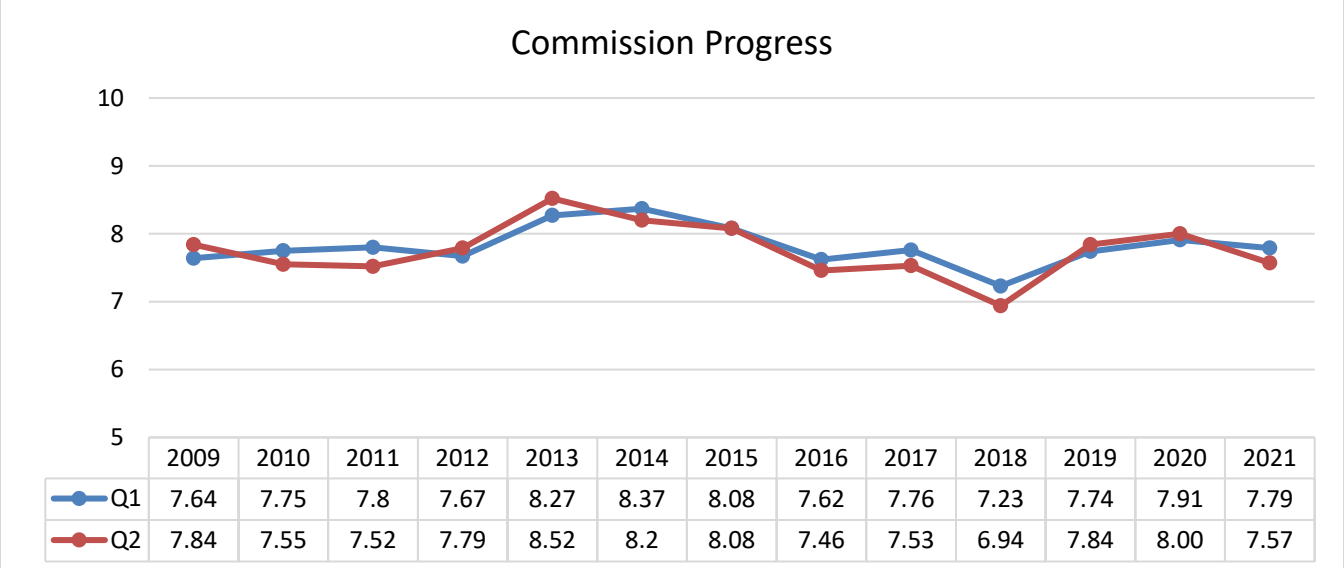
SUBJECT: 2021 Commissioner Survey Results
TO: ISFMP Policy Board
FROM: Deke Tompkins
DATE: January 10, 2022

28 Commissioners and Proxies completed the 2021 ASMFC Commissioner Survey, which is based on the Commission's 2019-2023 Strategic Plan. Questions 1-16 prompted respondents to rate their answer on a scale of 1 to 10 (ten-point Likert scale) and questions 17-21 prompted respondents to provide a written response. Questions 7, 8, 14 and 15 were new to the 2015 survey and Question 16 was added in 2020.

This memo includes graphs tracking responses for questions 1-16 throughout the time-series (2009-2021), a summary of the five open-ended questions for 2021, and unabridged responses to the five open-ended questions.

Commission Progress

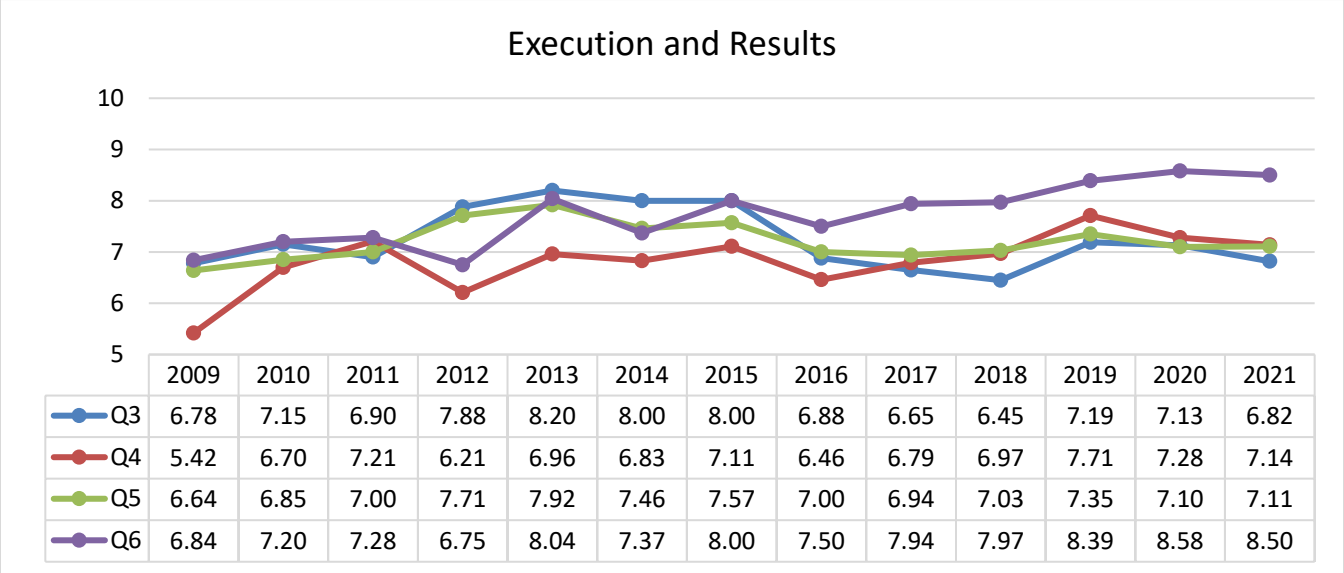
1. How comfortable are you that the Commission has a clear and achievable plan to reach the Vision (Sustainably managing Atlantic Coastal Fisheries)?
2. How confident are you that the Commission's actions reflect progress toward its Vision?



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Q1	7.64	7.75	7.8	7.67	8.27	8.37	8.08	7.62	7.76	7.23	7.74	7.91	7.79
Q2	7.84	7.55	7.52	7.79	8.52	8.2	8.08	7.46	7.53	6.94	7.84	8.00	7.57

Commission Execution and Results

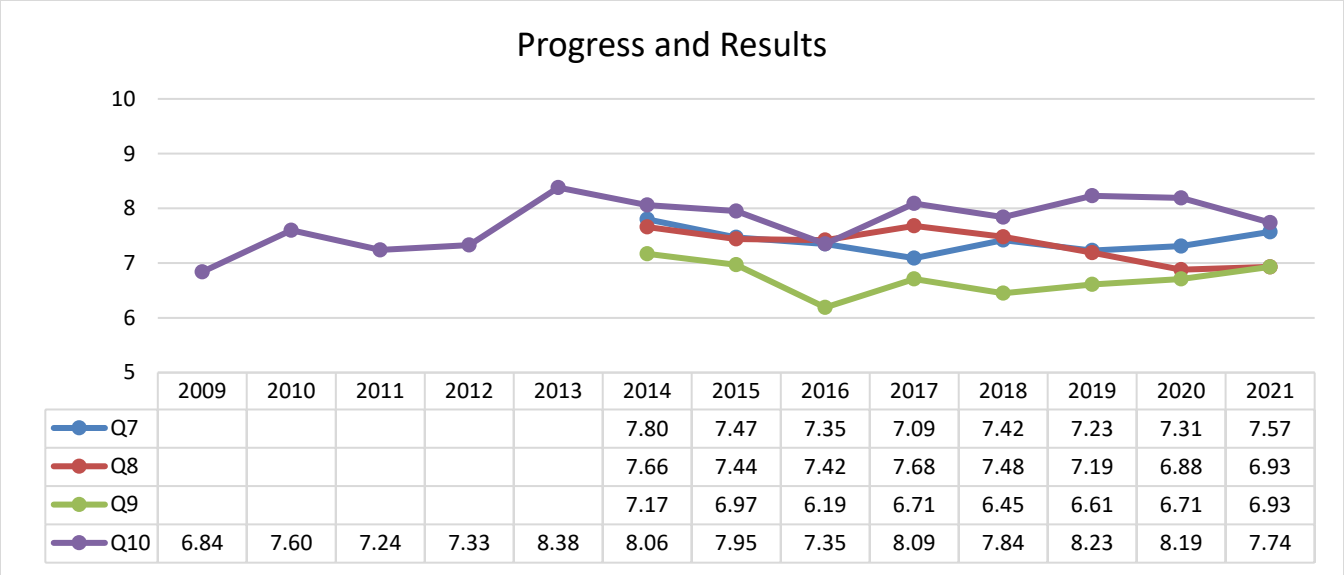
3. How satisfied are you with the cooperation between Commissioners to achieve the Commission's Vision?
4. How satisfied are you that the Commission has an appropriate level of cooperation with federal partners?
5. How satisfied are you with the Commission's working relationship with our constituent partners (commercial, recreational, and environmental)?
6. How satisfied are you with the Commission's effort and success in securing adequate fiscal resources to support management and science needs?



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Q3	6.78	7.15	6.90	7.88	8.20	8.00	8.00	6.88	6.65	6.45	7.19	7.13	6.82
Q4	5.42	6.70	7.21	6.21	6.96	6.83	7.11	6.46	6.79	6.97	7.71	7.28	7.14
Q5	6.64	6.85	7.00	7.71	7.92	7.46	7.57	7.00	6.94	7.03	7.35	7.10	7.11
Q6	6.84	7.20	7.28	6.75	8.04	7.37	8.00	7.50	7.94	7.97	8.39	8.58	8.50

Commission Progress and Results

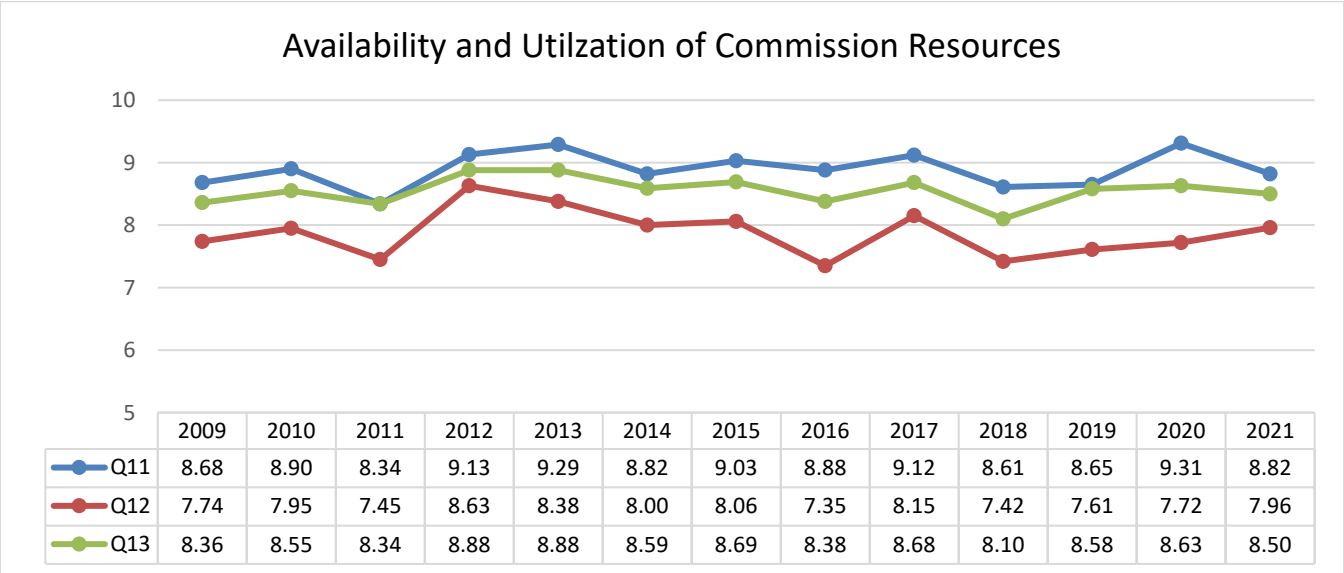
7. One of the metrics the Commission uses to measure progress is tracking the number of stocks where overfishing is no longer occurring. Is this a clear metric to measure progress?
8. How satisfied are you with the Commission's progress to end overfishing?
9. Are you satisfied with the Commission's ability to manage rebuilt stocks?
10. How satisfied are you with the Commission's efforts to engage with state legislators and members of Congress?



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Q7						7.80	7.47	7.35	7.09	7.42	7.23	7.31	7.57
Q8						7.66	7.44	7.42	7.68	7.48	7.19	6.88	6.93
Q9						7.17	6.97	6.19	6.71	6.45	6.61	6.71	6.93
Q10	6.84	7.60	7.24	7.33	8.38	8.06	7.95	7.35	8.09	7.84	8.23	8.19	7.74

Measuring the Availability and Utilization of Commission Resources

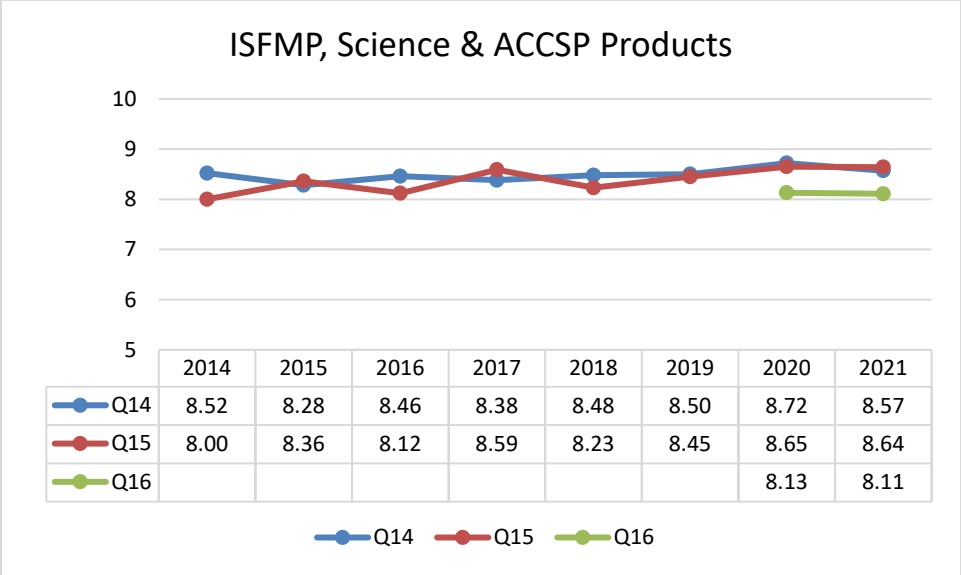
11. How satisfied are you that the Commission efficiently and effectively utilizes available fiscal and human resources?
12. How comfortable are you with the Commission's performance in reacting to new information and adapting accordingly to achieve Commission Goals?
13. The Commission has a limited scope of authority. How comfortable are you that the Commission spends the appropriate amount of resources on issues within its control?



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Q11	8.68	8.90	8.34	9.13	9.29	8.82	9.03	8.88	9.12	8.61	8.65	9.31	8.82
Q12	7.74	7.95	7.45	8.63	8.38	8.00	8.06	7.35	8.15	7.42	7.61	7.72	7.96
Q13	8.36	8.55	8.34	8.88	8.88	8.59	8.69	8.38	8.68	8.10	8.58	8.63	8.50

Commission Products

14. How satisfied are you with the products of the ISFMP Department?
15. How satisfied are you with the products of the Science Department?
16. How satisfied are you with the products ACCSP?



	2014	2015	2016	2017	2018	2019	2020	2021
Q14	8.52	8.28	8.46	8.38	8.48	8.50	8.72	8.57
Q15	8.00	8.36	8.12	8.59	8.23	8.45	8.65	8.64
Q16							8.13	8.11

Discussion Question Summaries

Some of the most mentioned **obstacles to the Commission's success in rebuilding stocks (Q17)** include a need to improve cooperation among states and federal managers; managing fisheries in changing environmental conditions; and the social impacts of management decisions.

The most **useful products produced by the Commission (Q18)** include Science trainings; Meeting Week materials and summaries; ISFMP and Science products (stock assessments, compliance reports, FMPs and amendments/addenda), www.asmfc.org; virtual meetings; Annual Report; Status of the Stocks Report; Atlantic Coast Fisheries Newsletter; and Public Comment.

Additional products the Commission could provide (Q19) include in-person trainings and workshops; enhanced data management/storage opportunities for states through ACCSP; earlier access to Meeting Week materials; an Annual FMP review; easier access to reports and board membership on the website; summaries of lengthy documents; easier access to graphs and tables from Commission products; access to software and licenses (ArcGIS); summaries of marine law enforcement initiatives; and spelling acronyms the first time they are used in a document.

Issues the Commission should focus on more (Q20) include allocation; improving recreational management strategies (party and charter mode split, processes that allow for uncertainty in recreational harvest estimates); adapting management to changing environmental conditions; filling data gaps; advocating for increased state and federal agency resources; cooperation with federal partners; improving federal enforcement; technical trainings; social impacts of management decisions; making Commission products concise and easy to understand; more frequent stock assessments for species not assessed as often as others (weakfish, cobia); increasing state level MRIP intercepts; improving the efficiency of meetings (Roberts Rules, adhering to schedules); limiting the reduction harvest of Atlantic menhaden; real time science on fish conditions/populations and timely recommendations; and right whale conservation impacts on Commission-managed species.

Please see page 8 for **Additional comments (Q21)**.

Unabridged Answers to Questions 17-20

Q17 What is the single biggest obstacle to the Commission's success in rebuilding stocks?

1. Interjurisdictional cooperation and compromise
2. Climate change
3. Environmental conditions
4. Social impacts created when reductions in harvest are needed to rebuild stocks...plus, the political pressure that accompanies these impacts.
5. The socioeconomic impacts of conservation measures.
6. building flexibility into the management of interstate fisheries between sectors
7. For jointly managed stocks, the amount of time it takes to get get NOAA and Councils to take action
8. One of the largest is climate, and how to balance significant management actions to mitigate overfishing when climate is the cause for populations decline.
9. Population/distribution changes due to climate change and states unwilling to adapt; States interests above science.
10. Limited human and fiscal resources making it difficult nigh impossible to acquire the the data needed to fully understand anthropogenic and natural affects on commission-managed species.
11. Environmental conditions impacting recruitment
12. We can only manage fishing pressure on stocks, yet several depleted stocks (Weakfish, American Shad) are not responding to decreased fishing pressure. Other environmental factors affecting stocks (climate change, watershed development) may be preventing the rebuild. Commercial and recreational fishers are understandably frustrated when asked to cut back further from already restrictive measures/low quotas, yet the recovery doesn't happen.
13. Cooperation between Commissioners
14. For some stocks (ones that are "depleted" rather than "overfished") not clear that ASMFC has a clear regulatory/policy mechanism to achieve rebuilding. This isn't a knock on ASMFC - it's an acknowledgement that fisheries management is not the solution to rebuilding those stocks.
15. Joint management with MAFMC
16. How to manage depleted species.
17. Environmental issues (habitat, water quality, climate change)
18. Being able to build consensus on difficult issues.
19. inaccurate assumptions in stock assessments and a delay in recognizing/acting on the disconnect between best available science and anecdotal experience.
20. The politics involved in making critical decisions regarding important conservation measures
21. It is very difficult to obtain the consensus of so many stakeholders and the science lags and is not keeping up with current conditions
22. How to consider and account for data uncertainties - particularly with recreational data and missing survey data due to Covid

Q18 What are the most useful products the Commission produces for you?

1. The science trainings (which have slowed down due to the pandemic but I hope can be reimplemented when things become normal again). Simply creating the opportunities for collaboration with the other commission states is the other extremely useful product. Additionally, the help in contracting employees has been extremely valuable, and the management of the funds from the CARES act was hugely helpful."
2. staff products and science

3. Materials accessible via the ASMFC website. Complied briefing materials for each meeting. Press release information on actions taken by the commission.
4. Management information on the website
5. The Commission does is outstanding at communicating with states. The virtual meetings have been run particularly well.
6. Meeting briefing documents; they are the best
7. Stock assessments and fishery management plans/amendments
8. FMP reviews, annual report
9. All of them! We refer to everything from benchmark assessments to compliance reports in responding to management questions here.
10. Commission briefing materials
11. Stock assessments, meeting briefing materials, ASMFC website
12. summaries and meeting materials.
13. Reports, especially assessment reports and status of the stock reports.
14. Meeting summaries (TC, PDTs, APs, quarterly meetings, etc.), FMP Reviews, meeting minutes, annotated agendas for Board Chairs, Atlantic Coast Fisheries Newsletters
15. Meeting Summaries, information on web page for each species
16. Graphics, charts and tables to convey the status of stocks
17. ASMFC has done a remarkable job in building important bonds among the commissioners so that we can analyze issues and problems beyond our single state perspective. I also truly appreciate the input from the public and wish that this "open forum" could be enhanced and expanded.
18. All are useful. I cannot single out any specifics.
19. Draft addenda/amendments as well as stock assessment reports

Q19 What additional products could the Commission create to make your job easier?

1. As mentioned, getting back to trainings is something I look forward to. An additional product could be to enhance the data management/storage opportunities for states through ACCSP.
2. Can't think of anything right now. Staff do a great job.
3. Make materials for board meetings available a week earlier (I don't know if this is practical)
4. Annual FMP review
5. Getting meeting materials earlier before the Commission meetings would be very helpful in preparing.
6. Very satisfied; nothing comes to mind.
7. The web site is very good, but it could be made more intuitive when it comes to finding reports, etc.
8. make website easier to navigate to view membership of species boards, TCs and PRTs, etc.
9. Any documents that provide a summary of other (lengthy) documents are very helpful. Many members have other commitments , such as ""day jobs"" and other fishery management meetings that require a lot of prep and reading materials. cutting back on prep time and still being well informed with summary docs would certainly be appreciated."
10. Make all graphs and tables that the Commission releases accessible so that they can be copied into reports, correspondence, and Power Point talks.
11. Can't think of any
12. possible sharing of software and software licenses (ArcGIS as example)
13. Whiskey...
14. Summaries of marine law enforcement initiatives so that we can make accurate and prudent assessments of this critical phase of the overall management initiatives.

15. It would be nice to have the information contained in some of the materials boiled down with reference below to additional information/resources should one need to review further. Also will be nice to identify all acronyms the first time they are used in a product. i.e. Marine Recreational Information Program (MRIP) instead of just using MRIP throughout
16. I can't think of any - the materials created are already great

Q20 What issue(s) should the Commission focus more attention/time on?

1. We still lack a rational process for allocation, this should be worked on outside of the heat of a pending action (potentially follow a similar trajectory to the Risk and Uncertainty process).
2. Continue to focus on progressive management strategies in recreational fisheries (party and charter mode split, processes that allow for uncertainty in recreational harvest estimates, etc.)."
3. give more emphasis on environmental conditions that are out of our control
4. Improving how we deal with allocation issues. Filling data gaps/needs & advocating for the necessary additional resources for state and federal agencies.
5. Figure out ways to accelerate the management of jointly managed stocks ,make changes in response to climate change, and improve enforcement at federal level. There is little or no enforcement in federal waters
6. Commission/Council interactions on joint plans. Councils increasing involvement is having negative impacts.
7. The influence of changing estuarine and ocean environmental conditions on the temporal and spatial distribution of commission-managed species.
8. Technical training for TC and Board members
9. We need more flexibility for MSA managed species. The recent GARFO mandate that recreational Black Sea Bass harvest must be reduced by 28% is going to needlessly cause pain to these fisheries. The bureaucratic inflexibility we are forced into for some of these management measures make us look less like knowledgeable fisheries managers and more like chuckleheads that couldn't find their own asses with both hands.
10. Species range and distribution shifts, and defining what "fairness" and "equity" related to this.
11. socio economics
12. Keeping recommendations, addenda, and amendments concise and easy to understand without an advanced degree in fisheries science or quantitative assessment.
13. Stock assessments for species not assessed as often as others (weakfish, cobia), ways to increase state level MRIP intercepts (to improve overall precision of estimates and to better document new species expanding their ranges)
14. Improving efficiency of meetings. Following Roberts Rules. Time limits in comments.
15. Find a way (perhaps over time) to eliminate the reduction industry (Omega Protein) from any harvesting menhaden in the Chesapeake Bay.
16. real time science on fish conditions/populations and timely recommendations which are specifically designed to alleviate issues/conditions to the extent possible
17. The right whale issue has already been a focus of the lobster fishery but I suspect that the discussions will start to impact a greater number of fisheries so this topic may require more Commission staff focus in 2022

Q21 Additional comments.

1. Some of my more negative scores were based on the continuing struggle the Commission faces when dealing with allocation and accounting for climate change in that process and more generally. A more objective process should be developed, and new management strategies for climate change effects on fisheries should continue to be investigated.

2. Thanks for all the hard work you all do!!
3. Thank you for your continued efforts!
4. Keep up the great work.
5. The Black Sea Bass commercial allocation addendum was a good compromise in that no one was happy afterward, but approving the NY appeal was a mistake that increased mistrust between regions.
6. Complements on your great work and leadership on the CARES Act and your support during COVID. You acted swiftly to meet the needs and concerns of states and constituents and displayed mastery in execution. We appreciate Bob's continued excellent leadership.
7. The ASMFC leadership and staff does a tremendous job educating members and the public. Thanks
8. I have raised this issue for a number of years, but the number and complexity of joint meetings between the Councils and the Commissions continue to grow. The Councils pay their attendees while the Commission does not. This leads to excessively long meetings, thousands of pages to read, and excessive time for the volunteers that serve on the Commission without pay.
9. None
10. Overall I think the Commission is doing a good job. We just need to start looking at the forest a bit more instead of dissecting the single trees
11. I'll just note that one challenge I see for the Commission in 2022 is how we deal with in-person meetings. We are undoubtedly living in uncertain times with Covid. We also have some large actions upcoming (menhaden, striped bass, lobster) and I think it is becoming more apparent on recent webinars the impact of no face-to-face interaction, particularly on these bigger issues. I don't have a solution but just reflecting on my recent webinar experiences

DRAFT

Policy on Information Requests

Atlantic States Marine Fisheries Commission

November 23, 2021

ASMFC member states have committed to transparent and open ASMFC 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. Thus, while the Atlantic States Marine Fisheries Commission (ASMFC or Commission) is not subject to state or federal freedom of information laws, the Commission is dedicated to transparency and to broad public access to information.

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 are 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 5 days, ASMFC will acknowledge receipt of the request and provide a timeline for fully responding to the request. For information requests that will take more than two hours of staff time, the Commission will charge to reimburse for staff time, copying, mailing, etc. The requestor will receive an estimate of reimbursement costs and will have the choice to proceed with the request, adjust the scope, or terminate the request.

Please be advised that ASMFC will not create new records to respond to an information request. Eligible documents will be provided in existing form. If requested documents do not exist, the requestor will be notified accordingly.

For ASMFC, as with any governmental entity, there are limitations regarding the types of information that can be made 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 information of a kind that is 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. The Executive Director, in consultation with the ASMFC legal counsel where appropriate, will determine whether any requested documents or information cannot be made public.

Finally, in light of the policies and practices explained above, the public should be aware that letters, public comments, emails, faxes and other correspondence submitted to ASMFC may be made public by posting on the Commission's website or in response to an information request.

Atlantic States Marine Fisheries Commission

Update to ASMFC Habitat Management Series #15: Submerged Aquatic Vegetation Policy: A Review of Past Accomplishments & Emerging Research and Management Issues

Date

Atlantic States Marine Fisheries Commission
Submerged Aquatic Vegetation Policy

Executive Summary

Submerged aquatic vegetation (SAV) comprise some of the most productive ecosystems in the world. SAV is significantly important to many Atlantic States Marine Fisheries Commission (Commission) managed fish species and provides a variety of ecosystem services, especially important given climate change. SAV is afforded different degrees of protection and different management measures up and down the coast. In 1997, the Commission's Habitat Committee developed a policy to communicate the need for conservation of coastal SAV resources, and highlight state and Commission-based activities for implementation of a coastal SAV conservation and enhancement program. The Commission encouraged implementation of this policy by state, federal, local, and cooperative programs which influence and regulate fish habitat and activities impacting fish habitat; specifically, SAV.

In 2017, 20 years after the original policy was released, the Habitat Committee re-evaluated its recommendations and importance. Upon review, it was determined that the policy is still relevant, and arguably more important now than ever.

Another update was made in 2022 to further refine the definition of SAV, and to introduce the Commission's position on living shorelines and nature-based features. Other minor clarifying edits were also included.

The Habitat Committee has left the goals largely unchanged from the 1997 version. The primary goal is to preserve, conserve, and restore SAV where possible, in order to achieve a net gain in distribution and abundance along the Atlantic coast and tidal tributaries, and to prevent any further losses of SAV in individual states by encouraging the following:

1. Protect existing SAV beds from further losses due to degradation of water quality, physical destruction to the plants, or disruption to the local benthic environment, such as from coastal construction;
2. Continue to promote state or regional water and habitat quality objectives that will result in restoration of SAV through natural re-vegetation;
3. Continue to promote, develop, attain, and update as needed, state SAV restoration goals in terms of acreage, abundance, and species diversity, considering historical distribution records and estimates of potential habitat.
4. Continue to promote SAV protection at local, state and federal levels and when unavoidable impacts to SAV occur from permitted coastal alterations or other unintended actions, agencies should implement compensatory mitigation for the functional and temporal impacts.
5. Encourage monitoring and research to address management-oriented information gaps.
6. Provide funding for pilot projects and other demonstration restoration areas.

There are six key components to achieving the goal of this policy: 1) Assessment of historical, current and potential distribution and abundance of SAV; 2) Protection of existing SAV and associated habitat; 3) SAV Restoration and Enhancement; 4) Public Education and Involvement; 5) Research; 6) Implementation through pilot demonstration areas; and 7) Potential Changes to policies.

Atlantic States Marine Fisheries Commission

Update to Habitat Management Series #15: Submerged Aquatic Vegetation Policy

Date

Prepared by Lisa N. Havel and the ASMFC Habitat Committee

Table of Contents

Acknowledgements

The Habitat Committee would like to acknowledge all of the partners and staff who took the ASMFC 1997 SAV Policy to heart and implemented it. In particular, we thank the early pioneers in North Carolina and Virginia – Bob Noffsinger, Wilson Laney, John Stanton, and John Gallegos of the U.S. Fish and Wildlife Service; Dean Carpenter of the Albemarle Pamlico National Estuary Program (APNEP); Anne Deaton of the North Carolina Division of Marine Fisheries (NC DMF); and Don Field of the National Ocean Service, NOAA for their organization and regular mapping efforts. Also thanks to Rob Allen and Keith Johnston of the North Carolina Department of Transportation's Photogrammetry section. Their team's collaboration with APNEP and NC DMF during the project's second cycle (2012-2014) translated into great gains in efficiency during aerial image acquisition.

For their assistance with providing, reviewing, and/or updating information in this document (in some cases multiple times), we thank Soren Dahl, Kathryn Ford, Kate Frew, and others that we might have forgotten to mention.

Additionally, we would like to extend our gratitude to Bob Orth of the Virginia Institute of Marine Science for his May 2, 2017 presentation to the Habitat Committee on SAV in the Chesapeake Bay. The presentation and subsequent discussion helped guide the direction of this update to the SAV Policy.

Publication Citation

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Preface

The Atlantic States Marine Fisheries Commission (Commission) was formed in 1942 as a means to conserve and enhance interjurisdictional fisheries of the Atlantic coast. The Commission and its 15 member states and associated jurisdictions which also serve on the Commission's Interstate Fisheries Management Policy Board (District of Columbia, NOAA Fisheries, Potomac River Fisheries Commission, and U.S. Fish and Wildlife Service) recognize that marine fisheries cannot be adequately managed without due consideration for marine fish habitat; however, the Commission does not have the capability to regulate marine fish habitat or activities other than fishing that may cause adverse impacts. Under these circumstances, the Commission recognizes that it is imperative to collaborate with the state and federal agencies that hold such authority, and equip them with the recommendations and guidance necessary to help provide for the conservation of healthy marine fish habitat.

Submerged aquatic vegetation (SAV) comprise some of the most productive ecosystems in the world (Orth et al. 2006a). SAV is significantly important to many Commission managed fish species, and afforded different degrees of protection up and down the coast. In 1997, the Commission's Habitat Committee developed a policy (ASMFC 1997) to communicate the need for conservation of coastal SAV resources, and highlight state and Commission-based activities for implementation of a coastal SAV conservation and enhancement program. This policy was modeled after a similar policy prepared by the Chesapeake Bay Program (Chesapeake Executive Council 1989), and background information relied heavily on the Commission's publication *Atlantic Coastal Submerged Aquatic Vegetation: A Review of its Ecological Role, Anthropogenic Impacts, State Regulation, and Value to Atlantic Coastal Fisheries* (Stephan and Bigford 1997). The intent of the original policy was not to hold marine fisheries agencies accountable for the suggested state activities, but rather to efficiently communicate the goals of the policy to the agencies or organizations that can best carry out the prescribed activities, and encourage the participation of these agencies in achieving policy goals.

In 2017, 20 years after the original policy was released, the Habitat Committee re-evaluated its recommendations and importance. Upon review, it was determined that the policy is still relevant, and arguably more important now than ever due to new or intensifying threats that could reduce water quality or damage SAV habitat, such as aquaculture and coastal development (Short et al. 2011, Lefcheck et al. 2017). Our objective was to provide updates to the scientific research and management issues, including emerging issues over the past 20 years.

In 2022, the Habitat Committee made another update to further refine the definition of SAV and SAV habitat, and to update the language in *Policy II. Protection of Existing SAV* to clarify the Commission's position on the installation of living shorelines and nature-based features. Minor changes were also made for clarity and to better incorporate the current status of SAV and current or emerging threats to these important habitats and nursery grounds.

Introduction

Background

Submerged aquatic vegetation or SAV systems, which include both true seagrasses in saline regions and freshwater angiosperms that have colonized lower salinity regions of estuaries, are among the most productive ecosystems in the world (Orth et al. 2006a). They perform a number of irreplaceable ecological functions, which range from chemical cycling and physical modification of the water column and sediments, to providing food and shelter for commercial, recreational, as well as ecologically important organisms, and are especially critical for juvenile development of many fish and invertebrate species (Thayer et al. 1997, Heck et al. 2003, Ralph et al. 2013). Due in part to their status as a nursery habitat, SAV is also a key linkage among not only other marine ecosystems, but terrestrial ones as well (Heck et al. 2008). The majority of ASMFC-managed species utilize SAV for refuge, attachment, spawning, food, or prey location for at least part of their life cycle (data from Kritzer et al. 2016, ACFHP Species-Habitat Matrix). Conservation of these vital habitats is critical not only for successfully managing our Atlantic fisheries, but for all who depend on healthy aquatic ecosystems.

The Commission established a policy on SAV in 1997 because of the important role SAV plays in the habitat of Commission-managed species. Both marine and freshwater SAV is covered by the policy because some managed species utilize both during their ontogenetic development. Both natural events and human activities can threaten local and regional SAV health and abundance, and result in impacts to fisheries. SAV loss has been reported worldwide (Orth et al. 2006a, Waycott et al. 2009) and in most Atlantic coastal states (see 'SAV Efforts by Atlantic Coast States and Federal Partners since the Policy was Released' below). Some reasons for the decline are pervasive threats along the coast. Water quality issues, caused by sedimentation and eutrophication, especially from algal blooms, reduce water column transparency and prevent SAV from photosynthesizing. Climate change-induced heat waves and storm events have big impacts on temperature and salinity in the shallow water environments where SAV grow. These threats and others have led to massive die-offs. Certain regions, like Long Island, New York bays and the Indian River Lagoon, Florida now have only a fraction of historic SAV coverage. Coastal construction, including dredging and filling, is also a major threat to SAV. The Chesapeake Bay saw declines in all species in all areas of the bay in the early 1970s (Orth and Moore 1983, Orth et al. 2002a). In 1993, researchers identified the main influencers on SAV abundance and distribution: water clarity, suspended sediments, nitrogen, phosphorus, and chlorophyll *a* (Dennison et al. 1993). Since then, managers have been using these indicators for specific water quality targets. The current restoration target is 130,000 acres by 2025 (Submerged Aquatic Vegetation (SAV) - Chesapeake Progress). Conservation measures have also slowed, and in some cases reversed, SAV decline in other locations, including parts of Florida (SAFMC 2014).

The Commission encouraged implementation of the original policy by state, federal, local, and cooperative programs which influence and regulate fish habitat and activities impacting fish habitat; specifically, SAV. The development of the original policy was overseen by the Commission's Habitat Committee, with scientific guidance from experts in the field of SAV ecology. The 2018 version the SAV policy was updated by distributing the 1997 policy to SAV and habitat experts and incorporating their changes. The final draft was approved by the Habitat Committee January 16, 2018 and by the Policy Board February 8, 2018. This 2021 version contains minor changes to the 2018 version by noting emerging issues associated with implementing some shoreline protection measures and associated SAV losses.

Definition of Submerged Aquatic Vegetation and SAV Habitat

In general, SAV normally refers to all macrophytes, including macroalgae, found in aquatic systems ranging from freshwater to marine. For the purposes of this document, ASMFC's definition of SAV refers to rooted, vascular, flowering plants that, except for some flowering structures, live and grow below the estuarine and marine water surface. Because of their requirements for sufficient sunlight, seagrasses, the estuarine and marine constituent species of SAV, are found in shallow coastal areas of all Atlantic coastal states, with the exception of Georgia and South Carolina. In those states, freshwater inflow, high turbidity, and tidal amplitude combine to inhibit their growth. SAV growth is seasonal, and during winter months, leaf blades may not be present.

ASMFC's definition of SAV habitat includes SAV beds and standing populations of various species and densities, including bare areas of sediment within a bed. This definition also accounts for the average physical requirements of depth and light availability for SAV community persistence. SAV habitat is characterized by the current or historical presence of rhizomes, roots, shoots, or reproductive structures associated with one or more SAV species. Mapping and surveying during the active growing season enhances the ability to identify SAV habitat.

There are at least 13 species of seagrasses common in US waters to which this definition of SAV and these policies may apply. In the New England and northern Mid-Atlantic regions, eelgrass (*Zostera marina*) dominates coastal shallow waters, with two other species also occurring – widgeon grass (*Ruppia maritima*) and, from North Carolina southward, Cuban shoalgrass (*Halodule wrightii*). South towards Florida, turtlegrass (*Thalassia testudinum*) and manatee grass (*Syringodium filiforme*) become dominant along with Cuban shoalgrass and several species of *Halophila*. One species of *Halophila*, Johnson's seagrass (*H. johnsonnii*), was listed as threatened in 1998. Its critical habitat was designated in 2000, and in 2002 the National Oceanic and Atmospheric Administration (NOAA) published a recovery plan for the species[1]. In light of recent genetic studies, which indicate that Johnson's seagrass shares a predominance of its genome with paddle weed (*Halophila ovalis*), NOAA is evaluating the threatened status of this species for delisting (Waycott et al. 2021). Widgeon grass (*Ruppia maritima*) which can tolerate both fresh and saltwater, has the broadest range of all species (Orth 1997).

In addition to the seagrass species that fall under ASMFC's definition of SAV, approximately 20 – 30 species of freshwater macrophytes may be found in the tidal freshwater and low salinity areas of the estuaries of the eastern United States. These lower salinity communities can be quite diverse, with as many as 10 species co-occurring at a single location. Wild celery (*Vallisneria americana*), redhead grass (*Potamogeton perfoliatus*), sago pondweed (*P. pectinatus*), horned pondweed (*Zannichellia palustris*), common elodea (*Elodea canidensis*), coontail (*Ceratophyllum demersum*), and southern naiad (*Najas quadalupensis*) are a few of the native species that will dominate these areas while two non-native (invasive) species, Eurasian watermilfoil (*Myriophyllum spicatum*) and hydrilla (*Hydrilla verticillata*), will also be found in many areas.

Finally, the updates and the original policy acknowledge that there will be situations where it may be appropriate to undertake control measures for invasive species of SAV. However, where native SAV species have been eliminated and invasive species are of functional value it may be more appropriate to protect the invasive species from development activities (e.g. see Ramus et al. 2017). These situations should be evaluated on a case-by-case basis.

[1] http://www.fisheries.noaa.gov/pr/species/plants/johnsons-seagrass.html

SAV Efforts by Atlantic Coast States and Federal Partners since the Policy was Released

In 2017, the Habitat Program Coordinator sent out a survey asking each partner a series of questions based on the goals and components of the original policy statement (results in Figure 1).

Of the eleven states that have marine seagrass within their borders and responded to the survey, seven of the eleven have implemented a resource assessment and monitoring strategy to quantitatively evaluate SAV distribution and abundance. One state is currently in the process of developing an assessment. Ten states have put measures in place to limit permanent and irreversible direct and indirect impacts to SAV and their habitats. Whether or not a state has been active in evaluating the effectiveness of these measures has been mixed across states. Three states have carried out an evaluation and five have not. Two states have evaluations in development, and one state has conducted an evaluation in the past, but is not currently doing so. Fifty-five percent of states have set restoration goals, whereas 45% have not. Most (81%), however, have identified the key reasons for SAV loss in their state. Seven states have identified suitable areas for protection and restoration, and two are in the process of doing so. One state has not, and one identifies areas as needed. All states either incorporate SAV education in their outreach or citizen science programs, either directly or via other entities (such as National Estuarine Research Reserves). Most states have also supported SAV research and follow specific Best Management Practices (10 and 8 states, respectively).

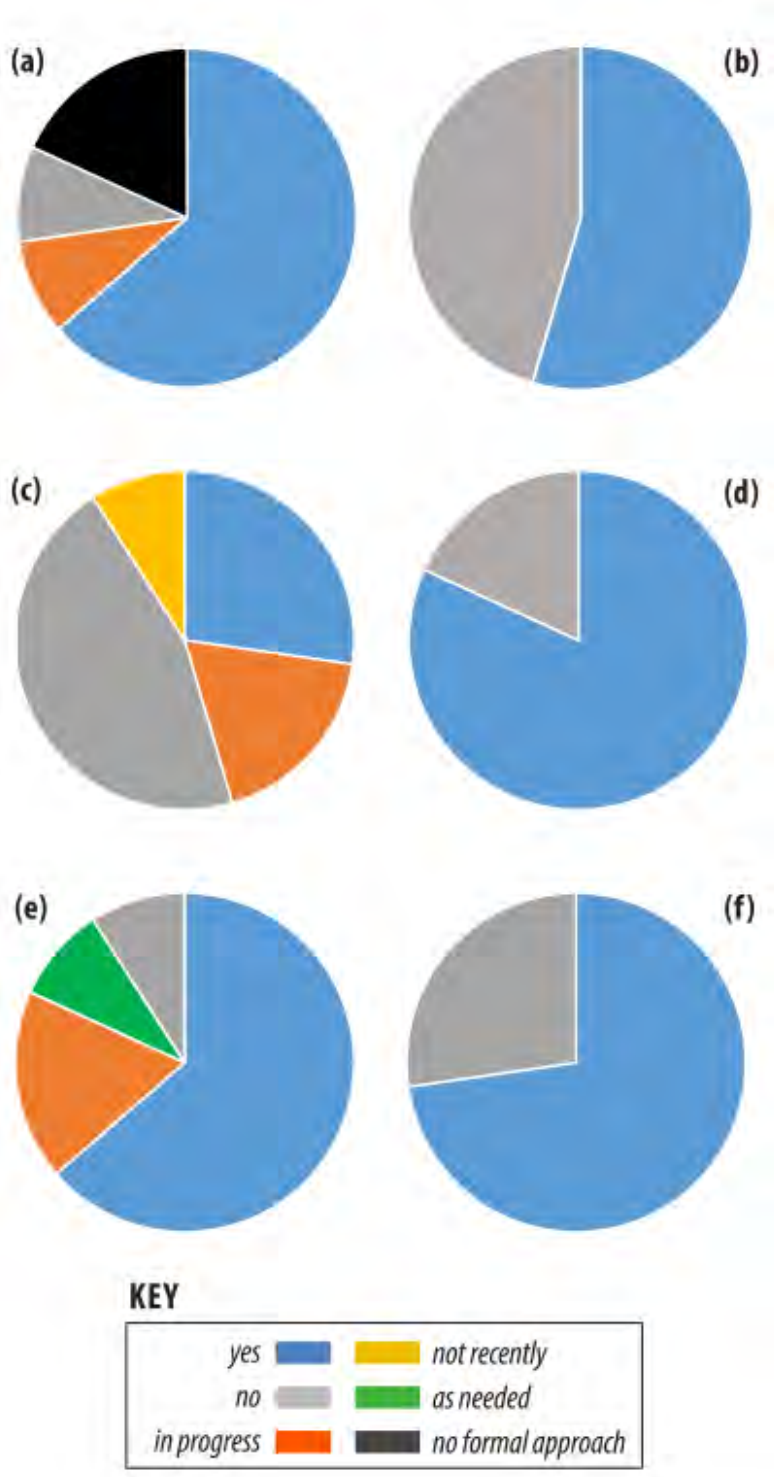

Figure 1. State responses to the following questions: (a) Has your state implemented an SAV resource management assessment and monitoring strategy? (b) Has your state set restoration goals? (c) Has your state reviewed the effectiveness of their assessment and monitoring programs? (d) Has your state identified reasons for loss and/or addressed the need for SAV improvement? (e) Has your state identified areas for protection or restoration? (f) Does your state follow specific Best Management Practices?

Most of the federal partners do not have regulatory authority pertaining to SAV, but do serve in an advisory role and can designate specific SAV areas as protected. Most have developed technical guidance or SAV standards, and promote Best Management Practices. While they have not implemented the Commission's SAV Policy, most have implemented other, similar policies to protect SAV.

Policy Statement

Goal

The Habitat Committee found that the original goals are still relevant today, and have left them largely unchanged from the 1997 version. The primary goal is to preserve, conserve, and restore SAV where possible, in order to achieve a net gain in distribution and abundance along the Atlantic coast and tidal tributaries, and to prevent any further losses of SAV in individual states by encouraging the following:

1. Protect existing SAV beds from further losses due to degradation of water quality, physical destruction to the plants, or disruption to the local benthic environment such as from coastal construction;

2. Continue to promote state or regional water and habitat quality objectives that will result in restoration of SAV through natural re-vegetation;

3. Continue to promote, develop, attain, and update as needed, state SAV restoration goals in terms of acreage, abundance, and species diversity, considering historical distribution records and estimates of potential habitat.

4. Continue to promote SAV protection at local, state and federal levels and when unavoidable impacts to SAV occur from permitted coastal alterations or other unintended actions, agencies should implement compensatory mitigation for the functional and temporal impacts.

5. Encourage monitoring and research to address management-oriented information gaps.

6. Provide funding for pilot projects and other demonstration restoration areas.

   There are six key components to achieving the goal of this policy: 1) Assessment of historical, current and potential distribution and abundance of SAV; 2) Protection of existing SAV and associated habitat; 3) SAV restoration and enhancement; 4) Public education and involvement; 5) Research; 6) Implementation through pilot demonstration areas; and 7) Potential changes to policies.

I. Assessing the Resource

Determining current status and identifying trends in health and abundance are key factors in management of SAV resources. In an effort to develop consistent monitoring techniques among regions, SAV mapping protocols have been identified by NOAA's Coastal Change Analysis Program (C- CAP, Dobson et al. 1995), and updated in 2001 (NOAA 2001).

Policy:

At a minimum, each member state should ensure the implementation of an SAV resource assessment and monitoring program which will provide a continuing quantitative evaluation of SAV distribution and

abundance and the supporting environmental parameters. The optimal coast-wide situation would be a monitoring system which would establish consistent monitoring techniques among regions so that the data are comparable. For example, SeagrassNet is used at several locations along the Atlantic coast and other areas worldwide to assess trends in health of discrete SAV beds using comparable techniques. In addition to evaluating distribution and abundance, monitoring should also evaluate trends in the overall health of existing SAV beds.

Action:
ASMFC: Support (financially, politically, or through the sharing of resources and information) and promote states to adopt an SAV mapping and monitoring plan. Assessment and data collection should have relevant metrics and scales to inform specific management questions and goals (Bernstein et al. 2011, Neckles et al. 2012, Roca et al. 2016). When possible, promote universal metrics for monitoring along the coast to allow for inter-state comparisons.

States: ASMFC members should encourage their appropriate state agencies or departments to implement regular statewide or regional SAV monitoring programs which will identify changes in SAV health and abundance cumulatively on a coast-wide basis if they are not already doing so (see "SAV Efforts by Atlantic Coast States and Federal Partners since the Policy was Released" above for more information). Surveys should minimally be on a five-year basis, and preferably annually, for areas considered to be especially at risk of severe declines from anthropogenic activities, disease, or other factors. Aerial images captured from a plane allow for standard comparability across regions, if resources allow. A good map provides spatial extent and rough approximations of density. However, aerial-based assessment results can vary considerably based on image quality, SAV bed plant densities, visual signature interpretation and extent of surface level verification. Above ground biomass (e.g., shoot density and canopy height) from sentinel beds can allow for a closer look at plant health and bed dynamics.

II. Protection of Existing Submerged Aquatic Vegetation and Associated Habitat

A concerted effort should be made to protect those areas where SAV currently exists and habitat where SAV could potentially occur, since it can be problematic to successfully restore or mitigate SAV losses. Habitat where SAV habitat could potentially occur, a buffer, allows room for SAV seed dispersal, normal seasonal expansion, and would resolve the difficulty of accurately mapping belowground plant structure. Impacts which result in losses of SAV and SAV habitat, such as direct alterations to a vegetated area or indirect actions within a watershed, should be minimized. Primary causes of existing SAV and SAV habitat loss include coastal construction, reduced water clarity due to increased nutrient (and subsequent algal blooms), and sediment delivery to ambient waters from development and agriculture. Climate change is expected to have an effect on SAV distribution and abundance as water temperature, salinity, and water depth change. Shading from docks, propeller dredging from boating, and bottom disturbing fishing gear also contribute to SAV loss (e.g., Orth et al. 2002b).

Since the original policy was released, SAV has been facing emerging issues including coastal construction (e.g., boom in the installation of new boat mooring areas, port expansions), and significant increases in aquaculture in shallow coastal waters, both of which can conflict with the conservation of SAV. This is especially true for shellfish aquaculture. Aquaculture has the potential for conflicts that requires careful ocean planning, and siting should not occur within or adjacent to areas of existing SAV or SAV habitat until further research can be completed that examines whether specific aquaculture practices, such as shellfish aquaculture, can co-exist with SAV.

Additionally, there has been increasing interest in the use of living shorelines or nature-based features[2] to provide shoreline stabilization, wave attenuation, and erosion control instead of using bulkheads and other shoreline hardening measures. The term "living shoreline" has itself progressed to take on a more general meaning, encompassing a wide variety of projects that integrate ecological principles into the engineering design. When designed correctly, living shorelines can provide a benefit to adjacent SAV beds by stabilizing highly erodible sediment that may be negatively impacting SAV, while continuing to support the necessary sediment supply to maintain the beds. Some living shorelines efforts have the purpose of restoring SAV. In contrast, poorly designed living shorelines or hardened shorelines can significantly and negatively impact adjacent SAV beds by altering nearshore hydraulics and reducing the necessary sediment supply. Permitting processes have been developed on the federal level and in some states to encourage the use of living shorelines. While correctly designed living shorelines and nature-based features can provide benefit to adjacent SAV beds, there have been examples of poor living shoreline and nature-based feature design and implementation that reduced the acreage of SAV beds or damaged the beds during construction.

Because SAV requirements for growth and survival are stringent, controlling the type, extent, intensity, and duration of impacts to SAV will further other efforts to restore and protect coastal fish habitat. Furthermore, protection and conservation of SAV should be prioritized as an assured and cost-effective approach to the preservation of SAV.

Policy:
Member states and federal partners should use existing regulatory, proprietary (submerged lands), and resource management programs, and in addition, develop new programs to limit permanent direct and indirect impacts to SAV and SAV habitat.

Action:
ASMFC, States, and Federal Partners: Review and evaluate the effectiveness of existing administrative procedures, regulatory, proprietary, and resource management programs to protect existing SAV and their habitats. This includes: fishing impacts; aquaculture; erosion control, living shoreline and nature-based shoreline implementation; coastal construction; water quality standards; indirect vessel impacts such as elevated wakes and direct vessel impacts from hulls, propellers, and personal watercraft; runoff from land-based development and agriculture; and compensatory mitigation.

ASMFC:

1. Support and promote the development of water quality standards by the Environmental Protection Agency and member states that can be implemented to protect SAV habitat (i.e., light attenuation, total suspended solids, chlorophyll *a*, dissolved inorganic nitrogen, dissolved inorganic phosphorus, critical life period).

2. Support and promote responsible siting, design, and construction of living shorelines and nature-based features over the use of hardened structures to the maximum extent practical. Avoidance and minimization measures should always be demonstrated before unavoidable impacts to SAV are considered. Generally, avoidance of SAV habitat (i.e., either present or historically present) plus room for a buffer should be a critical constraint that influences the selection and design of a living shoreline or

[2] Nature-based features are created by human design, engineering, and construction for specific services such as coastal hazard risk reduction.

nature-based feature project. Where impacts to SAV habitat are truly unavoidable to accomplish project goals without compromising the integrity of the design, compensatory in-kind mitigation should be used to offset the lost ecological functions.

3. Support and promote the development of technical guidelines and standards as well as expand research where needed to objectively evaluate fishing gear, propeller scarring, dredging, coastal construction, and bottom fishing impact, and develop best management practices to avoid disturbance and standard mitigation strategies when disturbance is unlikely to be avoided.

States:

4. ASMFC members should determine which actions are causing disturbance to SAV habitat, develop objective methods and research to evaluate impacts when the extent and longevity of the disturbance is not well documented, and propose best management practices and when necessary improvements in state regulation and management. This may include, for example, conditions pertaining to harvesting shellfish or finfish in SAV habitat by use of mechanical means and the placement and operations of aquaculture activities to protect existing SAV habitat.

5. States and federal partners should promote the use of living shorelines and nature-based features and develop new programs to provide shoreline stabilization, wave attenuation, and erosion control which limit permanent direct and indirect impacts to SAV, SAV habitat, and the immediate surrounding buffer area.

6. Encourage state and federal regulatory agencies to make improvements as necessary to ensure that living shorelines and other nature-based features adequately address fisheries habitat concerns and consider new approaches to ecosystem management that result in multiple objectives. Specifically, SAV habitat should not be negatively impacted by shoreline construction activities including living shorelines and nature-based features.

III. Restoration of Submerged Aquatic Vegetation

In addition to minimizing impacts to existing SAV resources and SAV habitat, restoration of former SAV habitat should improve the likelihood of achieving an overall net gain. In cases where monitoring assessments show SAV is in decline due to poor environmental quality, sufficient environmental quality standards must be attained before restoration can occur. Planning will induce maximum restoration program effectiveness. Even with adequate environmental quality, SAV restoration is challenging due to herbivores, community ecological imbalances, human impacts, and the risk of newly planted shoots to uproot easily. Good planning and use of scientifically-based restoration protocols will help ensure success where environmental conditions warrant. Examples of tools and protocols include habitat suitability models (Vaudrey et al. 2013), site-specific planning and testing (Leschen et al. 2010), and restoration strategies (Orth et al. 2006b, van Katwijk et al. 2016). To be successful, water quality conditions that historically and currently support SAV should be compiled regionally and used to identify potential SAV restoration sites.

Policy:

Conservation through effective management of existing resources is preferred over restoration. Restoration programs should include confirmation of existing environmental conditions necessary for successful SAV restoration, or re-establishment of environmental conditions necessary for successful SAV restoration, prior

to restoration actions occurring or being considered for compensatory mitigation purposes. Restoration methods should incorporate scientifically based protocols. Restoration goals should consider potential and historical SAV spatial footprint.

Action:
ASMFC, States, and Federal Partners: ASMFC should partner with/promote/support other state and federal agencies, departments, NGOs, universities, and other entities to support SAV restoration activities. ASMFC members should contribute or take the lead on setting state restoration goals for SAV acreage and providing current literature and best management practices to state and federal agencies.

States: ASMFC members should encourage their appropriate state agency or department to set regional or state restoration goals for SAV acreage, abundance, and species diversity considering historical records of abundance and distributions and estimates of potential habitat. Identify reasons for losses, and address any need for habitat improvement prior to restoration. Based on scientific protocols, identify areas currently suitable for SAV restoration, and consider them for protection and future use, or immediate use in restoration projects. Implement science-based transplanting and planting protocols, and support their use by other organizations.

IV. Public Education and Involvement

An informed and involved public will provide a firm foundation of support for SAV protection and restoration efforts. Education and involvement are important facets of increasing public awareness and stewardship (e.g., Figure 2).

Figure 2. Seagrass habitat conservation signage in Jamestown, Rhode Island. Photo and sign courtesy of the Atlantic Coastal Fish Habitat Partnership.

Policy:
ASMFC and member states should promote and support public education and stewardship programs that will increase the public's knowledge of SAV, the impacts and disturbances to SAV beds, its value to mitigate climate change, its importance as fish habitat, and commitment to SAV conservation.

Action:

ASMFC, States, and Federal Partners: ASMFC in coordination with member States, federal agencies, and non-profits will promote and support the improvement of policy maker and public understanding of the value, habitat requirements, status, significant threats, cumulative human impacts, and trends in abundance of SAV. States should include this information in their aquatic education programs.

State: ASMFC members should encourage their appropriate state agency or department to promote the involvement of citizen's groups in activities such as Tier 2 sampling of remotely sensed and mapped SAV locations; water quality monitoring programs; reporting of impacts, especially cumulative impacts such as dock and pier expansions; losses or perturbations; and SAV restoration and protection activities. One way to aid in increasing awareness would be to share area maps online (preferably not requiring GIS software capabilities).

V. Scientific Research

Through scientific research, we will improve our knowledge and understanding of SAV to ensure that efforts to protect and restore the resource will be effective. Further information on growth, physiology, reproduction, genetics, life cycles, disease, transplanting (successes and failures), environmental requirements, and anthropogenic impacts is needed to protect and restore SAV.

Policy:

ASMFC and member states should promote and support those research projects which will improve our knowledge of SAV, the impacts and disturbances to SAV beds, its value to mitigate climate change, and its benefits as fish habitat.

Action:

ASMFC, States, and Federal Partners: On a coast wide basis, support research financially, politically, and through data and results sharing in the following areas:

1. The relationship between SAV and the environmental quality of fish habitat and the relative importance of SAV to other, high quality habitat types. This should include the development of specific habitat functions of SAV (e.g., spawning, feeding, growth, refuge), taking into consideration the benefits to managed fish species across their ranges.

2. Improving methodologies for SAV transplanting and restoration techniques and determine the ecological functioning of transplanted vs. naturally vegetated areas.

3. Improving our understanding of the relationships between SAV and managed fish species, including fishery production patterns associated with different landscape or bed forms and sizes within the context of location within the system, as well as the influence of human disturbance and consequences of altering seagrass landscapes vis-à-vis fragmentation and isolation.

4. The specific physical requirements for SAV survival, on a regional basis, as well as the effects of eutrophication, sediment loading, indirect (pesticides) and direct (herbicides) impacts to epiphyte grazers, disease, physical disturbance, climate change (e.g., respiratory stress from increased temperatures), and natural perturbations on growth and survival of SAV. Efforts should be made to identify the primary threat(s) to SAV health in each locale. This will help identify potential sites for SAV restoration.

5. The effects of reduced genetic diversity and difference in physiology (e.g., annual vs. perennial, below-ground biomass) on the ability of seagrass populations to survive habitat alterations. Research should also identify regional differences in SAV requirements.

6. The potential effect of climate change on SAV, including range expansion and contraction, temperature tolerance, susceptibility to disease, etc.

VI. Policy Implementation

Habitat Program

This policy was distributed to all Commissioners and other interested persons for use in promoting local and regional protection of SAV habitat. The Commission's federal partners, including the U.S. Fish and Wildlife Service and NOAA Fisheries, were encouraged to adopt and implement this policy. Other federal agencies, such as the U.S. Army Corps of Engineers and the Environmental Protection Agency, were briefed on the policy, and encouraged to adopt it as well.

The Commission will continue to progress in its commitment to facilitate communication among local, state, and federal fishery and habitat managers, as well as assist marine fisheries agencies in transmitting this updated policy to habitat protection agencies (Appendix I).

Fishery Management Planning

Under the Atlantic Coastal Fisheries Cooperative Management Act, the Commission may require that states implement certain facets of fishery management plans, termed "compliance criteria." The following is a list of compliance criteria which the Commission will continue to consider for adoption in fishery management plans (FMP) for species with demonstrated reliance on SAV habitat (Laney 1997):

1. Preparation of an annual status report by each state and federal partner on implementation and results, where applicable, of each aspect of the policy.

2. Transmission of the policy by each state and federal partner to all agencies with habitat regulatory and management authority or organizations which can have a significant positive or negative impact on SAV.

3. Preparation of state plans to identify and objectively demonstrate through research, fishing gear and practices employed by any state regulated fishery which may negatively impact SAV; and development and implementation of best management practices and strategies to significantly reduce, or when possible, eliminate negative impacts identified pursuant to Section II where appropriate to achieve SAV objectives.

In addition, the policy should continue to be incorporated by reference into FMPs for species with demonstrated reliance on SAV habitat. These FMPs should include background information on the importance of SAVs, and recommendations which parallel the prescribed activities of the policy.

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Appendix I Points of Contact Responsible for Regulating SAV

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Atlantic States Marine Fisheries Commission

Business Session

Thursday, January 27, 2022
3:00 – 3:15 pm
Webinar

Draft Agenda

The order in which these items will be taken is subject to change;
other items may be added as necessary.

1.	Welcome/Introductions (S*. Woodward*)	3:00 p.m.
2.	Committee Consent • Approval of Agenda • Approval of Proceedings from October 2021	3:00 p.m.
3.	Public Comment	3:05 p.m.
4.	Consider Approval of Amendment 22 to the Interstate Fishery Management Plan for Summer Flounder, Scup, and Black Sea Bass: Commercial/Recreational Allocation (*J. Davis*) **Final Action**	3:10 p.m.
5.	Consider Noncompliance Recommendations (if necessary) **Final Action**	3:15 p.m.
6.	Other Business/Adjourn	3:15 p.m.

The meeting will be held via webinar, click here for details.
Sustainable and Cooperative Management of Atlantic Coastal Fisheries

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

BUSINESS SESSION

Webinar
October 20, 2021

These minutes are draft and subject to approval.
The Board will review the minutes during its next meeting.

Draft Proceedings of the Business Session
October 2021

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ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Dan McKiernan, MA (AA)
Raymond Kane, MA (GA)
Jason McNamee, RI (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Bill Anderson, MD (AA)
Russell Dize, MD (GA)
Steve Bowman, VA (AA)
Shanna Madsen, VA, proxy for B. Plumlee (GA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Bill Gorham, NC, prosy for Sen. Steinberg (LA)
Mel Bell, SC, proxy for P. Maier (AA)
Malcolm Rhodes, SC (GA)
Sen. Ronnie Cromer, SC (LA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Erika Burgess, FL, proxy for J. McCawley (AA)

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

Staff

Robert Beal
Toni Kerns
Laura Leach
Lisa Carty
Tina Berger
Pat Campfield
Maya Drzewicki
Kristen Anstead
Emilie Franke
Chris Jacobs
Jeff Kipp
Savannah Lewis
Sarah Murray
Julie Defilippi Simpson
Caitlin Starks
Deke Tompkins
Geoff White

Guests

Max Appelman, NOAA
Pat Augustine, Coram, NY
Alan Bianchi, NC DENR
Jeff Brust, NJ DEP
Jessica Daher, NJ DEP
Lennie Day
Lynn Fegley, MD DNR
James Fletcher
Terry Haggerty
Eric Harrison
Jay Hermsen, NOAA
Asm. Eric Houghtaling, NJ (LA)
Bob Humphrey
Wilson Laney
Michael Louie
Mike Luisi, MD DNR
Chip Lynch, NOAA
John Maniscalco, NYS DEC
Nicola Meserve, MA DMF
Steve Meyers
Allison Murphy, NOAA
Dick Omrod
Evan Priovolos
Cody Rubner
Tara Scott, NOAA
Melissa Smith, ME DMR
Somers Smott
Megan Ware, ME DMR
Angel Willey, MD DNR
Sarah York, NOAA
Renee Zobel, NH FGD

These minutes are draft and subject to approval.
The Board will review the minutes during its next meeting.

The Business Session of the Atlantic States Marine Fisheries Commission convened via webinar; Wednesday, October 20, 2021, and was called to order at 11:15 a.m. by Chair Patrick C. Keliher.

CALL TO ORDER

CHAIR PATRICK C. KELIHER: This is Pat Keliher, and welcome to this morning's Business Session. We've got a couple action items on the agenda for this morning, which is the approval of the Action Plan and the Election of the Chair and Vice-Chair. Plus, you're going to have to bear with me and listen to me as I give a little farewell, thank you as well.

APPROVAL OF AGENDA

CHAIR KELIHER: Before we get into all of that we need Board consent. First, Approval of the Agenda. Are there any additions to the agenda, just raise your hand? Seeing no hands, if no objections to the agenda it is approved as presented.

APPROVAL OF PROCEEDINGS

CHAIR KELIHER: The Approval of the Proceedings from the August, 2021 Meeting. Are there any additions, deletions, corrections for those proceedings?

Seeing no hands, the proceedings are approved by consensus.

CONSIDER APPROVAL OF THE 2022 ACTION PLAN

CHAIR KELIHER: At this time, I would like to go to the public, to see if there is any member of the public who would like to comment on anything that is not on the agenda. Seeing no hands, we are going to go right into the next agenda item, which is Agenda Item Number 4, which is Consider the Approval of the 2022 Action Plan. With that I think what I'll do, Toni, I believe you are first on the list to start us off.

MS. TONI KERNS: That is correct, Mr. Chair. Today I'm going to run through each of the species. I'm just going to hit the highlights mostly, and ongoing or new management documents and stock assessments. Then I'll pause at the end to see if there are any questions. As a reminder, we have categorized the species into high priority, and then low to medium priority.

It's not that we think that some species are better than others, it's more about the workload for each of these species, and how we prioritize them. To start us off, the American eel will receive the results of the benchmark stock assessment, and respond with any management changes if necessary. For American lobster, we'll continue with the resiliency addendum for Gulf of Maine and Georges Bank, in addition, continue with the Addendum IV vessel tracking.

The Board put off the management strategy evaluation until, to consider it at least, until 2023, so we'll remove that from the document, and we will also continue to work with NOAA on Atlantic Large Whale Take Reduction Plan modifications, as well as with the Law Enforcement Committee on improving enforcement in both state and offshore waters for lobster.

For menhaden, we'll finalize the Addendum on quota allocation, and review the stock assessment update, and respond if necessary. For Atlantic striped bass we will finalize and implement Amendment 7, and if the Board moves forward with Addendum VII, we will also finalize that, and Addendum VII is considering transfers of commercial quota. We'll also receive a stock assessment update and respond if necessary. For summer flounder, scup, black sea bass and bluefish, we're working in coordination with the Mid-Atlantic Council on the Harvest Control Rule Addendum. We'll finalize and implement that Addendum next year.

We will also for all four of those species work on any remaining issues that address recreational reform with the Mid-Atlantic Council. For both black sea bass and for bluefish, we'll contribute data for a 2022 research track assessment, and for black sea bass, summer flounder, and scup we will work with the Mid-Atlantic Council to finalize the Amendment on the commercial and recreational allocation changes.

Then for bluefish, we'll work with the Mid-Atlantic Council to implement Amendment 2, which has already made changes to the commercial and recreational allocation amendment, as well as a rebuilding program. For horseshoe crab, we'll review the adaptive resource management framework revisions and peer review report, and respond with a management document, if necessary, to make changes to the ARM.

For Jonah crab, we will work on the tracking addendum. It also impacts the Jonah crab fishery as well, and continue work on the stock assessment for 2023. I've already covered all the issues for scup, and then for summer flounder the last remaining issue is to work with the Mid-Atlantic Council on their management strategy evaluation, looking at the benefits of minimizing discards and converting discards into landings for the recreational sector.

For tautog, the management board decided to not move forward based on the results of the assessment, to use the risk and uncertainty decision tool for management responses to the stock assessment. We're just going to use it to sort of hypothetically go through the risk and uncertainty tool.

We're going to delete that first bullet, and it's our recommendation then, since we won't be doing a management response, to move tautog down into the medium low priority species. But we will work with the Law Enforcement Committee to continue to monitor the implementation of the tagging program.

For both Atlantic croaker and spot we'll conduct a traffic light analysis and respond as necessary. For Atlantic herring we may reconsider Draft Addendum III, which looks at how we allocate the Area 1A quota. We'll also review the 2022 management track assessment and respond if necessary, and continue to work with the New England Council on several of their activities, and respond if necessary to make changes to our plan if needed.

They have Framework 7, which looks at spawning protections for Georges Bank and Nantucket Shoals, Framework 9, which looks at potential changes to the industry funded monitoring program. For Atlantic sturgeon, we'll continue to monitor federal activities and the five-year status review and recovery plan. But John will be continuing the benchmark stock assessment for peer review, and for coastal sharks HMS will be conducting a stock assessment for all of the hammerheads through SEDAR. For cobia we will continue to work with the SERO to monitor and respond to any changes necessary for NOAA rulemaking. For northern shrimp, based on the decisions made later this year, we'll conduct the appropriate stock evaluation and respond if necessary, and we'll continue to explore long term management options, given the environmental changes in the Gulf of Maine and the depleted stock status of shrimp.

For red drum, we'll review the assessment simulation model and peer review results, and then from those results initiate the benchmark stock assessment that will be completed in 2024. For shad and river herring we'll continue the development of the river herring assessment for 2023. We'll continue updates for SFMPs for both species, and the Habitat Plan.

For Spanish mackerel we'll review the SEDAR results, and then work with the South Atlantic Fishery Management Council to respond if necessary. For spiny dogfish we'll work in collaboration with the Science Center and the

Mid-Atlantic and the New England Council on a stock assessment. For winter flounder we'll review the management track assessment and respond if necessary. I'm going to pause there, Mr. Chair, before getting into the cross-cutting issues, to sees if there are any questions on species.

CHAIR KELIHER: Great, thank you, Toni, any questions for Toni? We've got a couple hands. I've got Adam Nowalsky and Erika Burgess. Adam.

MR. ADAM NOWALSKY: If there was some opportunity for summer flounder, scup, black sea bass, and scup as we work on the harvest control rule work, that right now is dependent on models that are outside the control of the ASMFC. If there came some opportunity during the 2022 year to further contribute on those, to make them more useful. Do you feel that that would fall under the bullet points that we have here, or should we have some other consideration, so that if that opportunity should arise, we could be responsive?

MS. KERNS: Adam, I think that they would fall under either bullet, depending on what the work was for the Harvest Control itself, or the work on the remaining rec reform issues. I think we would be covered there.

MR. NOWALSKY: Thank you very much.

CHAIR KELIHER: Erika.

MS. ERIKA BURGESS: I was wondering about Spanish mackerel. I'm wondering whether that SEDAR actually will be available for us next year. I think there was some talks about revising the schedules at the SEDAR Steering Committee, and I don't know if anyone was able to provide an update on that.

MS. KERNS: I'll go to Pat or Bob for that schedule, because I am not sure, Erika.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Mr. Chair, I can chime in if you would like.

CHAIR KELIHER: Yes, please, Bob.

EXECUTIVE DIRECTOR BEAL: Yes, Erika, that's a great question. You're right, the SEDAR schedule was talked about, I guess it was last week, and some movement is happening, apparently. It sounds like the benchmark results are only going to be pushed back one month for Spanish mackerel. We will get those results during the course of next year.

The difficulty is it will be, I think the results will be available in May, which kind of pushed the presentation back from our May meeting, and probably out of the Council's, I think June meeting, if I am remembering the schedule correctly. It will, even though it's only a one-month delay, it's going to push back the planning, I think a whole Council and Commission meeting cycle. But it should still happen in 2022.

MS. BURGESS: Thanks, Bob.

CHAIR KELIHER: Any other hands for Toni? No seeing any other hands, Toni, do you want to just touch on the cross-cutting issues?

MS. KERNS: Will do, Mr. Chair, thanks. A couple of things that are here we are going to evaluate the MRIP implementation of data presentation standards to the Commission FMP and stock assessments. These are the sort of rolling changes that are coming out, have just recently started coming out and will continue to come out over the next couple of months, on how data will be presented on the website, and provided to the public.

We'll update existing management programs to address concerns of the recreational community with regard to Commission and jointly managed species. We'll continue to provide administrative support for scenario planning activities that address changes in stock

and fisheries due to climate and fisheries governance, and we're doing that in collaboration with all three Councils, and both regions and NOAA Headquarters.

We'll evaluate COVID-19 impacts on fishery independent and dependent data, and we'll develop strategies to adapt stock assessment methods. We'll work with NOAA on the TRT plans for North Atlantic Right Whales, continue to participate on the Council's Research Steering Committee to examine reestablishing the Research Set-aside Program.

We'll evaluate the conservation equivalency program and update any guidance documents as necessary. We'll also explore allocation strategies for the Commission's quota managed species, to reflect current fishery conditions. Those are the newer ones, the ones that we have. I'll take any questions.

CHAIR KELIHER: Mel Bell.

MR. MEL BELL: Just a quick question. Toni, I thought when you were covering scup, and we don't deal with scup, I wasn't really listening that hard. But you mentioned something about an MSE process concerning conversion of recreational discards into landings. Who is doing that?

MS. KERNS: It is for summer flounder, and it is the Mid-Atlantic Council is taking the lead on a management strategy evaluation for that.

MR. BELL: Okay, got you, summer flounder.

MS. KERNS: We have staff that are participating in the process.

MR. BELL: Great, thank you.

CHAIR KELIHER: Any other questions for Toni? Seeing none, thank you, Toni. Let's go right to Goal Number 2, which is Pat Campfield.

PATRICK A. CAMPFIELD: As highlighted in Goal 1, next year 2022 will be very busy for stock assessments, about a dozen assessments overall. One of the highlights in our Science Committee activities is to support a new stock assessment scientist hire at a state agency, to expand our coastwide analytical capacity, to try to keep up with the stock assessment workload.

In the socioeconomic realm, we plan to participate in the development of NMFS Northeast Science Center's Ecosystem and Socioeconomic Profiles, and also work on developing a lobster socioeconomic data inventory, to enhance stock and fishery indicators. At the Shad and River Herring Board we heard a lot of talk about the alosine genetics repository, so that will be an activity ramping up next year to coordinate closely with several state agencies, as well as USGS, to collect those samples and have the genetic analyses run at USGS.

As part of that project, we will continue to collaborate with NOAA Fisheries to request shad and river herring genetic samples from the Atlantic herring fishery through their Observer Program. Under the Fisheries Research category, the Commission always conducts aging workshops each year. In 2022 we plan to focus on menhaden and Atlantic sturgeon.

Finally, under Ecosystem Based Management and Changing Ocean Conditions, we plan to provide input to NOAA Fisheries Atlantic Coast Science Coordination Initiative that kicked off earlier this year, as well as participate in the East Coast Climate Change Scenario Planning Initiative with all three Councils as well as GARFO and the Northeast Science Center. Those are the highlights, Mr. Chairman.

CHAIR KELIHER: Great, thank you, Pat. Any questions for Pat Campfield? Seeing no hands, why don't we go right on to Section 3, which is Geoff White. Geoff, are you ready?

MR. GEOFF WHITE: ACCSP will also be busy helping out, and continuing items. You see the kind of the continuing basis items. There is significant workload there, but we're happy to be relied on for it, and that's all good. The short highlights, as we go through this. Under the Program Management.

The biggest one there is really updating the recreational implementation plan that guides MRIP on regional priorities for kind of five-year funding needs, so involving not just ACCSP staff but all partners in that, including the states, Councils, and Fish and Wildlife Service. It will be great to have everyone's input. Under Data Collection there is support for the trip location data, be that for lobster or other initiatives, including SEFHIER, and connecting to that within the databases. Also support for one-stop reporting, so the multiple permits coming through one application and being shared on the back end. We've had great success on the federal sources in 2021, and will be expanding that for clarification on the federal and the addition of some of the state permit needs in 2022. Then the really big one in the middle is resource dependent. It's really the background work on updating dealer reporting systems that we are hosting because of the structures, the functionality and the Apps for that in the background.

The goal is for 2023 end user application release, but that may change as we get into that. There is a fair amount of complex work to make that happen, and we are trying to get the resources in place to do so. Under data standards, distribution and work and use the highlight item there is really expanding biological data feeds and the online queries.

We have some program inventories that we wanted to change from kind of an Excel reference available to an online searchable and updatable format, and also now that we've got the bio module, which is in place, and support things like the Jonah crab assessment this year, to be able to do more online queries for that.

Under the recreational piece, it's really long-term expansion of the existing work on the for-hire methodology to include logbook information more fully, and to work on standards for Citizen Science Data. Moving that direction, in terms of what data fields, what data centralization can be there and provide maybe some guidance to where that can be useful for the assessment and to the management processes. That is the summary for Goal 3.

CHAIR KELIHER: Great, thanks, Geoff, any questions for Geoff? Not seeing any hands go up, let's move right on to Goal 4 and 5, which are both yours, Toni. You can just take us right from one to the next, if you would like.

MS. KERNS: Sounds great, thanks, Pat. These will be faster, because we have streamlined both of these goals. Goal 4 is our goal associated with our Law Enforcement Committee for compliance with fishery management plans, and for here we're just highlighting the exploring methods for improved enforcement of the offshore lobster regulations, and then moving into Goal 5.

This is our fish habitat goal, where also the Atlantic Coastal Fish Habitat Partnership falls under. For this we'll be completing the Habitat Management Series Document on acoustics this year. These are acoustics affecting fish habitat. Once that document is completed, we will initiate the next Habitat Management Series Document. We don't have a topic picked out, so if the Board has any topics that they're interested in, we can let the Habitat Committee know.

Then under ACFHP the National Fish Habitat Partnership is going to be releasing project evaluation guidance in the coming months. Once that information has been released, then ACFHP will compile monitoring data on their

previously funded on the ground projects, and then ACFHP will also be developing a new strategic plan for activities over the next five years. I will take any questions on both of those.

CHAIR KELIHER: Adam Nowalsky has got his hand.

MR. NOWALSKY: The Mid-Atlantic Council at their August meeting, which was where they did some focus on offshore wind energy development, had sent a letter to developers requesting a suspension of certain bottom profiling work this fall, as a result of some information they had received.

With the bullet point here about acoustics affecting fish habitat, and I think I brought this up with Habitat here before. Do you know if that would cover, potentially, something like that, or is that something I would need to take up directly with the Habitat Committee, or talk more about here today if there is interest in working with the offshore wind developers on that type of work?

MS. KERNS: Adam, is it to send a letter to them to collaborate, or is it for information on impacts to habitat, you know like having additional information on the impacts to habitat? I just want to get clarity what direction we would be going.

MR. NOWALSKY: The Council had sent a letter asking for the bottom profiling acoustic work to cease for a period of time, and advocated for ongoing cooperative research with management and with fishing communities. The letter that was sent back to the Council indicated that they were unable to suspend activities this fall.

But they were interested in that ongoing research type of work. I'm not sure if that helps at all, and maybe if the answer is we just need to take this offline, okay, but again, I understand the importance of these plans here, and just want to make sure anything that might provide benefit to us as managers in the fisheries we manage, make sure that we've got ourselves covered here.

MS. KERNS: Unless Pat Campfield has an idea of how to work it in, off the top of his head, maybe you and I can collaborate together offline. But I'm going to see if Pat has any ideas right away, or Bob.

MR. CAMPFIELD: This is Pat, I don't have anything right offhand, but might suggest we follow up offline with Mr. Nowalsky.

CHAIR KELIHER: Great, so Adam, you all set with that for a follow up offline?

MR. NOWALSKY: Yes, that's fine, and I would think that hopefully this conversation on the record here today, if those offline conversations do yield something that's fruitful, that staff feels would be appropriate. Hopefully that would be an allowable addition at a future time if it's deemed appropriate here.

CHAIR KELIHER: Yes, I think we can just address it at the next meeting, but certainly the ability to update is there, so we can certainly do that. Thank you very much for that. Any other questions or comments for Toni? Seeing none, we'll go right into Goal 6, which is Tina.

MS. TINA L. BERGER: Thank you, Mr. Chair. I will be brief. Many of our activities are the same from year to year, but we focus on different things. This year, we will focus on outreach materials that highlight successes in our ending overfishing and better describe challenges in rebuilding efforts for depleted species. As Toni and Pat mentioned, there are a number of stock assessments that are coming onboard, and a number of major management activities, so we will focus our outreach efforts on those, and they are listed below. Under use of current and new technologies, we will upgrade our website to include some additional content on Recreational Reform Initiative,

Recreational Data and Best Fishing Practices, as well as looking at exploring, moving a number of our websites that are currently maintained and hosted on sight to an offsite host, and modify and update those websites accordingly.

Next year we're going to move to full digital distribution of our newsletters, and under stakeholder participation, we're going to attempt to revitalize Advisory Panels for American Lobster, Bluefish, Tautog, Summer Flounder, Scup and Black Sea Bass, to strengthen input on those management activities that are pending for those species.

We will also coordinate with the South Atlantic Council on providing input for their Spanish mackerel management development. We will look at post COVID-19 processes, to facilitate stakeholder participation at both in-person meetings and via webinar. We will be working and have been working with NOAA Fisheries to develop and conduct the recreational fishing summit schedule for March of next year.

In terms of media relations and networking. We continue to modify our social media plan to ensure consistent messaging. I will continue to work with Bill Leeds from the NRCC and South Atlantic Council to promote the activities of the Climate Change Scenario Initiative, and that's it for me. I welcome any questions.

CHAIR KELIHER: Great, thank you, Tina, Adam Nowalsky has got his hand.

MR. NOWALSKY: I sure hope somebody else will chime in and help me out here, so I'm not dominating all this today. I appreciate the time. The Mid-Atlantic Council had created a new Advisory Panel for themselves this past year on Communication and Outreach. I was thinking it might be appropriate to consider a bullet point somewhere in here that would consider coordination with the Council on the use of communication and outreach with that AP for those species that are jointly managed.

MS. BERGER: Thanks, Adam, I put a note for myself. I am also on the South Atlantic Council's similar committee, so I can reach out to the Mid-Atlantic Council to get better coordinated. Just so you know, I am very involved with the NRCC Communications folks, which include the Mid-Atlantic Council, so we are in constant communication. But I will pursue that as well. Thank you.

CHAIR KELIHER: I've got a couple more hands, I've got Loren Lustig and then John Clark. Loren.

MR. LOREN W. LUSTIG: Tina, thank you for that report. I'm always interested in the outreach discussions, and in particular environmental education initiatives. Can you describe anything that might be new or on the horizon regarding environmental education via ASMFC outreach efforts?

MS. BERGER: Well, last year we released a story map on ecological reference points that got pretty positive feedback on it. We will continue to use story maps as a way of not only getting the word out, but also improving education on some major issues. You'll see within my goal that there is a couple of places where we identify what those could be.

Including climate change scenario planning, recreational reform initiative, management strategy evaluation, and risk and uncertainty tool, as well as the American lobster and Jonah crab tracker development. We will continue to use that as one of our major tools, and focus some educational outreach efforts on those issues.

CHAIR KELIHER: Moving down the list I've got John Clark and then Roy Miller.

MR. JOHN CLARK: Thanks for the update, Tina, and the great communications work. I'm just curious as to why you are going to be moving those websites to an offsite host, and then also

just wondering how the progress is coming along for hybrid webinars for the future.

MS. BERGER: You know there has been a number of discussions, most primarily those websites are hosted currently on a server that is nearing the end of its efficacy or performance. We are going to look at the possibility of moving our websites offsite. Not only will it potentially be cost savings, in terms of maintenance onsite, but it very much could improve security on those websites through an external host vendor. I forgot your second question.

MR. CLARK: Thanks for that, and that makes a lot of sense. I was just curious as to whether you're working on, as we move more toward hybrid meetings in the future, how progress on that is going.

MS. BERGER: You know, we talked a lot about it prior to the decision to have the October meeting change to a virtual format. Given that we, the Executive Committee made a decision this morning to move towards the in-person meeting in January, I am sure we are going to double our efforts to look into that. We have explored it initially, but we are going to need to do some testing and playing with that as we approach that January meeting.

MR. CLARK: Thank you.

CHAIR KELIHER: Roy Miller.

MR. ROY W. MILLER: John covered with his second question covered my question for the most part. I'm just curious about for the January meeting, if we're going to attempt to integrate hybrid technology. Is that going to be targeted mostly, Tina, at public participation or would there also be hybrid participation opportunities for Commissioners at the January meeting?

MS. BERGER: I think that's really a decision that you all need to make. I think whatever we can do to ensure full participation of our commissioners and proxies in our process, that's what we're going to do. But I can't speak to that fully. Maybe Bob could speak to that a bit more.

CHAIR KELIHER: Bob.

EXECUTIVE DIRECTOR BEAL: I'll chime in Pat, if that's okay. Roy, I agree with Tina. It's sort of a decision of the Executive Committee and the Commissioners on how exactly they want to tackle the hybrid meeting format, and what they want it to look like. Not to duck your question, but a little bit of it is almost premature.

In other words, we don't know where we're going to be with COVID, we don't know if the majority of Commissioners are going to feel very comfortable, or the majority are going to feel somewhat comfortable coming to the meeting in January. I think it may be a decision and details that we have to work out as we get a little bit closer to the January meeting, and see what the climate is at that time.

MR. MILLER: Thanks, Bob.

CHAIR KELIHER: Seeing no more hands for questions for Tina, I'm going to move right along and go to Goal 7, and Bob, your microphone is on so the floor is yours.

EXECUTIVE DIRECTOR BEAL: Thank you, Mr. Chairman. Yes, just briefly, Goal 7 is the Commission's goal on legislative activities and Capitol Hill Outreach that Deke and I tackle with the help from many of you. It's pretty much continuing sort of steady as she goes on this outreach, but there are a couple highlights worth noting.

One is that we'll get ready for the mid-term elections that are going to take place later this year, about a year from now, so yes not this year next year, about a year from now, and Deke and I will be ready to react to those, and

see if anything changes up on Capitol Hill. Then as you go on, you'll see some bolded text.

We're going to consider authorizing legislation, see if we can get something more permanent, as far as funding goes for funding for horseshoe crab, menhaden and NEMAP work. It's been catch as catch can so far, so we'll look into that and see if we can do any better. Then there is a list of pending legislative issues that we'll track.

In and under Pursue Federal Resources heading there is a list of priority activities that the Commission engages in, and these are the areas that Deke and I seek funding for, and make sure that there are no shortfalls and in fact we will hopefully provide some increases. Underneath that same heading it's worth noting that there is a new reference to the U.S. Geological Survey, USGS activity, and as you guys have heard during this meeting week and previously, ASMFC and the USGS have sort of an emerging scientific partnership.

Things are going really well there, so we want to note that to our Capital Hill partners, and that's really it. You know the most importantly Deke and I will continue to provide opportunities for any and all commissioners to go to Capitol Hill and participate in meetings, whenever you guys are interested in doing that.

CHAIR KELIHER: Great, thanks, Bob. This certainly highlights the fact that our presence on Capitol Hill and these larger issues continues to expand in a very positive way, so I want to thank Bob and Deke for their efforts on that. Do we have any questions for Bob on any of these activities? Seeing none, we will roll right into Goal Number 8 on Fiscal Stability, and Laura, the floor is yours.

MS. LAURA C. LEACH: Thank you, Pat. Very quickly, very briefly. Most of what we do in my department is ongoing, and so I'm not going to highlight too many. I will highlight four different things we're going to evaluate our equipment leases, in light of the hybrid work environment that seems to be here to stay. We're also working on implementing or plan to work on implementing a paperless process for accounting inspections, HR functions and that because of the fact that we're not necessarily in the office together.

It just makes more sense to be paperless. We're going to work on developing a Commission Internet, to connect our hybrid workforce via seamless and transparent communication. We're going to explore approaches for commissioners to caucus during virtual meetings. Then everything else you can read is things we do on an annual basis or a regular basis. That concludes my goal.

CHAIR KELIHER: Any questions of Laura? Adam Nowalsky.

MR. NOWALSKY: From the couple of conversations we've had, both through the Executive Committee and either here at this Board meeting, with regards to getting back together. One of the topics that has come up is policies regarding masks, potentially vaccination needs to consider exemptions that might go along with those.

Where does the Human Resources aspect plan have a plan for consideration of those policies regarding vaccination, masking and then addressing how you're going to handle exemptions. Is that something that is covered elsewhere, or would this be something specifically that you need to account for, for 2022?

MS. LEACH: If I might. Adam, I'm not sure that that needs to be in the Action Plan. I think that that's a management decision that Bob with leadership will make. I did not capture that in there for a reason. Bob, do you have anything to add?

EXECUTIVE DIRECTOR BEAL: Pat, if I might. I guess Adam, a question to answer your question, which isn't helpful. Are you asking

about when staff returns to the office how we're going to handle it, or is it the larger, how vaccines and masks and other things are going to be considered during commission meeting weeks when we start getting back together?

MR. NOWALSKY: I think it's a three-pronged effort. One certainly, staff is of importance. You're going to have to deal with this issue on a daily basis. You're going to, I think, have to deal with policies on a commission-wide basis for commissioners when you deal with meetings. Then you're also going to have to consider concerns for the public, both at meetings and at other public hearings, and other things that we hopefully will begin to resume in person. I think that this concern covers all three of those aspects.

EXECUTIVE DIRECTOR BEAL: I guess, Adam, to follow up. The in-office decisions. I've been making those independently, talking to staff, see what they're comfortable with, and moving on from there. Everyone in the office has indicated they're vaccinated, so I think we're in a pretty safe spot in the office. But for meeting weeks and other things, we're going to have to figure that out, you're right. Again, it's somewhat similar to Roy's question. In other words, we will have to see where the Delta variant and some other things are, as we progress through late fall and early winter, and make decisions about the January meeting.

But we'll definitely have to do that. I don't know if we need any action plan. It's something we can't avoid and we're going to have to do it. If the commissioners feel they want a placeholder here to memorialize that we need to do that, that's fine, or there is a realization we can't go on without doing it, I think that's fine too.

CHAIR KELIHER: This is Pat, I think we've got a situation where the Executive Committee has been very engaged in these conversations. When I report out tomorrow on today's Executive Committee meeting, I am going to give the Policy Board and opportunity to weigh in on just the larger issues around vaccination, masks, as well as the exceptions to those type of rules as well, because we're going to have to deal with that.

The idea would be to get some comments from the larger groups that the Executive Committee can then hold on to, as they develop their final plans. I would agree with Bob. I personally don't think this needs to be part of the Action Plan. I think it is just ongoing conversations and management decisions that will ultimately end up in policy.

If people disagree with that, please raise your hand and we'll have a conversation about it now. I'm not seeing any additional hands, so I'll just take it that we've got consensus on that. The AOC did report out, or did review the Action Plan in detail with staff. With that I'm going to turn it over to Spud for the AOC recommendation as it relates to the Action Plan.

MR. A. G. "SPUD" WOODWARD: On behalf of the Administrative Oversight Committee, I move to approve the 2022 ASMFC Action Plan as modified by today's discussion.

CHAIR KELIHER: Great, thank you, Spud. As a committee recommendation this does not need a second. Are there any questions or comments on the motion? **Seeing none, is there any objection to the motion? Seeing no hands raised or voices in objection, the motion passes.** Perfect, thank you very much, and thanks staff for the work on the Action Plan.

A lot of time and effort goes into this on an annual basis, and I want to recognize the staff who spend a lot of time pulling this together, so thank you very much. We now are going to move on to Item Number 5, which is the election of the Chair and Vice-Chair. Before I turn it over to our Executive Director for running the election, I do want to make some

statements and some words of thanks to the Commission.

This is my last time that I get to speak to you guys as the Commission Chair. It was a few weeks ago, maybe a month ago that China blamed COVID on Maine lobster, on a shipment of Maine lobster that spread COVID. I'm not sure if you saw that, but it was pretty amazing to think Maine lobster was connected to COVID. Several people then called me up to say, do I have anything to do with it, because they know how much I love social engagements and being around everybody, and they thought maybe I had something to do with it. But I just want to set the record straight. I had nothing to do with it. It wasn't because I had just become Chair and didn't want to have to go to these meetings. A lot of time and effort has gone into these meetings over the last year and a half during this period, and I've got a lot of thanks to give to everybody.

I want to thank you all for your support that you have given, both to myself and to Spud over the past two years. Again, it's certainly been a challenging time for the Commission, the states, our stakeholders and the world at large. With the exception of my first meeting as Chair in February, 2020, we've been conducting all of the Commission's business through virtual meetings.

I don't know how many Executive Committee meetings we've had. But at times we were holding them weekly. I think that effort at the Executive Committee level certainly helped move the Commission forward. But despite the drawbacks of not meeting in person, I continue to be incredibly impressed with the scope of work we've accomplished over that time.

The accomplishments include quick action by the states to end overfishing of Atlantic striped bass, the implementation of ecological reference points to manage Atlantic menhaden. The positive stock status for all four tautog populations after years of efforts to rebuild these stocks. A new Plan Amendment for bluefish, and the completion of a benchmark stock assessment for American lobster, American shad, cobia and tautog.

We've also had the difficult, but important discussions about reallocation that will continue in the next year and beyond, as we seek to respond to changes in the species distribution along the coast. Looking ahead, Spud and your new Vice-Chair will have a full plate of issues to address. They include a new plan amendment for Atlantic striped bass, as well as broader issues such as responding to climate impacts to our managed stocks, along with reallocation.

I know one of Spud's goals while Chair is to strengthen the Commission's fundamental management principals, such as conservation equivalencies, the use of de minimis provisions and our appeals process, to ensure regulatory and management stability. That's a big workload right there, so Spud is going to need a lot of help, and a lot of luck frankly to get through some of that work, because they are not inconsequential tasks.

But in all seriousness, I am very grateful for the individual and collective efforts of our commissioners, proxies, technical and industry advisors, and our regional and federal partners in advancing the sustainability and management of the Atlantic Coastal Fisheries, despite the challenges that the pandemic has placed upon us.

I also want to give a big thank you to staff at all levels within the Commission. This organization is what it is because of your commitments to not only the states, but to our public resources. From a personal standpoint it is very humbling to be elected by my peers to oversee the Commission.

I have a long history with ASMFC, starting as Advisor over 25 years ago, to serving as your Chair for the past two years. I can honestly say that all of that time, while sometimes

frustrating and even infuriating, has always been a privilege. For me that link to the privilege is directly related to the fact that the Commission is a States' rights organization. We should never, ever lose sight of that. Our individual states rights create our greatest challenges, as we balance sustainability with the needs of our respective states. Climate change and shifting stocks without a doubt will continue to clash with state needs, and I urge you all in the years ahead to stay committed to addressing these challenges.

It will not be easy, but it must happen. I remain committed to working with our new leadership and all of you in the years ahead, to further our missions and shared goals. I want to thank you all for what you do for our Atlantic coast fisheries. With that I will turn it over to our Executive Director to move forward with the elections.

EXECUTIVE DIRECTOR BEAL: Great, thanks, Pat, and appreciate the kind words and appreciate all your work. Just before I jump into elections, a couple words of thanks to Pat. First of all, Pat, there is additional evidence that you had something to do with this COVID situation we're all in. We know that you are not fond of hosting hospitality in your suite, and that was one of the responsibilities of Chairs.

I think there may be some more evidence that you had stuff to do with COVID, so you could duck out of that responsibility for the past seven meeting cycles. But we'll keep looking into that and see if there is any truth to that rumor too. But seriously, Pat, on behalf of the commissioners and staff, I just want to thank you for the past two years of your leadership and guidance and friendship. It's been great.

I've often joked with you and Spud that I can't think of two greater people to go through a global pandemic with than both of you. Everything that's going on this year it's been extra busy. Chairing the Commission is always a pretty busy job, and when you put in COVID and CARES Act and this little whale issue thing that you've got going on back at home.

You know, it's required of you to be available almost 24/7 to me and staff and your fellow commissioners. I know I've called you at weird hours and texted you and done all sorts of things, and you've always been quick to respond. I hope I never woke you up or didn't wake you up too often.

I appreciate it, and just again, thank you for the last two years, all your hard work and everything that you've done. It's been greatly appreciated. I'm pretty confident if we were in person right now you would be getting a big round of applause and a standing ovation from the group, so we really appreciate your efforts.

Our tradition has been to recognize the outgoing Chair with a crystal clock to commemorate your time as a Chair, and we'll get that to you once we can meet in person, hopefully in January. On a personal note, and on behalf of the staff and commissioners, thanks for the past two years, Pat, we really appreciate it.

CHAIR KELIHER: Thank you very much, I appreciate that.

ELECTION OF ASMFC CHAIR AND VICE-CHAIR

EXECUTIVE DIRECTOR BEAL: With that, we'll go into maybe Pat's favorite part of the whole meeting week, which is the election. The way this will be conducted is a little bit different, obviously, since we're meeting virtually. But just as a reminder, the Nomination Committee has been working for the past month or so coming up with nominations for Chair and Vice-Chair, and hopefully all of you were contacted in that process.

Voting occurs on a state basis. Each state is one state, one vote, so it's just caucusing similar to how we operate in board meetings and everything else that the Commission does. I will call on Jim Gilmore in a moment to provide the

nominations for Chair. We'll take a vote on that, and then we'll go into Vice-Chair.

One of the provisions that is unique to the ASMFC election process is that it always provides an opportunity for write in nominees, which is tricky when we're not in the same room or we don't have little ballots or pieces of paper in front of us. What I would like to do is say that once Jim gives his nominations, and I'll give a couple minutes for caucus at the state level.

If there are any write in nominations that need to occur, I ask that you quickly e-mail your write in nomination to Jim Gilmore. Jim is the Chair of the Nominating Committee, and he'll notify the group that there has been an additional nomination, and we'll have to account for that in the election.

I think it's been probably a fairly thorough process that the Nominating Committee went through. We may not have any write in votes, but if we do, they are definitely in bounds, and please e-mail Jim Gilmore very quickly if you have a write in nomination for Chair or Vice-Chair. With that, Mr. Gilmore, can you provide the Nominations Committee report, please?

MR. JAMES J. GILMORE: I certainly can, Mr. Beal. Just quickly to add my points to Pat, having recently been Chair. I know the tough job it can be, and I think Pat you did just beyond an outstanding job. I just wanted to add my voice to that. In any event, let me just give you a little bit of our process of the Nomination Committee.

I thank the other two members, Cheri Patterson was covering the New England area, Mel Bell was doing the South Atlantic area, and myself for the Mid-Atlantic. We've solicited interest in being nominated for both Chair and Vice-Chair over the last few weeks, and we met on a couple of occasions by phone.

At this point, I would like to first take the Chairman. **We have one nomination for Chairman, and would like to forward the one candidate, Spud Woodward for your consideration.** Back to you, Bob. Oh, and if there is, just so you know. My e-mail is James.Gilmore@DEC Donald, Edward, Charlie. NY.GOV, that's DEC.NY.GOV if anybody does want to e-mail me for a write in. Thanks, Bob.

EXECUTIVE DIRECTOR BEAL: Maya, can you pull up the nomination for Commission Chair? Since this is a nomination on behalf of the Nominations Committee, it does not need a second. With that, I think we'll take about a two-minute pause to provide caucusing time and opportunity for any write in votes, and then we'll come back and vote on this motion. All right, two minutes are pretty close to up. Jim, did you receive any e-mails on write in nominations?

MR. GILMORE: No, Bob, I did not receive any write-ins.

EXECUTIVE DIRECTOR BEAL: All right, thanks, Jim. Well, with that are there any objections to electing Spud Woodward as the next Chair of the Atlantic States Marine Fisheries Commission? Toni, can you note if there are any hands raised?

MS. KERNS: Yes, I will. I have no hands raised.

EXECUTIVE DIRECTOR BEAL: With that, congratulations, Spud, you have been elected unanimously as the next Chair of the Atlantic States Marine Fisheries Commission.

MR. WOODWARD: Thank you very much, Bob. When we conclude the election, I would like to make a few remarks, please.

EXECUTIVE DIRECTOR BEAL: Absolutely, you will be the Chair, you can do whatever you want. With that let's go ahead back to Jim for nominations for Vice-Chair of the Commission, please, Jim.

MR. GILMORE: Thanks Bob, and same process. We solicited from all of the east coast states and we have one nomination for Vice-Chairman. On behalf of the Committee, I would like to forward the nomination for Joe Cimino from New Jersey.

EXECUTIVE DIRECTOR BEAL: Great, thank you, Jim. Maya will put that up, so we have one, and again it's a motion from the Nominations Committee, so it does not need a second. With that I think we'll go to the same process, two-minute pause for caucusing and write in votes, and if you have anything to let Jim know about as far as write ins, please do it. Pretty close to two minutes again, Jim, do you have any e-mails on write in nominations for Vice-Chair?

MR. GILMORE: No, Bob. There is no write in nominations.

EXECUTIVE DIRECTOR BEAL: All right, thank you. With that, are there any objections to electing Joe Cimino as the Vice-Chair of the Atlantic States Marine Fisheries Commission? If you object, please raise your hand.

MS. KERNS: I don't have any hands, Bob.

EXECUTIVE DIRECTOR BEAL: Thanks, Toni. It stands, Joe Cimino is elected unanimously as the Vice-Chair of the Atlantic States Marine Fisheries Commission. Congratulations, Joe, and then Spud, we will go back to you for your comments, if that works for you.

CHAIR A.G. "SPUD" WOODWARD: Thanks, Bob, and congratulations to Joe. I look forward to working with you. I'm honored to be selected as Chair of the Commission. You know a couple of my predecessors at Georgia DNR were honored to do that while still being actively employed. I decided to try to stay involved with the Commission after retirement. I really did not expect to be chosen for a leadership position, so I am certainly humbled and honored. I'm sure me and Joe will do our best to help us pull out of this pandemic. In some ways I think getting out of it is going to perhaps be more challenging than having gone into it. With that I certainly would like to express my thanks to Pat.

You know to us folks down south; you know New Englanders were kind of mysterious. But we've always thought of Mainers as pretty hardy, toe the line, no nonsense people, and I can't think of anyone better than a man like Pat to have led us through the uncertainties and tumultuous times of this pandemic. He set a new standard, I think, for communications albeit virtual.

We've learned that that is a tool in our toolbox, it isn't a substitute for in-person meetings, and I'm certainly going to strive to have us back to in-person meetings, in whatever form they can take, as soon as possible. I know Pat was presented with challenges unlike any of his predecessors, and I appreciate the hard work he did. He kept me involved, kept me engaged, and gave all of us a chance to be involved in making the decisions that affected us. Joe and I have got some big shoes to fill, but we'll do our best, so thanks.

EXECUTIVE DIRECTOR BEAL: Great, thank you, Spud. Pat, I think you're still technically presiding over this meeting. I don't know if you want to take back over and wrap it up.

CHAIR KELIHER: Yes, I'm happy to do that. Spud has asked me to stay on as Chair, dealing with the business of the Commission until the end of the meeting tomorrow. You will continue to hear my voice until then. I do want to thank Spud for his time as Vice-Chair. I couldn't have done this work without him, and want to congratulate him for stepping into the Chairman's role, and Joe of course into the Vice-Chair role. I think we've got a great team at the helm moving forward over the next couple of years.

I again, look forward to working with both of them. With that, there is no other business

before the Business Session today. We would resume, if needed, at 4:30 tomorrow afternoon.

ADJOURNMENT

CHAIR KELIHER: Unless there are other hands that have comments for the Business Session, we will stand adjourned. I see no hands, so we stand adjourned until tomorrow, if we are needed. With that, I want to thank everybody. I want to thank everybody for the kind words. We've got a lot of work to do, so let's get back at it. Thank you very much.

(Whereupon the meeting adjourned at 1:17 p.m. on October 22, 2020.)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Business Session

FROM: Dustin Colson Leaning, FMP Coordinator

DATE: January 11, 2022

SUBJECT: Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment 22 Summary

In December, the Summer Flounder, Scup, and Black Sea Bass Management Board (Board) recommended approval of the Commercial/Recreational Allocation Amendment to the Fishery Management Plan (FMP) by the Commission. The Mid-Atlantic Fishery Management Council (Council) approved the same preferred alternatives for the Amendment for consideration and approval by NOAA Fisheries.

Amendment 22 revises the commercial and recreational allocations for all three species, and allows for future changes to commercial/recreational allocations and annual quota transfers to be made through addenda. If approved by the Commission and NOAA Fisheries, this Amendment would be implemented for management for the 2023 fishing year.

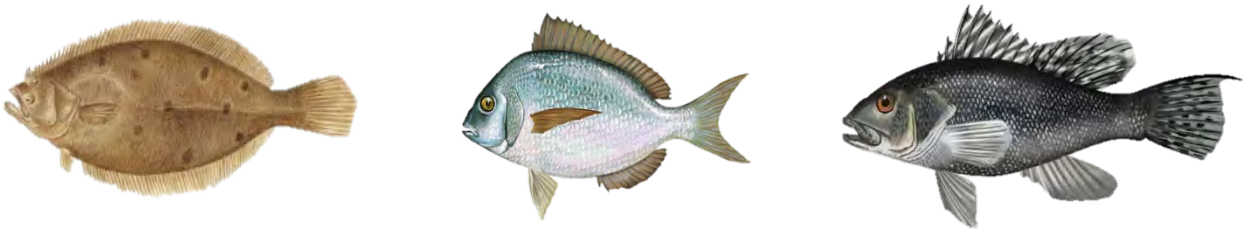
	Current Allocations	Revised Allocations
Summer Flounder	**60%** Commercial; **40%** Recreational Landings-based	**55%** Commercial; **45%** Recreational Catch-based
Scup	**78%** Commercial; **22%** Recreational Catch-based	**65%** Commercial; **35%** Recreational Catch-based
Black Sea Bass	**49%** Commercial; **51%** Recreational Landings-based	**45%** Commercial; **55%** Recreational Catch-based

Note: Landings-based allocations are based on each sector's harvest only. Catch-based allocations are based on each sector's harvest plus dead discards.

Both the December 2021 Amendment Decision Document (Council) and the ASMFC Draft Amendment 22 have been included in briefing materials for reference. The Decision Document contains the complete set of alternatives that were considered by the Board and Council at their joint meeting in December, including those that were added in August by four Board and Council members. The Board approved alternatives have been highlighted in yellow within the Decision Document (pages 10-12, 28, 37, and 45). The Draft Amendment contains additional background information such as information on protected species, habitat considerations, etc. Once approved by the Commission, the Amendment 22 will be updated to reflect the final measures that were approved by the Board and Council.

Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment

Council/Board Decision Document



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Prepared by the
Mid-Atlantic Fishery Management Council
and the
Atlantic States Marine Fisheries Commission

1.0 CONTENTS

2.0 INTRODUCTION AND AMENDMENT STATUS

The Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission), through its Summer Flounder, Scup and Black Sea Bass Management Board (Board), will consider taking final action on the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment in December 2021. The Council and Commission work cooperatively to develop commercial and recreational fishery regulations for summer flounder, scup, and black sea bass from Maine through North Carolina (north of Cape Hatteras for scup and black sea bass). The National Marine Fisheries Service (NMFS) serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch for all three species is taken from both state (0-3 miles offshore) and federal waters (3-200 miles offshore).

Public hearings and a public comment period for this action took place during January through March 2021. The Council and Board considered taking final action on this amendment in April 2021; however, they chose to delay final action until December. They also agreed to consider proposals for additional alternatives that fell within the range of the originally analyzed alternatives prior to final action. In August 2021, they added four additional allocation percentage alternatives for each species. The expected impacts of the additional alternatives are within the range of the expected impacts of the original alternatives; therefore, these new alternatives did not necessitate an additional public comment period.

2.1 Summary of Public Hearing Process

Five virtual public hearings were held between February 17 and March 2, 2021, targeted toward certain states or regional groupings of states. Hearings were attended by approximately 233 unique individuals in total, excluding Council and Commission staff. Approximately 49 unique individuals provided comments across all hearings.

Written comments were accepted from January 15, 2021 through March 16, 2021. In total, 311 individuals or organizations either provided written comments (200) or signed a form letter (111) on this action. Some of these commenters overlapped with those providing comments at hearings.

Public comments were reviewed at the April 2021 Council and Board meeting. The full summary of the written and hearing comments is available at: https://www.mafmc.org/s/3-FSB-Allocation-Am-PUBLIC-Comment-Summary_FINAL_Mar2021.pdf.

2.2 Activity Since Public Hearings and Addition of New Alternatives

The Council and Board first considered final action on this amendment at their April 2021 joint meeting,[1] but instead voted to postpone final action until December 2021 to allow for further development of the Recreational Harvest Control Rule Framework and Addendum.[2] They also agreed to consider proposals for additional commercial/recreational allocation alternatives from Council and Board members at their joint meeting in August 2021. Both bodies agreed that any

[1] See https://www.mafmc.org/briefing/april-2021.
[2] https://www.mafmc.org/actions/recreational-reform-initiative

additional proposals should be within the existing range of alternatives in the document to avoid further delaying final action.

At the August 2021 joint meeting,[3] the Council and Board approved the addition of four new allocation alternatives for each species. The basis for these alternatives is described in Appendix B. As discussed at the August meeting, the impacts of these new alternatives fall within the range of the previously considered alternatives, all of which remain in consideration for this action.

This document represents a revised version of the January 2021 Public Hearing Document, with the following changes:

1) The range of alternatives and impacts analysis now include the four new alternatives for each species that were adopted in August 2021. The basis for these alternatives has been added to Appendix B.
2) The impacts analysis uses example commercial quotas and recreational harvest limits (RHLs; see Appendix C) that are now based on the 2023 Acceptable Biological Catch limits (ABCs) instead of the 2020 ABCs. This was done to provide more up to date information about possible impacts based on recent stock assessments and the Council and Board's adopted ABCs for 2023. These limits are still examples, as expected discard calculations would still be considered by the Monitoring Committee and Council/Board under any revised allocations.
3) The allocation phase-in analysis in section 4.3.2 has been updated to reflect the additional alternatives and to update the baseline for switching from a landings- to a catch-based allocation (or vice versa) to the 2022 catch or landings split.
4) The example high and low transfer caps described in section 5.2.3 have been updated to include ABCs through 2023.

2.3 What Happens Next?

The Council and Board are expected to take final action on this amendment in December 2021. While the Commission's actions are final for state waters (0-3 miles from shore) upon approval of the amendment unless otherwise specified, the Council's recommendations are not final until they are approved by the Secretary of Commerce through the National Marine Fisheries Service. Therefore, the timing of full implementation of this action will depend on the federal rulemaking timeline. This rulemaking process is expected to occur in 2022, with the intent for revised measures (if applicable) to be effective at the start of the 2023 fishing year.

3.0 AMENDMENT PURPOSE AND NEED FOR ACTION

3.1 Amendment Purpose

The purposes of this amendment are to:

1) Consider modifications to the current allocations between the commercial and recreational sectors for summer flounder, scup, and black sea bass (Section 4.0). The commercial and recreational allocations for all three species are currently based on historical proportions of landings (for summer flounder and black sea bass) or catch (for scup) from each sector. The current allocations were set in the mid-1990s and have not been revised since that time.

[3] See https://www.mafmc.org/briefing/august-2021.

2) Consider the option to transfer a portion of the allowable landings each year between the commercial and recreational sectors, in either direction, based on the needs of each sector (Section 5.0). The current Fishery Management Plan (FMP) does not allow for such transfers.
3) Consider whether future additional modifications to the commercial/recreational allocation and/or transfer provisions can be considered through a future FMP addendum/framework action, as opposed to an amendment (Section 6.0).

Several other issues identified during scoping for this action were considered by the Council and Board but have since been removed from further consideration in this amendment. Some of those issues will be further considered through other initiatives or actions. For more information, see the documents associated with past meetings for this amendment, available at: https://www.mafmc.org/actions/sfsbsb-allocation-amendment.

3.2 Need for Action

The commercial and recreational allocations for all three species are currently based on historical proportions of landings (for summer flounder and black sea bass) or catch (for scup) from each sector. Recent changes in how recreational catch is estimated have resulted in a discrepancy between the current levels of estimated recreational harvest and these allocations.

Recreational catch and harvest data are estimated by the Marine Recreational Information Program (MRIP). In July 2018, MRIP released revised time series of catch and harvest estimates based on adjustments to its angler intercept methodology, which is used to estimate catch rates, as well as changes to its effort estimation methodology, namely, a transition from a telephone-based effort survey to a mail-based effort survey for the private/rental boat and shore-based fishing modes.[4] These revisions collectively resulted in much higher recreational catch estimates compared to previous estimates, affecting the entire time series of data going back to 1981.

The revised MRIP estimates were incorporated into the stock assessments for summer flounder in 2018 and for scup and black sea bass in 2019. This impacted the estimated stock biomass and resulting catch limits for these species. In general, because the revised MRIP data showed that more fish were caught than previously thought, the stock assessment models estimated that there were more fish available to catch, which in turn impacted the biomass estimates derived from the stock assessments. However, for each species, the revised MRIP data were one of many factors that impacted the stock assessments and the resulting catch limits. Other factors such as the addition of data on recent recruitment also impacted the assessment model results.

- For summer flounder, the revised MRIP estimates were 30% higher on average compared to the previous estimates for 1981-2017. The differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. Increased recreational catch resulted in increased estimates of stock size compared to past assessments. The higher biomass projections resulted in a 49% increase in the commercial quota and RHL for 2019. Expected recreational harvest in the new MRIP currency was

[4] For-hire effort continues to be assessed through a telephone survey of known for-hire operators. More information on how MRIP collects data from the recreational fishery is available at: https://www.fisheries.noaa.gov/recreational-fishing-data/types-recreational-fishing-surveys.

close to the revised RHL; therefore, recreational measures could not be liberalized in 2019 despite the 49% increase in the RHL.

- For scup, the revised MRIP recreational catch estimates were, on average, 18% higher than the previous estimates for 1981-2017. The differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. The MRIP data have a lesser impact in the scup stock assessment model, with the 2019 operational stock assessment showing minor increases in biomass estimates compared to the 2015 assessment. Due to below-average recruitment in recent years, the scup catch and landings limits for both the commercial and recreational sectors decreased slightly as a result of biomass projections provided with the 2019 operational stock assessment.
- For black sea bass, the revised MRIP recreational catch estimates increased the 1981-2017 total catch by an average of 73%, ranging from +9% in 1995 to +161% in 2017. As with summer flounder and scup, the differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. These increased catch estimates combined with an above average 2015 year class contributed to a notable scaling up of the spawning stock biomass estimates from the previous assessment. As a result, the 2020 black sea bass commercial quota and RHL both increased by 59% compared to 2019. Recent harvest under the new MRIP data was higher than the 2020 RHL, therefore, recreational management measures could not be liberalized.

Some changes have also been made to commercial catch data since the allocations were established. For example, the time series of commercial scup discard estimates was revised through the 2015 scup stock assessment. For the 1988-1992 allocation base years, the current estimates of scup commercial catch are on average 8% lower than the estimates used to set the allocations under Amendment 8.

The commercial and recreational data revisions not only impact the catch estimates, but also affected our understanding of the population levels for all three fish stocks. This has management implications due to the fixed commercial/recreational allocation percentages defined in the FMP for all three species. These allocation percentages do not reflect the current understanding of the recent and historic proportions of catch and landings from the commercial and recreational sectors. These allocation percentages are defined in the Council and Commission FMPs; therefore, they can only be modified through an FMP amendment. This amendment considers whether the allocations are still appropriate and meeting the objectives of the FMP, as well as other potential changes related to how the allocations are managed, as described in Sections 5 and 6.

4.0 COMMERCIAL/RECREATIONAL ALLOCATION ALTERNATIVES AND IMPACTS

This section describes the alternatives under consideration for the commercial/recreational allocation percentages for summer flounder, scup, and black sea bass (Section 4.1), along with their expected impacts (Section 4.2). The basis for each alternative is described in more detail in Appendix B. The range of allocation alternatives for each species includes options that would maintain the current allocations as well as options to revise them based on updated data using the same or modified base years. Section 4.3 describes options to phase in any allocation changes over multiple years, as well as the expected impacts of these phase-in provisions.

Alternatives for both catch-based and landings-based allocations are under consideration for all three species. As described in more detail in Appendix A, the same types of catch and landings limits are required under both catch and landings-based allocations (i.e., commercial and recreational annual catch limits, or ACLs, and annual catch targets, commercial quota, and RHL). Dead discards (i.e., discarded fish that are assumed to die)[5] must be accounted for in the catch limits under both allocation approaches. Under both approaches, dead discards are subtracted from the catch limits to derive the sector-specific landings limit. **The main difference between these approaches is the step in the calculations where the commercial/ recreational allocation percentage is applied.** This has implications for how those dead discards are factored into the calculations.

Catch-based allocations (currently in place for scup) apply the commercial/recreational allocation at the ABC level, meaning the entire amount of allowable catch (i.e., the ABC, which includes landings and dead discards) would be split based on the commercial/recreational allocation percentage defined through the alternatives listed below. Under a landings-based allocation (currently in place for summer flounder and black sea bass), the ABC is first split into the amount expected to come from landings and the amount expected to come from dead discards. The expected landings amount is then split according to the commercial/recreational allocation percentage defined through the alternatives listed below.

It is important to note that **because expected dead discards are handled differently under catch and landings-based approaches, the allocation percentages under these two approaches are not directly comparable**. To allow for comparison across all alternatives, example resulting commercial quotas and RHLs for each species are provided in Section 4.2 (see Appendix C for details on how these example quotas and RHLs were calculated). Actual resulting commercial quotas and RHLs will vary based on annual considerations.

Table 1 provides a summary comparison of the key differences and similarities between catch- and landings-based allocations. The implications of catch vs. landings-based allocations are further discussed in Appendix A and in Section 4.2.

[5] The current discard mortality rates assumed in the stock assessments and catch and landings limits calculations are: 10% for recreational summer flounder discards and 80% for commercial summer flounder discards; 15% for scup recreational discards and 100% for commercial scup discards; 15% for recreational black sea bass discards, 15% for commercial non-trawl black sea bass discards, and 100% for commercial trawl black sea bass discards. These discard mortality rates are used in all aspects of the management program which utilize estimates of dead discards.

Table 1: Summary of the differences and similarities between catch- and landings-based allocations.

Catch-based allocations	Landings-based allocations
• Currently in place for scup. • **Allocation at ABC level** as first step: total catch (landings + dead discards) split into recreational and commercial ACLs based on allocation percentage defined in FMP. • The entire ABC is always split among the sectors based on the allocation defined in the FMP, regardless of recent trends in landings and discards by sector. Therefore, changes in landings and dead discards in one sector do not influence the other sector's ACL. • Expected dead discards are calculated separately for each sector to subtract from the sector ACLs to determine the sector landings limits	• Currently in place for summer flounder and black sea bass. • ABC is first split into the amount expected to come from landings (Total Allowable Landings, or TAL) and the amount expected to come from dead discards. The methodology for this split is not pre-defined and is usually based on recent trends in landings and dead discards, as well as stock assessment projections where possible. • **Allocation at TAL level:** TAL is allocated among the commercial and recreational sectors based on the allocation percentage defined in the FMP. • Total expected dead discards are split by sector based on different methods, usually recent trends in discards by sector. The sector specific expected dead discards are subtracted from the sector ACLs to derive the sector landings limits. • Changes in landings and dead discards in one sector over time can impact the catch and landings limits in both sectors by impacting the division of the ABC into expected landings and expected dead discards.
Under Both Approaches: • Commercial and recreational ACLs, annual catch targets, and landings limits (i.e., commercial quota and RHL) are required. • Expected dead discards must be projected and accounted for by sector. • Only **dead** discards (discarded fish that are assumed to die) are accounted for in setting and evaluating catch limits. Neither allocation approach includes consideration of released fish that are assumed to survive. • Accountability measures are required for each sector and tied to sector-specific ACLs. Each sector is held separately accountable for any ACL overages. **The main difference between approaches is the step in the calculations at which the commercial/recreational allocation percentages are applied, which has implications for how expected dead discards are projected and divided by sector.**	

4.1 Commercial/Recreational Allocation Alternatives

4.1.1 Summer Flounder Allocation Alternatives

Table 2 lists the alternatives under consideration for the commercial/recreational summer flounder allocation percentages. The current allocations for summer flounder are landings-based and are represented by the no action/status quo alternative (alternative 1a-4). As described above, both catch- and landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch-based allocations and landings-based allocations. Appendix C provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Appendix A provides more details on the differences between catch- and landings-based allocations and the potential implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix B.

Table 2: Summer flounder commercial/recreational allocation alternatives. The current allocations are highlighted in green. Alternatives beginning with 1a represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "fluke" represent those added during their August 2021 meeting.

Summer Flounder Catch-Based Allocation Percentages	
Alternative	**Basis (see Appendix B for details)**
Fluke-4: 50.0% com., **50.0%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2006-2008, 2014, and 2016)
Fluke-2: 45.0% com., **55.0%** rec.	Average 2004-2018 catch proportions, excluding years with RHL overages (i.e., 2006-2008, 2014 and 2016)
1a-1: 44.0% com., **56.0%** rec.	Average 2004-2018 catch proportions
1a-2: 43.0% com., **57.0%** rec.	Multiple approaches: 2009-2018 average catch proportions, approximate status quo harvest per sector compared to 2017/2018, and average of other approaches approved by Council/Board in June 2020
1a-3: 40.0% com., **60.0%** rec.	Average 2014-2018 catch proportions
Summer Flounder Landings-Based Allocation Percentages	
Alternative	**Basis (see Appendix B for details)**
1a-4: 60.0% com., **40.0%** rec.	No action/status quo (1980-1989)
1a-5: 55.0% com., **45.0%** rec.	Same base years, new data (1981-1989; 1980 data unavailable) BOARD/COUNCIL APPROVED PERCENTAGE, BUT APPLIED IT AS A CATCH BASED ALLOCATION INSTEAD
Fluke-3: 51.0% com., **49.0%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2006-2008, 2014, and 2016)
Fluke-1: 47.0% com., **53.0%** rec.	Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2006-2008, 2014 and 2016)
1a-6: 45.0% com., **55.0%** rec.	Multiple approaches: average 2004-2018 landings proportions and average 2009-2018 landings proportions
1a-7: 41.0% com., **59.0**% rec.	Average 2014-2018 landings proportions

4.1.2 Scup Allocation Alternatives

Table 3 lists the alternatives under consideration for the commercial/recreational scup allocation percentages. The current allocations for scup are catch-based and are represented by the no action/status quo alternative (alternative 1b-1). As described above, both catch- and landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch- and landings-based allocations. Appendix C provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Appendix A provides more details on the differences between catch and landings-based allocations and the potential implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix B. The alternatives in this section are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from Table 3 below.

Table 3: Scup commercial/recreational allocation alternatives. The current allocations are highlighted in green. Alternatives beginning with 1b represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "scup" represent those added during the August 2021 Council and Board meeting.

Scup Catch-Based Allocation Percentages	
Alternative	**Basis (see Appendix B for details)**
1b-1: 78.0% com., **22.0%** rec.	No action/status quo
1b-2: 65.0% com., **35.0%** rec.	Same base years, new data (1988-1992)
Scup-4: 63.5% com., **36.5%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2004 and 2007-2010)
Scup-2: 62.0% com., **38.0%** rec.	Average 2004-2018 catch proportions, excluding years with RHL overages (i.e., 2004 and 2007-2010)
1b-3: 61.0% com., **39.0%** rec.	Multiple approaches: average 2009-2018 catch proportions and average of other approaches approved by Council/Board in June 2020
1b-4: 59.0% com., **41.0%** rec.	Approximate status quo harvest per sector compared to 2018/2019
Scup Landings-Based Allocation Percentages	
Alternative	**Basis (see Appendix B for details)**
Scup-1: 59.0% com., **41.0%** rec.	Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2004 and 2007-2010)
Scup-3: 58.0% com., **42.0%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2004 and 2007-2010)
1b-5: 57.0% com., **43.0**% rec.	Multiple approaches: Same base years, new data; average 2014-2018 landings proportions; average 2009-2018 landings proportions
1b-6: 56.0% com., **44.0%** rec.	Average 2004-2018 landings proportions
1b-7: 50.0% com., **50.0%** rec.	Approximate status quo harvest per sector compared to 2018/2019

4.1.3 Black Sea Bass Allocation Alternatives

Table 4 lists the alternatives under consideration for the commercial/recreational black sea bass allocation percentages. The current allocations for black sea bass are landings-based and are represented by the no action/status quo alternative (alternative 1c-4). As described above, both catch- and landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch-based allocations and landings-based allocations. Appendix C provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Appendix A provides more details on the differences between catch- and landings-based allocations and the potential implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix B.

The alternatives in this section are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from Table 4 below.

Table 4: Black sea bass commercial/recreational allocation alternatives. The current allocations are highlighted in green. Alternatives beginning with 1c represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "BSB" represent those added during their August 2021 meeting.

Black Sea Bass Catch-Based Percentages	
Alternative	**Basis (see Appendix B for details)**
BSB-4: 40.5% com., **59.5%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)
BSB-2: 36.0% com., **64.0%** rec.	Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)
1c-1: 32.0% com., **68.0%** rec.	Approximate status quo harvest per sector compared to 2018/2019
1c-2: 28.0% com., **72.0%** rec.	Average 2004-2018 catch proportions
1c-3: 24.0% com., **76.0%** rec.	Average 2009-2018 catch proportions
Black Sea Bass Landings-Based Percentages	
Alternative	**Basis (see Appendix B for details)**
1c-4: 49.0% com., **51.0%** rec.	No action/status quo
1c-5: 45.0% com., **55.0%** rec.	Same base years, new data (1983-1992) BOARD/COUNCIL APPROVED PERCENTAGE, BUT APPLIED IT AS A CATCH BASED ALLOCATION INSTEAD
BSB-3: 41.0% com., **59.0%** rec.	50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)
BSB-1: 37% com., **63%** rec.	Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)
1c-6: 29.0% com., **71.0%** rec.	Multiple approaches: Approximate status quo harvest per sector compared to 2018/2019 and average of other approaches approved by Council/Board in June 2020
1c-7: 22.0% com., **78.0%** rec.	Average 2009-2018 landings proportions and average 2014-2018 landings proportions

4.2 Impacts of Commercial/Recreational Allocation Alternatives

As described in more detail below, the impacts of these alternatives are expected to be mostly socioeconomic in nature. Potential biological impacts on the summer flounder, scup, and black sea bass stocks are also briefly discussed below. Impacts applicable to all three species are discussed in section 4.2.1, while species-specific impacts are outlined in sections 4.2.2 through 4.2.4. A more complete impacts analysis, including consideration of the potential impacts on other components of the environment such as non-target species, habitats, marine mammals, and species listed as threatened or endangered under the Endangered Species Act, will be included in the Environmental Assessment prepared after the Council and Board select their final preferred alternatives.

Sections 4.2.2 through 4.2.4 contain example projected RHLs and commercial quotas for each allocation alternative to demonstrate potential impacts to the recreational and commercial fisheries. The 2023 ABC for each species was used to project landings limits that reflect recent stock size and to allow for comparison to recent fishery performance. The methodology used to develop the example landings limits differs from the methodology that was used to develop the actual landings limits that were implemented for management use in 2023 in order to allow for a consistent approach across all alternatives. For the status quo alternatives for each species, the actual 2023 RHLs and commercial quotas are presented. For the other alternatives, use of a different method was necessary to allow for several assumptions that must be made about how dead discards by sector would be projected, including the effect that changing allocations could have on each sector's fishing effort and dead discards. A more detailed description of the methodology used to generate example RHLs and quotas can be found in Appendix C.

Actual future commercial quotas and RHLs under any of these alternatives cannot be determined at this time and may differ from the examples presented here based on annual decisions made through the specifications process. For example, assumptions about expected dead discards (total and sector-specific) may vary from those used here. In addition, the ABCs from which the commercial quotas and RHLs are derived have not been set beyond 2023. The example commercial quotas and RHLs in this document are provided only for the purposes of assessing the potential impacts of each alternative and for comparing between the alternatives.

4.2.1 General Impacts of Allocation Changes on All Three Species

Socioeconomic Impacts

Aside from the no action/status quo alternatives, all alternatives for all three species would result in an increased recreational allocation. This would result in higher RHLs than the current allocations. RHLs are tied to recreational measures such as possession limits, fish size restrictions, and open/closed seasons. These measures are adjusted as needed to allow harvest to meet but not exceed the RHL. Depending on the magnitude of the increase, an increased recreational allocation may not allow for liberalized recreational management measures compared to recent years in all cases. In some cases, recreational restrictions may still be needed if the allocation increase is not enough to account for recent increases in the MRIP harvest estimates.

Liberalizing or restricting recreational measures can impact angler access to all three species. Increased access could take the form of more fish to take home (under higher possession limits or lower minimum fish sizes) and more opportunities to target these species (under longer open seasons). Decreased access could mean the ability to retain fewer fish and reduced opportunities to target these species. This can affect angler satisfaction, revenues for for-hire businesses (e.g.,

by impacting demand for for-hire trips), and revenues for support businesses such as bait and tackle shops.

At the community level, these impacts may be greatest for communities with or near recreational fishing sites, communities where for-hire businesses are based, and communities with tourism that is impacted by recreational fishing.

Aside from the no action/status quo alternatives, all alternatives for all three species would result in reduced allocation to the commercial sector, which is expected to result in lower commercial quotas than the current allocations. The commercial sector may experience a loss in revenue due to corresponding lower quotas and a reduction in potential landings of summer flounder and black sea bass. For scup, this will depend on the degree of the decrease in the quota as the commercial scup quota has not been fully harvested since 2007 due to other factors such as market demand. However, future market conditions may vary. For all three species, the loss in revenue associated with the reduction in quota is not expected to be consistently linear, as the relationship between price and volume landed in the fishery is variable over time and by species. Other factors such as variation in costs can also affect revenue. Some negative impacts associated with quota reductions might be partially offset by the potential for increased prices paid by dealers if decreased quotas result in decreased supply. However, the degree to which this happens depends on the relationship between demand and price.

Impacts from a reduction in commercial quota will not be felt equally across all commercial industry participants. The coastwide commercial quota is divided into state quotas for summer flounder and black sea bass, and seasonal quota periods for scup. Of the three scup quota periods, only the summer period quota is further allocated among states. Some states typically fully utilize their quota, while other states tend to underutilize their quota. Commercial fishermen[6] from states that fully utilize quota are more likely to experience loss in revenue, restrictive trip limits, and seasonal closures to account for the reduced commercial quota. States that have historically underutilized their quota may still be impacted in the medium- to long-term as reduced access to quota may inhibit the ability for market expansion in the future. These states could also be impacted in the near-term depending on the magnitude of allocation reduction. If the commercial allocation is substantially reduced, quotas in some states may drop below what is currently being utilized.

Lower commercial quotas resulting from lower allocations could result in lower trip limits and shorter seasons. Lower trip limits can incentivize high-grading whereby smaller fish are discarded to allow for more landings of larger fish that can fetch a higher price per pound. Shorter seasons could result in market instability through greater fluctuations in price, as well as “race to fish” conditions if seasons are shortened substantially. A reduction in commercial quotas would not just impact commercial fishermen, it would also reduce the availability of these species to consumers. Changes in commercial allocation of these three species also affects the economic health of communities with notable participation in these commercial fisheries through employment in the harvesting, processing, distribution, and retail aspects of the commercial fisheries. The scale of the impacts will depend on the scale of the change and the degree of local economic dependence on these commercial fisheries.

[6] The term fishermen applies to all people who fish, regardless of gender.

There are also impacts for both sectors associated with switching from a landings-based allocation (currently implemented for summer flounder and black sea bass) to a catch-based allocation (currently implemented for scup). It could be perceived as a benefit that the catch and landings limits for each sector can be calculated independently from each other under a catch-based allocation. As described in more detail in Appendix A, under a catch-based allocation, changes in landings and dead discards in one sector do not influence the other sector's allocation as the entire ABC is always split among the sectors based on the allocation defined in the FMP, regardless of recent trends in landings and discards by sector. In theory, this can allow each sector to see the benefits of a reduction in their own dead discards to a greater extent than under a landings-based allocation. Under a catch-based allocation, a reduction in dead discards in one sector can result in an increase in that sector's landings limit in a future year. This was part of the rationale for implementing the current catch-based allocation for scup as it was expected to incentivize a reduction in commercial dead discards, which were of concern during development of Amendment 8 when the commercial/recreational scup allocations were first developed. Under a landings-based allocation, changes in landings and dead discards in one sector can influence the catch and landings limits in both sectors; therefore, the benefits of a reduction in dead discards (or the negative impacts of an increase in dead discards) in one sector can also be felt by the other sector. Beyond these considerations, commercial and recreational fishermen are not expected to experience a meaningful difference in impacts from landings or catch-based allocations independent from the resulting commercial quotas and RHLs. For example, aside from the considerations described above, there will not necessarily be a negative impact to the fisheries from switching from one method (catch or landings-based) to the other.

Under all alternatives considered in this action, the commercial and recreational sectors will continue to be held separately accountable for overages of their catch and landings limits. There will be no changes to the accountability measures for either sector.[7]

Biological Impacts to Summer Flounder, Scup, and Black Sea Bass Stocks

As described above, all but the no action/status quo alternatives would reduce the commercial allocations, which would in turn result in lower commercial quotas than the no action/status quo alternatives.

As described in more detail in the species-specific sections below, some alternatives which would increase the recreational allocation may still require additional restrictions in the recreational fisheries compared to the measures used in recent years due to the mismatch between the revised MRIP data and the RHLs which could result from the allocations under many alternatives.

Depending on the scale of the change, a decrease in the commercial quota or additional restrictions on the recreational fishery could lead to increased regulatory discards of these species compared to recent levels. Actual changes in discards will depend on many factors. For example, fishing behavior in both sectors is influenced by many factors in addition to the regulations (e.g., weather, availability of other target species, market demand). Discards are also influenced by availability of each species, both overall abundance and by size class. For example, high availability of fish smaller than the minimum size limit can lead to high regulatory discards. Lower availability of

[7] A summary of the current accountability measures for summer flounder, scup, and black sea bass can be found at: https://www.mafmc.org/s/AMs-description_SF_scup-BSB_Dec2020.pdf.

legal-sized fish can lead to decreased discards. For these reasons, it is challenging to predict future discards based on changes in allocations.

In all cases, total dead catch (i.e., landings and dead discards) will continue to be constrained by the overall ABC, which is based on the best scientific information available and is intended to prevent overfishing. In this way, none of the alternatives are expected to change patterns in landings, discards, or fishing effort in such a way that they negatively impact stock status for any of the three species.

Landings and discards in the commercial and recreational sectors are monitored and estimated in different ways. A preliminary analysis taking into account the different levels of precision of the estimates of landings and dead discards in each sector for all three species suggested that the risk of exceeding the ABC does not vary greatly under a wide range of different proportions of total dead catch from each sector. This suggests that changes in the commercial/recreational allocation, especially changes within the range under consideration, may not have notably different impacts on the risk of exceeding the ABC.

4.2.2 Summer Flounder Allocation Impacts

Many stakeholders across regions and fishing modes view the summer flounder recreational minimum size and bag limit to be overly restrictive. Depending on the alternative selected and annual considerations, an increase in allocation to the recreational sector may allow for a liberalization of these measures and could increase access to anglers. A reduction in the minimum size limit may be particularly impactful to those who fish from shore and typically encounter smaller fish. Allowing more fish to be retained increases angler satisfaction and provides greater access to fish to bring home to eat.

Table 5 compares example quotas and RHLs under each allocation alternative using the 2023 ABC (see Appendix C for methodology) to the actual quota and RHL adopted for 2023. All alternatives represent an increase in allocation to the recreational sector relative to the no action/status quo alternative (1a-4), and therefore an increase in the RHL. Likewise, each alternative other than the status quo alternative represents a decrease in allocation and resulting commercial quota for the commercial sector. Relative to the actual 2023 limits, example limits would range from no change (under the status quo alternative 1a-4) to a 31% decrease in the commercial quota and 50% increase in the RHL (under alternative 1a-7). As previously stated, these commercial quotas and RHLs are examples. Actual future quotas and RHLs are likely to differ from these examples based on future ABCs, discard assumptions, and other considerations.

Figure 1 compares the example quotas and RHLs (using the 2023 ABC, Table 5) to commercial and recreational landings for summer flounder from 2004 through 2019. The commercial and recreational fisheries were both impacted by the COVID-19 pandemic; therefore, 2020 data were not included in this figure as they may not be representative of typical fishery conditions for either sector. Data for both recreational and commercial fisheries from 2021 are currently incomplete and preliminary.

Since 2004, landings in each sector have varied with annually varying quotas and RHLs and other factors. In many years since 2004, commercial landings have been above the example commercial quotas, particularly under alternatives Fluke-2, 1a-1, 1a-2, 1a-3, Fluke-1, 1a-6, and 1a-7. This indicates that if the ABC remains similar to 2023, reduced commercial landings may be required relative to 2004-2019 average landings. However, most example quotas are above commercial

landings for 2015-2019, indicating that relative to these more recent years, commercial landings may not need to be cut, depending on future ABCs.

For the recreational fishery, harvest in most years since 2004 has been above the example RHLs using the 2023 ABC. However, the example RHLs under most alternatives are higher than recreational harvest during 2017-2019, meaning that recreational measures may be able to be liberalized relative to these years if ABCs remain similar to 2023 levels, depending on actual RHLs and current and future harvest trends.

As previously stated, the summer flounder commercial quota is further allocated among the states based on allocation percentages defined in the FMP. As of January 1, 2021, as the result of Amendment 21 to the FMP,[8] the commercial allocations of the summer flounder quota among the states vary based on the overall coastwide commercial quota amount. Quota below 9.55 million pounds is allocated among states based on the state allocations that have been in place since Amendments 2 and 4 (1993). When the quota exceeds 9.55 million pounds, the first 9.55 million pounds is allocated according to the previous (Amendments 2 and 4) allocations. Any surplus quota above 9.55 million pounds will be allocated differently. As shown in Table 5, all of the example quotas (using the 2023 ABC as an example for future quotas under recent biomass levels) would be above that threshold. Therefore, these alternatives are likely to have implications for how the summer flounder quota is allocated among states, depending on future ABCs.

Along with summer flounder commercial landings potentially varying under the range of allocation alternatives, ex-vessel prices may also change (Figure 2). Using the equation in Figure 2, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1a-7 (10.79 million pounds under a 33.12 mil pound ABC), the average ex-vessel price is predicted to be $1.90 per pound and would yield $20.5 million in total ex-vessel revenue (both in 2019 dollars). If the same process is followed for the alternative 1a-4 example quota (15.53 million pounds), the average ex-vessel price would fall to $0.63 per pound and revenues would decrease to $9.7 million, despite the higher quota. These are rough estimates, and price is influenced by many other factors aside from landings, such as changes in consumer preferences or product substitution. This simplified example does offer some limited support that full utilization of the quota under the highest commercial quota alternative may not maximize fishery-wide revenues.

The Council funded a study consisting of an economic model to evaluate the current 60/40 summer flounder landings allocation. The model, developed by Dr. Kurt Schnier (University of California, Merced) and Dr. Rob Hicks (College of William & Mary), aimed to determine which allocations would maximize marginal economic benefits (i.e., the marginal value to each sector of an additional pound of summer flounder allocation at a given allocation) to the commercial and recreational sectors. The original model was peer reviewed in November 2016 with a final report completed in 2017.[9] In 2019 and 2020, the model was updated with the revised MRIP estimates released in 2018, as well as more recent commercial fishery data. The results of the updated model suggest that the existing 60/40 commercial/recreational allocation is not suboptimal from an economic efficiency perspective. However, it also suggested that modest allocation changes in

[8] See https://www.mafmc.org/actions/summer-flounder-amendment for additional information on this amendment.
[9] The final 2017 report is available at: https://www.mafmc.org/s/Hicks-Schnier-Summer_flounder_allocation_report_final_4_11_2017.pdf.

either direction would not likely lower the economic benefits received from both sectors of the fishery combined.[10] Using the new recreational data, the value of the fishery to the recreational sector increased relative to the results of the prior report. The point estimate of the recreational sector's marginal willingness to pay is higher and would potentially support higher recreational allocations; however, the confidence intervals for the recreational and commercial sectors' willingness to pay estimates have substantial overlap due to high uncertainty in these estimates, particularly for the recreational sector. This means that due to data limitations, more concrete guidance about optimal allocations could not be generated due to the inability to more precisely estimate the recreational sector's value.

Table 5: Example commercial quotas and RHLs for each allocation alternative under the 2023 ABC (33.12 million pounds) and the assumptions outlined in Appendix C, with comparison to the 2023 implemented limits. Actual future limits will vary based on future ABCs and discard assumptions. All values are in millions of pounds. Alternatives beginning with 1a represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "Fluke" represent those added during the August 2021 Council and Board meeting.

Alt	Fluke-4	Fluke-2	1a-1	1a-2	1a-3	1a-4[a]	1a-5	Fluke-3	Fluke-1	1a-6	1a-7
	Catch-Based					Landings-Based					
Com. allocation	50%	45%	44%	43%	40%	60%	55%	51%	47%	45%	41%
Rec. allocation	50%	55%	56%	57%	60%	40%	45%	49%	53%	55%	59%
Example com. quota	13.69	12.24	11.95	11.66	10.79	15.53[b]	14.48	13.42	12.37	11.84	10.79
Difference from 2023 com. quota	-12%	-21%	-23%	-25%	-31%	0%	-7%	-14%	-20%	-24%	-31%
Example RHL	12.55	13.98	14.27	14.55	15.41	10.36[b]	11.84	12.90	13.95	14.47	15.53
Difference from 2023 RHL	21%	35%	38%	40%	49%	0%	14%	24%	35%	40%	50%

[a] Alternative 1a-4 is the no action/status quo alternative for summer flounder (i.e., the current commercial/recreational allocations).

[b] The actual implemented commercial quota and RHL for 2023 are shown under Alternative 1a-4 (no action/status quo).

[10] The updated report (December 2020) is available at: https://www.mafmc.org/s/Hicks-Schnier_Summer_Flounder_allocation_report_UPDATE-Dec-2020.pdf.

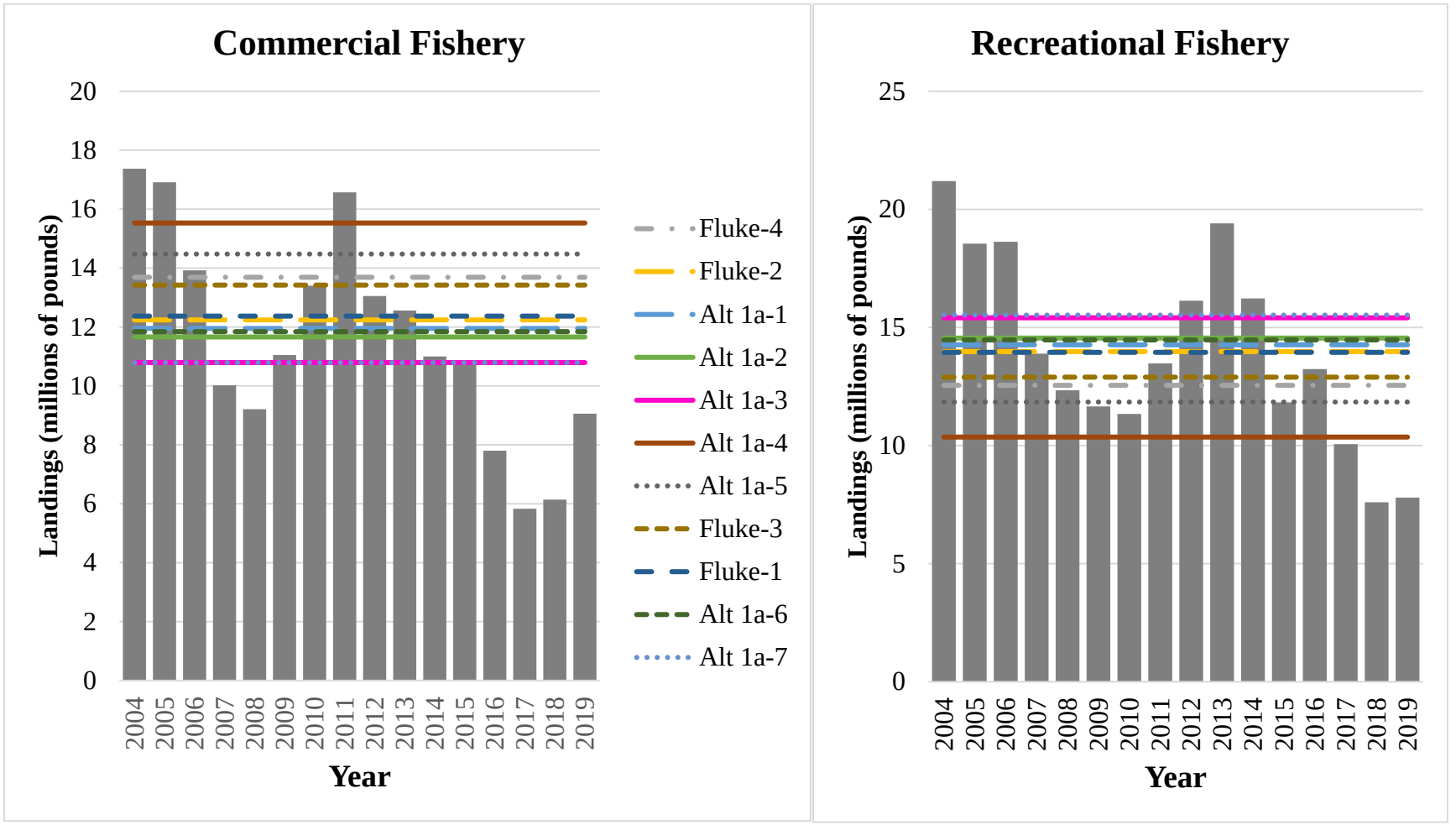


Figure 1: 2004-2019 commercial and recreational summer flounder landings with comparison to example commercial quotas and RHLs developed using the 2023 ABC (see Appendix C for methodology).

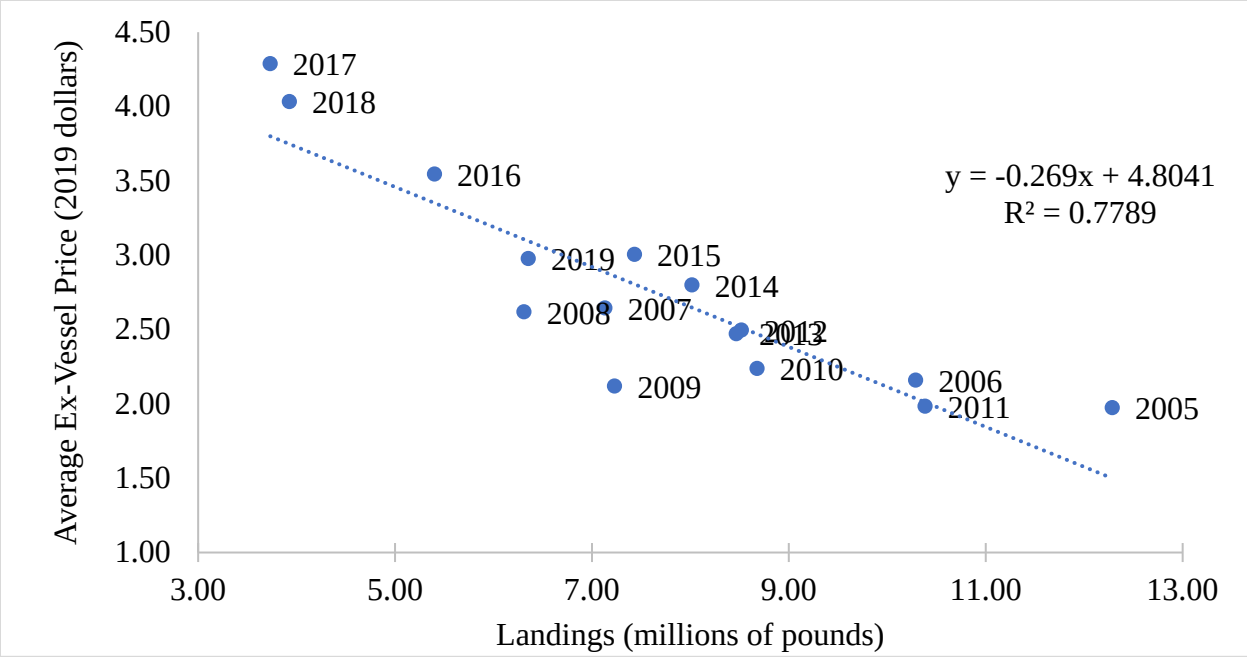


Figure 2: Commercial summer flounder landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.2.3 Scup Allocation Impacts

Table 6 compares example commercial quotas and RHLs under each allocation alternative using the 2023 ABC (see Appendix C for methodology) to the commercial quota and RHL adopted for 2023. Example commercial quotas, RHLs, and impacts of alternatives added in August 2021 (scup-1 through scup-4) fall within the range of reallocation alternatives 1b-2 through 1b-7. Relative to the adopted 2023 limits, example limits would range from no change (under the status quo/no action alternative 1b-1) to a 34% decrease in the commercial quota and 119% increase in the RHL (under alternative 1b-7). Actual future quotas and RHLs are likely to differ from these examples based on future ABCs, discard assumptions, and other considerations. Figure 3 compares the example quotas and RHLs (using the 2023 ABC, Table 5) to commercial and recreational landings for scup from 2004 through 2019. The commercial and recreational fisheries were both impacted by the COVID-19 pandemic; therefore, 2020 data were not included in this figure as they may not be representative of typical fishery conditions. Data from 2021 are currently incomplete and preliminary.

Under the no action/status quo alternative for scup (alternative 1b-1), recreational harvest would need to be reduced from recent levels to prevent exceeding the RHL. This is because the revised MRIP harvest estimates for recent years are notably higher than the RHLs that result from the current allocation (assuming recent ABC levels; Figure 3). Alternatives 1b-2 through 1b-7 would increase the recreational allocation. Alternative 1b-7 results in the highest example RHL, however none of the alternatives project an example RHL that is higher than 2004-2019 recreational harvest (Figure 3). Therefore, alternative 1b-7 would provide the most benefit to the recreational sector in the form of higher angler satisfaction, greater economic opportunity, more revenue to the for-hire sector compared to the other allocation alternatives. Recreational harvest in recent years is variable as shown in Figure 3; however, alternatives 1b-3 through 1b-6 including scup-1-4 have the

potential to allow for harvest at similar levels to multiple years from 2004-2019, though the example RHLs fall below harvest in the most recent 3 years.

Alternatives 1b-2 through 1b-7 including Scup-1 through Scup-4 include lower commercial allocations than the no action/status quo alternative (1b-1). The commercial sector has not fully utilized its quota since 2007 so a decrease in allocation would not necessarily lead to a decrease in commercial landings or revenues compared to recent levels. Commercial landings from 2004 through 2010 fall below the example quotas shown in Figure 3 for all alternatives. However, average landings from 2011 to 2019 exceed the example quotas for all alternatives except alternative 1b-1. If future ABCs are similar to the 2023 ABC, revising the allocation will have minimal to moderate impacts on the commercial industry. Compared to recent commercial landings, alternatives 1b-2 and Scup-1 may limit the potential for market expansion and future increases in landings and ex-vessel revenue compared to the no action/status quo alternative (1b-1). Alternatives 1b-3, 1b-4, 1b-5, 1b-6, Scup-2, Scup-3, and Scup-4 result in example commercial quotas that are slightly more restrictive, and the example quota for alternative 1b-7 is the most restrictive.

In 2019, the scup stock was at 196% of the biomass target level and trending down to the target. The compounding effects of reductions in allocation to the commercial sector combined with a reduction in the overall ABC could result in lower commercial quotas in the future. The reduction in commercial quota under alternatives all but alternative 1b-1 may not constrain harvest on a coastwide basis but may negatively impact commercial industry members in states that fully utilize their state quota during the summer scup quota period. Impacts may be felt more equally across states in the winter 1 and 2 period scup fishery with the coastwide trip limit.

Ex-vessel prices may change if changes in the allocation result in changes in commercial landings (Figure 4). Using the equation in Figure 4, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1b-7 (11.85 million pounds under a 29.67 million pound ABC), the average ex-vessel price is predicted to be $0.68 per pound and would yield $8.1 million in total ex-vessel revenue. Ex-vessel revenues are not predicted to vary greatly under Alternatives 1-b2 through 1b-7. Full utilization of the quota under the highest quota alternatives, 1b-1, would decrease revenues following these methods. Average scup landings over the last three years are 14.20 million pounds (through 2019), meaning full utilization of the quota at 17.87 would appear unlikely. Based on the price responses to changes in quantity, achieving full utilization in this highest commercial quota scenario may not be economically desirable for the commercial scup fishery as a whole.

Table 6: Example commercial quotas and RHLs for each allocation alternative under the 2023 ABC (29.67 million pounds) and the assumptions outlined in Appendix C, with comparison to the 2023 implemented limits. Actual future limits will vary based on future ABCs and discard assumptions. All values are in millions of pounds. Alternatives beginning with 1b represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "Scup" represent those added during the August 2021 Council and Board meeting.

Alternative	1b-1[a]	1-b2	Scup-4	Scup-2	1b-3	1b-4	Scup-1	Scup-3	1b-5	1b-6	1b-7
	Catch-Based						Landings-Based				
Com. allocation	78.0%	65.0%	63.5%	62.0%	61.0%	59.0%	59.0%	58.0%	57.0%	56.0%	50.0%
Rec. allocation	22.0%	35.0%	36.5%	38.0%	39.0%	41.0%	41.0%	42.0%	43.0%	44.0%	50.0%
Example commercial quota	**17.87[b]**	**14.10**	**13.79**	**13.49**	**13.28**	**12.88**	**13.99**	**13.76**	**13.52**	**13.28**	**11.85**
% Difference from 2023 commercial quota	**0%**	**-21%**	**-23%**	**-25%**	**-26%**	**-28%**	**-22%**	**-23%**	**-24%**	**-26%**	**-34%**
Example RHL	**5.41[b]**	**9.06**	**9.47**	**9.89**	**10.17**	**10.73**	**9.73**	**9.96**	**10.20**	**10.43**	**11.85**
% Difference from 2023 RHL	**0%**	**67%**	**75%**	**83%**	**88%**	**98%**	**80%**	**84%**	**88%**	**93%**	**119%**

[a] Alternative 1b-1 is the no action/status quo alternative for scup (i.e., the current commercial/recreational allocations).
[b] The actual implemented commercial quota and RHL for 2023 are shown under Alternative 1b-1 (no action/status quo)

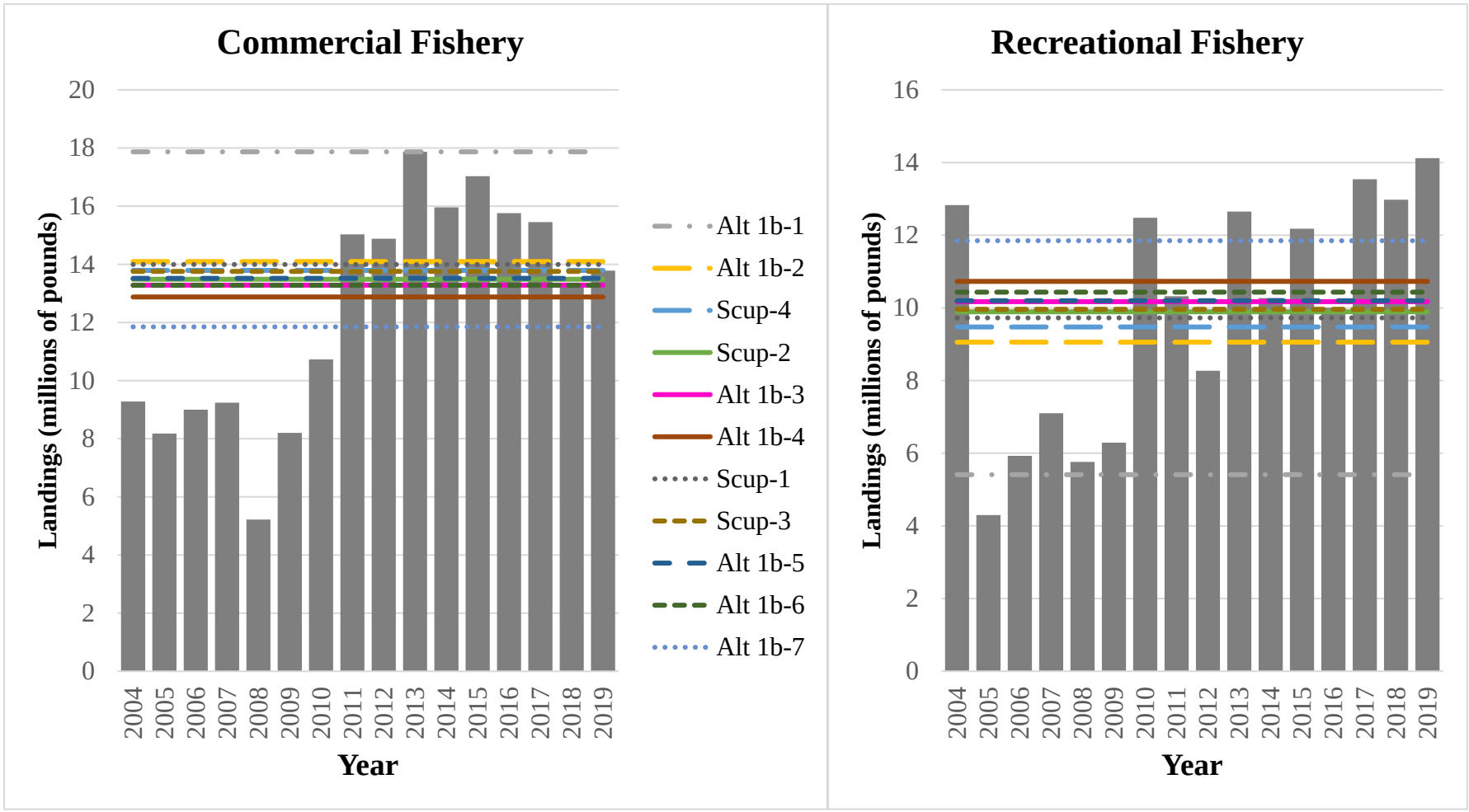


Figure 3: 2004-2019 commercial and recreational scup landings with comparison to example commercial quotas and RHLs developed using the 2023 ABC (see Appendix C for methodology).

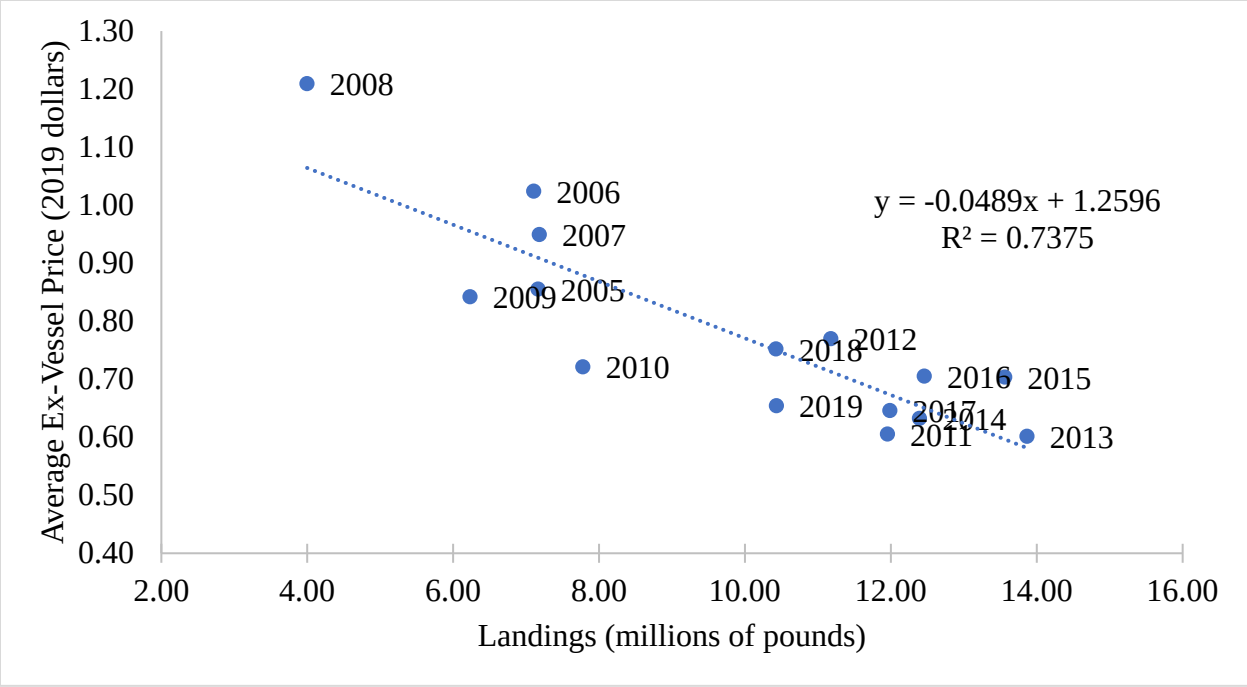


Figure 4. Commercial scup landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.2.4 Black Sea Bass Allocation Impacts

All black sea bass alternatives, with the exception of the no action/status quo alternative (1c-4) would increase the recreational allocation and decrease the commercial allocation. Table 7 compares example quotas and RHLs under each allocation alternative using the 2023 ABC (see Appendix C for methodology) to the commercial quota and RHL adopted for 2023. Relative to the adopted 2023 limits, example limits would range from no change (under the status quo/no action alternative 1c-4) to a 51% decrease in the commercial quota and 68% increase in the RHL under alternative 1c-3, and a 50% decrease in the commercial quota and a 69% increase in the RHL under alternative 1c-7. Again, these limits are examples. Actual future quotas and RHLs are likely to differ from these examples based on future ABCs, discard assumptions, and other considerations.

Figure 5 compares the example black sea bass quotas and RHLs (using the 2023 ABC, Table 7) to commercial and recreational landings from 2004 through 2019. The commercial and recreational fisheries were both impacted by the COVID-19 pandemic; therefore, 2020 data were not included in this figure as they may not be representative of typical fishery conditions. Data from 2021 are currently incomplete and preliminary. Throughout the time period shown in Figure 5, commercial and recreational landings varied with changes in the landings limits, changes in black sea bass availability, and other factors. When comparing these example commercial quotas and RHLs to landings through 2019, it is important to note that the example limits are based on the 2023 ABC, which was higher than the ABCs for 2004-2019. In all years shown in Figure 5, the commercial and recreational fisheries operated under landings limits that were set based on ABCs lower than the 2020 ABC.

As shown in Figure 5, commercial landings were below the example quotas under alternatives 1c-4, 1c-5, BSB-3, BSB-1, and BSB-4 during 2004-2019, largely because the fishery was constrained

by much lower quotas during those years. The other alternatives result in example quotas that are lower than commercial landings in at least one year during 2004-2019. The highest commercial landings during this time period occurred during 2017-2019. Therefore, if future ABCs are similar to the 2023 ABC, commercial landings may need to be restricted compared to 2017-2019 (on average) under alternatives 1c-1, 1c-2, 1c-3, and 1c-7 (Figure 5). Reductions in commercial landings could lead to reduced revenues and negative socioeconomic impacts for commercial fishery participants and support businesses.

Ex-vessel prices for commercial landings may also change in response to the different potential quota levels under each alternative (Figure 6). Using the equation in Figure 6, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1c-7 (2.84 million pounds under a 16.66 million pound ABC) the average ex-vessel price is estimated to be $3.19 per pound and would yield about $9.1 million in ex-vessel revenue. If the same process is followed for the alternative 1c-4 quota (i.e., the quota adopted for 2023, 5.71 million pounds, which is higher than all other example quotas), the average ex-vessel price is estimated at $2.41 per pound. Expected revenues would be $13.7 million, which is higher than the expected revenues under alternative 1c-7 despite the lower ex-vessel price per pound due to the higher overall quota under 1c-4. These are rough estimates, and price is influenced by many other factors aside from landings, such as changes in consumer preferences or product substitution. These results, however, do suggest that black sea bass commercial revenues would increase under higher quotas with full utilization.

As shown in Figure 5, the example RHLs under all alternatives are lower than recreational harvest in at least 2 of the 16 years from 2004-2019. Five alternatives include example RHLs that exceed harvest during 2018-2019, but not during the peak years of 2015-2017 (i.e., alternatives 1c-7, 1c-3, 1c-2, 1c-1, and 1c-6). When considering only 2018-2019, and assuming future ABCs are similar to the 2023 ABC, these five alternatives could allow recreational harvest to remain at similar levels or increase. All other alternatives could require minor (alternative BSB-2) to notable (alternatives 1c-4, 1c-5, and BSB-3) reductions in harvest, depending on the alternative.

As previously stated, reductions in recreational harvest would be achieved through more restrictive management measures. This would be expected to have negative socioeconomic impacts for the recreational sector due to reduced angler satisfaction, reduced demand for for-hire trips, and reduced revenues for for-hire businesses and other recreational fishery support businesses. Alternatively, RHLs which allow for increased harvest could allow for more liberal measures which could have positive socioeconomic impacts.

Based on the information shown in Figure 5, only alternative 1c-6 would be expected to prevent a need for restrictions in both the recreational and commercial sectors, based on the comparison of example quotas and RHLs against 2018-2019 landings shown in Figure 5. The alternatives which, depending on annual considerations, may allow for close to or above status quo recreational harvest compared to 2018-2019 (alternatives BSB-2, 1c-6, 1c-1, 1c-2, 1c-3, and 1c-7) would require varying levels of reduction in commercial landings, depending on the alternative, (Figure 5).

Table 7: Example commercial quotas and RHLs under each allocation alternative using the 2023 ABC (16.66 million pounds) and the assumptions outlined in Appendix C, with comparison to the 2023 limits. Actual future limits will vary based on future ABCs and discard assumptions. All values are in millions of pounds. Alternatives beginning with 1c represent those considered by the Council and Board during their April 2021 meeting. Alternatives beginning with "BSB" represent those added during the August 2021 Council and Board meeting.

Alternative	BSB-4	BSB-2	1c-1	1c-2	1c-3	1c-4[a]	1c-5	BSB-3	BSB-1	1c-6	1c-7
	Catch-Based					Landings-Based					
Com. allocation	40.5%	36.0%	32.0%	28.0%	24.0%	49.0%	45.0%	41.0%	37.0%	29.0%	22.0%
Rec. allocation	59.5%	64.0%	68.0%	72.0%	76.0%	51.0%	55.0%	59.0%	63.0%	71.0%	78.0%
Example commercial quota	4.18	3.81	3.47	3.14	2.80	5.71[b]	5.37	4.96	4.53	3.65	2.84
% Difference from 2023 commercial quota	-27%	-33%	-39%	-45%	-51%	0%	-6%	-13%	-21%	-36%	-50%
Example RHL	7.83	8.42	8.95	9.48	10.01	5.95[b]	6.56	7.13	7.72	8.94	10.07
% Difference from 2023 RHL	32%	42%	50%	59%	68%	0%	10%	20%	30%	50%	69%

[a] Alternative 1c-4 is the no action/status quo alternative for black sea bass (i.e., the current commercial/recreational allocations).
[b] The actual implemented commercial quota and RHL for 2023 are shown under Alternative 1c-4 (no action/status quo).

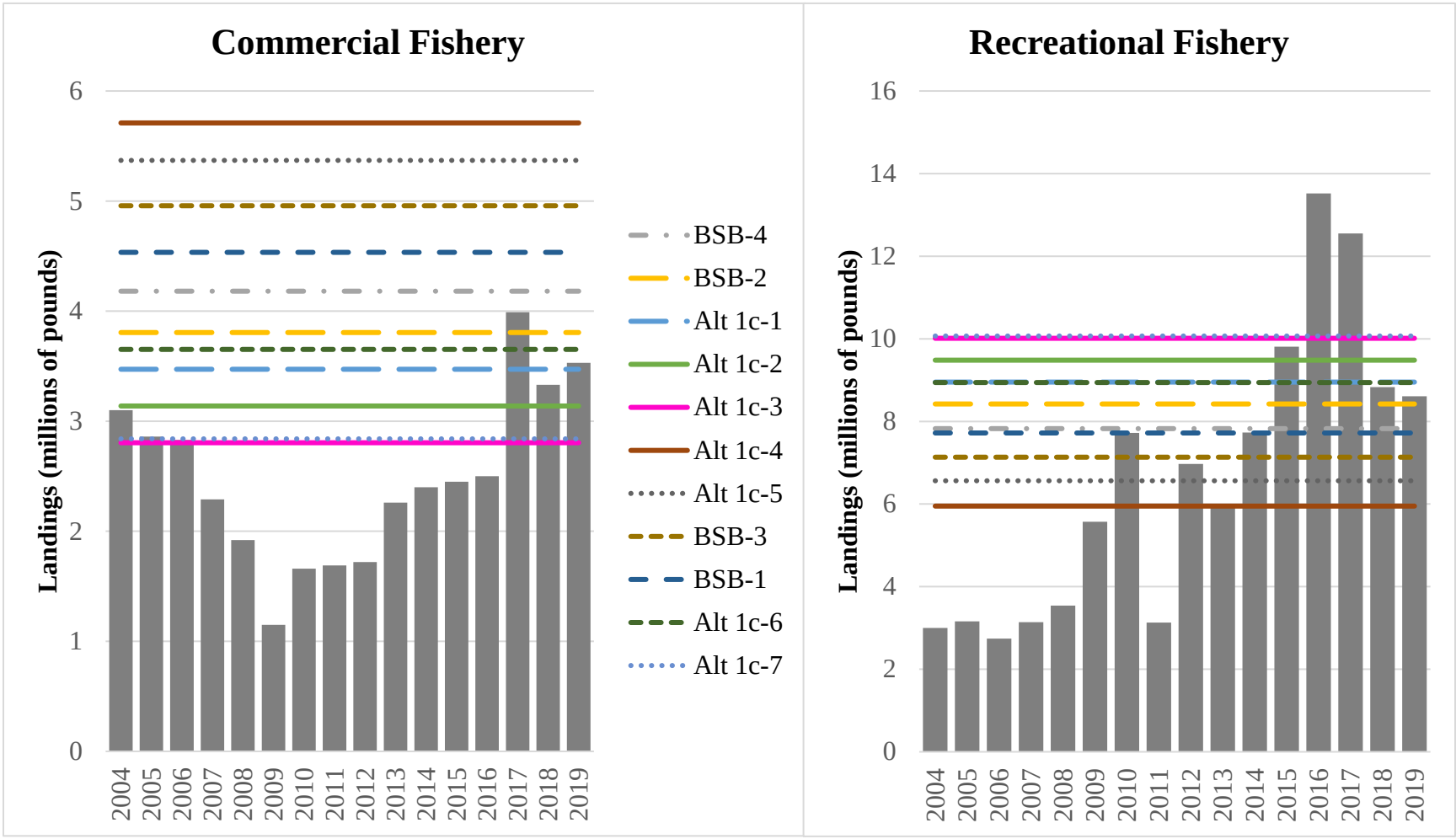


Figure 5: 2004-2019 commercial and recreational black sea bass landings with comparison to example commercial quotas and RHLs developed using the 2023 ABC (see Appendix C for methodology).

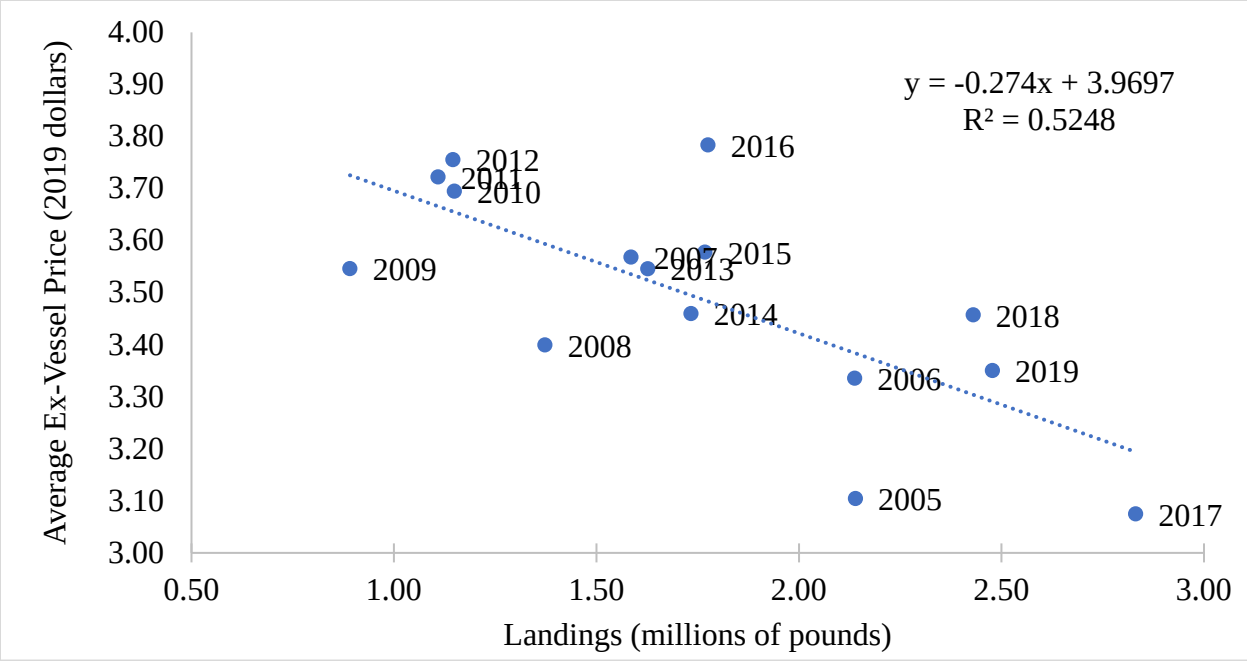


Figure 6. Commercial black sea bass landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.3 Allocation Change Phase-In

4.3.1 Allocation Change Phase-In Alternatives

The alternatives listed in Table 8 consider if any changes to the allocation percentages under alternative sets 1a, 1b, and 1c should occur in a single year (alternative 1d-1, no phase in) or if the change should be spread over 2, 3, or 5 years (alternatives 1d-2 through 1d-4). The Council and Board agreed that 5 years is a reasonable maximum phase-in time frame as longer transition periods may not adequately address the issue an allocation change is attempting to address. The choice of whether to use a phase-in approach, and the length of the phase-in, may depend on the magnitude of allocation change proposed. A phase-in period may not be desired if under smaller allocation changes. Larger allocation changes may be less disruptive to fishing communities if they are phased in over several years.

These phase-in alternatives could apply to any of the three species. The Council and Board may choose to apply different phase-in alternatives (including no phase-in) to each species if desired.

Table 8: Allocation change phase-in alternatives.

Phase-In Alternatives
1d-1: No phase-in
1d-2: Allocation change evenly spread over 2 years
1d-3: Allocation change evenly spread over 3 years
1d-4: Allocation change evenly spread over 5 years

4.3.2 Impacts of Allocation Change Phase-In Alternatives

The biological, social, and economic impacts of the phase-in alternatives are dependent on two things: 1) the difference between the status quo allocation percentage and the allocation percentage

selected, and 2) the duration of the phase-in period. Based on the range of allocation percentages across the three species (Section 4.1), the commercial and recreational sector allocations could shift by as much as 13.5% per year, or as little as 0.8% per year under the phase-in timeframes of 2-5 years. Sections 4.3.2.1 through 4.3.2.3 describe the associated percent shifts per year for each species, and the impacts of these phase-in approaches.

Both catch- and landings-based allocation alternatives are considered for all three species. As previously stated, summer flounder and black sea bass are currently managed under a landings-based allocation and scup is currently managed under a catch-based allocation. It is straightforward to calculate the annual percent shift in allocation under each phase-in alternative if the allocation remains landings-based for summer flounder and black sea bass or catch-based for scup.

The phase-in transition is more complicated when transitioning from a landings-based to a catch-based allocation or vice versa. Under a landings-based allocation, the division of expected dead discards to each sector is typically calculated using a moving average of recent trends. As a result, under a landings-based allocation, the percentage of the ABC (landings + dead discards) assigned to each sector typically varies from year to year and usually does not match the landings-based allocation percent. To illustrate this, the 2022 percent split of landings, dead discards, and sector ACLs for each species are shown in Table 9. As described below, when transitioning from a landings-based to a catch-based allocation or vice versa, the total and annual phase-in amounts should not be calculated starting from the existing FMP allocation, as the actual split of catch does not match the landings-based allocation for summer flounder and black sea bass, and the actual split of landings does not match the catch-based allocation for scup. The phase-in amounts for each alternative can instead be calculated by using the 2022 measures as a starting point since these are the implemented measures that the transition would be away from. This includes the actual division of catch (for transition to a catch-based allocation) or landings (for transition to a landings-based allocation) in 2022. Additional details for each species are discussed below.

Table 9: The currently implemented recreational/commercial split for total landings, dead discards, and total dead catch for 2022 specifications. The current FMP-specified allocations for each species are highlighted in yellow.

Currently Landings-Based Allocations						
	Comm. % of TAL (allocation)	**Rec. % of TAL (allocation)**	**Expected comm. % of discards in 2022**	**Expected rec. % of discards in 2022**	**Comm. ACL % of ABC in 2022**	**Rec. ACL % of ABC in 2022**
Summer flounder	60	40	41	59	56	4
Black sea bass	49	51	64	36	54	46
Currently Catch-Based Allocation						
	Comm. % of TAL in 2022	**Rec. % of TAL in 2022**	**Expected comm. % of discards in 2022**	**Expected rec. % of discards in 2022**	**Comm. ACL % of ABC (allocation)**	**Rec. ACL % of ABC (allocation)**
Scup	77	23	83	17	78	22

NEFSC Social Sciences Branch crew survey results (Table 10) suggest that while a limited number of crew from the summer flounder, scup, and black sea bass fisheries were surveyed, the majority of those surveyed agreed that it was hard to keep up with changes in regulations. A phase-in approach to reallocation would require annual regulatory changes to the catch and landings limits. However, limiting the magnitude of the year-to-year changes in allocation could make it easier for the fisheries to adapt to these changes, especially in the case of reductions. However, phase-in approaches may also require more frequent changes in management measures such as open seasons and possession limits during the phase-in period. Therefore, consideration should be given to balancing regulatory stability and economic stability.

Table 10. NEFSC Social Sciences Branch Crew Survey results for reactions to the statement "the rules and regulations change so quickly it is hard to keep up." Results presented for crew primarily involved in the summer flounder, scup, and black sea bass fisheries over the 2012-2013 survey, 2018-2019 survey, and the combined results.

Survey Wave	2012-13	2018-19	Total
Strongly agree	3 (27%)	10 (45%)	13 (39%)
Agree	4 (36%)	7 (32%)	11 (33%)
Neutral	1 (9%)	2 (9%)	3 (9%)
Disagree	3 (27%)	3 (14%)	6 (18%)
Strongly disagree	0 (0%)	0 (0%)	0 (0%)
Total	11 (100%)	22 (100%)	33 (100%)

4.3.2.1 Summer Flounder Phase-In Impacts

If the summer flounder allocation is modified but a landings-based allocation is maintained (alternatives 1a-5 through 1a-7, Fluke-3, and Fluke-1), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (Table 11).

Under a transition from a landings-based to a catch-based allocation (Fluke-4, Fluke-2, and 1a-1 through 1a-3), dead discards would first need to be incorporated into the current baseline to determine the total and annual percent shift. Any allocation changes adopted may take effect starting in 2023; therefore, the specifications for 2022 can serve as this baseline for the current split of catch by sector. Specifically, the percentage of the ABC that each sector will receive in 2022 as a sector ACL is used as the starting point for calculating transition percentages below.

For summer flounder, in 2022, the commercial ACL represents 56% of the ABC and the recreational ACL represents 44% of the ABC (Table 9). From these starting percentages, the total amount of catch-based allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (Table 11).

Across all summer flounder alternatives, the total allocation shift (if allocations are modified) from the commercial to the recreational fishery would range from 5-19% from the current allocations, and the annual phase-in would range from 1% per year to 9.5% per year depending on the allocation change and the phase-in alternative selected (Table 11).

As described in Section 4.2, a decline in commercial allocation is expected to lead to a decline in landings and revenue, especially in states where the commercial allocation is fully utilized. The

potential decline in landings may result in higher ex-vessel prices due to a price/volume relationship, potentially tempering declines in ex-vessel revenue. The recreational sector for summer flounder is expected to experience positive social and economic impacts under any of the allocation changes proposed (with the exception of the no action/status quo alternative 1a-4). However, given the transition to revised MRIP estimates, positive impacts may be partially offset in some years if higher harvest estimates lead to an inability to meaningfully liberalize measures. The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well sector participants are able to adapt to any changes.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) may result in a sudden loss of income and jobs due to a more sudden drop in revenue in the commercial fishery. Commercial sector participants who are highly dependent on summer flounder may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for summer flounder. This could allow for a smoother transition to modified business models such as diversifying target species.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) is expected to have social and economic benefits as this allows for a faster transition to an allocation that supports the recent recreational harvest under the revised MRIP data (Figure 1). This has implications for recreational management measures, which could be liberalized more quickly if a faster transition to a revised allocation occurs. For summer flounder, recent recreational harvest under the revised MRIP estimates are at similar levels as recent RHLs, so it is possible that recreational measures could be liberalized in the coming years if allocation to the recreational sector is increased (e.g., Figure 1). However, this is also dependent on future projections of stock biomass, trends in recreational catch and effort, and other factors. If recreational measures can be liberalized, this could result in a decrease in recreational discards. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for summer flounder. This may mean that recreational measures and fishing opportunities could be maintained at current levels for longer, or liberalized more slowly, though it is important to note that possible liberalizations depend on many different factors and are not guaranteed.

Table 11: Percent shift in summer flounder allocation per year for 2, 3, and 5 year phase-in options for all summer flounder allocation change alternatives.

Alternatives	Total allocation shift [a]	1d-2: 2 year phase-in	1d-3: 3 year phase-in	1d-4: 5 year phase -in
Catch-Based				
Fluke-4: 50% com., **50%** rec.	**6%**	**3%** per year	**2%** per year	**1.2%** per year
Fluke-2: 45% com., **55%** rec.	**11%**	**5.5%** per year	**3.7%** per year	**2.2%** per year
1a-1: 44% com., **56%** rec.	**12%**	**6%** per year	**4%** per year	**2.4%** per year
1a-2: 43% com., **57%** rec.	**13%**	**6.5%** per year	**4.3%** per year	**2.6%** per year
1a-3: 40% com., **60%** rec.	**16%**	**8%** per year	**5.3%** per year	**3.2%** per year
Landings-Based				
1a-4 (status quo): 60% com., **40%** rec.	**0%**	**N/A**	**N/A**	**N/A**
1a-5: 55% com., **45%** rec.	**5%**	**2.5%** per year	**1.7%** per year	**1%** per year
Fluke-3: 51% com., **49%** rec.	**9%**	**4.5%** per year	**3%** per year	**1.8%** per year
Fluke-1: 47% com., **53%** rec.	**13%**	**6.5%** per year	**4.3%** per year	**2.6%** per year
1a-6: 45% com., **55%** rec.	**15%**	**7.5%** per year	**5%** per year	**3%** per year
1a-7: 41% com., **59%** rec.	**19%**	**9.5%** per year	**6.3%** per year	**3.8%** per year

[a] For catch-based alternatives, the starting point for this calculation is the current (2022) split of the sector-specific ACLs (which incorporates dead discards) instead of the landings limit allocation. Here, this shift is calculated by starting from the 2022 specifications which includes a commercial ACL that is 56% of the ABC, and a recreational ACL that is 44% of the ABC (Table 9).

[b] For landings-based alternatives, the starting point for this calculation is the specified landings-based allocation (60% commercial/40% recreational). This does not account for dead discards, which would continue to be split using different methods with the resulting percentages varying depending on the year.

4.3.2.2 Scup Phase-In Impacts

The current allocation for scup is catch-based. If the allocation is modified but a catch-based allocation is maintained (alternatives 1b-2 through 1b-4, Scup-4, and Scup-2), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (Table 12).

Under a transition from a catch-based to a landings-based allocation (alternatives 1b-5 through 1b-7, Scup-1, and Scup-5), dead discards would first need to be separated from the current baseline to determine the total and annual percent allocation shift. Because any allocation changes adopted may take effect in 2023, the specifications for 2022 can serve as this baseline for the current split of landings by sector. Specifically, the percentage of the total allowable landings (TAL) that each sector will receive in 2022 as sector landings limits (commercial quota and RHL) is used as the starting point for calculating transition percentages below (Table 9).

For scup, in 2022, the commercial quota represents 77% of the TAL and the RHL represents 23% of the TAL (Table 9). From these starting percentages, the total amount of landings-based allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (Table 12).

Across all the alternatives for scup, the total allocation shift needed (if allocations are modified) from the commercial to the recreational fishery would range from 13-27% from current

allocations, and the annual phase-in would range from 2.6% per year to 13.5% per year depending on the allocation change and the phase-in alternative selected (Table 12).

As described in Section 4.2, depending on the scale of the change, a decline in commercial allocation could lead to loss of revenues from scup or it may not impact revenues as commercial landings have been below the full allowed amount for several years due to market factors. Any potential loss in revenue for fishermen may be partially offset by increased prices paid by dealers if a price/volume relationship impacts prices under lower quotas (Figure 4). The recreational sector is expected to experience positive social and economic impacts under any of the allocation changes proposed (with the exception of the no action/status quo alternative 1b-1). However, the positive impacts may be partially offset by an inability to meaningfully liberalize measures under a higher allocation given the transition to revised MRIP estimates (Figure 3). The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well fishery participants are able to adapt to any changes.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2), especially when coupled with a greater total allocation change, may result in a more sudden loss of income and jobs due to a more sudden drop in revenue. Commercial sector participants who are highly dependent on scup may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for scup. This could allow for a smoother transition to modified business models such as diversifying target species. As previously stated, these impacts would vary based on the magnitude of the allocation change as the commercial scup fishery has not harvested their full quota under the current allocations for many years due to market demand.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) is expected to have social and economic benefits as this allows for a faster transition to an allocation that matches the recent recreational harvest under the revised MRIP data (Figure 3). This has implications for recreational management measures, which for scup, are currently resulting in harvest levels higher than the current RHL. Under the current allocation, this should require more restrictive measures to be implemented for the recreational fishery. However, under an increased allocation to the recreational fishery, it is possible that recreational scup measures could remain the same (avoiding potentially severe restrictions that would otherwise be taken if the allocations are not changed; Figure 3). Recreational measures are also dependent on factors such as future projections of stock biomass, trends in recreational catch and effort, and other trends. It is possible that if scup biomass is projected to increase in the coming years, recreational measures could be liberalized under an increased allocation. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for scup. This could mean that recreational measures and fishing opportunities would need to be restricted during the transition years, possibly severely given recent MRIP estimates (Figure 3), though it is important to note that adjustments to recreational measures depend on many different factors.

Table 12: Percent shift in scup allocation per year for 2, 3, and 5 year phase-in options for all scup allocation change alternatives.

Alternatives	Total allocation shift[a]	1d-2: 2 year phase-in	1d-3: 3 year phase-in	1d-4: 5 year phase -in
Catch-Based				
1-b1 (status quo): 78.0% com., **22.0%** rec.	**0%**	**N/A**	**N/A**	**N/A**
1b-2: 65.0% com., **35.0%** rec.	**13%**	**6.5%** per year	**4.3%** per year	**2.6%** per year
Scup-4: 63.5% com., **36.5%** rec.	**14.5%**	**7.3%** per year	**4.8%** per year	**2.9%** per year
Scup-2: 62.0% com., **38.0%** rec.	**16%**	**8%** per year	**5.3%** per year	**3.2%** per year
1b-3: 61.0% com., **39.0%** rec.	**17%**	**8.5%** per year	**5.7%** per year	**3.4%** per year
1b-4: 59.0% com., **41.0%** rec.	**19%**	**9.5%** per year	**6.3%** per year	**3.8%** per year
Landings-Based				
Scup-1: 59.0% com., **41.0%** rec.	**18%**	**9%** per year	**6%** per year	**3.6%** per year
Scup-3: 58.0% com., **42.0%** rec.	**19%**	**9.5%** per year	**6.3%** per year	**3.8%** per year
1b-5: 57.0% com., **43.0%** rec.	**20%**	**10%** per year	**6.7%** per year	**3.4%** per year
1b-6: 56.0% com., **44.0%** rec.	**21%**	**10.5%** per year	**7%** per year	**4 %** per year
1b-7: 50.0% com., **50.0%** rec.	**27%**	**13.5%** per year	**9%** per year	**5.4%** per year

[a] For catch-based alternatives, the starting point for this calculation is the FMP-specified allocation percentage (78% commercial/22% recreational).

[b] For landings-based alternatives, the starting point for this calculation is the current (2021) split of the sector-specific landings limits (commercial quota and RHL). Here, this shift is calculated by starting from the 2022 specifications which includes a commercial quota that is 77% of the total allowable landings, and an RHL that is 23% of the total allowable landings (Table 9). This does not account for dead discards, which going forward would be split using different methods with the resulting percentages varying depending on the year.

4.3.2.3 Black Sea Bass Phase-In Impacts

If the black sea bass allocation is modified but a landings-based allocation is maintained (alternatives 1c-5 through 1c-7, BSB-3, and BSB-1), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (Table 13).

Under a transition from a landings-based to a catch-based allocation (alternatives 1c-1 through 1c-3, BSB-4, and BSB-2), dead discards would first need to be incorporated into the current baseline to determine the total and annual percent shift. Specifications for 2022 can serve as this baseline for the current split of catch by sector. Specifically, the percentage of the ABC that each sector will receive in 2022 as a sector ACL is used as the starting point for calculating transition percentages below (Table 9).

For black sea bass, in 2022, the commercial ACL represents 54% of the ABC and the recreational ACL represents 46% of the ABC (Table 9). From these starting percentages, the total amount of allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (Table 13).

Across all the alternatives for black sea bass, the total allocation shift needed (if allocations are modified) from the commercial to the recreational fishery would range from 4-30%, compared to

the current allocations, and the annual phase-in would range from 0.8% per year to 15% per year depending on the allocation change and the phase-in alternative selected (Table 13).

As described in Section 4.2, a reduced commercial allocation is expected to lead to loss of revenue, depending on the magnitude of the allocation change, especially in states where the commercial allocation is fully utilized. However, the potential loss in revenue may be partially offset by an increase in prices paid by dealers to fishermen if a price/volume relationship impacts prices under lower landings (Figure 6). The recreational sector is expected to experience positive social and economic impacts under any of the allocation changes proposed (with the exception of the no action/status quo alternative 1c-4). However, the positive impacts may be partially offset by an inability to meaningfully liberalize recreational management measures under a higher allocation given the transition to revised MRIP estimates, depending on the alternative (Figure 5). The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well sector participants are able to adapt to any changes. For both sectors, these impacts will vary depending on the magnitude of the total allocation change, as well as the length of the phase-in period.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) may result in a sudden loss of income and jobs due to a more sudden drop in revenue in the commercial fishery. Commercial sector participants who are highly dependent on black sea bass may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for black sea bass. This could allow for a smoother transition to modified business models such as diversifying target species.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) could have social and economic benefits as this would allow for a faster transition to an allocation that matches the recent recreational harvest under the revised MRIP data. This has implications for recreational management measures, which for black sea bass, are currently resulting in harvest levels much higher than the current RHL. If the current allocation is maintained, more restrictive measures may need to be implemented to constrain harvest to the RHL. Under an increased allocation to the recreational fishery, it is possible that recreational black sea bass measures could remain the same (avoiding restrictions that could otherwise be required; Figure 5). Recreational measures are also dependent on factors such as future projections of stock biomass, trends in recreational catch and effort, and other trends. It is possible that if black sea bass biomass is projected to increase in the coming years and this allows for a higher ABC, recreational measures could be liberalized under an increased allocation. Alternatively, further restrictions could be needed if the ABC decreases. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for black sea bass. This could mean that recreational measures and fishing opportunities will need to be restricted during the transition years, possibly severely given recent MRIP estimates (Figure 5), though it is important to note that adjustments to recreational measures depend on many different factors.

Table 13: Percent shift in black sea bass allocation per year for 2, 3, and 5 year phase-in options for all black sea bass allocation change alternatives.

Alternatives	Total allocation shift [a]	1d-2: 2 year phase-in	1d-3: 3 year phase-in	1d-4: 5 year phase -in
Catch-Based				
BSB-4: 40.5% com., **59.5%** rec.	**13.5%**	**6.8%** per year	**4.5%** per year	**2.7%** per year
BSB-2: 36.0% com., **64.0%** rec.	**18%**	**9%** per year	**6%** per year	**3.6%** per year
1c-1: 32.0% com., **68.0%** rec.	**22%**	**11%** per year	**7.3%** per year	**4.4%** per year
1c-2: 28.0% com., **72.0%** rec.	**26%**	**13%** per year	**8.7%** per year	**5.2%** per year
1c-3: 24.0% com., **76.0%** rec.	**30%**	**15%** per year	**10%** per year	**6%** per year
Landings-Based				
1-c4 (status quo): 49.0% com., **51.0%** rec.	**0%**	**N/A**	**N/A**	**N/A**
1c-5: 45.0% com., **55.0%** rec.	**4%**	**2%** per year	**1.3%** per year	**0.8%** per year
BSB-3: 41.0% com., **59.0%** rec.	**8%**	**4%** per year	**2.7%** per year	**1.6%** per year
BSB-1: 37.0% com., **63.0%** rec.	**12%**	**6%** per year	**4%** per year	**2.4%** per year
1c-6: 29.0% com., **71.0%** rec.	**20%**	**10%** per year	**6.7%** per year	**4%** per year
1c-7: 22.0% com., **78.0%** rec.	**27%**	**13.5%** per year	**9%** per year	**5.4%** per year

[a] For catch-based alternatives, the starting point for this calculation is the current (2022) split of the sector-specific ACLs (which incorporates dead discards) instead of the landings limit allocation. Here, this shift is calculated by starting from the 2022 specifications which includes a commercial ACL that is 54% of the ABC, and a recreational ACL that is 46% of the ABC for black sea bass (Table 9).

[b] For landings-based alternatives, the starting point for this calculation is the specified landings-based allocation (49% commercial/51% recreational). This does not account for dead discards, which would continue to be split using different methods with the resulting percentages varying depending on the year.

5.0 QUOTA TRANSFER ALTERNATIVES AND IMPACTS

5.1 Quota Transfer Provision Alternatives

The following alternatives describe options for allowing annual transfer of quota between the commercial and recreational sectors as part of the specifications setting process (i.e., the annual process of setting or reviewing catch and landings limits for the upcoming fishing year). This process is similar to that currently used for bluefish, although the options below would allow transfers in either direction between sectors. Section 5.1.1 discusses quota transfer process alternatives while Section 5.1.2 addresses options for a cap on the total amount of a transfer.

5.1.1 Quota Transfer Process Alternatives

Table 14 lists the alternatives under consideration for quota transfer provisions.

Under alternative 2a, transfers would not be allowed between the commercial and recreational sectors, consistent with past practice and the current FMP requirements for these species.

Under alternative 2b, each year during the setting or review of annual catch limits, the Board and Council could recommend that a portion of the total ABC be transferred between the recreational and commercial sectors as a landings limit transfer, affecting the final commercial quota and RHL. They could recommend a transfer from the commercial fishery to the recreational fishery or from

the recreational fishery to the commercial fishery. If a transfer cap is adopted via one of the sub-alternatives under alternative 2c, the transfer amount could not exceed this cap.

Table 15 describes how the process of transfers would work within the Council and Board's current specifications process under alternative 2b.

Note that while the transfer would occur at the landings limit level (commercial quota and RHL), for the purposes of maintaining accurate accounting and accountability at the ACL level, both sector's ACLs would be adjusted to reflect the transfer at the landings limit level.

If transfer provisions under alternative 2b are adopted, some changes to the accountability measures (AMs) may also need to be considered. For example, AMs could specify that if the MC determines that a transfer caused the donating fishery's ACL, or the combined ABC, to be exceeded, the transfer amount could be deducted from the receiving fishery in a subsequent year. The Council and Board could consider a follow-on action to make these changes if desired. These specific changes are not considered through this amendment.

Table 14: Alternatives for annual transfer of quota between the commercial and recreational sectors.

Annual Quota Transfer Alternatives
2a: No action/status quo (do not modify the FMP to allow transfers of annual quota between the commercial and recreational sectors.)
2b: Allow for optional bi-directional transfers through the annual specifications process with pre-defined guidelines and process. The transfer would consist of a portion of the total ABC in the form of a landings limit (i.e., commercial quota and RHL) transfer. Transfers would not occur if the stock is overfished or overfishing is occurring.

Table 15: Proposed quota transfer process during a typical specifications cycle under alternative 2b.

July: **Assess the need for a transfer**	Staff and the Monitoring Committee (MC) would assess the potential need for a transfer and develop recommendations to the Council and Board as part of the specifications process. The MC would consider the expected commercial quota and RHL (pending Council and Board review/approval) in the coming year, and each sector's performance relative to landings limits in recent years. **The MC will have very limited data for the current year and would not be able to develop precise current year projections of landings** for each sector. The MC could also consider factors including but not limited to: • Projected changes in stock size, availability, or year class strength; • Recent or expected changes in management measures; • Recent or expected changes in fishing effort; The MC would consider how these factors might have different impacts on the commercial and recreational sectors. The effects of these considerations can be difficult to quantify and there is currently **no methodology that would allow the MC to quantitatively determine the need for a transfer with a high degree of precision**. **The MC would use their best judgement to recommend whether a transfer would further the Council and Board's policy objectives.**
August: **Council and Board consider whether to recommend a transfer**	The Council and Board would consider MC recommendations on transfers while setting or reviewing annual catch and landings limits. The Council and Board would need to jointly agree on a transfer direction, amount of transfer, and if setting multi-year specifications, whether the transfer would apply for one year or multiple years.
October: **Council staff submits specifications package to NMFS**	Council staff would prepare and submit supporting documents to modify catch limits or implement or revise transfers. During a multi-year specifications review year, if a transfer is newly adopted or revised, a regulatory package may need to be developed even if catch limits do not change.
Mid-December: **Recreational measures adopted***	The Council and Board would adopt federal waters recreational measures and a general strategy for coastwide recreational management including any reductions or liberalizations needed in state waters. **These recommendations would be based on the expected post-transfer RHL which likely would not yet be implemented via final rule.**
Late December: **Final specifications published**	NMFS approves and publishes the final rule for the following year's catch and landings limits (if new or modified limits are needed), including any new or revised transfers. During a multi-year specifications review year, if a transfer is newly adopted or revised, rulemaking will likely need to occur even if catch limits do not change.
January 1: **Fishing year specifications effective, including any transfers**	Fishing year specifications including any transfers would be effective January 1. **No post-implementation reviews or adjustments to the transfer amount would occur** given that the final rule would recently have published and recreational measures would have already been considered based on expected post-transfer RHLs.

*While this step is not directly part of the quota transfer process, the timing of the recreational measures setting process influences the necessary timeline of transfer-related decisions.

5.1.2 Transfer Cap Alternatives

Table 16 lists the alternatives under consideration for a cap on the total transfer amount (if any). These alternatives would only be considered if transfer provisions were adopted under alternative 2b above, and would specify a maximum percent of the ABC that could be transferred from one sector to another each year in the form of a landings limit transfer.

Table 16: Alternatives for annual transfer of quota between the commercial/recreational sectors.

Annual Quota Transfer Cap Alternatives
2c-1: No transfer cap specified; the Council and Board can recommend any amount of the ABC be transferred between fisheries.
2c-2: Maximum transfer amount set at 5% of the ABC.
2c-3: Maximum transfer amount at 10% of the ABC.
2c-4: Maximum transfer amount set at 15% of the ABC.

5.2 Impacts of Quota Transfer Provision Alternatives

The current FMP does not allow for the annual transfer of landings between the commercial and recreational sectors. Transfers are being considered as a way to address situations where landings limits in one sector exceed recent landings but fall below recent landings in the other sector. In short, transfers could provide flexibility when a landings limit is restrictive in one sector and the other sector has a surplus. However, the process for determining when a transfer is needed and how much to transfer could be complex, as described below.

Under alternative 2a (no action), there would be no change to the FMP to allow for transfers. Lacking this flexibility, the result when one sector is underachieving its limits and another sector is in need of additional allowable landings may be that limits remain set so that one sector is more likely to have an overage of catch, and the other sector may underutilize their allowable catch. This may negatively impact the ability to achieve the Council and Boards' policy and FMP objectives on a short-term basis. If these trends persist, it could indicate a need for longer-term solutions such as further changes to the allocations.

The short-term impacts of not allowing transfers would be similar to current conditions, where in the event that there is surplus allocation to one sector and the other needs allocation, negative socioeconomic impacts could be expected for the sector in need of allocation. This sector would not be able to receive additional quota and may need restrictive management measures to constrain catch and may experience reduced revenues and/or reduced angler satisfaction as a result. The sector determined to have a surplus allocation would most likely experience no impacts under the no action alternative; however, in some cases where conditions such as market factors or participation differ from what is predicted, this sector may experience slight positive impacts due to the opportunity to fish for their full allocation. These impacts may be less positive in practice if this sector is not able to fully utilize this quota.

Impacts associated with the proposed transfer process as well as sector-specific expected impacts of transfers are described in more detail below.

5.2.1 Impacts of the Proposed Process

A major disadvantage of the process proposed in Section 5.1.1 requires an annual evaluation of the need for a transfer in the upcoming year using data from the previous year (and potentially

older data). Because in-year landings projections are not feasible with this timeline, this would cause at least a two-year disconnect in the timing of the data used to evaluate the need for transfer and the year in which the transfer would apply. This could result in a mismatch between the recommended transfer amount and direction and the reality of the fishery conditions and needs for the upcoming year.

The need for a transfer in any given year may be difficult to determine, due to several factors in addition to the timing of the data availability described above. These fisheries (particularly summer flounder and black sea bass) tend to fully or mostly utilize their allocation and sometimes experience overages. Annual changes in management measures are sometimes needed (especially in the recreational fisheries), and the effects of both past and expected future changes on expected harvest must be considered when determining a transfer amount. It is also difficult to predict changes in market factors that may influence whether the commercial fishery would utilize additional quota or has quota to spare.

Past sector performance for these fisheries may not be very informative when it comes to determining how often transfers will be needed. Because the recreational data currency has recently changed, pre-revision MRIP performance relative to the RHLs is not likely to be useful since the changes were not a simple linear scaling. In addition, any allocation changes implemented through this action may reduce the need for transfers. For these reasons, predicting the need for a transfer may be more straightforward in the future after additional years of evaluating harvest against catch and landings limits set in the new MRIP currency, and after any allocation changes implemented through this action have been in place for a few years. In this way, the ability to use transfers may be a useful "tool in the toolbox" for future years, as opposed to an option that is likely to be used in the more immediate future.

Looking solely at past trends in sector performance, transfer provisions may be most useful for the scup fishery given that the commercial quota has not been fully utilized for several years, but again, it is difficult to determine future transfer needs given the many uncertainties discussed here.

The MC recommendations for a transfer amount and direction would be based on an expected set of landings limits which would not yet have been reviewed or adopted by the Council and Board (Table 15). If these landings limits are modified by either the Council and Board or NMFS (e.g., if NMFS determines that a modification is necessary to account for a past year's overage), the MC's transfer recommendation may no longer be appropriate and it could be difficult for the Council and Board to adopt a modified transfer amount in time for the upcoming fishing year. The intent is that any transfer would be implemented before January 1 of the relevant fishing year, meaning that a mid-year quota change due to a transfer is not expected.

The conclusion about whether a transfer is needed could result in increased political discussion and potentially increased tensions between sectors during the specifications setting or review process.

As described in Section 5.1.1, recreational measures (typically determined in December) would need to be set using the expected post-transfer RHL. While typically there are no changes to the Council and Board's adopted RHL during the implementation process, it is possible that NMFS may change the RHL if circumstances require such modifications, such as if a recreational payback for an ACL overage is required. In practice, this may not represent a problem, since recreational measures are typically set based on the expected RHL. However, the use of transfers may further

complicate this process if NMFS modifies or does not adopt the Council and Board recommendation for transfer.

If the Council and Board determine that the ability to use transfers during specifications is not desired, they could consider allowing for temporary transfers via FMP frameworks/addenda instead. This could be specified through alternative set 3 (Section 6.0). Annual transfers though a framework/addendum process would provide some additional flexibility in adapting to changing sector needs but would not allow for as timely of a response as would be possible through the specifications process.

5.2.2 Socioeconomic Impacts of Transfers

The impacts of transfers depend on the frequency of transfer, the amount transferred in each year, the direction of transfer between sectors, and to what extent each sector has been or is expected to achieve their limits. The impacts of a transfer are also dependent on the marginal economic value of additional allowable landings for each sector (in terms of commercial and for-hire revenues and revenues for associated commercial and recreational businesses), as well as the positive or negative impacts on angler satisfaction that may arise from modifying or maintaining recreational measures. As described below, many additional factors can influence how the commercial and recreational fisheries may be impacted by a transfer, including market conditions, overall availability of the species, availability of substitute species, and trends in effort driven by external factors.

Commercial to Recreational Transfers

If the recreational fishery receives a transfer, they would experience positive socioeconomic impacts due to outcomes such as the potential for liberalized measures, the ability to maintain status quo measures when a restriction may otherwise be needed, and/or a reduced risk of an RHL or ACL overage that may impose negative consequences in a future year. These outcomes could result in maintained or increased revenues for recreational businesses as well as improved or maintained levels of angler satisfaction, compared to if no commercial to recreational transfer occurred.

In this scenario, the commercial sector would give up quota that is not expected to be fully utilized. In theory, if the decision to transfer is based on a pattern of underutilization in the commercial sector, the economic impacts to the commercial sector from such a transfer would be neutral. However, the commercial sector could experience a loss in revenue if the potential for underutilization is incorrectly evaluated. This could be due to a disconnect in the data used to evaluate the transfer and conditions in the relevant fishing year, possibly driven by changes in market conditions or fishery participation and effort.

Impacts to the commercial fisheries are not likely to be felt equally across states given different commercial quota management systems and differing quota utilizations by state. While coastwide commercial landings can fall short of the total commercial quota, individual states vary considerably in utilizing or underutilizing their individual quotas. A coastwide projected underutilization could occur even if one or more states would be expected to fully utilize their quota in the upcoming year. This could have negative economic impacts to the commercial industries in states that regularly achieve their quotas.

Recreational to Commercial Transfers

If the commercial fishery receives a transfer, they would experience positive socioeconomic impacts in the year of the transfer due to increased potential revenues associated with higher potential landings. In general, quota increases are expected to result in higher revenues, although some of these benefits may be partially offset by decreases in price per pound that can be associated with higher quotas. As described in Section 4.2, average ex-vessel price for each species tends to decrease with increasing landings. This relationship depends on the magnitude of the change in quota as well as other market factors in addition to total landings, so this relationship is difficult to predict. The relationship is also stronger for summer flounder and scup compared to black sea bass, so positive impacts of the commercial sector receiving a transfer are likely to be greater for black sea bass.

In theory, if the decision to transfer is based on a pattern of underutilization by the recreational sector, negative socioeconomic impacts to the recreational sector from such a transfer may not be realized. However, this would limit the potential for liberalizing recreational management measures. For these species, particularly for summer flounder and black sea bass, many stakeholders are of the opinion that recreational measures are currently overly restrictive. Because recreational harvest is more difficult to predict and control than commercial harvest, recreational management measures are frequently adjusted in order to strike an appropriate balance between conservation and angler satisfaction. Therefore, it may be less likely that a recreational to commercial transfer would actually occur.

Impacts of Transfers in Either Direction

The impacts of transfers should be considered in combination with the short-term and long-term impacts associated with commercial/recreational allocation modifications under alternative set 1. However, it is difficult to do so quantitatively given the uncertainties about allocation changes as well as the uncertainties in the frequency, amount, and direction of potential transfers. In general, any annual transfers away from a sector can compound the negative impacts experienced due to a reduction in that sector's total allocation, or in the short term could partially offset the positive impacts of an increase in allocation. Annual transfers to a sector can simultaneously create additional positive impacts on top of the positive impacts of reallocation from the perspective of the receiving sector, and also exacerbate negative impacts of a loss in allocation for the donating sector.

The impacts of transfers would also be influenced by annual reductions or increases in the overall ABC based on changes in projected stock biomass and the application of the Council's risk policy. The recipient of a transfer could have some negative socioeconomic impacts from ABC reductions mitigated by receiving a transfer, while the transferring sector may experience exacerbated negative economic impacts from ABC reductions. Conversely, if the ABC were increasing, this could offset negative impacts to the transferring sector and provide additional benefits to the sector receiving the transfer.

As described above, the impacts of transfers may differ by state or region. For the commercial industry, the negative impacts associated with losing quota or the positive impacts associated with receiving a transfer are influenced by the method of quota allocation for each species. For summer flounder, the commercial quota allocation was revised as of January 1, 2021, and the state allocations are now tied to the overall coastwide commercial quota amount. This means that a transfer to or from the commercial quota could influence whether the coastwide commercial quota is above or below the quota threshold for modified allocations, which is currently specified at 9.55

million pounds. The Council and Commission approved modifications to the black sea bass state commercial allocations such that the allocations will now partially account for biomass distribution. These changes will take effect on January 1, 2022. The revised black sea bass commercial state allocations are not dependent on the overall quota level; therefore, their impacts will be independent from the impacts of sector transfers.

The impacts of transfers can also be impacted by the availability and management of substitute species for a particular sector. High availability and access to recreational or commercial substitute species would help mitigate negative impacts of a transfer away from a given sector, while lower availability and access would compound these negative effects.

Availability of a target species in a given year can also affect the outcome of a transfer, in the sense that availability influences catch rates and search costs associated with commercial and recreational trips. In general, it has been more difficult to calibrate recreational measures to constrain catch below the target level when availability for a species is high. This could drive managers to adopt commercial-to-recreational transfers more frequently under high availability conditions in order to avoid recreational overages.

5.2.3 Impacts of Transfer Cap Alternatives

Alternative set 2c (Section 5.1.2) contains options for setting a cap on the total amount of transfer between sectors, as a percentage of the ABC.

Alternative 2c-1 would specify that there is no transfer cap, meaning the Council and Board could recommend any amount of the ABC be transferred between sectors during the annual specifications process. This allows for maximum flexibility in changing the effective allocation in each year; however, this is also associated with a higher likelihood of politically contentious discussions during the annual specifications setting process and greater uncertainty about future effective sector allocations. The Council and Board could effectively consider large temporary reallocations on an annual basis. No transfer cap could also mean a very wide range of potential transfer amounts to consider and analyze. This could lead to less predictability and more frequent fluctuations in sector-specific landings limits from year to year, which could be amplified by changes in overall catch limits resulting from fluctuating stock projections. This could partially negate some of the positive impacts experienced by the sector receiving transfers, given that it could mean their adjustments in the following year may be more severe than if a transfer did not occur the prior year.

Alternatives 2c-2, 2c-3, and 2c-4 provide options for transfer caps set at 5%, 10%, and 15% of the ABC, respectively. This would provide less flexibility in adapting to circumstances where there may be a surplus of allocation in one sector but a deficit in the other. However, a transfer cap also limits consideration of larger allocation transfers through the specifications process and would limit the politically contentious nature of this discussion and provide greater certainty in the effective sector allocations. Transfer caps would limit the allocation changes that could occur from year to year. Transfer caps would somewhat streamline the process of transfer consideration given that it would limit the range of what could be considered. A lower transfer cap (alternative 2c-2) would accomplish this more so than a larger cap (alternative 2c-4).

Under all alternatives, increased fluctuation in allocation from year to year could increase instability and unpredictability in landings limits, which could partially negate the positive impacts

from a transfer even if a cap is in place, although transfer caps under alternatives 2c-2 through 2c-4 would lower the likelihood or severity of this, particularly if the cap is lower.

Under all transfer alternatives, if larger and/or more frequent transfers are adopted, this may indicate that the allocation is not properly specified in the FMP and consideration should be given to modifications to the allocation percentages.

Table 17 shows 5%, 10%, and 15% transfer caps in millions of pounds under the 2017-2023 high and low ABCs for each species. This is meant to provide an example of the amounts that could have been transferred between sectors under recent high and low ABCs. This does not represent a theoretical minimum or maximum amount of quota transfer in pounds, given that the transfer cap alternatives are specified as a percent of the ABC and will vary as ABCs change.

Between 2017-2023, alternative 2c-2 (5% cap) would have resulted in a cap between 0.45 and 1.96 million pounds depending on the species and year. Alternative 2c-3 (10% cap) would have resulted in a cap between 0.89 and 3.91 million pounds depending on the species and year. Alternative 2c-4 (15% cap) would have resulted in a cap between 1.34 and 5.87 million pounds depending on the species and year. Over this time period, scup would have had the highest average transfer cap given the highest average ABC, followed by summer flounder and then black sea bass.

Table 17: Example transfer caps under alternatives 2c-2 through 2c-4 for the 2017-2023 high and low ABCs for each species, in millions of pounds. Note that these are only examples using recent ABCs and do not represent a theoretical maximum or minimum transfer amount in pounds.

		Summer Flounder	Scup	Black Sea Bass
ABC for comparison	**2017-2023 Low ABC**	11.30	28.40	8.94
	2017-2023 High ABC	33.12	39.14	18.86
2c-2: 5% of ABC	**2017-2023 Low Transfer Cap**	0.57	1.42	0.45
	2017-2023 High Transfer Cap	1.66	1.96	0.94
2c-3: 10% of ABC	**2017-2023 Low Transfer Cap**	1.13	2.84	0.89
	2017-2023 High Transfer Cap	3.31	3.91	1.89
2c-4: 15% of ABC	**2017-2023 Low Transfer Cap**	1.70	4.26	1.34
	2017-2023 High Transfer Cap	4.97	5.87	2.83

6.0 FRAMEWORK/ADDENDUM PROVISION ALTERNATIVES AND IMPACTS

6.1 Framework/Addendum Provision Alternatives

The alternatives in Table 18 consider whether the Council and Board should have the ability to make future changes related to certain issues considered through this amendment through a framework action (under the Council's FMP) and/or an addendum (for the Commission's FMP). Frameworks/addenda are modifications to the FMPs that are typically (though not always) more efficient than a full amendment. While amendments may take several years to complete and may be more complex, frameworks/addenda can usually be completed in 5-8 months. Both types of management actions include multiple opportunities for public input; however, scoping and public hearings are required for amendments, but are optional for frameworks/addenda. Frameworks/

addenda can only modify existing measures and/or those that have been previously considered in an FMP amendment.

The framework/addenda provisions would apply to commercial/recreational allocation changes (alternative set 1) and quota transfer provisions between the commercial and recreational sectors (alternative set 2). The ability to revise commercial/ recreational allocations through a framework or addendum could make future allocation changes simpler and less time consuming. The Council adopted an allocation review policy in 2019,[11] where each relevant allocation will be reviewed at least every 10 years; however, the Council may choose to conduct reviews more frequently based on substantial public interest or other factors (including changes in ecological, social, and economic conditions). Framework/addendum provisions are also considered for transfers of quota between sectors, as this may allow for a more efficient management response to changes in the needs of the commercial and recreational fisheries for these species than if these changes needed to be considered through an FMP amendment, as is currently the case.

Allowing such changes through a framework/addendum **does not require or guarantee that this mechanism can be used for future changes**. The Council and Board can always choose to initiate an amendment rather than a framework/addendum if more thorough evaluation or additional public comment opportunities are desired. In addition, if the specific changes under consideration are especially controversial or represent a significant departure from previously considered measures, an amendment may be required, even if the type of change is identified in the FMP as a change that can be made through a framework/addendum.

Table 18: Framework/addendum provision alternatives.

Framework/addendum provision alternatives
3a: No action/status quo (no changes to framework/addendum provisions; changes to commercial/recreational allocations must be made through an amendment)
3b: Allow changes to commercial/recreational allocations, annual quota transfers, and other measures included in this amendment to be made through framework actions/addenda

6.2 Impacts of Framework/Addendum Provision Alternatives

The impacts of alternatives 3a and 3b are briefly described below. These alternatives are primarily procedural in nature. The purpose of modifying the list of "frameworkable items" in the FMP is to demonstrate that the concepts included on the list have previously been considered in an amendment (i.e., they are not novel).

Alternative 3a would make no changes to the current list of framework provisions in the Council's FMP and no changes to the current list of measures subject to change under adaptive management in the Commission's FMP. Any future proposed modifications to the commercial/recreational allocations or proposed allocation transfer systems would likely require a full FMP amendment. The timeline and complexity of such an amendment would depend on the nature of the specific options considered.

Alternative 3b would allow changes to commercial/recreational allocations and sector allocation transfer provisions to be implemented through a framework action (for the Council) and/or an FMP addendum (for the Commission). This alternative is intended to simplify and improve the

[11] https://www.mafmc.org/s/MAFMC-Fishery-Allocation-Review-Policy_2019-08.pdf

efficiency of future actions to the extent possible and would not have any direct impacts on the environment or human communities as it is primarily procedural in nature. As previously stated, under alternative 3b, the Council and Board could still decide it is more appropriate to use an amendment if significant changes are proposed. The impacts of any specific changes to the commercial/ recreational allocations or transfers between the sectors considered through a future framework/ addendum would be analyzed through a separate process with associated public comment opportunities and a full description of expected impacts.

7.0 APPENDICES

APPENDIX A: Catch vs. Landings-Based Allocations

This appendix provides additional clarification on the differences between catch and landings-based allocations. These allocations are used to derive a set of required annual catch and landings limits for both sectors, including commercial and recreational annual catch limits and annual catch targets (ACLs and ACTs[12], which both account for landings and dead discards), and landings limits (commercial quota and RHL, both of which only account for landings). The same types of catch and landings limits are all required under both catch and landings-based allocations. These limits are calculated through the annual specifications process. The commercial/recreational allocations are not used in other parts of the management process; they are only used in the specifications process to derive the sector-specific catch and landings limits.

In both cases, all catch and landings limits are derived from the overall ABC, which applies to all dead catch and is set based on the best scientific information available. The main difference between catch and landings-based allocations is the step in the process at which the commercial/recreational allocation is applied and how dead discards are factored into the calculations.

A **catch-based** allocation allocates the total ABC (which accounts for both landings and dead discards) between the two sectors as commercial and recreational ACLs, based on the allocation percentages defined in the FMP (catch-based step 1 in the figures below). Dead discards are then estimated for each sector and subtracted from the sector ACLs to derive the annual sector landings limits (commercial quota and RHL).

A **landings-based** allocation applies the allocation percentage defined in the FMP to only the portion of the ABC that is expected to be landed (landings-based steps 1 and 2 in the figures below). This requires first calculating the amount of expected dead discards from both sectors combined and subtracting that from the ABC (landings-based step 1), so that the allocation percentage can be applied to the total allowable landings (landings-based step 2). Dead discards are still projected for each sector and incorporated into the ACLs under a landings-based allocation, but the process is more complex due to the need to separate out total landings first to apply the allocation. This process evolved because management of summer flounder and black sea bass was previously based on landings limits only and did not consider dead discards. When dead discards were first incorporated into management, the allocation percentages continued to be

[12] ACTs are set equal to or lower than the ACLs to account for management uncertainty. For these species, ACTs have typically been set equal to the ACLs in recent years.

applied to landings only and it was determined that other methods were needed to split expected dead discards by sector.

As described in more detail below, in both cases, sector-specific dead discards are generally estimated based on recent trends in the fisheries. Therefore, **under a landings-based allocation, recent trends in dead discards in one sector have more of an impact on the catch and landings limits in the other sector. Under a catch-based allocation, the calculations of sector-specific catch and landings limits are more separate and recent trends in landings and dead discards in one sector have a lesser impact on the limits in the other sector**. This can have important implications due to sector-specific differences in factors such as how landings and discards are estimated, the factors influencing discards (e.g., regulations, market demand, catch and release practices), and discard mortality rates.

Under both allocation approaches, the commercial/recreational allocation percentages are fixed (until modified through an FMP action) and do not vary based on recent trends in the fisheries. They would be defined based on one of the alternatives listed in Section 4.0 of this document.

More details, including a description of the subsequent steps to arrive at the commercial quota and RHL are included below. Examples of the implications of each approach are included at the end of this section.

Projected Discards Under Both Allocation Approaches

For scup and summer flounder, the total amount of the ABC expected to come from dead discards can be projected using the stock assessment model. These projections account for variations in the size of different year classes (i.e., the fish spawned in a given year) and catch at age information from the commercial and recreational sectors. The current stock assessment model for black sea bass does not allow for these projections, so alternative methods such as recent year average proportions need to be used.

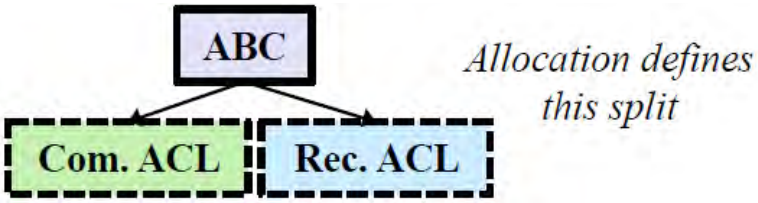
Regardless of the allocation approach, the methodology for calculating sector-specific dead discards (as opposed to total dead discards) is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.

Under both approaches, only **dead** discards are factored into the allocation percentages and the catch and landings limits calculations. Discarded fish which are presumed to survive do not factor into these calculations.

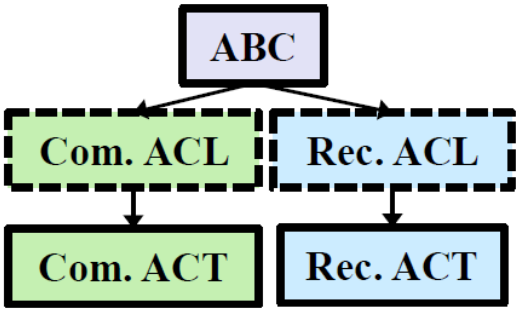
Catch-based Allocation Process

The allocation percentages under consideration are listed in Section 4.1. Those allocation percentages are then used in the specifications process as described below.

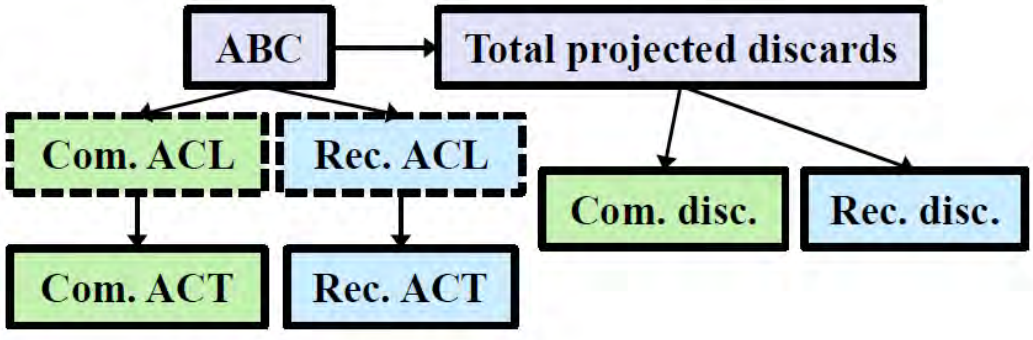
Catch-based Step 1. The ABC is divided into commercial and recreational ACLs based on the allocation percentages defined in the FMP.



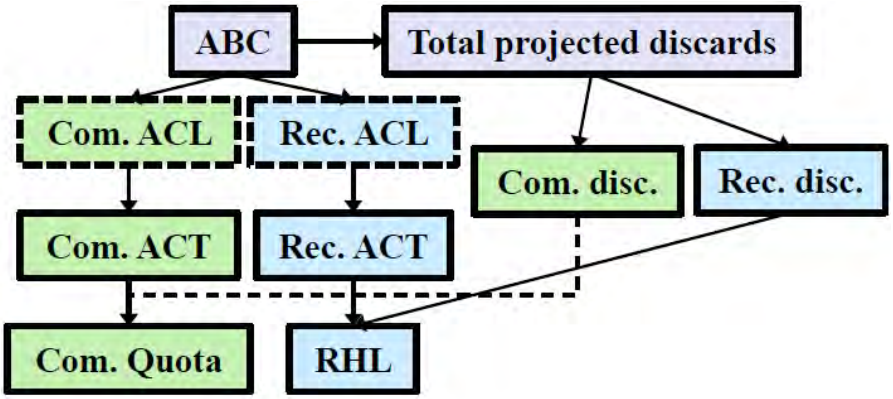
Catch-based Step 2. Commercial and recreational ACTs are set less than or equal to their respective ACLs to account for management uncertainty. The appropriate deduction for management uncertainty (if any) is not pre-defined and is based on annual considerations, including the advice of the Monitoring Committee.



Catch-based Step 3. Expected dead discards are calculated for each sector to derive the commercial quota and RHL from the sector-specific ACTs.



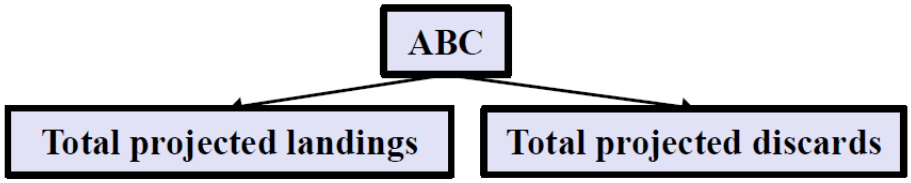
Catch-based Step 4. Commercial quotas and RHLs are determined by subtracting the sector-specific dead discards (see catch-based step 3) from the sector-specific ACTs.



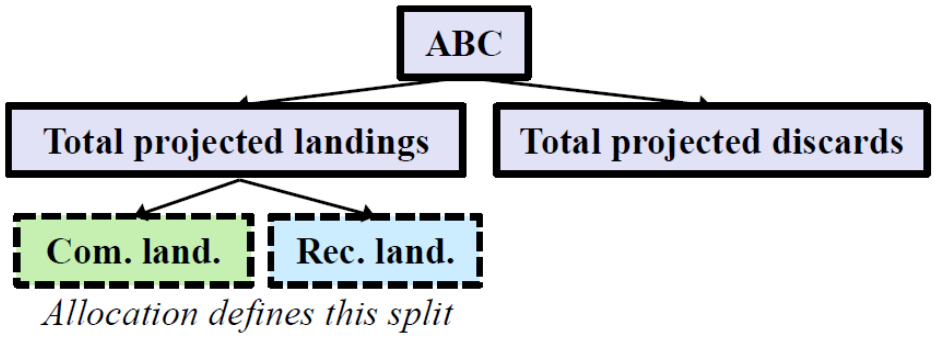
Landings-Based Allocation Process

Landings-based Step 1. The ABC is first divided into the amount expected to come from landings (total projected landings) and the amount expected to come from dead discards (total projected dead discards). The methodology for this calculation is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.

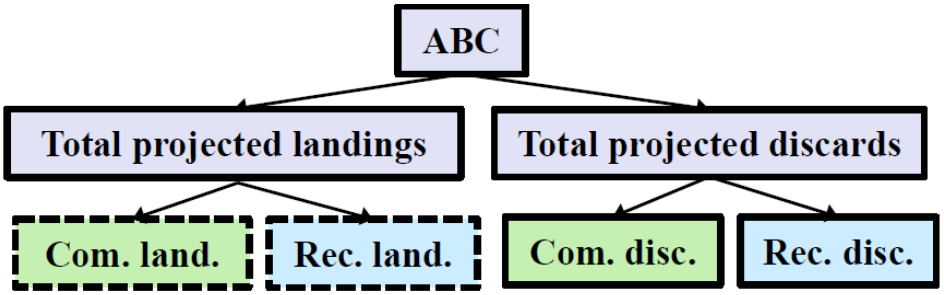
As previously stated, for scup and summer flounder, these calculations can be informed by stock assessment projections. The current black sea bass stock assessment does not model landings and dead discards separately; therefore, calculations of total projected landings and dead discards for black sea bass cannot be informed by stock assessment projections. Instead, other methods, such as those based on recent year average proportions, must be used.



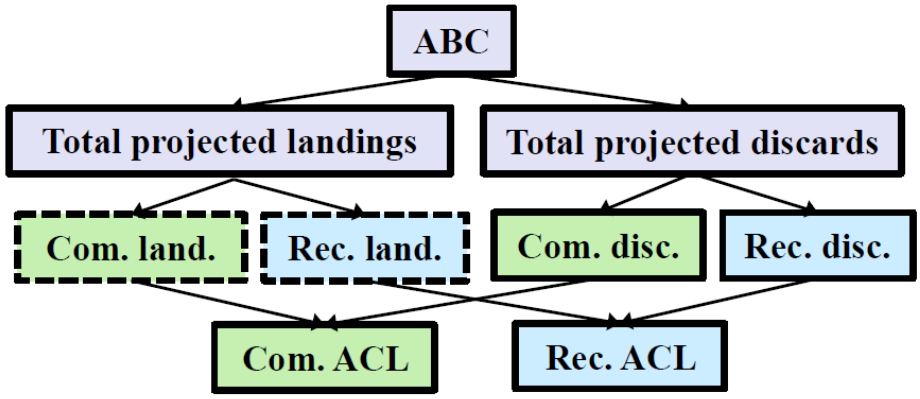
Landings-based Step 2. The total projected landings are allocated to the commercial and recreational sectors based on the allocation percentages defined in the FMP.



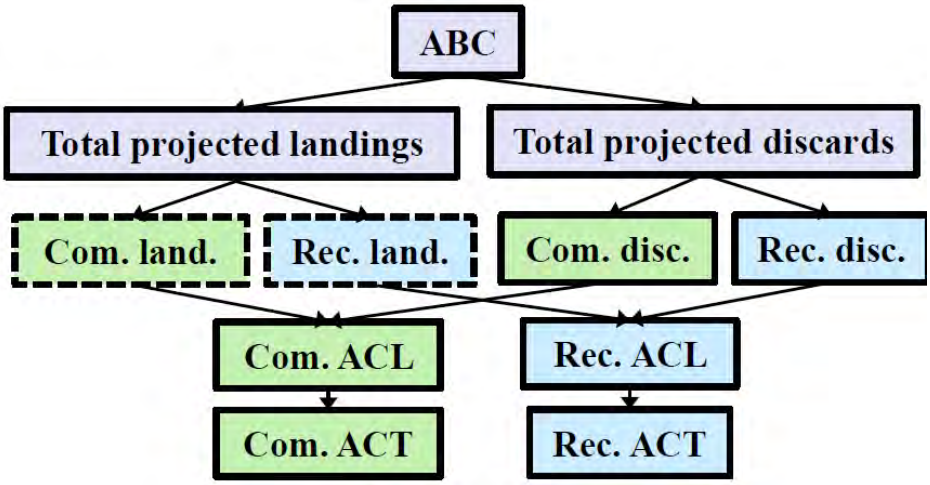
Landings-based Step 3. The total projected dead discards are split into projected commercial dead discards and projected recreational dead discards. The methodology for calculating sector-specific dead discards is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.



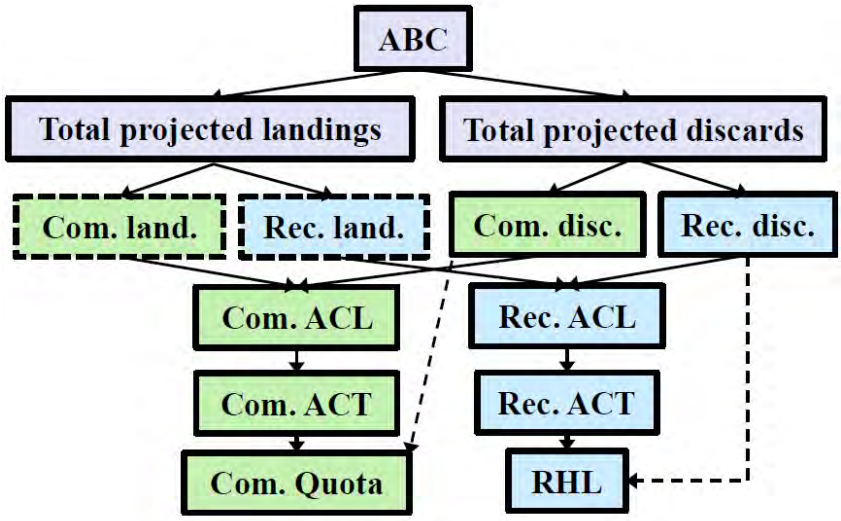
Landings-based Step 4. Commercial and recreational ACLs are calculated by adding the landings amount allocated to each sector and the sector-specific projected dead discards (see Steps 2 and 3 above).



Landings-based Step 5. Commercial and recreational ACTs are set less than or equal to their respective ACLs to account for management uncertainty. The appropriate deduction for management uncertainty (if any) is not pre-defined and is based on annual considerations, including the advice of the Monitoring Committee.



Landings-based Step 6. Commercial quotas and RHLs are determined by subtracting sector-specific discards from the sector-specific ACTs.



Implications of Catch vs. Landings-Based Allocation Approaches

One of the major differences between catch-based and landings-based allocations is at which step in the process the commercial/recreational allocation is applied to derive catch and landings limits. Under a catch-based allocation, the commercial/recreational allocation is applied in the first step of the process after the ABC is determined. Under a landings-based allocation, decisions about the total amount of expected landings and dead discards must be made before the commercial/ recreational allocation is applied. The commercial/recreational allocation is then applied to the total amount of expected landings (Figure 7).

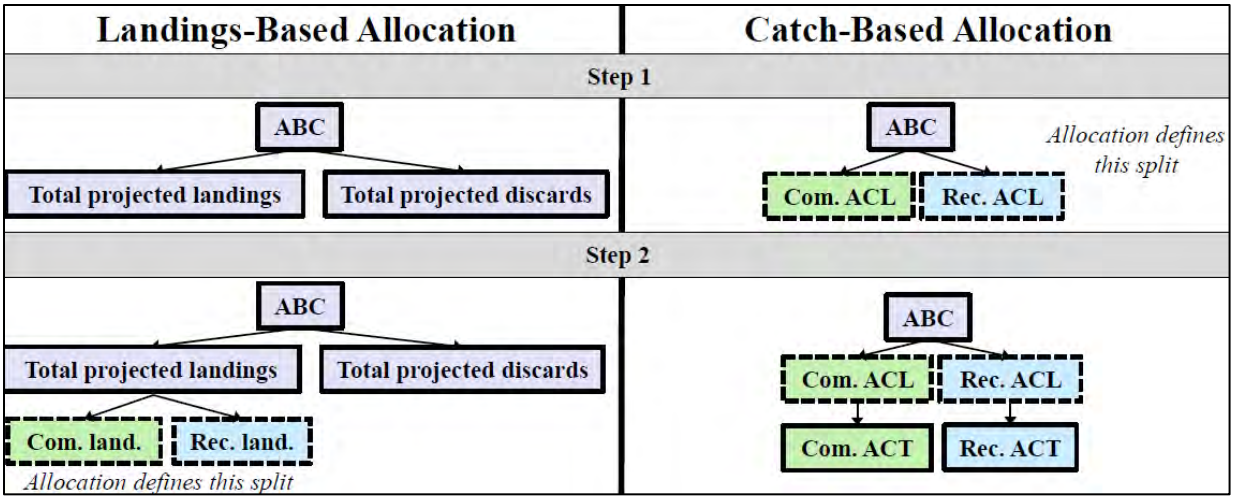


Figure 7: Comparison of first two steps of calculating commercial and recreational catch and landings limits under catch and landings-based allocations.

The method for determining total expected landings and dead discards under a landings-based approach is not specified in the FMP and can vary based on annual considerations. In practice, this typically involves consideration of stock assessment projections and/or recent trends in landings and dead discards, depending on the species. In this way, considerations of recent trends in the stock and discard trends in either the commercial or recreational fishery impacts both sector's catch and landings limit under a landings-based allocation to a greater extent than under a catch-based allocation.

Under a catch-based allocation, the total ABC is always allocated among the commercial and recreational sectors in the same way (i.e., based on the allocation percentages defined in the FMP) regardless of recent trends in year classes or landings and dead discards in each sector. Put another way, under a catch-based allocation, changes in landings and dead discards in one sector do not influence the other sector's ACL as the entire ABC is always split among the sectors based on the allocation defined in the FMP, regardless of recent trends in landings and discards by sector. In theory, this can allow each sector to see the benefits of a reduction in their own dead discards to a greater extent than under a landings-based allocation. Under a catch-based allocation, a reduction in dead discards in one sector can result in an increase in that sector's landings limit in a future year. This was part of the rationale for implementing the current catch-based allocation for scup as it was expected to incentivize a reduction in commercial dead discards, which were of concern during development of Amendment 8. Under a landings-based allocation, changes in landings and dead discards in one sector can influence the catch and landings limits in both sectors; therefore, the benefits of a reduction in dead discards (or the negative impacts of an increase in dead discards) in one sector can also be felt by the other sector.

Although catch- and landings-based allocations may create different incentives for reducing dead discards in each sector, in reality, this may be a long-term impact. With the exception of the no action alternatives, all the allocation alternatives under consideration through this amendment are based on historical patterns in the fisheries considering the best available recreational and commercial data, either using the original base years or considering data through 2018 or 2019, depending on the alternative (Section 4.1). Therefore, the catch or landings-based allocations under

many of the alternatives may not create an immediate notable incentive for change compared to recent operating conditions. Selection of catch versus landings-based allocations does have an immediate effect on each sector's landings limit. Appendix C presents a methodology for projecting landings limits under the catch- and landings-based allocation alternatives, and Section 4.2 compares recent trends in landings data to the projected landings limits under each allocation alternative.

APPENDIX B: Supplemental Information on Basis for Allocation Alternatives

This appendix describes the rationale behind each of the commercial/recreational allocation percentage alternatives listed in alternative sets 1a-1c (Table 19). Alternatives under approaches A through G were initially developed by the Fishery Management Action Team (FMAT) and approved by the Council and Board for inclusion in this amendment, while alternatives under approaches H and I were proposed by a group of Council and Board members and adopted for inclusion in this document in August 2021.

Table 19. Alternatives considered through this amendment for commercial/recreational allocation percentages (i.e., alternative sets 1a – summer flounder, 1b - scup, and 1c – black sea bass) grouped according to the approach used to derive the alternatives.

Approach	Description	Associated Alternatives
A	No action/status quo	1a-4, 1b-1, 1c-4
B	Same base years as current allocations (varies by species) but with new data	1a-5, 1b-2, 1b-5*, 1c-5
C	2004-2018 base years	1a-1, 1a-6*, 1b-6, 1c-2
D	2009-2018 base years	1a-2*, 1a-6*, 1b-3*, 1b-5*, 1c-3, 1c-7*
E	2014-2018 base years	1a-3, 1a-7, 1b-5*, 1c-7*
F	Approximate status quo harvest per sector compared to 2017/2018 (summer flounder) or 2018/2019 (scup, black sea bass)	1a-2*, 1b-4, 1b-7, 1c-1, 1c-6*
G	Average of other approaches approved by Council/Board in June 2020	1a-2*, 1b-3*, 1c-6*
H	Average 2004-2018 catch or landings proportions with RHL overage years excluded	Fluke-1 and -2, Scup-1 and -2, BSB-1 and -2
I	50/50 weighting of the historical base years and 2004-2018 with RHL overage years excluded	Fluke-3 and -4, Scup-3, and -4, BSB-3 and -4

*indicates an alternative supported by multiple approaches.

Approach A (no action/status quo)

The no action/status quo alternatives consider the consequences of taking no action and retaining the current commercial/recreational allocations. It is required that all Council and Commission amendments consider no action/status quo alternatives.

Approach B (same base years as current allocations but with new data)

This approach would use updated recreational and commercial data from the same base years as the current allocations to inform new allocation percentages. This is the basis (or, depending on the alternative, part of the basis) for alternatives 1a-5, 1b-2, 1b-5, and 1c-5.

Both catch and landings-based alternatives using this approach are considered for scup (alternatives 1b-2 and 1b-5, respectively). However, for summer flounder and black sea bass, only landings-based alternatives using this approach are considered (alternative 1a-5 for summer flounder and 1c-5 for black sea bass). This is because dead discard estimates in weight are not

available for all the current base years for summer flounder (i.e., 1980-1989) and black sea bass (i.e., 1983-1992). Estimates of landings and dead discards in weight in both sectors are available for all the current base years for scup (i.e., 1988-1992).

MRIP does not provide estimates of recreational catch or harvest prior to 1981; therefore, the full 1980-1989 base years for summer flounder cannot be re-calculated for the recreational fishery. Instead, alternative 1a-5 uses 1981-1989 as the base years.

The rationale behind the selection of the current base years for each species is not explicitly defined in the FMP amendments that first implemented the commercial/recreational allocations. The current base years for scup and black sea bass are all years prior to Council and Commission management. For summer flounder, the Commission FMP was adopted in 1982 but contained mostly management guidelines rather than required provisions. The joint Council and Commission FMP was adopted in 1988, toward the end of the 1980-1989 base year period used to develop allocations. The management program for summer flounder was quite limited until Amendment 2 was implemented in 1993. The current base years for each species were likely chosen based on a desire to use as long of a pre-management time period as possible considering the limitations of the relevant data sets.

The approach of revising the commercial/recreational allocations using the same base years and new data allows for consideration of fishery characteristics in years prior to influence by the commercial/recreational allocations, while also using what is currently the best scientific information available to understand the fisheries in those base years.

Approach C (2004-2018 base years), approach D (2009-2018 base years), and approach E (2014-2018 base years)

Under approaches C, D, and E, the commercial/recreational allocation for each species would be based on the proportion of catch or landings from each sector during the most recent 15, 10, or 5 years through 2018, respectively. Final 2019 data from both sectors were not available during initial development of these alternatives; therefore, this amendment only considers catch and landings data through 2018.

The fisheries have changed notably since the commercial/recreational allocations were first implemented in 1993 for summer flounder, 1997 for scup, and 1998 for black sea bass. Most notably, all three species were under rebuilding programs when these allocations were first implemented. According to the most recent stock assessment information, none of the three species are currently overfished or experiencing overfishing. Black sea bass and scup biomass levels are particularly high, at 237% and 198% of the target levels in 2018, respectively. Summer flounder biomass was at 78% of the target level in 2017.[13]

Other characteristics of the fisheries have also changed. Limited access programs for the commercial fisheries were implemented after the initial allocation base years. Possession limits and required minimum fish sizes in both sectors were implemented and have constrained both commercial and recreational harvest. Reporting and monitoring systems and requirements in both

[13] Stock assessment reports for these species can be found at: https://www.fisheries.noaa.gov/resource/publication-database/northeast-stock-assessment-documents-search-tool.

sectors have improved. Socioeconomic conditions such as demand for seafood and the demographics and number of both commercial and recreational fishermen have also shifted.

For these reasons, this amendment will consider allocation percentages based on more recent trends in the fisheries compared to the initial base years. The FMAT, Council, and Board agreed that the most recent 15, 10, and 5 years (through 2018) are reasonable time periods to consider.

During these time periods, the fisheries were theoretically constrained by the current allocations. However, the commercial fisheries were generally held closer to their allocations than the recreational fisheries, even when measuring recreational harvest with the pre-calibration MRIP data available prior to 2018. Due to the nature of these fisheries, the commercial fisheries have been much more comprehensively monitored in a more timely manner than recreational fisheries during these time periods. All federally permitted commercial fishermen are required to sell their catch to federally permitted dealers, and those dealers must submit landings reports on a weekly basis. If commercial fisheries are projected to land their full quota prior to the end of the year or quota period, they can be shut down. The commercial fisheries have rarely exceeded their quotas by notable amounts over the past 15 years due to close monitoring and reporting.

Recreational harvest is monitored through a combination of voluntary responses to MRIP surveys and VTR data from federally permitted for-hire vessels. Preliminary MRIP data are provided in two month "wave" increments and are not released until approximately two months after the end of the wave. Final recreational data are generally not available until the spring of the following year. Due to the delay in data availability, in-season closures are not used for these recreational fisheries. Recreational fisheries are primarily managed with a combination of possession limits, minimum fish sizes, and open/closed seasons that are projected to constrain harvest to a certain level. However, recreational harvest is influenced by a number of external factors, and the level of harvest associated with a specific combination of possession limits, minimum fish sizes, and open/closed seasons can be difficult to accurately predict. Compared to commercial effort, recreational effort is more challenging to manage, especially considering the recreational sector is an open access fishery. For these reasons, recreational harvest is not as tightly controlled and monitored as commercial landings.

In summary, there are tradeoffs associated with allocations based on recent fishery performance. These allocations could better reflect the current needs of the fisheries and be more responsive to changes in the fisheries and stocks compared to allocations using the initial base years. However, these alternatives would reallocate based on time periods when the recreational fishery was effectively less constrained to their limits than the commercial fishery. The implications may be different for each of the three species, and the issues should be carefully considered. From 2004-2018, scup tended to have more consistent quota and RHL underages in both sectors than summer flounder and black sea bass, and black sea bass had much more consistent RHL overages than the other two species (in all cases considering the pre-calibration MRIP data available prior to 2018).

Approach F: Approximate status quo harvest per sector compared to 2017/2018 (summer flounder) or 2018/2019 (scup, black sea bass)

Rationale

The intent behind this approach is to modify the percentage allocations to allow for roughly status quo landings in both sectors under the 2020-2021 ABCs for all three species compared to year(s) prior to the recent catch limit revisions based on the most recent stock assessments. This approach

was developed prior to the August 2020 Council and Board meeting when both groups agreed to revise the 2021 ABCs for all three species; therefore, this approach considers the previously implemented 2021 ABCs. Compared to the previously implemented 2021 ABCs, the revisions approved by the Council and Board in August 2020 represent an increase of 8% for summer flounder, 13% for scup, and 9% for black sea bass.

The most recent stock assessments for all three species incorporated the revised MRIP data as well as updated commercial fishery data and fishery-independent data through 2017 for summer flounder and 2018 for scup and black sea bass. Catch and landings limits based on these assessments were implemented in 2019-2021 for summer flounder and 2020-2021 for scup and black sea bass. Identical catch and landings limits across each year were implemented for summer flounder and black sea bass. For scup, the catch and landings limits varied across 2020-2021.

For summer flounder, these changes resulted in a 49% increase in the commercial quota and RHL in 2019 compared to 2018. Despite the increase in the RHL, recreational management measures could not be liberalized because the revised MRIP data showed that the recreational fishery was already harvesting close to the increased RHL. The increased commercial quota allowed for an increase in commercial landings.

For black sea bass, these changes resulted in a 59% increase in the commercial quota and RHL for 2020 compared to 2019. Status quo recreational measures for black sea bass were expected to result in an overage of the increased 2020 RHL; however, the Council, Board, and NMFS agreed to maintain status quo recreational management measures for 2020 to allow more time to consider how to best modify recreational management in light of the new MRIP data. Commercial landings appear to have increased in response to the increase in the quota; however, they are not likely to increase by the full 59% due to the impacts of the COVID-19 pandemic on market demand.

For scup, these changes resulted in a decrease in the commercial quota (-7%) and RHL (-12%) in 2020 compared to 2019. Status quo recreational measures for scup in 2020 were maintained based on similar justifications described above for black sea bass as well as the expectation that the commercial fishery would continue to under-harvest their quota due to market reasons.

Given these circumstances, an attempt was made to calculate revised commercial/recreational allocations for all three species such that harvest in each sector could remain similar to pre-2019 levels for summer flounder and pre-2020 levels for scup and black sea bass (i.e., the years prior to implementation of the most recent stock assessments for all three species), at least on a short-term basis under the current ABCs. This would require lower commercial quotas than those currently implemented for all three species. However, the Council and Board agreed that this approach warrants further consideration given that the commercial quotas for summer flounder and black sea bass increased by 49% and 59% respectively as a result of the most recent stock assessments, the commercial scup quota has been under-harvested for over 10 years. The recreational black sea bass and scup fisheries are facing the potential for severe restrictions based on a comparison of the revised MRIP data in recent years to the current RHLs under the existing allocations.

Defining status quo for each species and sector

Due to unique circumstances in each fishery, the status quo harvest target under this approach was not defined the same way across all species and sectors. Recreational harvest can vary notably from year to year, even under similar management measures. For this reason, recreational status quo for all three species was defined as average recreational harvest in pounds during the two years

prior to the most recent catch limit revisions (i.e., 2017-2018 for summer flounder and 2018-2019 for scup and black sea bass). Commercial scup landings are also variable and have been below the quota since 2007 for market reasons. Therefore, status quo for the commercial scup fishery was also defined as a recent two-year average of harvest (2018-2019). For summer flounder and black sea bass, commercial status quo was defined as landings in the last year prior to revisions based on the most recent assessments (i.e., 2018 for summer flounder and 2019 for black sea bass). This reflects the fact that commercial summer flounder and black sea bass landings are generally close to the quotas.

Status quo levels of discards for each species and sector were defined using the same years described above for landings. At the time that this approach was developed, discard estimates in weight for 2019 were not available for either sector; therefore, it was assumed that 2019 discards would be equal to the 2016-2018 average for all species and sectors. Because the Council and Board approved specific allocation alternatives in August 2020, this analysis was not updated with the 2019 discard data that has since become available.

Methodology for calculating allocations

This approach considers the 2020 - 2021 ABCs (or, in the case of scup, the average of the 2020 and 2021 ABCs). Because this approach would modify the commercial/recreational allocation percentages, expected harvest and discards in each sector could not be calculated with the same methods used for setting the 2020-2021 specifications. Instead, initial values for expected dead discards by sector were calculated by dividing the 2020-2021 ABCs into expected total (i.e., both sectors combined) landings and total dead discards based on the average proportion of total landings and dead discards during 2017-2019 (see note above about 2019 discards). The expected total amount of dead discards was then divided into commercial and recreational discards based on the average contribution of each sector to total dead discards during 2017-2019. Initial expected harvest was defined as the status quo level of landings in each sector described above. These were the target commercial quotas and RHLs. As described below, these initial values for both harvest and dead discards were modified during subsequent steps of the analysis.

For summer flounder, total expected catch was 18% below the 2020-2021 ABC. This surplus allowable catch was split evenly among the two sectors. The resulting catch and landings limits, including expected dead discards in each sector, were modified to account for this surplus. For scup, total expected catch was 9% above the 2020-2021 average ABC. For black sea bass, total expected catch was 2% above the 2020-2021 ABC. For both scup and black sea bass, the catch reduction necessary to prevent an ABC overage was evenly split between the two sectors. Thus, true status quo was not be maintained for any of the three species under this example. For summer flounder, both sectors were able to slightly liberalize compared to the definition of status quo described above. For scup and black sea bass, both sectors had to be slightly restricted. The resulting catch and landings limits were then used to define the allocation percentages in Table 20. These are the allocation percentages for consideration under this approach.

Table 20. Allocations aiming to allow approximately status quo landings in each sector under the 2020-2021 ABCs compared to recent years prior to catch limit revisions based on the most recent stock assessments.

Sector	Catch-based			Landings-based		
	Summer flounder	Scup	Black sea bass	Summer flounder	Scup	Black sea bass
Commercial	43%	59%	32%	43%	50%	29%
Recreational	57%	41%	68%	57%	50%	71%

Approach G (average of other approaches approved by Council/Board in June 2020)

The FMAT developed several allocation alternatives during May and June 2020. Many of these approaches resulted in very similar allocation percentages. The Council and Board refined the list of alternatives under consideration in June 2020 and agreed that it would be appropriate to consider an option for each species that averages the other alternatives in recognition of the similarities in outcomes across many alternatives.

Although this approach does not have a quantitative basis that is distinct from the other alternatives, the FMAT agreed that this is appropriate. They also emphasized that there is not necessarily a clear, objective scientific basis for a single best way to approach these allocations, and that the final decision will be a policy and judgement call between a number of defensible options.

Approach H: Average 2004-2018 Catch or Landings Proportions with RHL Overage Years Excluded

The following approach was submitted by a group of four Council/Board members and approved for inclusion in this document in August 2021.[14] Language below is taken from their proposal.

Recent base years options (the last 5, 10, and/or 15 years through 2018) incorporating the recalibrated MRIP data were included in the draft amendment for all three species in landings and catch. However, as highlighted in the public comment, these options did not recognize the fundamental difference between the quota-managed commercial fisheries and target-managed recreational fisheries, in that only one sector may harvest significantly in excess of its limit which can result in a fairness and equity issue for reallocation based on these data. The objective of this proposal is thus to provide an allocation alternative for each species based on recent years fishery performance that does not reward the recreational fishery for overages of their annual harvest target when the commercial fishery was not allowed to have similar overages of their annual harvest quota from which to benefit.

This approach would remove the years from the time series in which the uncalibrated MRIP coastwide harvest estimate exceeded the RHL.[15] The 15-year time series (2004–2018) was selected in order to have sufficient years remaining in the calculations (10 years for summer flounder and scup, and seven years for black sea bass; the 10- and 5-year time series result in only two and one

[14] https://www.mafmc.org/s/Tab07_SFSBSB-Allocation-Amd_2021-08.pdf

[15] It is not appropriate to use the calibrated MRIP coastwide harvest estimates for this comparison because the RHLs were based on stock assessments utilizing the uncalibrated MRIP estimates. It also would not be appropriate to cap an exceeding year's harvest at the RHL given the intent to transition to the use of calibrated MRIP data. Hence the approach to remove the year's data from the calculation entirely.

years left in the calculation for black sea bass). This method was applied to both the catch data and landings data (Table 21).

The effect of removing the RHL overage years on the allocations is minor for summer flounder and scup, and more pronounced for black sea bass. For summer flounder, the catch and landings based allocations for 2004–2018 are changed by 1–2 percentage points in favor of the commercial fishery by removing the RHL overage years; for scup, it is 2–3 percentage points in favor of the commercial fishery; and for black sea bass, it is 8–10 percentage points in favor of the commercial fishery.

The catch-based and landings-based options for all three species are within the range of the existing alternatives based on the example commercial quotas and RHLs depicted in the draft amendment. The allocation shares are also within the range of existing alternatives for the scup catch-based option and the summer flounder and black sea bass landings-based options.

Table 21: Allocation options using 2004–2018 average proportions of catch or harvest with RHL overage years excluded.

Alternative Label and Basis	Allocation		Example quota or RHL (mil lb)	
	Com.	Rec.	Com. Quota	RHL
Landings-based				
Fluke-1: Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2006-2008, 2014 and 2016)	47%	53%	8.75	9.87
Scup-1: Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2004 and 2007-2010)	59%	41%	17.43	12.11
BSB-1: Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)	37%	63%	4.23	7.20
Catch-based				
Fluke-2: Average 2004-2018 catch proportions, excluding years with RHL overages (i.e., 2006-2008, 2014 and 2016)	45%	55%	9.01	10.02
Scup-2: Average 2004-2018 catch proportions, excluding years with RHL overages (i.e., 2004 and 2007-2010)	62%	38%	16.17	12.04
BSB-2: Average 2004-2018 landings proportions, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)	36%	64%	3.63	7.68

Approach I: 50/50 Weighting of the Historical Base Years and Recent Base Years with RHL Overage Years Excluded

The following approach was submitted by a group of four Council/Board members and approved for inclusion in this document in August 2021.[16] Language below is taken from their proposal.

[16] https://www.mafmc.org/s/Tab07_SFSBSB-Allocation-Amd_2021-08.pdf

As described in the proposal for the new alternatives, the draft amendment included allocation options based on historical base years (which were largely favored by commercial interests during public comment) and options based on recent base years (which were largely favored by recreational interests during public comment). The objective of this proposal is to add a weighted approach that balances commercial and recreational stakeholder interests in an allocation method that acknowledges both the historical fisheries' dependence and the recent fisheries' performance in a manner that is fair and equitable and uses the recalibrated MRIP data as the best available science. Specifically, the approach gives equal weighting to the historical base years (or reasonably proxy thereof, see below) and the last 15 years excluding those in which the recreational harvest limit was exceeded (as described above), through averaging their resulting allocations.

In order to present this option in both a landings and catch basis, we needed to address that the draft amendment did not include catch-based historic base years allocations for summer flounder and black sea bass due to missing discard information during the species' historic base years. To do so, we adopted the Council staff's April 2021 recommendation for summer flounder as an approach to provide a reasonable proxy of catch-based historical base years allocations using the best available data for both summer flounder and black sea bass. That recommendation for summer flounder applied the landings- based historic base years allocation percentages (1a-5: 55% com/45% rec) as a catch-based allocation "to allow for a continued use of the existing base years with a transition to a catch-based allocation approach." For black sea bass, this meant likewise applying the landings-based historical base years allocation percentages (1c-5: 45% com/55% rec) as a catch-based allocation. In support of these being "reasonable proxies" for historical catch-based allocations, we note how the landings-based and catch- based allocation percentages for summer flounder and black sea bass for a particular time series within the draft amendment are generally within a percentage point or two of one another (e.g., the summer flounder 2004-2018 time series results in com/rec allocation percentages of 44/56 catch-based and 45/55 landings-based, indicating that the inclusion of discards in the data does not change the resulting allocation much).

The allocations resulting from this approach are provided in Table 22. It is notable that this approach results in a catch-based black sea bass allocation similar to the 42% com/58% rec recommended by Council staff in April 2021 that was developed through an ad hoc approach meant to balance the tradeoffs for both sectors. The approach herein provides a more transparent and repeatable process that can be applied consistently across the three species.

The catch-based and landings-based options for all three species are within the range of the existing alternatives based on the example commercial quotas and RHLs depicted in the draft amendment. The allocation shares are also within the range of existing alternatives for the scup catch-based option and the summer flounder and black sea bass landings-based options.

Table 23 provides the historical base year allocations (or reasonable proxy thereof) used in the development of this proposed option for reference.

Table 22: Allocation options using a 50/50 weighting of the historical base years (or reasonable proxy thereof; see Table 23) and average 2004–2018 catch or landings proportions with RHL overage years excluded (see Table 21).

Alternative label and basis	Allocation		Example quota or RHL (mil lb)	
	Com.	Rec.	Com. Quota	RHL
Landings-based				
Fluke-3: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2006-2008, 2014, and 2016)	51%	49%	9.48	9.10
Scup-3: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2004 and 2007-2010)	58%	42%	17.14	12.41
BSB-3: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)	41%	59%	4.63	6.67
Catch-based				
Fluke-4: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2006-2008, 2014, and 2016)	50%	50%	10.11	8.89
Scup-4: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2004 and 2007-2010)	63.5%	36.5%	16.53	11.54
BSB-4: 50/50 weighting of no action/status quo base years and 2004-2018, excluding years with RHL overages (i.e., 2009-2010, 2012-2016, and 2018)	40.5%	59.5%	4.00	7.13

Table 23: Historic base years allocations (or reasonable proxy thereof) used in development of Table 22.

Species	Landings-based			Catch-based		
	Basis	Allocation		Basis	Allocation	
		Com	Rec		Com	Rec
Summer Flounder	1981-1989 landings (1a-5)	55%	45%	1981-1989 landings (1a-5) applied as catch	55%	45%
Scup	1988-1992 landings (1b-5)	57%	43%	1988-1992 catch (1b-2)	65%	35%
Black Sea Bass	1983-1992 landings (1c-5)	45%	55%	1983-1992 landings (1c-5) applied as catch	45%	55%

APPENDIX C: Example Quotas and RHLs Under Each Allocation Alternative

This appendix provides examples of potential quotas and RHLs for each of the commercial/recreational allocation percentage alternatives listed in alternative sets 1a-1c (Table 19). Commercial quotas and RHLs are developed or reviewed annually through consultation with the MC and approved by the Council and Board. As described below, given several assumptions that need to be made about how dead discards are handled, it is not possible to precisely predict what quotas and RHLs would be under each allocation alternative. This analysis provides the best approximation of possible limits available at this time.

Dead Discard Projection Methodology

Projecting dead discards is necessary to develop landings limits. Typically, summer flounder and scup total dead discards are based on the stock assessment projections. The MC then takes into consideration recent trends to split the total projected dead discards into dead discards by sector. For black sea bass, the MC relies on recent year average proportions of dead discards by sector as the stock assessment projections do not predict landings separately from dead discards.

Projecting expected future commercial quotas and RHLs under revised allocations is complicated because large shifts in allocations are expected to impact recreational and commercial fishing effort, which may result in changes in dead discards for each sector in addition to changes in landings. As such, under modified allocations there would be a transition period where recent trends in dead discards by sector would not be particularly informative for projecting what sector discards would be under new allocations. Expected dead discards by sector under revised allocations are thus better predicted by modeling the relationship between dead catch, landings and dead discards. This can then be used to project dead discards under example catch and landings limits for each allocation alternative. The modeling process involves assumptions and like any model it is imperfect, but hopefully informative as well. This method is not necessarily the method that the MC will use in future specifications development, and they will still have the opportunity to adjust the dead discard projections based on expected changes in stock size, year class strength, recent changes in management measures, and recent changes in fishing effort.

The following methodology for producing dead discard projections was based on the assumption that there is a relationship between dead discards and catch/landings. Examination of recent trends in black sea bass dead discards and catch/landings reveals a strong positive linear relationship in both the recreational and the commercial fisheries. This is to be expected for catch which is comprised of both landings and dead discards, but the positive relationship between landings and dead discards is informative for the projection of dead discards. As an example, Figure 8 displays a scatterplot of black sea bass recreational discards and landings. The positive relationship between dead discards was also present in the commercial and recreational scup and summer flounder fisheries.

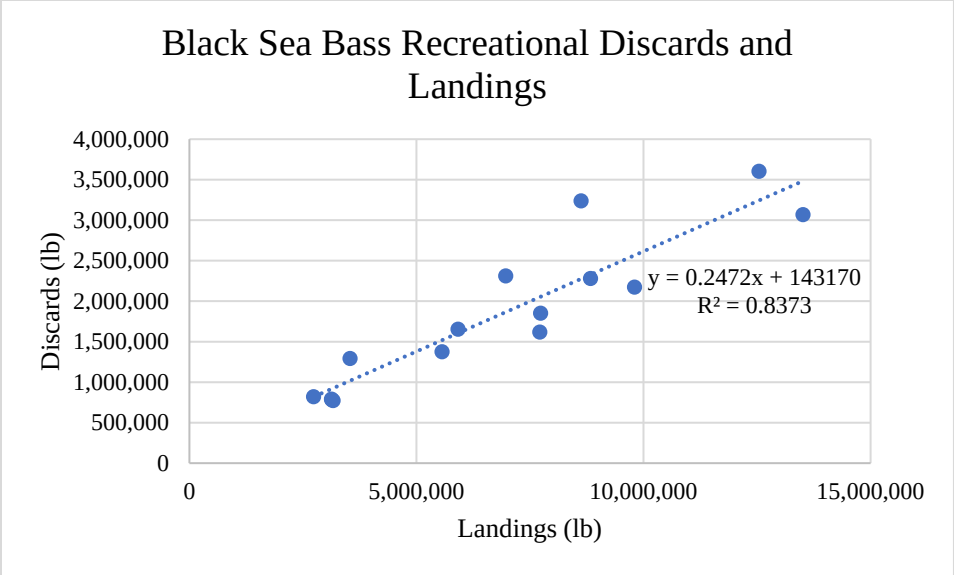


Figure 8: Scatterplot of black sea bass recreational discards and landings (2005-2019).

Deriving Landings Limits for Catch-based Allocations

Expected dead discards in each sector for catch-based allocations were calculated based on a linear regression with catch as the dependent variable and discards as the independent variable, using data from 2005-2019. While the coefficients for catch were not statistically significant at the 90% confidence interval for all species and sectors, in all instances the regression analyses revealed a positive linear relationship.

Deriving Landings Limits for Landings-Based Allocations

Example landings limits for landings-based allocations were also calculated using a linear regression, but with landings as the independent variable and dead discards as the dependent variable. Dead discards were regressed on landings for the years 2005-2019 for all three species by sector. Although the coefficients for landings were not all statistically significant at the 90%, the regression analyses did reveal a positive linear relationship for all three species.

Example RHLs and Quotas Under Allocation Alternatives

The following tables provide the example commercial quotas and RHLs for each species under each allocation alternative using the methodology described above. As previously stated, the regressions were based on landings and dead discards data from 2005-2019. In addition, the 2023 ABC value was used. For the status quo allocation alternatives, the actual 2023 commercial quota and RHL values are displayed for comparison.

Table 24: Black sea bass example quotas and RHLs in millions of pounds, under an ABC of 16.66 million pounds.

Black Sea Bass											
	CATCH-BASED					LANDINGS-BASED					
Alt.	BSB-4	BSB-2	1c-1	1c-2	1c-3	1c-4[a]	1c-5	BSB-3	BSB-1	1c-6	1c-7
Com. allocation	**40.5%**	**36%**	**32%**	**28%**	**24%**	**49%**	**45%**	**41%**	**37%**	**29%**	**22%**
Rec. allocation	**59.5%**	**64%**	**68%**	**72%**	**76%**	**51%**	**55%**	**59%**	**63%**	**71%**	**78%**
Com. ACL	6.75	6.00	5.33	4.66	4.00	8.93	8.33	7.62	6.89	5.36	3.96
Com. dead disc.	2.57	2.19	1.86	1.53	1.19	3.21	2.96	2.66	2.35	1.71	1.12
Com. quota	**4.18**	**3.81**	**3.47**	**3.14**	**2.80**	**5.71**	**5.37**	**4.96**	**4.53**	**3.65**	**2.84**
Rec. ACL	9.91	10.66	11.33	12.00	12.66	7.74	8.33	9.04	9.77	11.30	12.70
Rec. dead disc.	2.09	2.24	2.38	2.51	2.65	1.79	1.77	1.91	2.05	2.35	2.63
RHL	**7.83**	**8.42**	**8.95**	**9.48**	**10.01**	**5.95**	**6.56**	**7.13**	**7.72**	**8.94**	**10.07**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented for 2023, not example measures using the methodology described in this appendix.

Table 25: Scup example quotas and RHLs in millions of pounds, under an ABC of 29.67 million pounds.

Scup											
	CATCH-BASED						LANDINGS-BASED				
Alt.	1b-1[a]	1-b2	Scup-4	Scup-2	1b-3	1b-4	Scup-1	Scup-3	1b-5	1b-6	1b-7
Com. allocation	**78%**	**65%**	**63.5%**	**62%**	**61%**	**59%**	**59%**	**58%**	**57%**	**56%**	**50%**
Rec. allocation	**22%**	**35%**	**36.5%**	**38%**	**39%**	**41%**	**41%**	**42%**	**43%**	**44%**	**50%**
Com. ACL	23.14	19.29	18.84	18.40	18.10	17.51	18.57	18.33	18.08	17.83	16.34
Com. dead disc.	5.27	5.19	5.05	4.91	4.82	4.63	4.58	4.57	4.56	4.55	4.49
Com. quota	**17.87**	**14.10**	**13.79**	**13.49**	**13.28**	**12.88**	**13.99**	**13.76**	**13.52**	**13.28**	**11.85**
Rec. ACL	6.53	10.38	10.83	11.27	11.57	12.16	11.10	11.34	11.59	11.84	13.33
Rec. dead disc.	1.12	1.33	1.35	1.38	1.40	1.43	1.37	1.38	1.40	1.41	1.48
RHL	**5.41**	**9.06**	**9.47**	**9.89**	**10.17**	**10.73**	**9.73**	**9.96**	**10.20**	**10.43**	**11.85**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented for 2023, not example measures using the methodology described in this appendix.

Table 26: Summer flounder example quotas and RHLs in millions of pounds, under an ABC of 33.12 million pounds.

Summer Flounder											
CATCH-BASED						LANDINGS-BASED					
Alt.	Fluke-4	Fluke-2	1a-1	1a-2	1a-3	1a-4[a]	1a-5	Fluke-3	Fluke-1	1a-6	1a-7
Com. allocation	**50%**	**45%**	**44%**	**43%**	**40%**	**60%**	**55%**	**51%**	**47%**	**45%**	**41%**
Rec. allocation	**50%**	**55%**	**56%**	**57%**	**60%**	**40%**	**45%**	**49%**	**53%**	**55%**	**59%**
Com. ACL	16.56	14.90	14.57	14.24	13.25	18.48	17.26	16.12	14.98	14.41	13.27
Com. dead disc.	2.87	2.66	2.62	2.58	2.46	2.95	2.78	2.69	2.61	2.56	2.48
Com. quota	**13.69**	**12.24**	**11.95**	**11.66**	**10.79**	**15.53**	**14.48**	**13.42**	**12.37**	**11.84**	**10.79**
Rec. ACL	16.56	18.22	18.55	18.88	19.87	14.64	15.86	17.00	18.14	18.71	19.85
Rec. dead disc.	4.01	4.24	4.28	4.33	4.46	4.28	4.02	4.11	4.20	4.24	4.33
RHL	**12.55**	**13.98**	**14.27**	**14.55**	**15.41**	**10.36**	**11.84**	**12.90**	**13.95**	**14.47**	**15.53**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented for 2023, not example measures using the methodology described in this appendix.

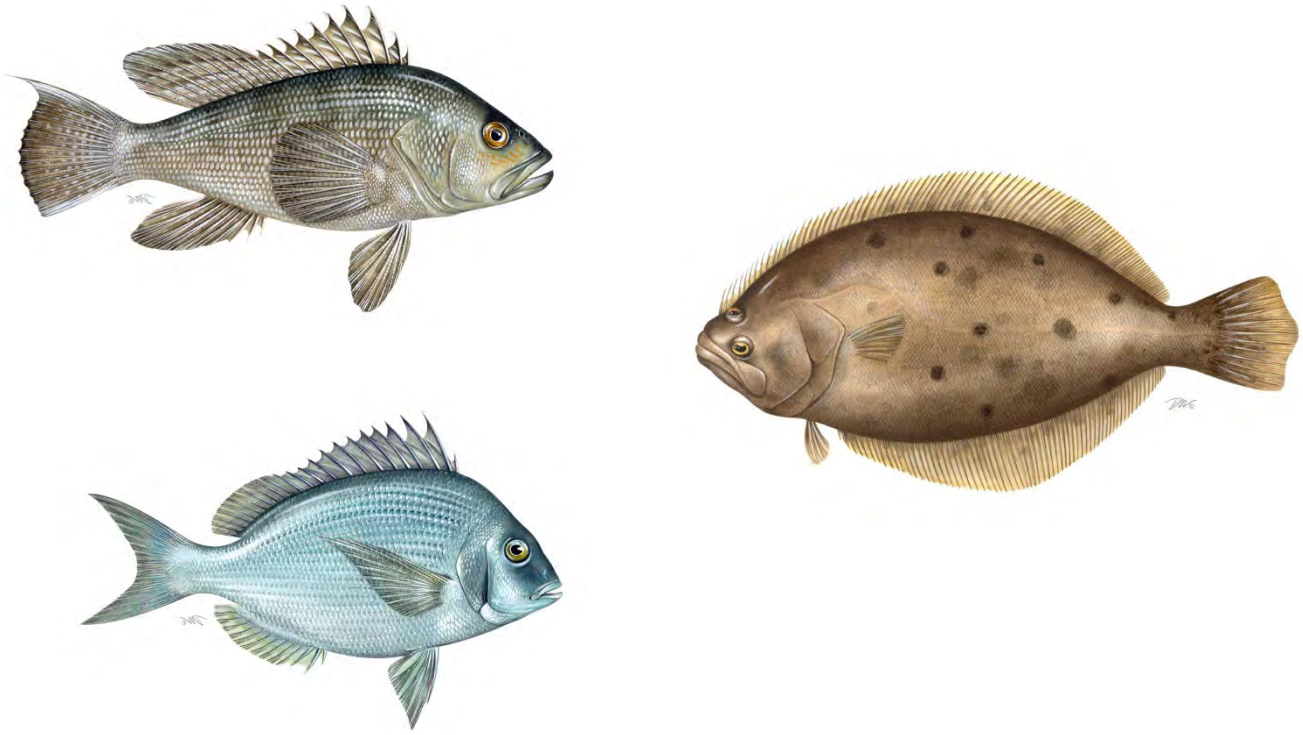
APPENDIX D: Acronyms and Abbreviations

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
AM	Accountability Measure
Board	The Commission's Summer Flounder, Scup, and Black Sea Bass Management Board
Commission	Atlantic States Marine Fisheries Commission
Council	Mid-Atlantic Fishery Management Council
FMP	Fishery Management Plan
MC	Monitoring Committee
MRIP	Marine Recreational Information Program
NEFSC	Northeast Fisheries Science Center
NMFS	National Marine Fisheries Service
RHL	Recreational Harvest Limit
TAL	Total Allowable Landings

Atlantic States Marine Fisheries Commission

Draft Amendment 22 to the Interstate Fishery Management Plan for Summer Flounder, Scup, and Black Sea Bass for Public Comment

Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment



December 2020

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

DRAFT DOCUMENT FOR PUBLIC COMMENT

Draft Amendment to the Interstate Fishery Management Plan for Summer Flounder, Scup, and Black Sea Bass

Prepared by

Atlantic States Marine Fisheries Commission and
Mid-Atlantic Fishery Management Council's Fishery Management Action Team

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This is a report of the Atlantic States Marine Fisheries Commission pursuant to U.S. Department of Commerce, National Oceanic and Atmospheric Administration Award No. NA20NMF4740012.

Public Comment Process and Proposed Timeline

The Atlantic States Marine Fisheries Commission (Commission) and Mid-Atlantic Fishery Management Council (Council) seek your input on the following Draft Amendment to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan. In particular, sections 4.1 – 4.4 introduce alternative management approaches that are under consideration.

You are encouraged to submit comments regarding this document during the public comment period. Comments must be received by **5:00 P.M. (EST) on March 16th.** Regardless of when they were sent, comments received after that time will not be included in the official record. The Commission and Council will consider public comment on this document before finalizing the amendment.

You may submit public comment by attending a public hearing or mailing, faxing, or emailing written comments to the address below. Comments can also be referred to your state's members on the Summer Flounder, Scup, and Black Sea Bass Management Board or Summer Flounder, Scup, and Black Sea Bass Advisory Panel; however, unless those comments are also submitted as instructed below they will not be considered as part of the official public comment record.

Written comments may be sent by any of the following methods:

1. **Online** at https://www.mafmc.org/comments/sfsbsb-allocation-amendment
2. **Email** to the following addresses: kdancy@mafmc.org
3. **Mail or Fax** to:
   Chris Moore, Ph.D, Executive Director
   Mid-Atlantic Fishery Management Council
   North State Street, Suite 201
   Dover, DE 19901
   FAX: 302.674.5399

If your organization is planning to release an action alert in response to this Draft Amendment, or if you have questions, please contact either Dustin Colson Leaning (email: dleaning@asmfc.org; phone: 703.842.0740) or Kiley Dancy (email: kdancy@mafmc.org; phone at 302.526.5257)

The timeline for completion of the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment is as follows:

	Dec 2019	Feb–Mar 2020	May 2020	May–Nov 2020	Dec 2020	January – February 2021	Spring 2021
Approval of Draft PID by Board and Council	**X**						
Public review and comment on PID		**X**					
Board and Council review of public comment; Board direction on what to include in the Draft Amendment			**X**				
Preparation of Draft Amendment				**X**			
Review and approval of Draft Amendment by Board and Council for public comment					**X**		
Public review and comment on Draft Amendment ***Current Step***						**X**	
Board review of public comment on Draft Amendment							**X**
Review and approval of the final Amendment by the Council, Board, Policy Board, and Commission							**X**

TABLE OF CONTENTS

1.0 INTRODUCTION

The summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*) and black sea bass (*Centropristis striata*) fisheries are managed under the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (FMP) that was prepared cooperatively by the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (ASMFC or Commission). The Commission, under the authority of the Atlantic Coastal Fisheries Cooperative Management Act, is responsible for managing summer flounder, scup, and black sea bass in state waters (0-3 miles). The Council develops regulations for federal waters (3-200 nautical miles from shore). NOAA Fisheries is the federal implementation and enforcement agency.

1.1 BACKGROUND INFORMATION

Revised recreational catch and harvest estimates, released in 2018, show that recreational catch and harvest of summer flounder, scup, and black sea bass are much higher than previously estimated and have resulted in significant changes to stock biomass estimates and resulting catch limits for these three species. As described in more detail below, these changes have consequential management impacts due to fixed commercial and recreational allocations of catch or landings for each species. In light of these impacts, at a joint meeting of the Board and Council in October 2019, the Summer Flounder, Scup, and Black Sea Bass Management Board (Board) and Council initiated an amendment to consider modifications to the commercial/recreational sector allocations for summer flounder, scup, and black sea bass. The Board and Council approved the Scoping and Public Information Document for public comment in December 2019. Public comment was received and eleven scoping hearings were held from Massachusetts through North Carolina between February and March, 2020. The hearings were attended by approximately 280 people, and 207 individuals and organizations provided comments in person or in writing.

Based on the summary of public comments, comments from the Advisory Panels (APs), and recommendations from the Fishery Management Action Team (FMAT), the Board and Council supported exploration of a variety of approaches including status quo, updating existing base years with revised data, separate allocations for the for-hire and private sectors of the recreational fishery, a 'harvest control rule' approach, dynamic allocations, and allocation transfers between sectors. Due to concerns about recreational data, the Board and Council also supported the development of draft alternatives to address recreational accountability and catch counting.

At the June and August 2020 joint meetings, the Board and Council determined that the 'harvest control rule', recreational accountability measures, recreational catch accounting, and recreational for-hire sector separation alternatives should be removed from this action and instead considered for inclusion in the recreational reform initiative.

In August 2020, the Board and Council identified the following priority issues for further development within this action including:

1. Summer flounder recreational/commercial allocation *Section 4.1.1*
2. Scup recreational/commercial allocation *Section 4.1.2*
3. Black sea bass recreational/commercial allocation *Section 4.1.3*
4. Allocation change phase-in *Section 4.1.4*
5. Quota transfers *Section 4.2*
6. Adaptive Management Provisions *Section 4.3*

1.1.1 Statement of Problem

1.1.1.1 Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation

The commercial and recreational allocations for all three species are currently based on historical proportions of landings (for summer flounder and black sea bass) or catch (for scup) from each sector. Recent changes in how recreational catch is estimated have resulted in a discrepancy between the current levels of estimated recreational harvest and the allocations for summer flounder, scup, and black sea bass to the recreational sector.

Recreational catch and harvest data are estimated by the Marine Recreational Information Program (MRIP). In July 2018, MRIP released revised time series of catch and harvest estimates based on adjustments to its angler intercept methodology, which is used to estimate catch rates, and its effort estimation methodology, namely, a transition from a telephone-based effort survey to a mail-based effort survey for the private/rental boat and shore-based fishing modes[1]. These revisions collectively resulted in much higher recreational catch estimates compared to previous estimates, affecting the entire time series of data going back to 1981.

The revised MRIP estimates were incorporated into the stock assessment for summer flounder in 2018 and for scup and black sea bass in 2019. This impacted the estimated stock biomass and resulting catch limits for these species. In general, because the revised MRIP data showed that more fish were caught than previously thought, the stock assessment models estimated that there must have been more fish available to catch, which in turn impacted the biomass estimates derived from the stock assessments. However, for each species, the revised MRIP data were one of many factors that impacted the stock assessments and the resulting catch limits. Other factors such as the addition of data on recent recruitment also impacted the assessment model results.

- For summer flounder, the revised MRIP estimates were 30% higher on average compared to the previous estimates for 1981-2017. The differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. Increased recreational catch resulted in increased estimates of stock size compared to past assessments. The higher biomass projections resulted in a 49% increase in the commercial quota and recreational harvest limit (RHL) for 2019.

[1] For-hire effort continues to be assessed through a telephone survey of known for-hire operators. More information on how MRIP collects data from the recreational fishery is available at: https://www.fisheries.noaa.gov/recreational-fishing-data/types-recreational-fishing-surveys.

Expected recreational harvest in the revised MRIP currency was close to the revised RHL; therefore, recreational measures could not be liberalized in 2019 despite the 49% increase in the RHL.

- For scup, the revised MRIP recreational catch estimates were, on average, 18% higher than the previous estimates for 1981-2017. The differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. The MRIP data have a lesser impact in the scup stock assessment model, with the 2019 operational stock assessment showing minor increases in biomass estimates compared to the 2015 assessment. Due to below-average recruitment in recent years, the scup catch and landings limits for both commercial and recreational sectors decreased slightly in response to the results of the 2019 operational stock assessment.

- For black sea bass, the revised MRIP recreational catch estimates increased the 1981-2017 total catch by an average of 73%, ranging from +9% in 1995 to +161% in 2017. As with summer flounder and scup, the differences between the previous and revised estimates tended to be greater in more recent years compared to earlier years. These increased catch estimates, in addition to other factors such as an above average 2015 year class, contributed to a notable scaling up of the spawning stock biomass estimates from the previous assessment. As a result, the 2020 black sea bass commercial quota and RHL both increased by 59% compared to 2019. Although this led to an increase in the RHL, recent harvest under the new MRIP data was higher than the 2020 RHL, therefore, recreational management measures could not be liberalized in response to this increased RHL.

Some changes have also been made to commercial catch data since the allocations were established. For example, the commercial scup discard estimates throughout the time series were revised through the 2015 scup stock assessment. For the 1988-1992 allocation base years, the current estimates of scup commercial catch are, on average, 8% lower than estimates used to set the allocations under Amendment 8.

The commercial and recreational data revisions not only impact the catch estimates, but also significantly affected our understanding of the population levels for all three fish stocks. This has management implications due to the fixed commercial/recreational allocation percentages defined in the FMP for all three species. These allocation percentages do not reflect the current understanding of the recent and historic proportions of catch and landings from the two sectors. These allocation percentages are defined in the Council and Commission FMPs; therefore, they can only be modified through an FMP amendment. This Amendment will consider whether the allocations are still appropriate and meeting the objectives of the FMP, as well as other potential changes related to how the allocations are managed, as described in Sections 4.2 and 4.3.

1.1.1.2 Allocation Change Phase-In

Changes in allocation percentages for each of the three species can be implemented immediately, but due to the potential large shift in allocation, the Council and Board are

considering phasing in any changes over 2, 3, or 5 years. The Council and Board agreed 5 years is a reasonable maximum phase-in time frame, as longer transition periods may not adequately address the management issue an allocation change is attempting to address. The choice of whether to use a phase-in approach, and the length of the phase-in period, may depend on the magnitude of allocation change proposed. A phase-in period may not be desired if the overall allocation change is relatively small. Larger allocation changes may be less disruptive to fishing communities if they are phased in over several years. The phase-in alternatives could apply to any of the three species. The Council and Board may choose to apply different phase-in alternatives (including no phase-in) to each species if desired.

1.1.1.3 Quota Transfer Provision

Quota transfers are a management tool that offer the potential for increased fishing opportunities in the commercial or recreational sectors for summer flounder, scup, and black sea bass. Currently, the FMP does not allow for transfers of quota to occur between the commercial and recreational sectors. A transfer of quota between the commercial and recreational sectors could be considered annually under the specifications setting process, as well as a cap on the maximum transfer amount. This process would allow for an expedient response to a potential future pressing need for increased fishing opportunities for either the commercial or recreational fisheries.

1.1.1.4 Adaptive Management Provision

The Board has the ability to add all management approaches considered through this Amendment to the list of measures subject to change through adaptive management (i.e., addenda). Addenda are modifications to the FMPs that are typically (though not always) more efficient than an amendment. While amendments may take several years to complete and may be more complex, addenda can often be completed in 5-8 months. Both types of management actions include multiple opportunities for public input during Board meetings and public comment periods; however, scoping and public hearings are required for amendments, but are optional for addenda. Addenda can only modify existing measures and/or those that have been previously considered in an FMP amendment.

1.1.2 Benefits of Implementation

This Amendment is designed to address the issue of allocation between the commercial and recreational sectors for summer flounder, scup, and black sea bass as described above. Additionally, this Amendment proposes processes by which the Board and Council may transfer quota between sectors or adjust allocations in the future should the need arise. In combination, these management approaches aim to provide fair and equitable access to all fishery participants.

1.1.2.1 Ecological Benefits

Throughout their ranges, summer flounder, scup, and black sea bass occupy important roles in the coastal marine food chain. All three species are benthic feeders that prey upon lower trophic level species while also providing sustenance to commercially viable predator species such as monkfish, spiny dogfish, and king mackerel. Implementation of this action will help the

Board and Council effectively manage these species under catch limits based on the best scientific information available in order to maintain healthy stock conditions for all three species.

1.1.2.2 Social and Economic Benefits

Summer flounder, scup, and black sea bass support valuable and culturally significant commercial and recreational fisheries along the Atlantic coast. Addressing the revised MRIP information, recent fishing trends, and the needs of the commercial and recreational fisheries to inform the allocation between the two sectors may enhance social and economic benefits by increasing economic returns and increasing access to the resources. This in turn could increase resilience in fishery-dependent communities along the Atlantic coast.

1.2 DESCRIPTION OF THE RESOURCE

1.2.1 Summer Flounder

Summer flounder are a demersal flatfish found in pelagic waters, demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas. Spawning occurs during the fall and winter over the open ocean over the continental shelf. Larvae and postlarvae are transported toward coastal areas by prevailing water currents, entering coastal and estuarine nursery areas. Development of post larvae and juveniles occurs primarily within bays and estuarine areas Adult summer flounder exhibit strong seasonal inshore-offshore movements, normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and remaining offshore during the colder months. Most fish are sexually mature by age 2. Summer flounder exhibit sexual dimorphism by size; most of the largest fish are females. Females can attain lengths over 90 cm (36 in) and weights up to 11.8 kg (26 lbs.; NEFSC 2017). Recent NEFSC trawl survey data indicate that while female summer flounder grow faster (reaching a larger size at the same age), the sexes attain about the same maximum age (currently age 15 at 56 cm for males, and age 14 at 65 cm for females). Unsexed commercial fishery samples currently indicate a maximum age of 17 for an 85 cm fish (M. Terceiro, personal communication, January 2017).

Summer flounder are opportunistic feeders; their prey includes a variety of fish and crustaceans. While the predators of adult summer flounder are not fully documented, larger predators such as large sharks, rays, and monkfish probably include summer flounder in their diets (Packer et al. 1999).

The recent benchmark stock assessment was developed through the 66th SAW process, and peer reviewed at the 66th SARC from November 27-30, 2018 (NEFSC 2019a). The assessment incorporated the revised time series of recreational catch from MRIP, which is 30% higher on average compared to the previous summer flounder estimates for 1981-2017. The MRIP estimate revisions account for changes in both the angler intercept survey and recreational effort survey methodologies. While fishing mortality rates were not strongly affected by incorporating these revisions, increased recreational catch resulted in increased estimates of stock size compared to past assessments.

The biological reference points for summer flounder, as revised through the SAW/SARC 66 process, include a fishing mortality threshold of $F_{MSY} = F_{35\%}$ (as the F_{MSY} proxy) = 0.448, and a biomass reference point of $SSB_{MSY} = SSB_{35\%}$ (as the SSB_{MSY} proxy) = 126.01 million lb = 57,159 mt. The minimum stock size threshold (1/2 SSB_{MSY}), is estimated to be 63.01 million lb (28,580 mt;
Figure **1. Summer flounder spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; vertical bars) 1980-2017. The horizontal dashed line is the 2018 SAW66 recommended target biomass reference point proxy, $SSB_{MSY} = SSB_{35\%}$ = 57,159 mt. The horizontal solid line is the 2018 SAW66 recommended threshold biomass reference point proxy ½ SSB_{MSY} = ½ $SSB_{35\%}$ = 28,580 mt. Source: NEFSC 2019a.**).

Assessment results indicate that the summer flounder stock was not overfished and overfishing was not occurring in 2017. Fishing mortality on the fully selected age 4 fish ranged between 0.744 and 1.622 during 1982-1996 and then decreased to 0.245 in 2007. Since 2007 the fishing mortality rate (F) has increased, and in 2017 was estimated at 0.334, below the SAW 66 F_{MSY} proxy = $F_{35\%}$ = 0.448 (Figure 2. **Total fishery catch (mt; solid line) and fully-recruited fishing mortality (F, peak at age 4; squares) of summer flounder. The horizontal solid line is the 2018 SAW66 recommended fishing mortality reference point proxy FMSY = F35% = 0.448. Source: NEFSC 2019a.**). The 90% confidence interval for F in 2017 was 0.276 to 0.380.

SSB decreased from 67.13 million lb (30,451 mt) in 1982 to 16.33 million lb (7,408 mt) in 1989, and then increased to 152.46 million lb (69,153 mt) in 2003. SSB has decreased since 2003 and was estimated to be 98.22 million lb (44,552 mt) in 2017, about 78% of SSB_{MSY} = 126.01 million lb (57,159 mt), and 56% above the ½ SSB_{MSY} proxy = ½ $SSB_{35\%}$ = 63.01 million lb (28,580 mt;
Figure **1. Summer flounder spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; vertical bars) 1980-2017. The horizontal dashed line is the 2018 SAW66 recommended target biomass reference point proxy, $SSB_{MSY} = SSB_{35\%}$ = 57,159 mt. The horizontal solid line is the 2018 SAW66 recommended threshold biomass reference point proxy ½ SSB_{MSY} = ½ $SSB_{35\%}$ = 28,580 mt. Source: NEFSC 2019a.**). The 90% confidence interval for SSB in 2017 was 39,195 to 50,935 mt.

Recruitment of juvenile summer flounder to the fishery has been below average since about 2011, although the driving factors behind this trend have not been identified. Bottom trawl survey data also indicate a recent trend of decreasing length and weight at age, which implies slower growth and delayed maturity. These factors affected the change in the biological reference points used to determine stock status.

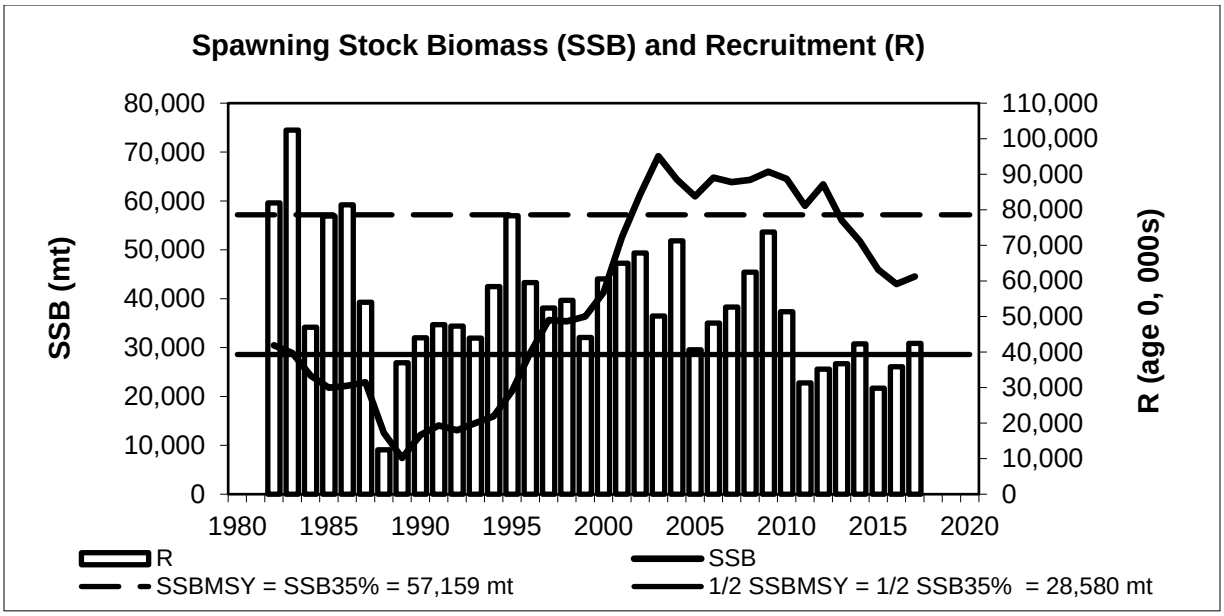


Figure 1. Summer flounder spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; vertical bars) 1980-2017. The horizontal dashed line is the 2018 SAW66 recommended target biomass reference point proxy, SSB_{MSY} = $SSB_{35\%}$ = 57,159 mt. The horizontal solid line is the 2018 SAW66 recommended threshold biomass reference point proxy ½ SSB_{MSY} = ½ $SSB_{35\%}$ = 28,580 mt. Source: NEFSC 2019a.

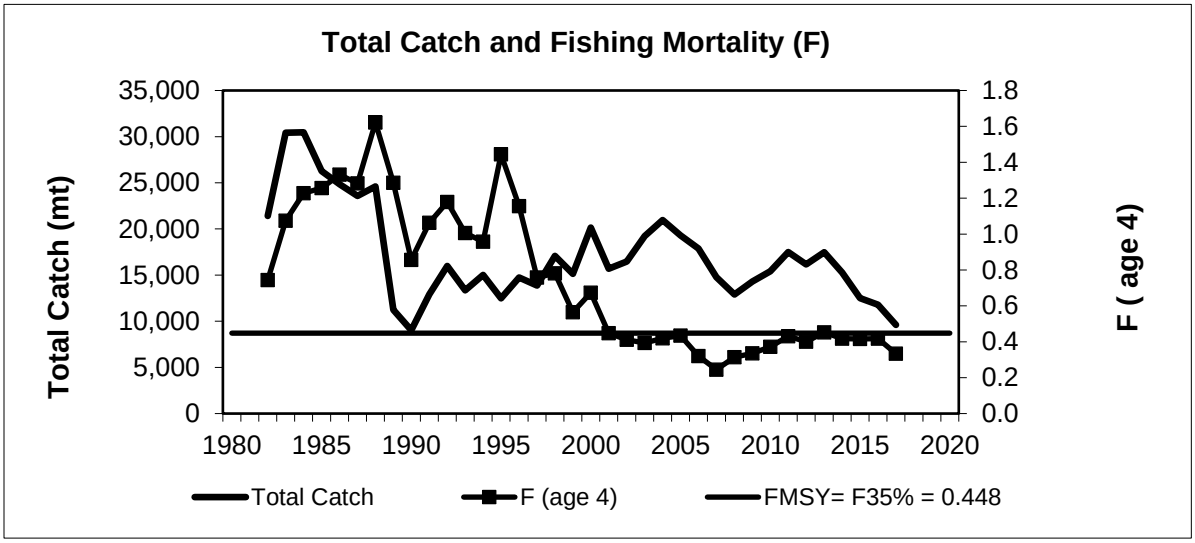


Figure 2. Total fishery catch (mt; solid line) and fully-recruited fishing mortality (F, peak at age 4; squares) of summer flounder. The horizontal solid line is the 2018 SAW66 recommended fishing mortality reference point proxy FMSY = F35% = 0.448. Source: NEFSC 2019a.

1.2.2 Scup

Scup are a schooling, demersal (i.e., bottom-dwelling) species found in a variety of habitats in the Mid-Atlantic. Scup essential fish habitat (EFH) includes demersal waters, areas with sandy or muddy bottoms, mussel beds, and sea grass beds primarily from the Gulf of Maine through Cape Hatteras, North Carolina. Scup undertake extensive seasonal migrations between coastal

and offshore waters. They are mostly found in estuaries and coastal waters during the spring and summer. Larger individuals tend to arrive in inshore areas in the spring before smaller individuals. They move offshore and to the south, to outer continental shelf waters south of New Jersey in the fall and winter (Steimle et al. 1999, NEFSC 2015).

About 50% of scup are sexually mature at two years of age and about 17 cm (about 7 inches) total length. Nearly all scup older than three years of age are sexually mature. Scup reach a maximum age of at least 14 years. They may live as long as 20 years; however, few scup older than 7 years are caught in the Mid-Atlantic (Steimle et al. 1999, NEFSC 2015).

Adult scup are benthic feeders. They consume a variety of prey, including small crustaceans (including zooplankton), polychaetes, mollusks, small squid, vegetable detritus, insect larvae, hydroids, sand dollars, and small fish. The NEFSC's food habits database lists several predators of scup, including several shark species, skates, silver hake, bluefish, summer flounder, black sea bass, weakfish, lizardfish, king mackerel, and monkfish (Steimle et al. 1999).

A scup operational stock assessment was peer reviewed and accepted in August 2019. This assessment retained the model structure of the previous benchmark stock assessment, completed in 2015, and incorporated fishery catch and fishery-independent survey data through 2018, including revised recreational data provided by MRIP for 1989-2018 (NEFSC 2019b).

The assessment found that the scup stock was not overfished and overfishing was not occurring in 2018. Updated proxy biological reference points from the 2019 operational stock assessment include a fishing mortality reference point of F_{MSY} proxy = $F_{40\%}$ = 0.215, a biomass reference point of SSB_{MSY} proxy = $SSB_{40\%}$ = 207.279 million pounds (94,020 mt), and a minimum biomass threshold of ½ SSB_{MSY} proxy = ½ $SSB_{40\%}$ = 103.639 million pounds (47,010 mt, NEFSC 2019b). Spawning stock biomass (SSB) was estimated to be about 411 million pounds (186,578 mt), about 2 times the SSB_{MSY} proxy reference point (i.e. $SSB_{40\%}$) of 207 million pounds (94,020 mt, Figure 3. **Scup SSB and recruitment at age 0, 1984-2018 from the 2019 operational stock assessment (NEFSC 2019b).**). Fishing mortality on fully selected age 3 scup was 0.158, about 73% of the F_{MSY} proxy reference point ($F_{40\%}$) of 0.215 (Figure 4. **Scup total catch and fishing mortality, 1984-2018 from the 2019 operational stock assessment (NEFSC 2019b).**). The 2015 year class is estimated to be the largest in the time series at 326 million fish, while the 2016-2018 year classes are estimated to be below average at 112 million fish, 93 million fish and 83 million fish, respectively (Figure 3. **Scup SSB and recruitment at age 0, 1984-2018 from the 2019 operational stock assessment (NEFSC 2019b).**, NEFSC 2019b).

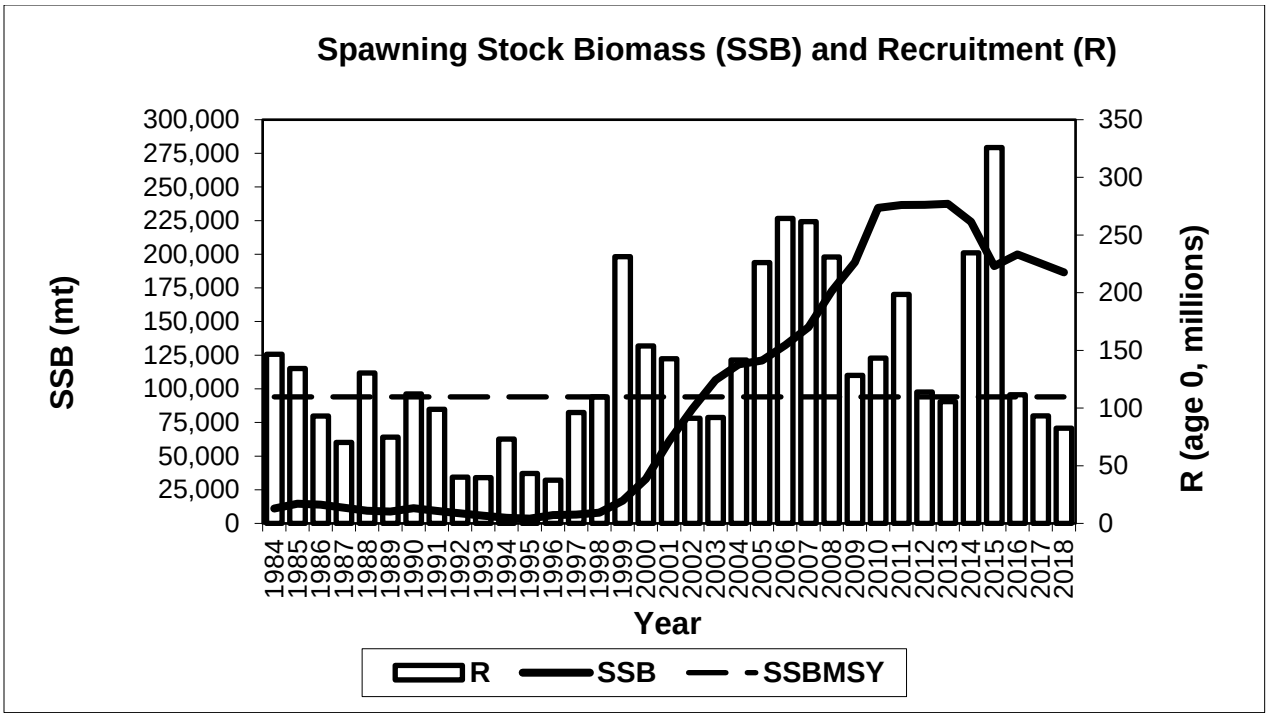


Figure 3. Scup SSB and recruitment at age 0, 1984-2018 from the 2019 operational stock assessment (NEFSC 2019b).

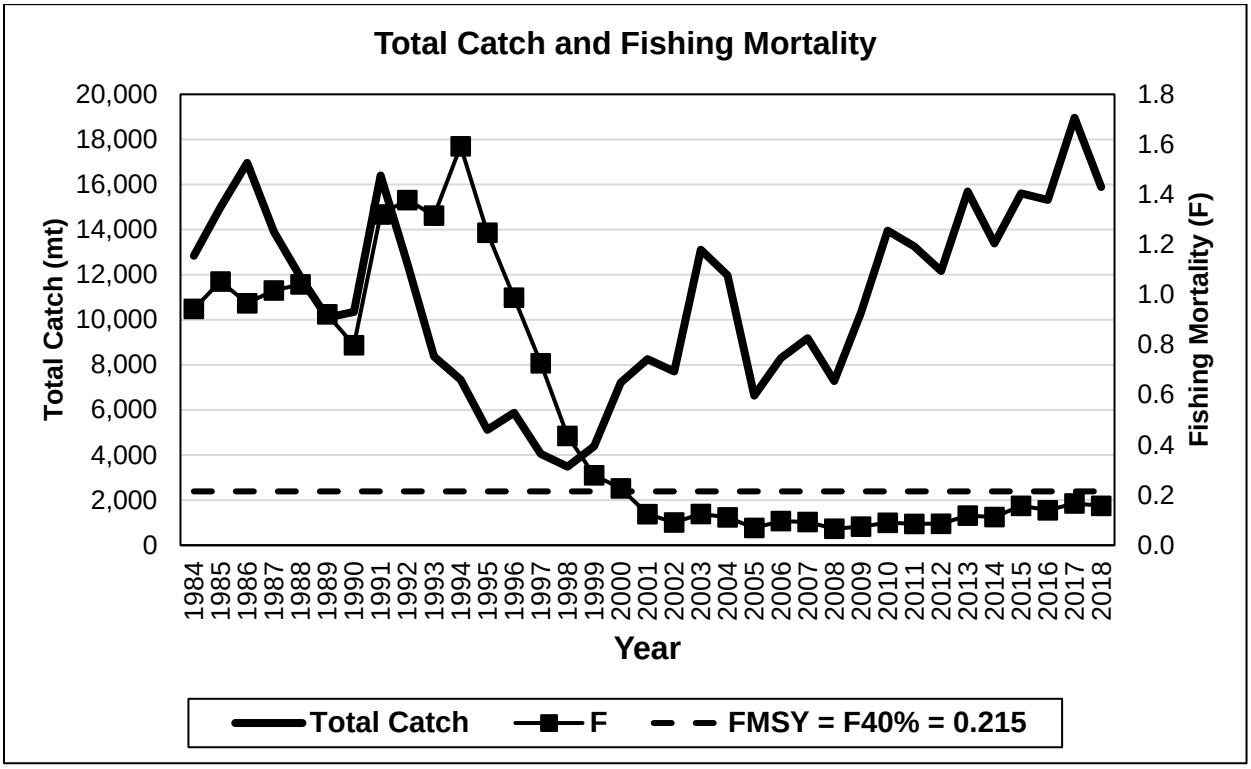


Figure 4. Scup total catch and fishing mortality, 1984-2018 from the 2019 operational stock assessment (NEFSC 2019b).

1.2.3 Black Sea Bass

Black sea bass are distributed from the Gulf of Maine through the Gulf of Mexico. Genetic studies have identified three stocks within that range. The boundaries of the northern stock are from the Gulf of Maine to Cape Hatteras, North Carolina. This stock is the focus of the black sea bass sections of this document. The stocks in the South Atlantic and Gulf of Mexico are not managed by the Commission and Mid-Atlantic Council.

Essential fish habitat for black sea bass consists of pelagic waters, structured habitat, rough bottom, shellfish, sand, and shell. Adult and juvenile black sea bass are mostly found on the continental shelf while young of the year (i.e., fish less than one year old) are primarily found in estuaries. Black sea bass migrate to offshore wintering areas starting in the fall to areas along the shelf edge, and can migrate as far south as the shelf edge off of Virginia. Most return to northern inshore areas by May, showing strong site fidelity during the summer. Adults prefer to be near structures such as rocky reefs, coral patches, cobble and rock fields, mussel beds, and shipwrecks. Black sea bass in the mid-Atlantic spawn between April and October in nearshore continental shelf areas at depths of 20-50 meters. (Drohan et al. 2007, NEFSC 2017).

Juvenile and adult black sea bass mostly feed on crustaceans, small fish, and squid. The NEFSC food habits database lists spiny dogfish, Atlantic angel shark, skates, spotted hake, summer flounder, windowpane flounder, and monkfish as predators of black sea bass (Drohan et al. 2007).

Black sea bass are protogynous hermaphrodites, meaning they are born female and some later transition to males around 2-5 years of age. Male black sea bass are either of the dominant or subordinate type. Dominant males are larger than subordinate males and develop a bright blue nuccal hump during the spawning season. About 25% of black sea bass are male at 15 cm (about 6 inches), with increasing proportions of males at larger sizes until about 50 cm, when about 70-80% of black sea bass are male. Results from a simulation model highlight the importance of subordinate males in the spawning success of this species. This increases the resiliency of the population to exploitation compared to other species with a more typical protogynous life history. About half of black sea bass are sexually mature by 2 years of age and 21 cm (about 8 inches) in length. Black sea bass reach a maximum size of about 60 cm (about 24 inches) and a maximum age of about 12 years (NEFSC 2017, Blaylock and Shepherd 2016).

A black sea bass operational stock assessment was peer reviewed and accepted in August 2019. This assessment retained the model structure of the previous benchmark stock assessment, completed in 2016 (NEFSC 2017), and incorporated fishery data and fishery-independent survey data through 2018, including revised recreational data provided by MRIP for 1989-2018 (NEFSC 2019b).

The 2019 operational assessment has a regional structure. The stock was modeled as two separate sub-units (north and south) divided approximately at Hudson Canyon. Each sub-unit was modeled separately and the average F, combined biomass, and SSB across sub-units were used to develop stock-wide reference points. As with the 2016 benchmark assessment, the

peer reviewers of the 2019 operational assessment concluded that "although the two-area model had a more severe retrospective pattern in opposite directions in each area sub-unit than when a single unit was assumed, it provides reasonable model estimates after the retrospective corrections and combining the two spatial units. Thus, even though reference points are generated and stock status determinations are conducted for each subunit, the combined projections should be used" (NEFSC 2019b).

Due to the lack of a stock/recruit relationship, a direct calculation of MSY and associated reference points (F and SSB) was not feasible and proxy reference points were used. SSB calculations and SSB reference points account for mature males and females. Due to the addition of a second selectivity time block for the non-trawl fleet in the 2019 operational assessment (1989-2008 and 2009-2018, compared to 1989-2015 in the 2016 benchmark assessment), the age at full selection changed from 4-7 in the 2016 benchmark assessment to 6-7 in the 2019 operational assessment (NEFSC 2019b).

A comparison of the 2018 SSB and F estimates to the reference points suggests that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2018. SSB in 2018 was estimated at 73.65 million pounds (33,407 mt, adjusted for retrospective bias), 2.4 times the updated biomass reference point (i.e., $SSB_{MSY\ proxy}$ = $SSB_{40\%}$=31.07 million pounds/14,092 mt). The average fishing mortality rate on fully selected ages 6-7 fish in 2018 was 0.42 (adjusted for retrospective bias), 91% of the updated fishing mortality threshold reference point (i.e., $F_{MSY\ proxy}$ = $F_{40\%}$ = 0.46). The 2018 estimates of F and SSB were adjusted for internal model retrospective error (Figure 5. **Estimates of black sea bass spawning stock biomass and fully-recruited fishing mortality relative to the updated biological reference points from the 2019 operational stock assessment. The red filled circle with 90% confidence intervals shows the un-adjusted 2018 estimates. The open circle shows the retrospectively adjusted estimates for 2018. (Source: NEFSC 2019b).**). Figure 6. **Black sea bass SSB and recruitment, 1989-2018 from the 2019 operational stock assessment. The horizontal dashed line is the updated biomass reference point. (Source: NEFSC 2019b).** and Figure 7. **Total black sea bass catch and fishing mortality, 1989-2018, from the 2019 operational stock assessment. (Source: NEFSC 2019b).** show the time series of estimated SSB, recruitment, fishing mortality, and catch without retrospective adjustments (NEFSC 2019b).

The 2011 year class was estimated to be the largest in the time series at 144.7 million fish. The 2015 year class was the second largest at 79.4 million fish. Recruitment of the 2017 year class as age 1 in 2018 was estimated at 16.0 million, well below the 1989-2018 average of 36 million fish (Figure 6. **Black sea bass SSB and recruitment, 1989-2018 from the 2019 operational stock assessment. The horizontal dashed line is the updated biomass reference point. (Source: NEFSC 2019b).**, NEFSC 2019b).

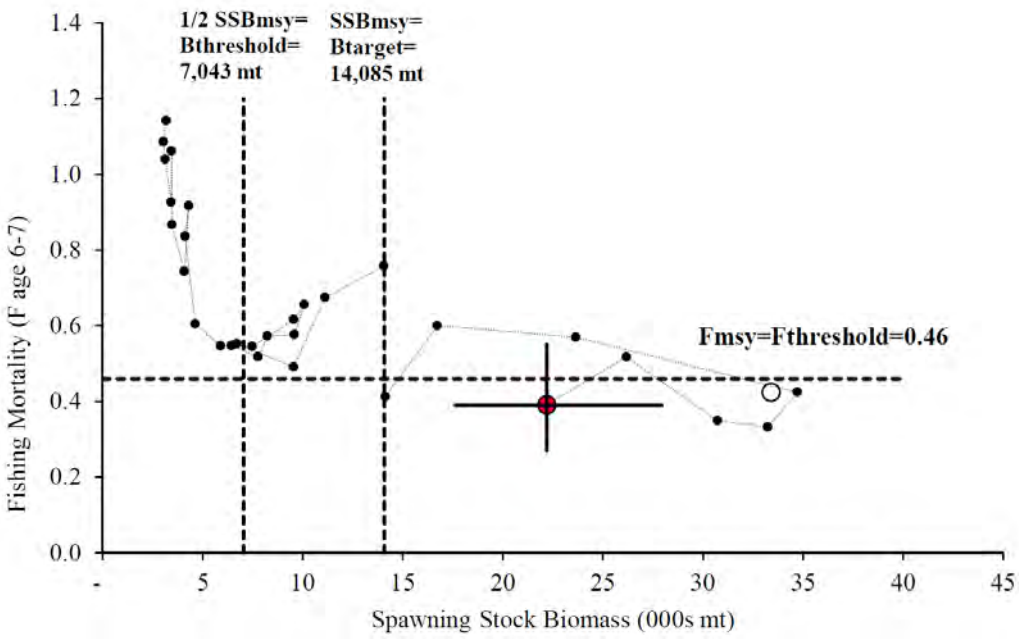


Figure 5. Estimates of black sea bass spawning stock biomass and fully-recruited fishing mortality relative to the updated biological reference points from the 2019 operational stock assessment. The red filled circle with 90% confidence intervals shows the un-adjusted 2018 estimates. The open circle shows the retrospectively adjusted estimates for 2018. (Source: NEFSC 2019b).

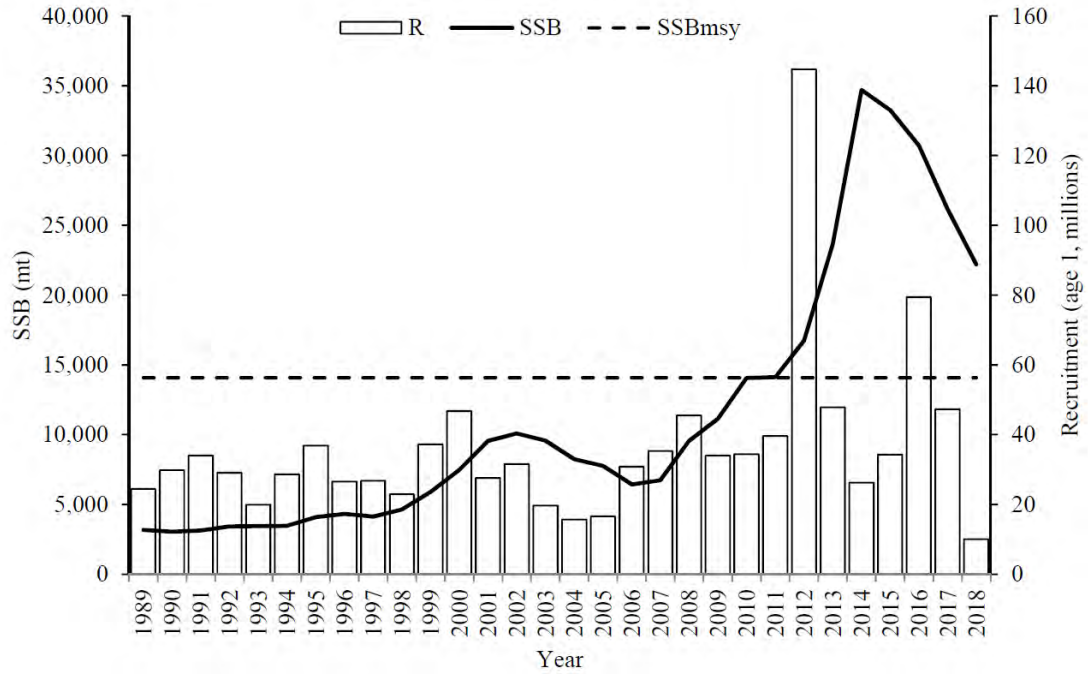


Figure 6. Black sea bass SSB and recruitment, 1989-2018 from the 2019 operational stock assessment. The horizontal dashed line is the updated biomass reference point. (Source: NEFSC 2019b).

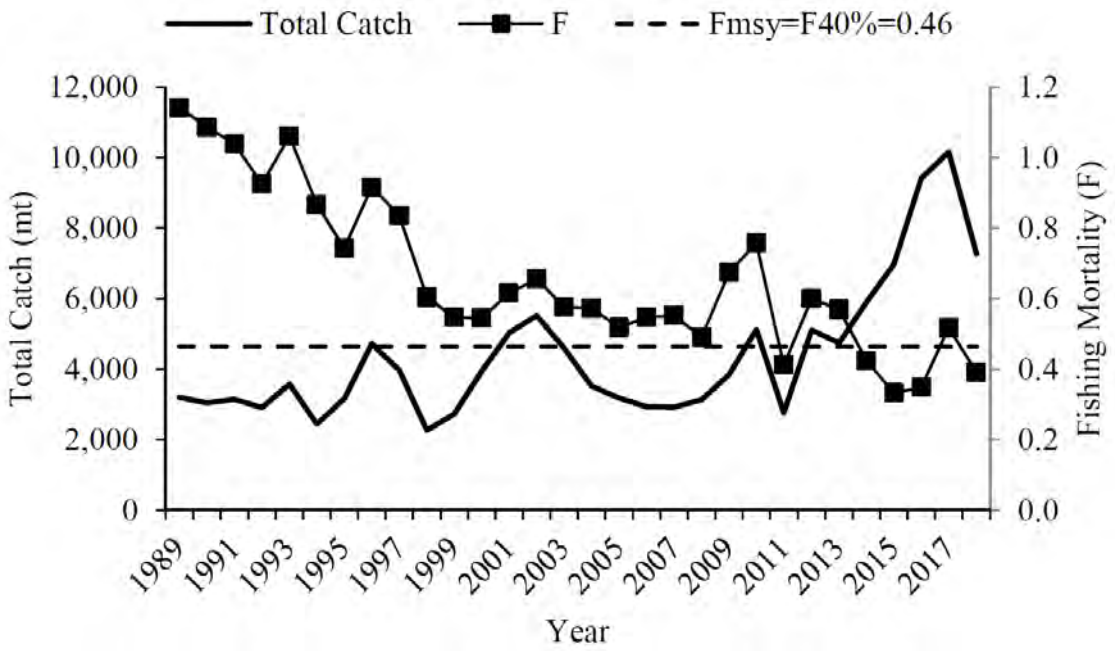


Figure 7. Total black sea bass catch and fishing mortality, 1989-2018, from the 2019 operational stock assessment. (Source: NEFSC 2019b).

1.3 DESCRIPTION OF THE FISHERIES

1.3.1 Summer Flounder

Summer flounder support important commercial and recreational fisheries along the US Atlantic coast. Data for all fisheries dead catch components (commercial landings, commercial dead discards, recreational landings, and recreational dead discards) are available dating back to 1989. Commercial landings have accounted for 38% of the total catch since 1989, with recreational landings accounting for 45%, commercial dead discards about 8%, and recreational dead discards about 9%. Over the more recent time period of 2014-2018, the comparable percentages are 33% commercial landings, 46% recreational landings, 8% commercial dead discards, and 13% recreational dead discards (Figure 8).

Commercial dead discards have accounted for about 19% of the total commercial catch 2014-2018, assuming a discard mortality rate of 80%. Recreational dead discards have accounted for 22% of the total recreational catch over 2014-2018, assuming a discard mortality rate of 10%.

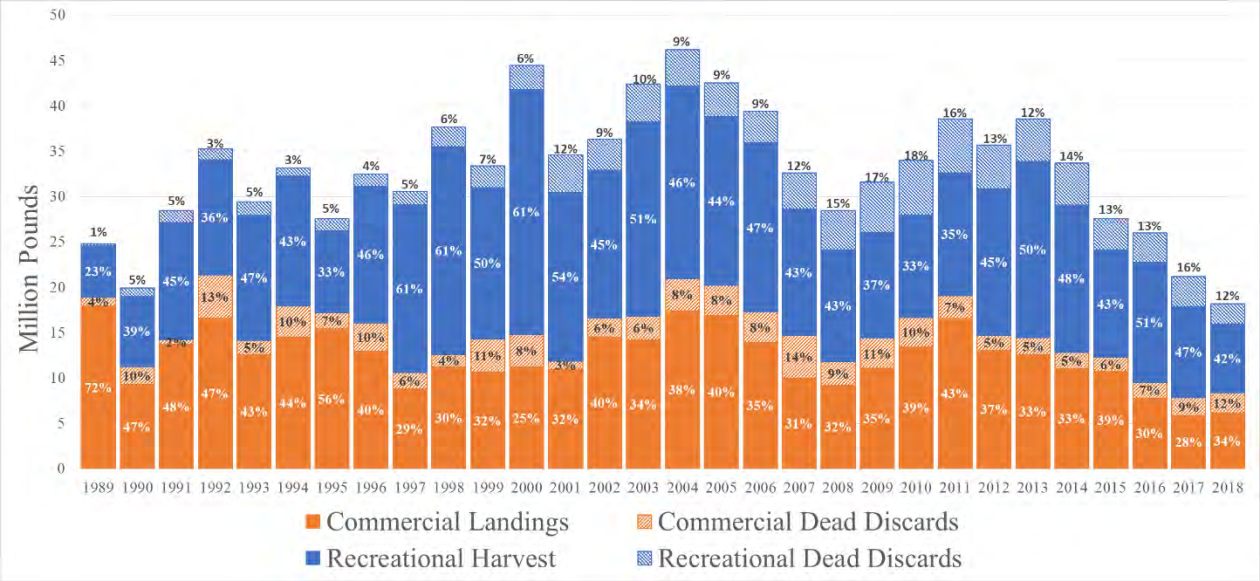


Figure 8. Commercial and recreational summer flounder landings and dead discards, 1982-2018. Data retrieved from the Northeast Fisheries Science Center 2019 data update. Commercial discard estimates prior to 1989 are not available.

Summer Flounder Commercial Fishery

The commercial quota is divided among the states based on the allocation percentages outlined in the FMP. In March 2019, the Council and Board approved Amendment 21 to the Summer Flounder, Scup, and Black Sea Bass FMP which modified the commercial state allocation system for summer flounder. The revised allocation system, effective January 1, 2021, modifies the state-specific allocations of the commercial quota in years when the annual coastwide commercial quota exceeds the specified trigger of 9.55 million pounds. Up to 9.55 million pounds of annual coastwide commercial quota is distributed according to the previous state allocations (column A in Table 1), and, in years when the coastwide quota exceeds 9.55 million pounds, the surplus quota will be distributed in equal shares to all states except Maine, Delaware, and New Hampshire, which will split 1% of the surplus quota (column B in Table 1). The total percentage allocated annually to each state is dependent on how much additional quota is available beyond 9.55 million pounds, if any, to be distribute in any given year. This allocation system is designed to provide for more equitable distribution of quota when stock biomass is higher while also considering the historic importance of the fishery to each state.

Table 1. Revised summer flounder commercial allocation system adopted by the Council and Board in March 2019 and implemented via Amendment 21 to the FMP, effective January 1, 2021.

State	A) Allocation of baseline quota ≤9.55 mil lb	B) Allocation of <u>additional</u> quota <u>beyond</u> 9.55 mil lb
ME	0.04756%	0.333%
NH	0.00046%	0.333%

MA	6.82046%	12.375%
RI	15.68298%	12.375%
CT	2.25708%	12.375%
NY	7.64699%	12.375%
NJ	16.72499%	12.375%
DE	0.01779%	0.333%
MD	2.03910%	12.375%
VA	21.31676%	12.375%
NC	27.44584%	12.375%
Total	100%	100%

A moratorium permit is required to sell summer flounder caught in federal waters. In 2019, 738 vessels held such permits. Typically, between 90% and 98% of the summer flounder landings are taken by bottom otter trawl gear, depending on the dataset. All other gear types each accounted for less than 1 percent of landings. Current regulations require a 14-inch total length minimum fish size in the commercial fishery. Trawl nets are required to have 5.5-inch diamond or 6-inch square minimum mesh in the entire net for vessels possessing more than the threshold amount of summer flounder (i.e., 200 lb from November 1-April 30 and 100 lb from May 1-October 31).

Commercial landings of summer flounder peaked in 1984 at 37.77 million pounds and reached a low of 5.83 million pounds in 2017. In 2019, commercial fishermen from Maine through North Carolina landed 9.06 million pounds of summer flounder, about 83% of the 10.98 million pound commercial quota (after deductions for prior year landings and discard overages). Total ex-vessel value in 2019 was $28.54 million, resulting in an average price per pound of $3.15 (Figure 9).

For 1994 through 2019, NOAA Fisheries dealer data indicate that summer flounder total ex-vessel revenue from Maine to North Carolina ranged from a low of $21.93 million in 1996 to a high of $36.16 million in 2005 (values adjusted to 2019 dollars to account for inflation). The mean price per pound ranged from a low of $1.86 in 2002 to a high of $4.40 in 2017 (both values in 2019 dollars). In 2019, 9.06 million pounds of summer flounder were landed generating $28.54 million in total ex-vessel revenue (an average of $3.15 per pound; Figure 9).

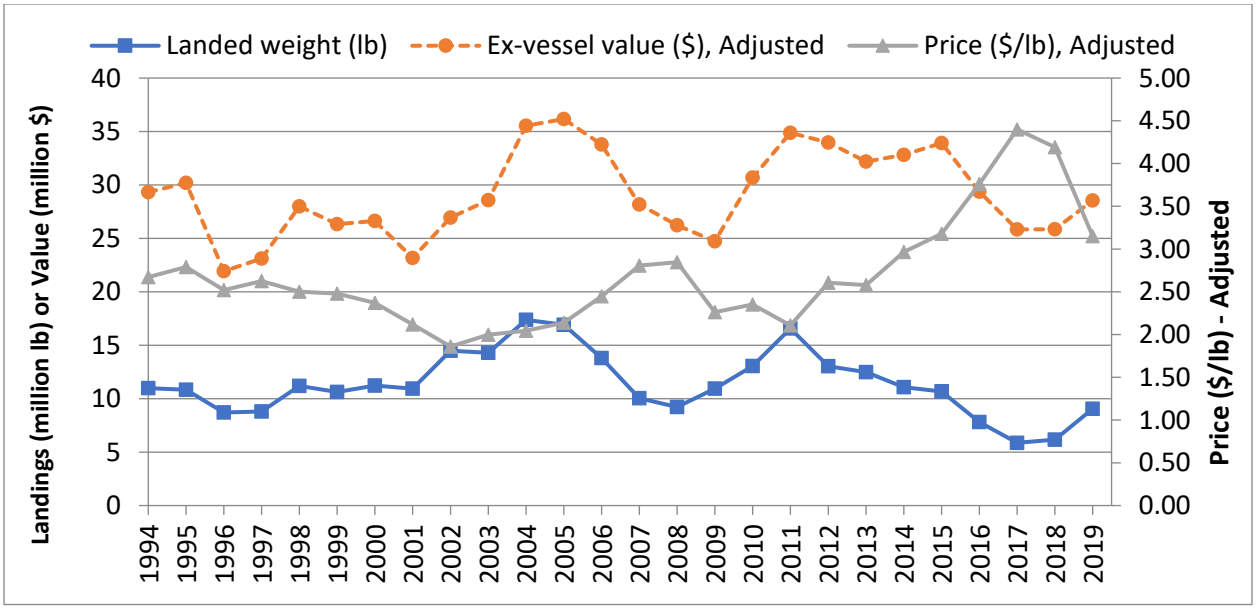


Figure 9. Landings, ex-vessel value, and price per pound for summer flounder, Maine through North Carolina, 1994-2019. Ex-vessel value and price are adjusted to real 2019 dollars using the Gross Domestic Product Price Deflator (GDPDEF).

Table 2 shows commercial landings of summer flounder by state in 2015-2019. As a percentage of coastwide landings, landings by state have generally been stable in recent years (Figure 10). From 1993 to 2020, state-level allocations have remained constant, and utilization rates have generally been high among all states involved in the summer flounder fishery.

Commercial summer flounder landings from Maine, New Hampshire, and Delaware are not shown in Figure 10 since landings are minimal, if they occur at all. Delaware landings have consistently been 0.1% or less of coastwide landings each year since 1993 and have averaged less than 0.01% in recent years.

Table 2. State Commercial Summer Flounder Landings in lbs (2015-2019). C = confidential data Source: Unpublished **NOAA Fisheries** commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

State	2015	2016	2017	2018	2019
Massachusetts	748,744	585,647	420,733	427,179	551,399
Rhode Island	1,716,507	1,305,216	897,434	1,022,716	1,662,585
Connecticut	286,770	190,793	134,106	176,587	290,483
New York	830,829	604,079	500,461	461,615	870,363
New Jersey	1,687,866	1,286,136	961,866	1,049,625	1,598,299
Delaware	C	C	C	C	C
Maryland	208,379	158,971	103,285	146,466	155,916
Virginia	2,282,508	1,567,404	1,252,662	1,259,983	1,926,512
North Carolina	2,912,158	2,107,147	1,550,328	1,598,332	2,003,468
Total	10,675,110	7,807,630	5,828,709	6,143,187	9,059,025

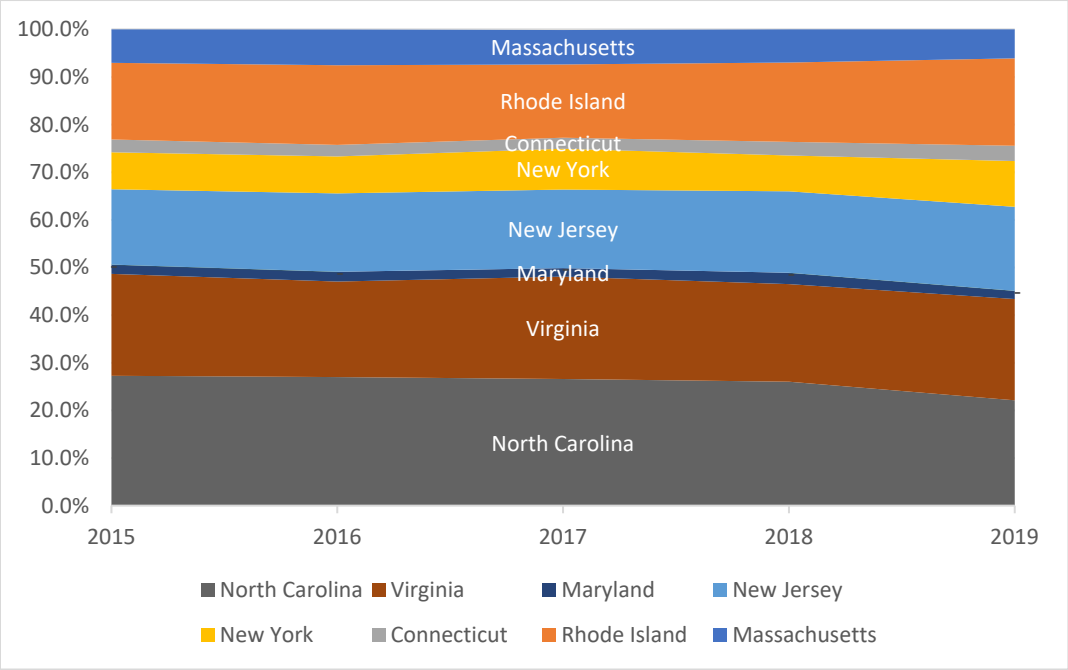


Figure 10. Percentage of coastwide summer flounder commercial landings by state 2015-2019, Massachusetts through North Carolina (excluding Delaware). Delaware accounts for less than 0.1% of landings each year. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

According to federal vessel trip report (VTR) data, statistical areas 616 and 537 were responsible for the highest percentage of commercial summer flounder catch (27% and 23% respectively; Table 3). While statistical area 539 accounted for only 6% of 2019 summer flounder catch, this area had the highest number of trips that caught summer flounder (2,510 trips). Note that all information on VTRs is self-reported by captains(
Table 3; Figure 11).

Table 3. Statistical areas that accounted for at least 5 percent of the total summer flounder catch in 2019, with associated number of trips.

Statistical Area	Percent of 2019 Commercial Summer Flounder Catch	Number of Trips
616	27%	1,052
537	23%	1,469
613	13%	1,455
622	8%	272
612	7%	1,076
539	6%	2,510

At least 100,000 pounds of summer flounder were landed by commercial fishermen in 17 ports in 8 states in 2019. These ports accounted for 87% of all 2019 commercial summer flounder landings. Point Judith, RI and Beaufort, NC were the leading ports in 2019 in pounds of summer flounder landed, while Point Judith, RI was the leading port in number of vessels landing summer flounder (Table 4).

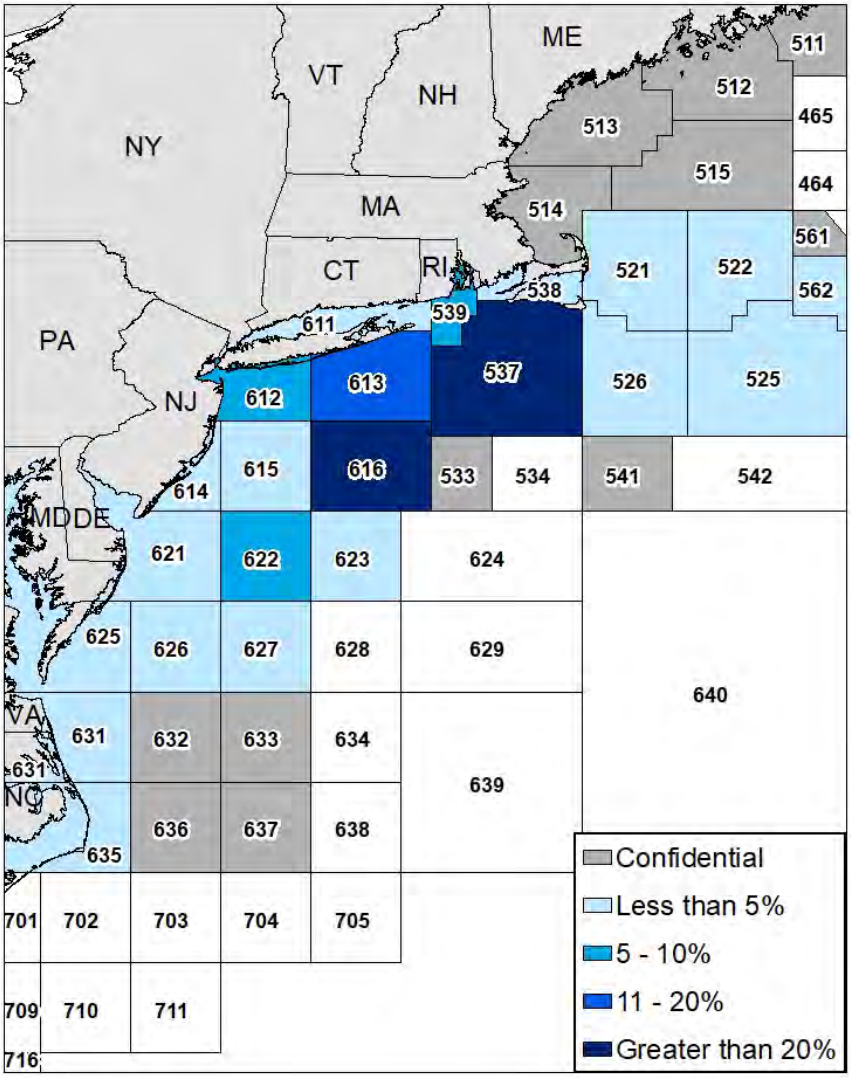


Figure 11. Proportion of summer flounder catch by NOAA Fisheries statistical area in 2019 based on federal VTR data. Statistical areas marked "confidential" are associated with fewer than three vessels and/or dealers. Statistical areas with confidential data collectively accounted for less than 1% of commercial catch reported on VTRs in 2019. The amount of catch (landings and discards) that was not reported on federal VTRs (e.g., catch from vessels permitted to fish only in state waters) is unknown. Northeast Fisheries Science Center Data ("AA tables") suggest that 8% of total commercial landings (state and federal) in 2019 were not associated with a statistical area reported in federal VTRs.

Table 4. Ports reporting at least 100,000 pounds of commercial summer flounder landings in 2019, based on dealer data.

Port	Commercial summer flounder landings (lb)	% of total 2019 commercial summer flounder landings	Number of vessels landing summer flounder
POINT JUDITH, RI	1,446,867	16%	120
BEAUFORT, NC	1,220,608	13%	61
HAMPTON, VA	975,621	11%	58
PT. PLEASANT, NJ	936,899	10%	48
NEWPORT NEWS, VA	713,569	8%	49
MONTAUK, NY	494,045	5%	68
WANCHESE, NC	244,898	3%	14
BELFORD, NJ	235,410	3%	16
CAPE MAY, NJ	226,271	2%	44
ENGELHARD, NC	221,177	2%	10
NEW BEDFORD, MA	214,518	2%	53
CHINCOTEAGUE, VA	212,628	2%	23
HAMPTON BAYS, NY	186,292	2%	31
ORIENTAL, NC	158,368	2%	8

Summer Flounder Recreational Fishery

There is a significant recreational fishery for summer flounder, primarily in state waters when the fish migrate inshore during the warm summer months. Summer flounder have historically been highly sought by sport fishermen, especially in New York and New Jersey waters. Characteristics of the recreational fishery are summarized in the sections below.

NOAA Fisheries has conducted recreational fishing surveys since 1979 to obtain estimates of participation, effort, and catch by recreational anglers in marine waters. Recreational data for 2004 and later are available from the MRIP. Prior to 2004, recreational data were generated by the Marine Recreational Fishery Statistics Survey (MRFSS). Note that MRIP has recently undergone major changes in its collection of effort data,[2] as well as changes to its angler intercept methods for private boat and shore anglers.[3] As such, major changes to the time series of recreational catch and landings were released in July 2018. A more detailed description of the revisions to the MRIP sampling methodology may be found in Section 1.1.1.1. The revised MRIP data are used in the summary of the recreational fishery below.

Recreational harvest for summer flounder peaked in 1983 at an estimated 36.74 million pounds landed. Recreational harvest dropped in the 1980s to a low of 5.66 million pounds in 1989,

[2] See https://www.fisheries.noaa.gov/recreational-fishing-data/effort-survey-improvements

[3] See https://www.fisheries.noaa.gov/event/access-point-angler-intercept-survey-calibration-workshop

corresponding with a decline in overall stock biomass over the same time frame. Starting in 1993, coastwide RHLs were implemented for the recreational fishery. Recreational harvest generally increased throughout the 1990s, and then began to decline after about 2000, in part due to decreases in the RHL. In 2019, recreational anglers harvested 7.80 million pounds of summer flounder. From 2010-2019, an average of 86.5% of the harvest (in pounds) originated from private/rental boats, while party/charter boats and shore-based anglers accounted for an average of 4.6% and 8.9% of the harvest, respectively (Figure 12). Recreational dead discard estimates ranged from a low of 0.19 million pounds in 1989 to a high of 5.98 million pounds in 2011. Recreational dead discards averaged 14% of total catch from 2009 to 2018 (

Table 5).

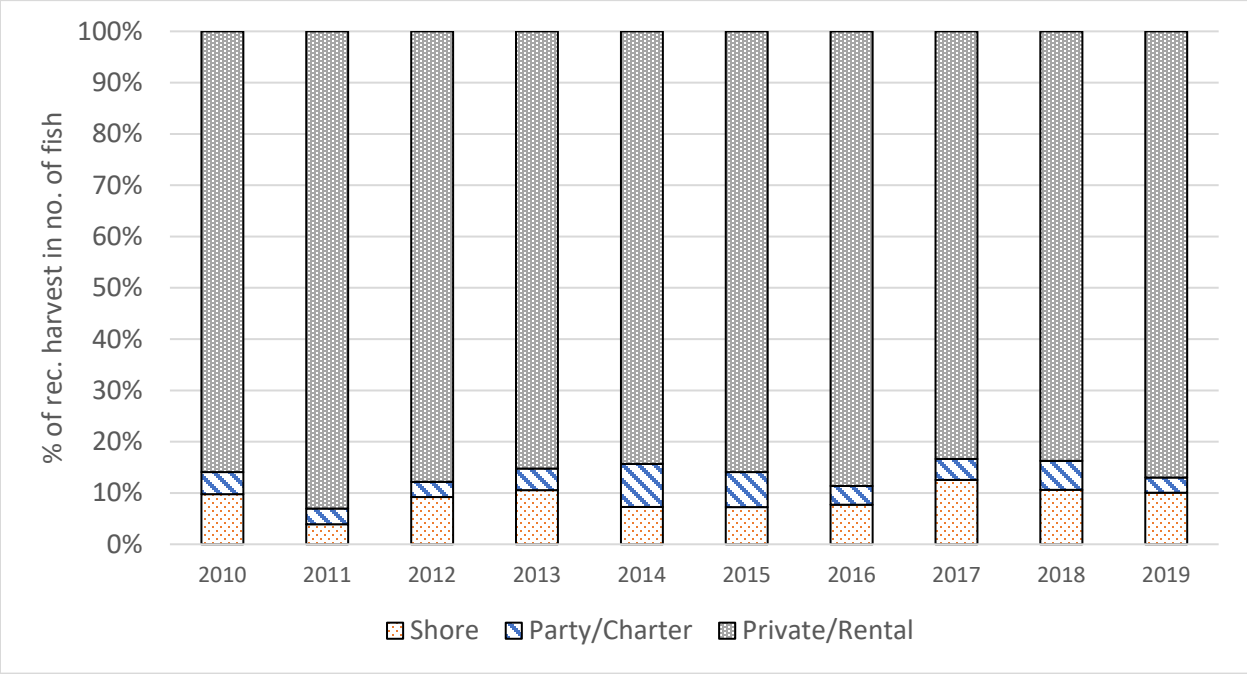


Figure 12. The percent of summer flounder harvested by recreational fishing mode in numbers of fish, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 18, 2020

Table 5. Recreational summer flounder landings, catch, and mean weight of landed fish, Maine through North Carolina, 1981-2019. Source: MRIP

Year	Catch (number of fish)	Landings (number of fish)	Landings (lbs)	Mean weight of landed fish (lb)
1981	22,764,996	17,017,575	15,854,414	0.93
1982	26,068,143	19,294,418	23,717,755	1.23
1983	36,351,038	25,780,410	36,740,016	1.43
1984	39,817,437	23,448,651	28,225,588	1.20
1985	26,281,245	21,388,987	25,142,403	1.18
1986	32,517,894	16,383,583	26,465,976	1.62
1987	29,936,826	11,926,130	23,453,212	1.97
1988	25,452,018	14,821,583	20,786,915	1.40
1989	5,064,611	3,103,367	5,657,136	1.82
1990	15,473,585	6,074,360	7,753,758	1.28
1991	24,831,911	9,833,938	12,905,506	1.31
1992	21,110,940	8,786,840	12,668,638	1.44
1993	36,182,494	9,800,527	13,729,937	1.40
1994	26,107,588	9,823,384	14,287,672	1.45
1995	27,836,448	5,473,382	9,017,103	1.65
1996	29,744,785	10,184,119	15,020,721	1.47
1997	31,866,871	11,036,807	18,524,759	1.68
1998	39,085,859	12,371,010	22,857,800	1.85
1999	42,878,662	8,096,243	16,696,341	2.06
2000	43,257,486	13,045,422	27,025,386	2.07
2001	43,677,692	8,029,216	18,556,023	2.31
2002	34,480,722	6,505,337	16,286,552	2.50
2003	36,211,634	8,208,884	21,486,707	2.62
2004	37,945,213	8,157,992	21,199,825	2.60
2005	45,979,974	7,044,371	18,545,254	2.63
2006	37,903,008	6,946,548	18,632,354	2.68
2007	35,264,760	4,849,806	13,888,850	2.86
2008	39,482,693	3,781,123	12,339,583	3.26
2009	50,622,466	3,645,119	11,656,844	3.20
2010	58,890,946	3,511,546	11,335,965	3.23
2011	56,043,009	4,326,867	13,483,852	3.12
2012	44,704,755	5,737,284	16,133,620	2.81
2013	44,962,178	6,600,546	19,414,043	2.94
2014	44,577,814	5,364,891	16,234,585	3.03
2015	34,140,115	4,034,036	11,829,854	2.93
2016	31,238,651	4,301,669	13,238,819	3.08
2017	28,075,235	3,174,950	10,088,244	3.18
2018	23,545,865	2,412,514	7,599,646	3.15

2019	30,743,494	2,383,228	7,798,280	3.27

On average, an estimated 83 percent of the landings (in numbers of fish) occurred in state waters over the past ten years (Figure 13). By state, the majority of summer flounder are typically landed in New York and New Jersey (Table 6).

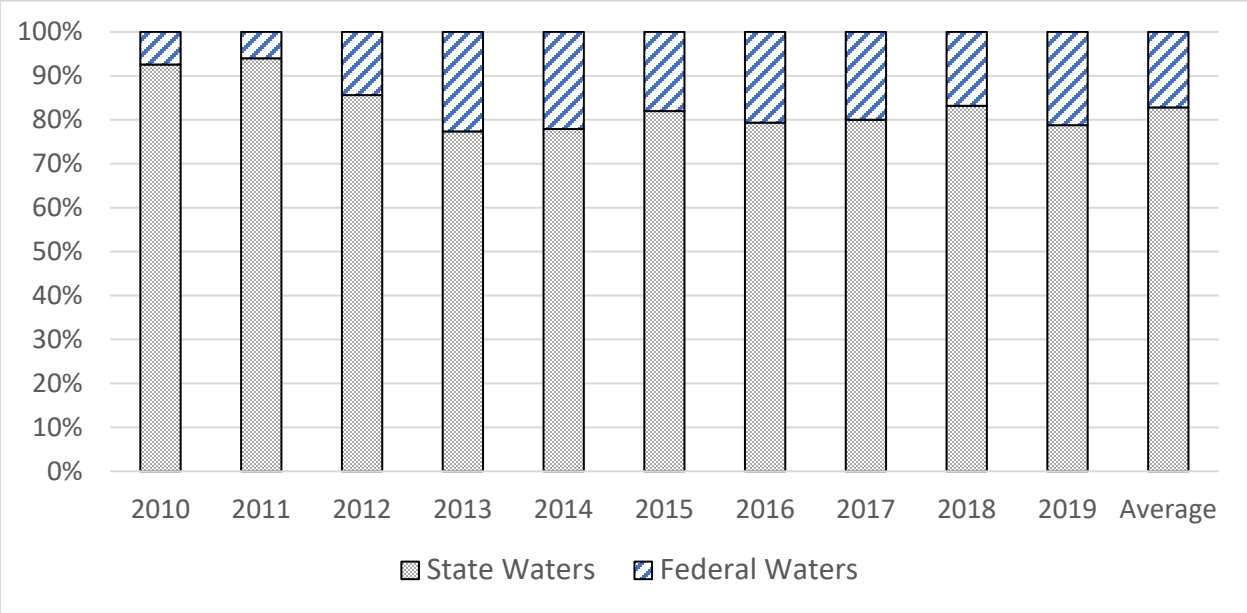


Figure 13. Estimated percentage of summer flounder recreational landings (numbers of fish) in state vs. federal waters, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

Table 6. State contribution (as a percentage) to total recreational landings of summer flounder (in numbers of fish), from Maine through North Carolina, 2017-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

State	2017	2018	2019	Avg 2017-2019
Maine	0.0%	0.0%	0.0%	0.0%
New Hampshire	0.0%	0.0%	0.0%	0.0%
Massachusetts	2.1%	2.8%	2.3%	2.4%
Rhode Island	4.9%	7.0%	9.0%	6.8%
Connecticut	3.8%	6.3%	3.8%	4.6%
New York	37.4%	26.6%	23.5%	30.0%
New Jersey	38.1%	43.3%	46.5%	42.2%
Delaware	3.1%	3.5%	3.8%	3.4%
Maryland	1.8%	2.0%	3.3%	2.3%
Virginia	5.9%	6.0%	6.3%	6.1%
North Carolina	2.9%	2.4%	1.5%	2.3%
Total	100.0%	100.0%	100.0%	100.0%

1.3.2 Scup

Scup are highly sought after by commercial and recreational fishermen throughout Southern New England and the Mid-Atlantic. Data for all fisheries dead catch components (commercial landings, commercial dead discards, recreational landings, and recreational dead discards) are available back to 1988. Commercial landings have accounted for 45% of the total catch since 1988, with recreational landings accounting for 36%, commercial dead discards about 16%, and recreational dead discards about 3%. Over the more recent time period of 2014-2018, the comparable percentages are 45% commercial landings, 33% recreational landings, 17% commercial dead discards, and 5% recreational dead discards (Figure 14).

Commercial dead discards have accounted for about 27% of the total commercial catch during 2014-2018, assuming a discard mortality rate of 100%. Recreational dead discards have accounted for 12% of the total recreational catch over 2014-2018, assuming a discard mortality rate of 15%.

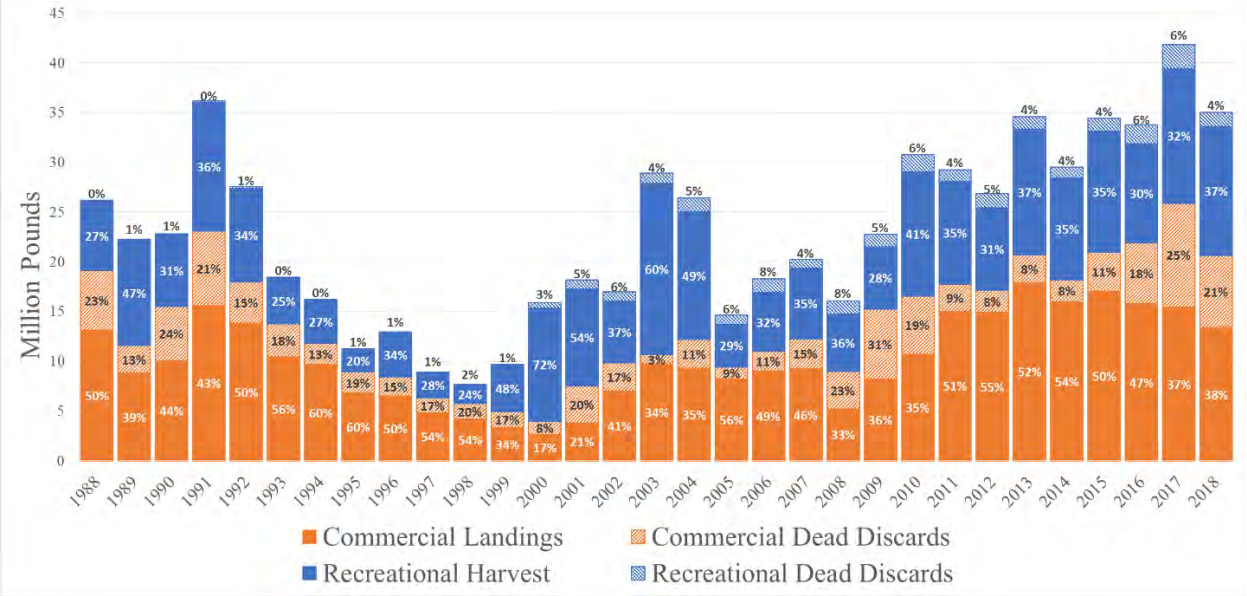


Figure 14. Commercial and recreational scup landings and dead discards, 1981-2018. Data retrieved from the 2019 Northeast Fisheries Science Center Scup Operational Assessment.

Scup Commercial Fishery

The commercial scup fishery operates year-round, taking place primarily in federal waters during the winter and state waters during the summer. A coast-wide commercial quota is allocated between three quota periods, known as the winter I, summer, and winter II quota periods (Table 7). These seasonal quota periods were established to ensure that both smaller day boats, which typically operate near shore in the summer months, and larger vessels operating offshore in the winter months can land scup before the annual quota is reached. Both winter periods are managed under a coastwide quota while the summer period quota is divided among states according to the allocation percentages outlined in the FMP (Table 8).

Once the quota for a given period is reached, the commercial fishery is closed for the remainder of that period. If the full winter I quota is not harvested, unused quota is added to the winter II period. Any quota overages during the winter I and II periods are subtracted from the quota allocated to those periods in the following year. Quota overages during the summer period are subtracted from the following year's quota only in the states where the overages occurred.

A possession limit of 50,000 pounds is in effect during the winter I quota period. A possession limit of 12,000 pounds is in effect during the winter II period. If the winter I quota is not reached, the winter II possession limit increases by 1,500 pounds for every 500,000 pounds of quota not caught during winter I. During the summer period, various state-specific possession limits are in effect.

Table 7. Dates, allocations, and possession limits for the commercial scup quota periods. Winter period possession limits apply in both state and federal waters.

Quota Period	Dates	% of commercial quota allocated	Possession limit
Winter I	January 1 – April 30	45.11%	50,000 pounds, until 80% of winter I allocation is reached, then reduced to 1,000 pounds.
Summer	May 1 – September 30	38.95%	State-specific
Winter II	October 1 – December 31	15.94%	12,000 pounds. If winter I quota is not reached, the winter II possession limit increases by 1,500 pounds for every 500,000 pounds of scup not landed during winter I.

Table 8. State quota shares for the commercial scup fishery during the summer quota period (May-September).

State	Share of summer quota
Maine	0.1210%
Massachusetts	21.5853%
Rhode Island	56.1894%
Connecticut	3.1537%
New York	15.8232%
New Jersey	2.9164%
Maryland	0.0119%
Virginia	0.1650%
North Carolina	0.0249%
Total	99.9908%

Trawl vessels may not possess 1,000 pounds or more of scup during October 1 – April 15, 2,000 pounds or more April 15 – June 15, or 200 pounds or more during June 15 – September 30, unless they use a minimum mesh size of 5-inch diamond mesh, applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net. In addition, the roller rig trawl roller diameter may not exceed 18 inches. Pots and traps for scup are required to have degradable hinges and escape vents that are either circular with a 3.1 inch minimum diameter or square with a minimum length of 2.25 inches on the side.

In 2019, commercial fishermen landed 13.78 million pounds of scup, about 57% of the commercial quota. Over the past two decades, total scup ex-vessel revenue ranged from a low of $4.8 million in 2000 to a high of $12.2 million in 2015. In 2019, 13.78 million pounds of scup were landed by commercial fishermen from Maine through North Carolina. Total ex-vessel value in 2019 was $9.20 million, resulting in an average price per pound of $0.67. All revenue and price values were adjusted to 2019 dollars to account for inflation (Figure 15).

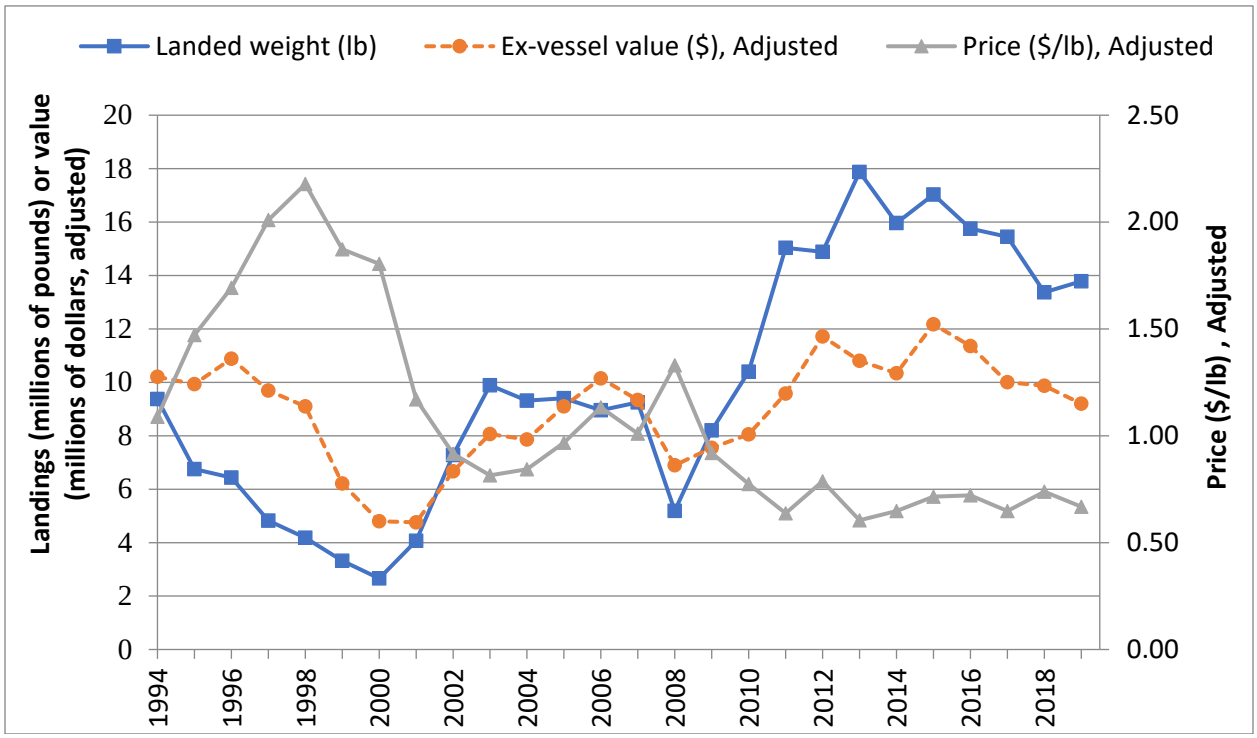


Figure 15. Landings, ex-vessel value, and price for scup from Maine through North Carolina, 1994-2019. Ex-vessel value and price are inflation-adjusted to 2019 dollars using the Gross Domestic Product Price Deflator. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e., "DERS"), which include both state and federal dealer data).

In general, the price of scup tends to be lower when landings are higher, and vice versa. This relationship is not linear and many other factors besides landings also influence price. The highest average price per pound over the past two decades was $2.18 in 1998, and the lowest average price per pound was $0.60 in 2013 (Figure 15).

Table 9 shows commercial landings of scup by state in 2015-2019. State landings have fluctuated some in recent years (Figure 16). Most notably, Rhode Island's contribution to the coastwide total landings has decreased in recent years. Most harvest occurs within Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. Commercial scup landings from Maine, New Hampshire, and Delaware are not shown in Figure 16 since landings are minimal, if they occur at all.

Table 9. State Commercial Scup Landings in lbs (2015-2019). C = confidential data Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

State	2015	2016	2017	2018	2019
Massachusetts	1,380,256	1,535,953	2,564,229	1,483,151	1,249,085
Rhode Island	6,798,185	6,815,478	5,968,327	4,713,371	4,586,975
Connecticut	981,407	933,140	751,955	793,806	1,140,224
New York	4,102,589	3,509,145	3,478,441	3,342,569	4,069,395
New Jersey	2,981,577	2,333,578	1,844,573	2,474,239	1,835,545
Delaware	C	C	C	C	C
Maryland	29,430	53,535	75,280	42,808	222,251
Virginia	510,930	447,218	557,833	441,544	462,085
North Carolina	245,584	127,656	204,673	76,916	218,113
Total	17,029,966	15,755,755	15,446,089	13,368,410	13,783,703

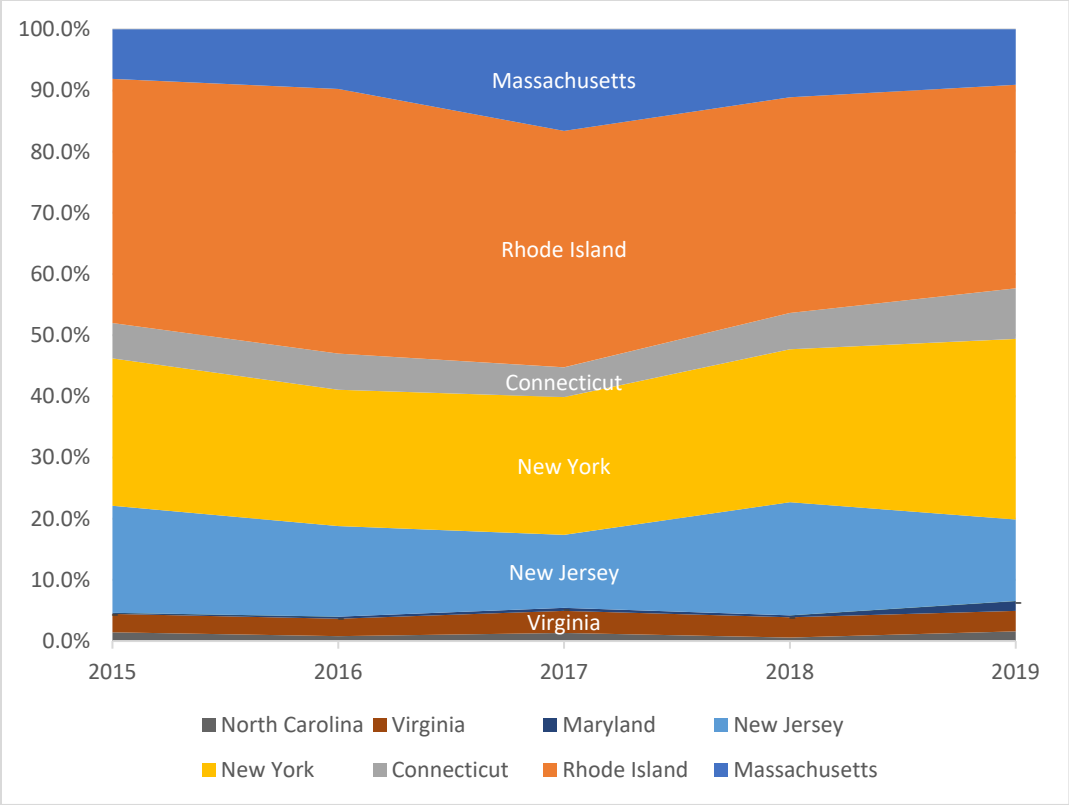


Figure 16. Percentage of coastwide scup commercial landings by state 2015-2019, Massachusetts through North Carolina (excluding Delaware). Delaware accounts for less than 0.1% of landings each year. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

VTR data suggest that NOAA Fisheries statistical areas 537, 613, 616, 539 and 611 were responsible for the largest percentage of commercial scup catch in 2019. Statistical area 539, off Rhode Island, had the highest number of trips which caught scup (Table 10; Figure 17).

Table 10. Statistical areas which accounted for at least 5% of the total commercial scup catch (by weight) in 2019, with associated number of trips. Unpublished NOAA Fisheries dealer data (i.e., "AA tables", which include both state and federal dealer data).

Statistical area	% of 2019 commercial scup catch	Number of trips
537	22%	1060
613	21%	1141
616	20%	627
539	12%	2268
611	6%	1729

The commercial scup fishery in state and federals waters is predominantly a bottom otter trawl fishery. In 2019, about 81% of the commercial scup landings (by weight) reported by state and

federal dealers were caught with bottom otter trawls. Pots/traps accounted for about 5% of landings, handlines accounted for 2% of landings, while all other gear types each accounted for 1% or less of the 2019 commercial scup landings. Nine percent of landings reported by dealers were of an unknown gear type. This includes landings from vessels that are only permitted to fish in state waters and do not submit federal VTRs, resulting in incomplete information on gear type in the data set.

At least 100,000 pounds of scup were landed by commercial fishermen in 18 ports in 6 states in 2019. These ports accounted for approximately 90% of all 2019 commercial scup landings. Point Judith, Rhode Island was the leading port, both in terms of landings and number of vessels landing scup (Table 11).

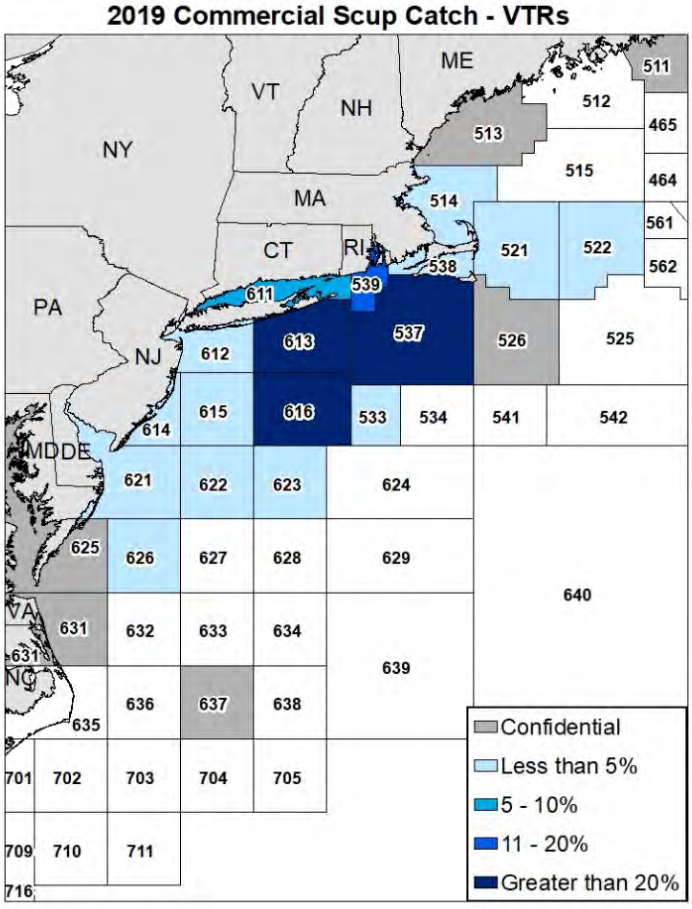


Figure 17. Proportion of scup catch by statistical area in 2019 based on federal VTR data. Statistical areas marked "confidential" are associated with fewer than three vessels and/or dealers. Statistical areas with confidential data collectively accounted for less than 1% of commercial catch reported on VTRs in 2019. Northeast Fisheries Science Center Data ("AA tables") suggest that 18% of total commercial landings (state and federal) in 2019 were not associated with a statistical area reported in federal VTRs. Source: Unpublished NOAA Fisheries Vessel Trip Report data.

Table 11. Ports reporting at least 100,000 pounds of commercial scup landings in 2019, based on dealer data.

Port	Scup Landings (lb)	% of total commercial scup landings	Number of vessels landing scup
POINT JUDITH, RI	3,831,399	28%	127
MONTAUK, NY	2,939,960	21%	76
PT. PLEASANT, NJ	1,382,156	10%	36
NEW BEDFORD, MA	902,313	7%	52
STONINGTON, CT	539,479	4%	19
MATTITUCK, NY	326,299	2%	7
NEW LONDON, CT	325,359	2%	7
HAMPTON BAYS, NY	315,355	2%	30
CAPE MAY, NJ	304,501	2%	20
HAMPTON, VA	275,071	2%	39
LITTLE COMPTON, RI	236,024	2%	11
OCEAN CITY, MD	222,251	2%	4
EAST HAVEN, CT	196,976	1%	7
WARWICK, RI	164,180	1%	C
AMMAGANSETT, NY	142,573	1%	C
BELFORD, NJ	127,752	1%	15
NEWPORT, RI	121,788	1%	11
CHINCOTEAGUE, VA	109,757	1%	12

Scup Recreational Fishery

Scup are highly sought after by recreational anglers throughout Southern New England and the Mid-Atlantic with the greatest proportion of catch taken in the states of Massachusetts through New York. Scup are a migratory schooling species and abundance is primarily influenced by water temperature, making them a popular target of anglers during the spring and summer months when they aggregate inshore to spawn. The 2018 MRIP recalibration resulted in higher harvest estimates throughout the time series, with more divergence in recent years. The revised MRIP data is used in describing the characteristics of the scup recreational fishery in the sections below.

The recreational fishery for scup is significant, with recreational anglers accounting for 21 -75% of total dead scup catch from 1988-2018. From 1981-2019, recreational catch of scup peaked in 2017 at 41.20 million scup and landings peaked in 1986 with an estimated 30.43 million scup landed by recreational fishermen from Maine through North Carolina. Recreational catch was lowest in 1997 with an estimated 6.60 million scup were caught and 3.64 million scup were landed. Recreational anglers from Maine through North Carolina caught an estimated 28.67 million scup and landed 14.95 million scup (about 14.12 million pounds) in 2019 (

Table 12).

Based on MRIP estimates, about 56% of recreational scup landings (in numbers of fish) in 2019 were from anglers who fished on private or rental boats. About 15% were from anglers fishing on party or charter boats, and about 29% were from anglers fishing from shore (Figure 18).

Most recreational scup harvest occurs in state waters during the warmer months when the fish migrate inshore. Between 2017 and 2019, about 97% of recreational scup landings (in numbers of fish) occurred in state waters and about 3% occurred in federal waters (Figure 19). Massachusetts, Rhode Island, Connecticut, New York and New Jersey accounted for over 99.9% of recreational scup harvest in 2019 (Table 13).

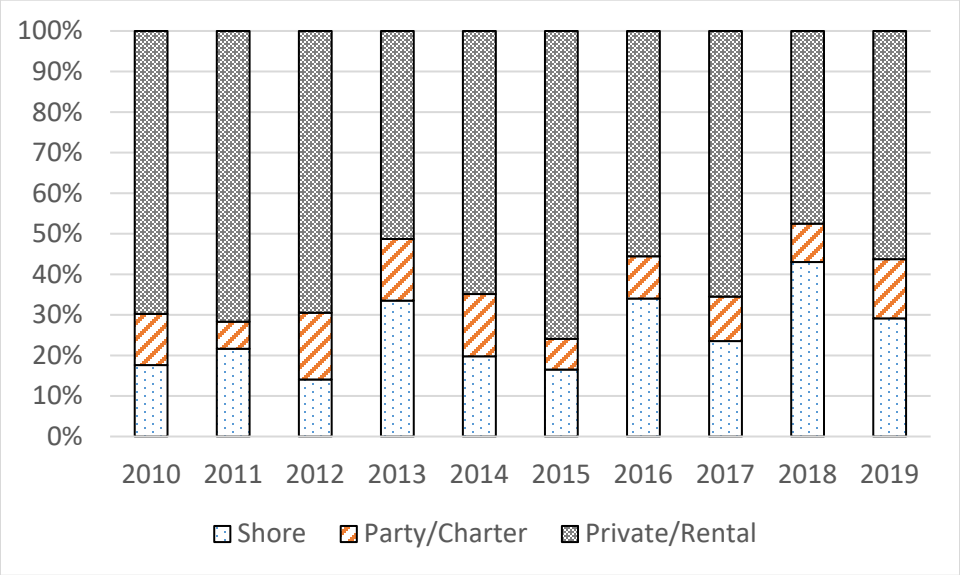


Figure 18. The percent of scup harvested by recreational fishing mode in numbers of fish, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

Table 12. Recreational scup landings, catch, and mean weight of landed fish, Maine through North Carolina, 1981-2019. Source: MRIP

Year	Catch (number of fish)	Landings (number of fish)	Landings (lbs)	Mean weight of landed fish (lb)
1981	19,682,427	17,306,715	11,142,808	0.64
1982	13,144,424	10,831,746	8,616,308	0.80
1983	13,781,182	12,189,386	8,621,722	0.71
1984	11,379,028	8,780,947	3,283,595	0.37
1985	24,564,765	18,837,853	11,292,539	0.60
1986	37,311,025	30,428,119	14,175,636	0.47
1987	18,108,256	14,030,569	10,409,377	0.74
1988	12,135,744	9,387,808	7,034,147	0.75
1989	23,728,813	19,323,875	10,540,661	0.55
1990	18,263,733	14,040,609	7,172,993	0.51
1991	27,408,916	21,896,663	12,912,660	0.59
1992	20,961,940	16,495,873	9,454,191	0.57
1993	10,705,511	8,401,830	4,631,187	0.55
1994	8,857,521	6,578,378	4,329,138	0.66
1995	6,783,845	4,063,766	2,270,722	0.56
1996	10,380,915	6,266,686	4,417,936	0.70
1997	6,595,887	3,639,312	2,539,961	0.70
1998	6,855,801	2,738,350	1,816,527	0.66
1999	10,986,627	7,413,089	4,625,639	0.62
2000	22,057,668	14,942,136	11,391,602	0.76
2001	21,933,490	11,132,585	9,774,943	0.88
2002	17,359,007	7,074,231	6,229,973	0.88
2003	28,629,886	17,519,827	17,208,925	0.98
2004	26,791,386	12,943,025	12,827,920	0.99
2005	13,193,600	4,487,025	4,296,294	0.96
2006	20,073,152	5,521,172	5,926,311	1.07
2007	17,804,784	7,457,872	7,099,945	0.95
2008	19,513,012	5,650,032	5,760,290	1.02
2009	20,748,181	6,064,111	6,284,583	1.04
2010	25,134,562	10,598,650	12,477,168	1.18
2011	18,520,338	7,598,242	10,322,642	1.36
2012	21,237,835	7,334,829	8,269,295	1.13
2013	25,878,520	11,547,028	12,635,882	1.09
2014	20,876,838	9,488,944	10,270,446	1.08
2015	25,154,964	11,498,780	12,174,253	1.06
2016	31,493,863	9,143,576	9,999,289	1.09
2017	41,199,436	13,820,613	13,526,579	0.98
2018	30,374,926	14,545,491	12,977,417	0.89
2019	28,666,419	14,954,156	14,116,223	0.94

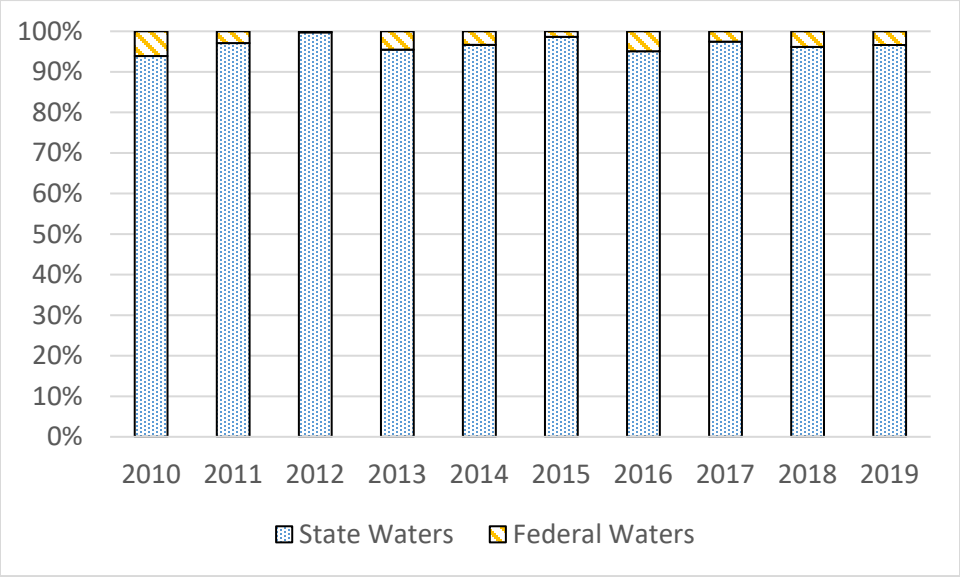


Figure 19. Estimated percentage of scup recreational landings (numbers of fish) in state vs. federal waters, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

Table 13. State contribution (as a percentage) to total recreational landings of scup (in numbers of fish), from Maine through North Carolina, 2017-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

State	2017	2018	2019	Avg 2017-2019
Maine	0.0%	0.0%	0.0%	0.0%
New Hampshire	0.0%	0.0%	0.0%	0.0%
Massachusetts	15.1%	22.5%	13.1%	16.9%
Rhode Island	10.0%	16.3%	21.9%	16.1%
Connecticut	12.3%	21.1%	16.7%	16.7%
New York	46.8%	36.9%	47.6%	43.8%
New Jersey	15.8%	3.2%	0.7%	6.5%
Delaware	<0.1%	<0.1%	0.0%	<0.1%
Maryland	<0.1%	<0.1%	<0.1%	<0.1%
Virginia	0.0%	0.0%	<0.1%	<0.1%
North Carolina	<0.1%	<0.1%	<0.1%	<0.1%
Total	100%	100%	100%	100%

1.3.3 Black Sea Bass

Black sea bass support important commercial and recreational fisheries along the US Atlantic coast. Data for all dead catch components (commercial landings, commercial dead discards, recreational landings, and recreational dead discards) are available back to 1989. Commercial landings have accounted for 30% of the total dead catch since 1988, with recreational landings accounting for 53%, commercial dead discards about 4%, and recreational dead discards about 13%. Over the more recent time period of 2014-2018, the comparable percentages are 17% commercial landings, 60% recreational landings, 8% commercial dead discards, and 15% recreational dead discards (Figure 20).

Commercial dead discards have accounted for about 33% of the total *commercial* catch 2014-2018, assuming a discard mortality rate of 100% in the commercial trawl fishery and 15% in the commercial non-trawl fishery. Recreational dead discards have accounted for 20% of the total *recreational* catch over 2014-2018, assuming a discard mortality rate of 15%.

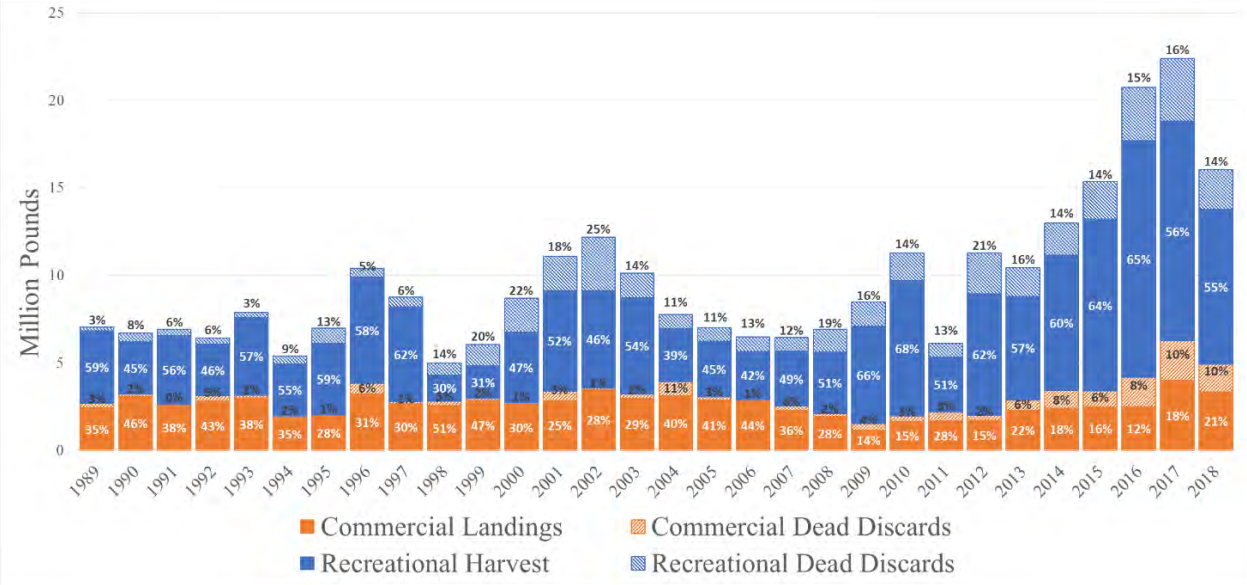


Figure 20. Commercial and recreational black sea bass landings and discards, 1989-2018. Data retrieved from the 2019 Northeast Fisheries Science Center Black Sea Bass Operational Assessment.

Black Sea Bass Commercial Fishery

The commercial quota is divided among the states based on the allocation percentages established in the FMP. States set measures to achieve their state-specific commercial quotas. The Council and Commission are currently developing a management action to consider if these state allocations should be modified.

Table 14. Black sea bass state by state allocation of annual commercial quota.

State	Percent Allocation
ME	0.50%
NH	0.50%
MA	13%
RI	11%
CT	1%
NY	7%
NJ	20%
DE	5%
MD	11%
VA	20%
NC	11%
Total	100%

A minimum commercial black sea bass size limit of 11 inches total length has been in place since 2002. There is no commercial possession limit for black sea bass in federal waters; however, states set possession limits for state waters. Any vessel which uses otter trawl gear and catches more than 500 pounds of black sea bass from January through March, or more than 100 pounds from April through December, must use nets with a minimum mesh size of 4.5-inch diamond mesh applied throughout the codend for at least 75 continuous meshes forward of the end of the net. In addition, the roller rig trawl roller diameter may not exceed 18 inches. Pots and traps used to commercially harvest black sea bass must have two escape vents with degradable hinges in the parlor. The escape vents must measure 1.375 inches by 5.75 inches if rectangular, 2 inches by 2 inches if square, or have a diameter of 2.5 inches if circular.

Commercial black sea bass landings peaked in 2017 at 3.99 million pounds, and were at their lowest in 2009, when 1.15 million pounds were landed (Figure 21). About 3.48 million pounds of black sea bass were landed by commercial fishermen in 2019, very close to the commercial quota of 3.52 million pounds.

Black sea bass are a valuable commercial species. Total ex-vessel value averaged $12.40 million per year during 2017-2019. When considered at the annual, coastwide level, the average ex-vessel price per pound (adjusted to 2019 dollars to account for inflation) during 2005-2019 tended to decline with increases in total landings. However, average ex-vessel price remained above $3.00 per pound (in 2019 dollars) throughout this time period, making black sea bass one of the more valuable commercial species in this region.

Table 15 shows commercial landings of black sea bass by state for 2015-2019. As a percentage of coastwide landings, landings by state have generally been stable in recent years and closely align with the state allocations (Figure 22). Commercial black sea bass landings from Maine and New Hampshire are not shown since landings are minimal, if they occur at all.

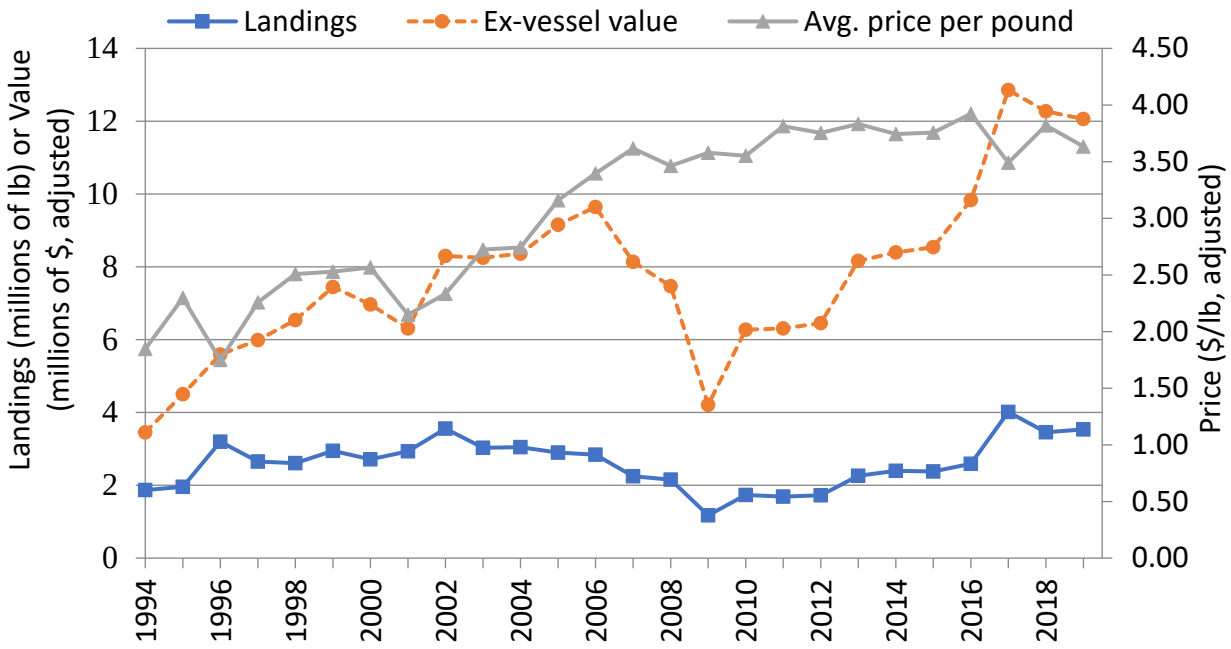


Figure 21. Landings, ex-vessel value, and average price for black sea bass, ME-NC, 1994-2019. Ex-vessel value and price are inflation-adjusted to 2019 dollars using the Gross Domestic Product Price Deflator. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

Table 15. State Commercial Black Sea Bass Landings in lbs (2015-2019). C = confidential data Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

State	2015	2016	2017	2018	2019
Massachusetts	347,980	354,069	542,095	480,810	530,827
Rhode Island	238,635	294,693	458,299	376,062	399,524
Connecticut	24,593	28,859	43,742	37,070	61,965
New York	150,898	187,032	296,269	269,371	297,469
New Jersey	471,009	523,120	898,674	697,571	718,486
Delaware	111,510	C	114,033	172,180	169,748
Maryland	349,273	271,809	389,118	391,998	382,006
Virginia	421,661	516,731	745,446	606,664	648,715
North Carolina	348,592	315,661	498,142	384,500	325,714
Total	2,464,151	2,588,768	3,985,818	3,416,226	3,534,454

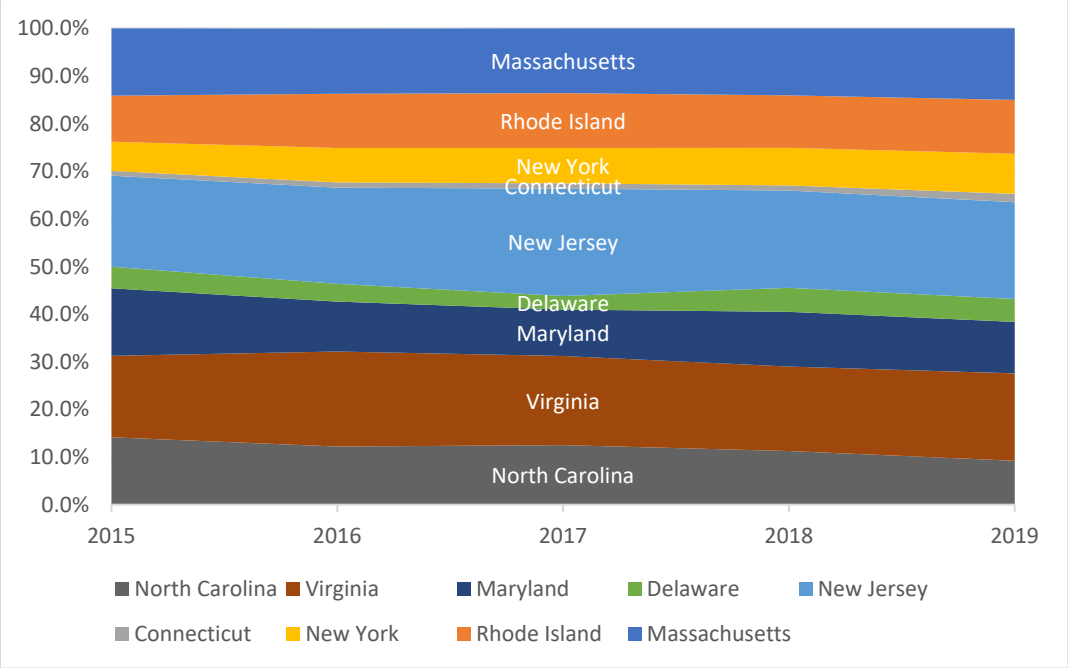


Figure 22. Percentage of coastwide black sea bass commercial landings by state 2015-2019, Massachusetts through North Carolina. Source: Unpublished NOAA Fisheries commercial fish dealer data (i.e, "DERS"), which include both state and federal dealer data).

According to federal VTR data, statistical area 616, which includes important fishing areas near Hudson Canyon, was responsible for the largest percentage of commercial black sea bass catch (landings and discards) in 2019 (i.e., 39%). Statistical area 621, off southern New Jersey, Delaware, and Maryland accounted for the second highest proportion of catch (9%), followed by statistical area 622 off Delaware (8%), statistical area 615 off New Jersey (7%), and statistical area 537, south of Massachusetts and Rhode Island (5%; Table 16, Figure 23). Statistical area 611, in Long Island Sound, and statistical area 539, off Rhode Island, had the highest number of trips which reported black sea bass catch on federal VTRs in 2019 (over 1,500 trips each); however they each accounted for less than 5% of total black sea bass catch.

Table 16. Statistical areas that accounted for at least 5% of the total commercial black sea bass catch in 2019 based on federal VTRs, with associated number of trips. Source: Unpublished NOAA Fisheries VTR data

Statistical Area	Percent of 2019 Commercial Black Sea Bass Catch	Number of Trips
616	39%	761
621	10%	332
622	8%	104
615	7%	175
537	5%	774

At least 100,000 pounds of black sea bass were landed in each of 10 ports in 7 states from Maine through North Carolina in 2019. These 10 ports collectively accounted for over 66% of all commercial black sea bass landings in 2019 (Table 17).

Table 17. Ports reporting at least 100,000 pounds of commercial black sea bass landings in 2019, based on dealer data.

Port	Black Sea Bass Landings (lb)	% of total commercial black sea bass landings	Number of vessels landing Black Sea Bass
POINT PLEASANT, NJ	395,691	11%	40
OCEAN CITY, MD	369,507	10%	8
POINT JUDITH, RI	284,176	8%	315
HAMPTON, VA	266,307	8%	32
NEW BEDFORD, MA	217,593	6%	192
NEWPORT NEWS, VA	188,542	5%	17
BEAUFORT, NC	163,148	5%	52
CAPE MAY, NJ	161,095	5%	32
MONTAUK, NY	159,324	5%	126
CHINCOTEAGUE, VA	113,229	3%	8

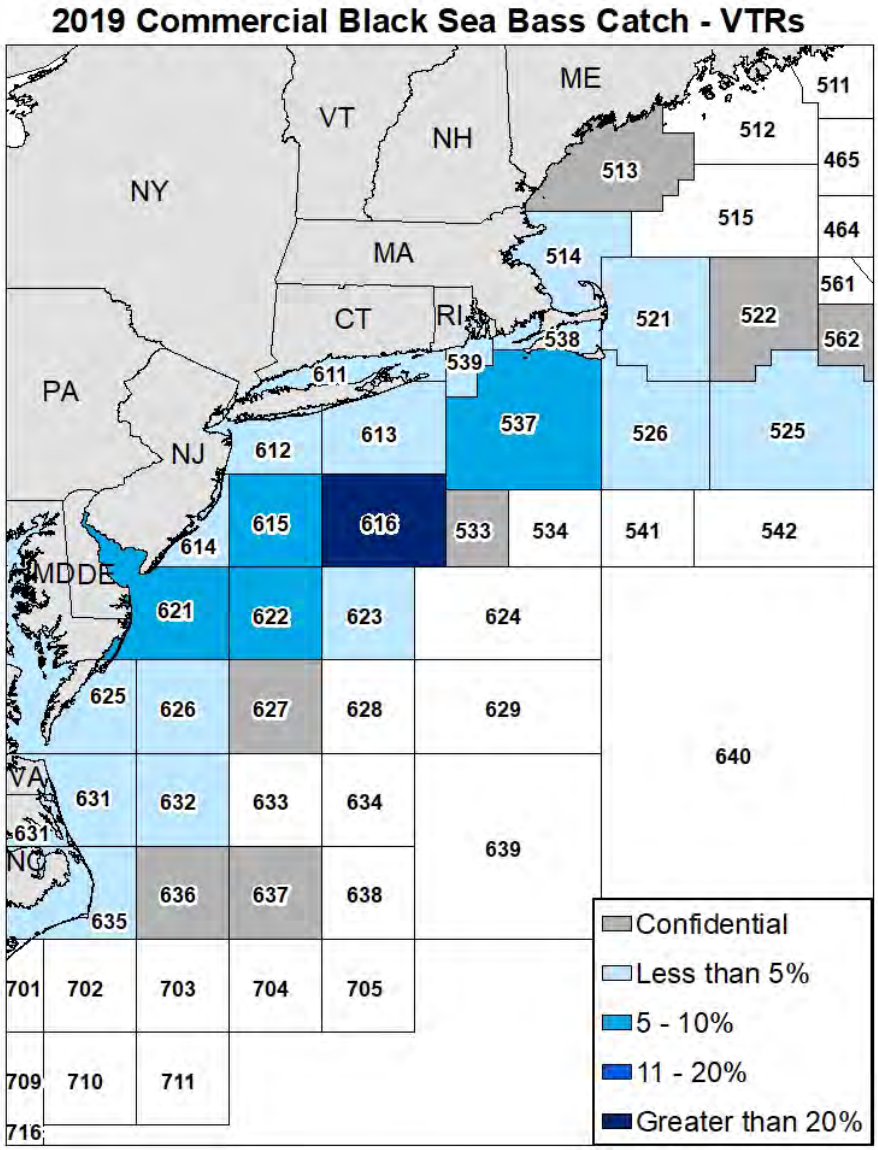


Figure 23. Proportion of black sea bass catch by statistical area in 2019 based on federal VTR data. Statistical areas marked "confidential" are associated with fewer than three vessels and/or dealers. Statistical areas with confidential data collectively accounted for less than 1% of commercial catch reported on VTRs in 2019. The amount of catch that was not reported on federal VTRs (e.g., catch from vessels permitted to fish only in state waters) is unknown. Northeast Fisheries Science Center Data ("AA tables") suggest that 20% of total commercial landings (state and federal) in 2019 were not associated with a statistical area reported on federal VTRs.

Black Sea Bass Recreational Fishery

Black sea bass are also an important recreational species in the Mid-Atlantic. Much of the annual fishing effort occurs during the period that sea bass are inshore (May to September), but season duration varies among the states. In 2018, recreational harvest estimates from MRIP were recalibrated based on the new Fishing Effort Survey. In general the recalibration resulted

Table 18). From 2010-2019, an average of 84.1% of the harvest (in pounds) originated from private/rental boats, while party/charter boats and shore-based anglers accounted for an average of 1.9% and 14.0% of the harvest, respectively (Figure 24). Recreational dead discard estimates ranged from a low of 0.22 million pounds in 1989 to a high of 3.60 million pounds in 2017. Recreational dead discards averaged 14% of total catch from 2010 to 2019

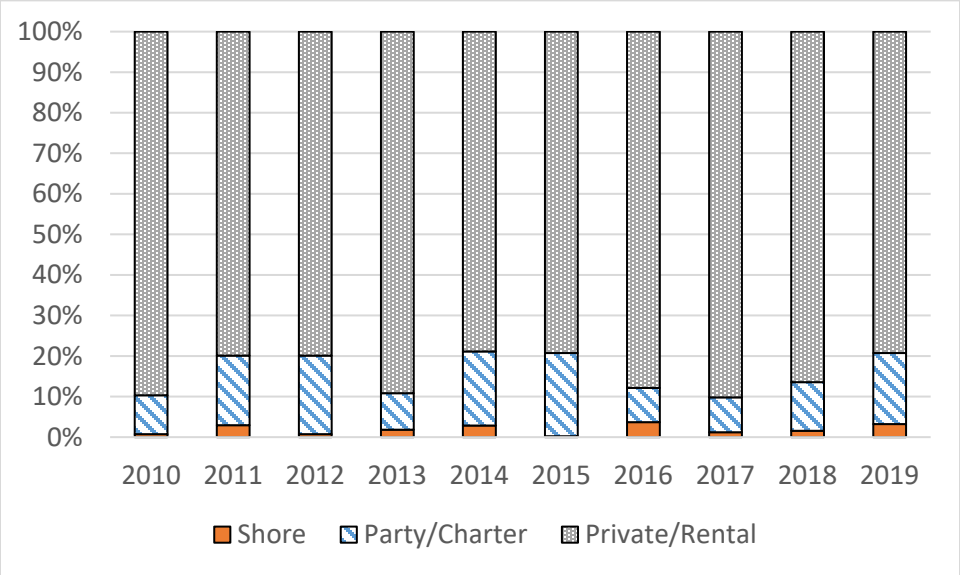


Figure 24. The percent of black sea bass harvested by recreational fishing mode in numbers of fish, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, May 12, 2020

Table 18. Recreational black sea bass landings, catch, and mean weight of landed fish, Maine through North Carolina, 1981-2019. Source: MRIP

Year	Catch (number of fish)	Landings (number of fish)	Landings (lbs)	Mean weight of landed fish (lb)
1981	10,302,297	3,431,735	2,101,224	0.61
1982	13,387,625	11,172,192	10,614,787	0.95
1983	9,782,212	5,852,690	5,136,992	0.88
1984	5,666,970	3,223,548	2,378,035	0.74
1985	10,827,931	5,556,972	4,180,036	0.75
1986	30,233,919	19,672,311	11,191,393	0.57
1987	6,415,842	3,084,164	2,177,825	0.71
1988	11,148,291	3,957,287	3,824,173	0.97
1989	12,568,892	7,264,555	5,770,697	0.79
1990	15,044,918	5,563,473	4,240,333	0.76
1991	16,014,778	6,420,550	5,007,585	0.78
1992	12,671,353	5,077,594	4,033,773	0.79
1993	13,081,089	7,439,497	5,881,426	0.79
1994	11,945,280	4,513,083	4,059,122	0.90
1995	19,991,850	7,101,638	5,435,419	0.77
1996	14,681,726	7,443,460	8,184,951	1.10
1997	16,631,810	6,826,489	6,563,226	0.96
1998	9,596,727	1,768,093	1,925,754	1.09
1999	15,506,801	1,719,090	2,220,080	1.29
2000	27,439,329	4,579,718	5,020,838	1.10
2001	22,514,133	4,631,814	6,645,254	1.43
2002	25,876,540	4,718,719	5,856,317	1.24
2003	19,463,038	4,383,299	5,970,617	1.36
2004	15,264,498	2,893,098	3,596,833	1.24
2005	14,770,461	2,347,314	3,653,133	1.56
2006	15,031,996	1,968,384	2,911,422	1.48
2007	16,059,303	2,272,546	3,582,800	1.58
2008	24,912,855	2,535,234	3,678,813	1.45
2009	24,409,019	4,065,964	5,857,509	1.44
2010	28,603,690	5,269,060	8,280,833	1.57
2011	14,883,578	1,889,204	3,422,046	1.81
2012	39,318,647	3,820,688	7,260,011	1.90
2013	28,744,942	3,095,095	5,791,445	1.87
2014	29,149,400	4,306,700	7,803,267	1.81
2015	29,314,181	5,258,234	9,505,659	1.81
2016	41,417,483	6,034,786	12,349,074	2.05
2017	47,525,605	5,997,390	12,007,504	2.00
2018	27,197,564	4,072,017	8,027,770	1.97
2019	35,113,323	4,523,214	8,821,559	1.95

In 2019, 62% of black sea bass harvested by recreational fishermen (in numbers of fish) were caught in state waters and about 38% in federal waters (Figure 25). Most of the recreational harvest in 2019 was landed in New York (34.9%), New Jersey (18.4%), Massachusetts (11.6%), Rhode Island (11.4%), and Connecticut (11.4%; Table 19).

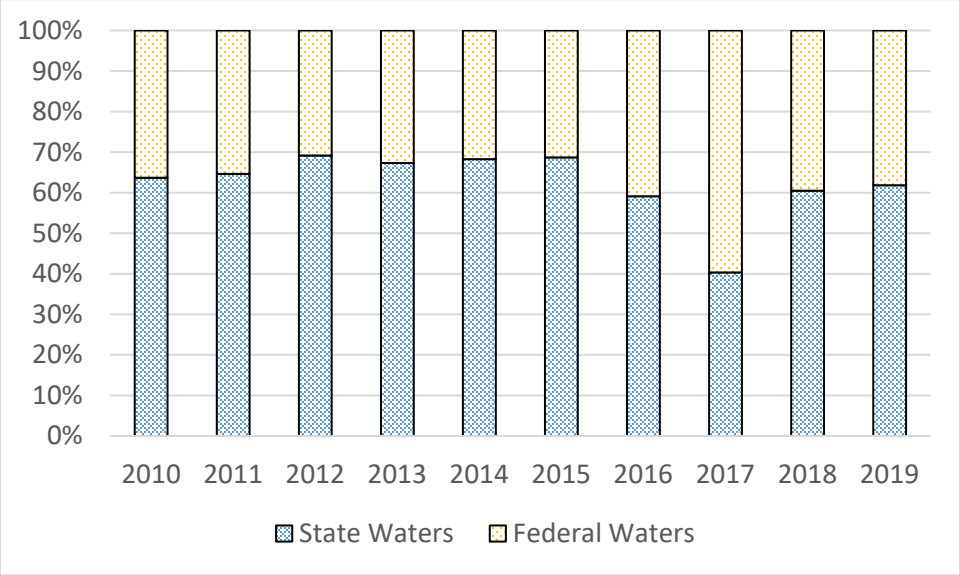


Figure 25. Estimated percentage of black sea bass recreational landings (numbers of fish) in state vs. federal waters, Maine through North Carolina, 2010-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

Table 19. State contribution (as a percentage) to total recreational landings of black sea bass (in numbers of fish), from Maine through North Carolina, 2017-2019. Source: Personal Communication with the National Marine Fisheries Service, Fisheries Statistics Division, November 19, 2020

State	2017	2018	2019	Avg 2017-2019
Maine	0.0%	0.0%	0.0%	0.0%
New Hampshire	0.0%	0.0%	0.0%	0.0%
Massachusetts	9.5%	16.7%	11.6%	12.6%
Rhode Island	5.5%	17.3%	11.4%	11.4%
Connecticut	8.2%	9.3%	11.4%	9.6%
New York	40.6%	21.0%	34.9%	32.1%
New Jersey	25.0%	25.5%	18.4%	23.0%
Delaware	1.9%	2.2%	1.0%	1.7%
Maryland	2.5%	3.8%	2.9%	3.0%
Virginia	1.6%	2.1%	5.1%	3.0%
North Carolina	5.3%	2.1%	3.4%	3.6%
Total	100.0%	100.0%	100.0%	100.0%

1.3.4 Interactions with Other Fisheries

Non-target species are those species caught incidentally while targeting other species, in this case, while targeting summer flounder, scup, or black sea bass. Some non-target species are occasionally retained, others are commonly discarded. This section describes the non-target species commonly caught in the commercial and recreational summer flounder, scup, and black sea bass fisheries and summarizes their management status and stock status.

Identification of Major Non-Target Species

It can be difficult to develop accurate quantitative estimates of catch of non-target species. The intended target species for any given tow or set is not always obvious. Fishermen may intend to target one or multiple species and the intended target species may change mid-trip. For example, the seasonal distributions of summer flounder, scup, and black sea bass are generally similar, and these species are often caught together. In some circumstances, scup can be a non-target species in the black sea bass fishery and vice versa. It is not always clear from the data which species is the primary target, which is a secondary target, and which species are not targeted but are landed if caught incidentally.

In addition, there are limitations to the data used to examine catch and discards (i.e., observer and VTR data). Observer data are available only for commercial fisheries and may not be representative of all fishing activity due to limited coverage and potential differences in behavior when observers are present. VTR data are available for commercial and for-hire fisheries. VTR data can be uncertain as they are based on the harvester's self-reported best estimates of catch, which are not intended to be precise measurements. MRIP is the only source of recreational catch and discard data for private recreational anglers participating in the summer flounder, scup, and black sea bass fisheries. For these reasons, a combination of quantitative and qualitative data were used here to identify relevant non-target species.

Northeast Fisheries Observer Program data from 2015-2019 were analyzed to identify species caught on observed commercial trips for which summer flounder, scup, or black sea bass made up at least 75% of the landings (by weight; a proxy for directed trips). Using this definition of a non-target species, the most common non-target species in the summer flounder fishery include little skate, spiny dogfish, clearnose skate, winter skate, Northern sea robin, barndoor skate, and black sea bass. The most common non-target species in the scup fishery include spiny dogfish, little skate, northern sea robin, black sea bass, and summer flounder. The most common non-target species in the black sea bass fishery include sea robins (striped, northern, and unknown), spiny dogfish, scup, and little skate. With the exception of spiny dogfish and striped sea robin, non-target species typically comprised a small portion (<10%) of the overall catch on these trips. All of these species, with the exception of the sea robins, are managed by the Mid-Atlantic or New England Fishery Management Councils and/or the Commission. Northern and striped sea robins are not managed.

A species guild approach was used to examine non-target species interactions in the recreational summer flounder, scup, and black sea bass fisheries from Maine through Virginia. This analysis identified species that were caught together on 5% or more of recreational trips.

Sea robins, black sea bass, and bluefish were highly correlated with summer flounder in the recreational fishery (J. Brust, personal communication January 2018). Black sea bass, sea robins, tautog, cunner, bluefish, summer flounder, and smooth dogfish were highly correlated with recreational scup catch (J. Brust, personal communication April 2019). Scup, summer flounder, sea robins, Atlantic croaker, and tautog where highly correlated with black sea bass recreational catch (NEFSC 2017).

Description and Status of Major Non-Target Species
The stock status and management status of the non-target species identified above are briefly described below. Management measures for the Mid-Atlantic and New England Fishery Management Council-managed species (skates, spiny dogfish, black sea bass, and scup) include Accountability Measures (AMs) to address Annual Catch Limit (ACL) overages through reductions in landings limits in following years. AMs for all of these species take discards into account and help to mitigate negative impacts from discards in these and other recreational fisheries. As indicated above, summer flounder, scup, and black sea bass are often caught together and, for some commercial and recreational trips, one or two of these species could be considered non-target species of the other. None of these three stocks are currently overfished or undergoing overfishing, and stock status is described in sections 1.2.1 through 1.2.3.

Spiny Dogfish
Spiny dogfish (*Squalus acanthias*) is a coastal shark with populations on the continental shelves of northern and southern temperate zones throughout the world. It is the most common shark in the western north Atlantic and ranges from Labrador to Florida, but it is found in greatest abundance from Nova Scotia to Cape Hatteras, North Carolina. Its major migrations on the northwest Atlantic shelf are north and south, but it also migrates inshore and offshore seasonally in response to changes in water temperature. Spiny dogfish are jointly managed by the MAFMC and the NEFMC; the Commission also has a complementary FMP for state waters.

Spiny dogfish have a long life, late maturation, a long gestation period, and relatively low fecundity, making them generally vulnerable to depletion. Fish, squid, and ctenophores dominate the stomach contents of spiny dogfish collected during the NEFSC bottom trawl surveys but they are opportunistic and have been found to consume a wide variety of prey. More detailed life history information can be found in the EFH source document for spiny dogfish at: http://www.nefsc.noaa.gov/publications/tm/tm203/tm203.pdf. The 2018 Stock Assessment Update indicates the population is not overfished nor experiencing overfishing. The spawning stock biomass estimate of 235 million pounds is above the SSB threshold of 175 million pounds, while the fishing mortality estimate (0.202) is just below the fishing mortality threshold (0.2439). Despite remaining above the threshold, biomass has declined in recent years, requiring a significant reduction in 2019-2020 to ensure that overfishing does not occur (NEFSC 2018).

Smooth Dogfish
Smooth dogfish are jointly managed by the Commission as a part of the Atlantic Coastal Sharks management plan and NOAA Fisheries as a part of the Atlantic Shark Highly Migratory Species

management plan. According to the most recent assessment, the stock is not overfished and overfishing is not occurring (SEDAR 2015).

Northeast Skate

The Northeast skate complex includes seven skate species: *Leucoraja ocellata* (winter skate); *Dipturis laevis* (barndoor skate); *Amblyraja radiata* (thorny skate); *Malacoraja senta* (smooth skate); *Leucoraja erinacea* (little skate); *Raja eglanteria* (clearnose skate); and *Leucoraja garmani* (rosette skate). Little skates are the main skate species identified as non-target species in the scup and black sea bass fisheries. Skate are mostly harvested incidentally in trawl and gillnet fisheries targeting groundfish, monkfish, and scallops. The fishing mortality reference points for skates are based on changes in biomass indices from the NEFSC bottom trawl survey. If the three-year moving average of the survey biomass index for a skate species declines by more than the average CV of the survey time series, then fishing mortality is assumed to be greater than FMSY and it is concluded that overfishing is occurring (NEFMC 2018). None of the skate species identified as non-target species in the commercial scup and black sea bass fisheries (i.e., little, clearnose, barndoor, and winter skates) are overfished or experiencing overfishing (NEFMC 2018).

Northern Sea Robin

Northern sea robins *(Prionotus carolinus)* and striped sea robins (*Prionotus evolans*) have not been assessed, therefore their stock status and overfishing status is unknown. Sea robins are not managed directly at the federal or state level. Northern sea robins are distributed from Nova Scotia to central Florida, and are most common between Cape Cod, MA and Cape Hatteras, NC. Sea robins typically inhabit coastal waters over open sand or mud from near shore to depths of about 170 meters, and undertake southerly/offshore migrations in the winter (Gilbert and Williams 2002).

Bluefish

Bluefish are jointly managed by the MAFMC and the Commission. The most recent operational assessment results indicated that the bluefish stock was overfished and overfishing was not occurring in 2018 relative to the biological reference points. Fishing mortality on the fully selected age 2 fish was 0.146 in 2018, 80% of the updated fishing mortality threshold reference point FMSY proxy = F35% = 0.183. There is a 90% probability that the fishing mortality rate in 2018 was between 0.119 and 0.205 (NEFSC 2019b).

Atlantic Croaker

Atlantic croaker are managed by the Commission. The latest stock assessment was not endorsed by an independent panel of fisheries scientists for management use; however, the panel agreed with the general results of the assessment. The panel recommended continued use of the annual "traffic light analysis" (TLA) established in 2014 to monitor fishery and resource trends, and implement management measures as needed. This analysis assigns a color (red, yellow, or green) to categorize relative levels of indicators of the condition of the fish population (abundance metric) or fishery (harvest metric). For example, as harvest increases relative to its long-term mean, the proportion of green in a given year will increase and as harvest decreases, the amount of red in that year will increase. Under the Atlantic croaker FMP,

state-specific management action would be initiated when the proportion of red exceeds the specified thresholds (for both harvest and abundance) over three consecutive years. A key issue causing uncertainty in the assessment results was the disagreement between recent trends in harvest and fishery independent indices of abundance. Recent harvest numbers are declining while estimated abundance from fishery independent surveys is increasing in some regions. In 2020 the TLA harvest and overall abundance composite's sustained downward trend triggered a management response in the northern Atlantic region (ASMFC 2017; ASMFC 2020).

Tautog

Tautog are managed by the Commission. The latest assessment (ASMFC 2016) assessed four regions (Massachusetts/Rhode Island, Long Island Sound, New Jersey/New York Bight, and Delaware/Maryland/Virginia) using landings and index data through 2015.

Cunner

Ranging along the Atlantic coast and offshore banks of North America, cunner are regular residents from Newfoundland to New Jersey and are occasionally found as far south as the mouth of the Chesapeake Bay. Recreational anglers most often catch cunner around piers, rock jetties and eel grass beds. Cunner are not currently managed and have not been assessed, therefore their stock status and overfishing status is unknown.

1.3.5 Catch vs. Landings-Based Allocations

This section provides additional clarification on the differences between catch and landings-based allocations. These allocations are used to derive a set of required annual catch and landings limits for both sectors, including commercial and recreational annual catch limits and annual catch targets (ACLs and ACTs[6], which both account for landings and dead discards), and landings limits (commercial quota and RHL, both of which only account for landings). The same types of catch and landings limits are all required under both catch and landings-based allocations. These limits are calculated through the annual specifications process. The commercial/recreational allocations are not used in other parts of the management process; they are only used in the specifications process to derive the sector-specific catch and landings limits.

In both cases, all catch and landings limits are derived from the overall ABC, which applies to all dead catch and is set based on the best scientific information available. The main difference between catch and landings-based allocations is the step in the process at which the commercial/recreational allocation is applied and how dead discards are factored into the calculations.

A **catch-based** allocation distributes the total ABC (which accounts for both landings and dead discards) between the two sectors as commercial and recreational ACLs, based on the allocation percentages defined in the FMP (catch-based step 1 in the figures below). Dead discards are then estimated for each sector and subtracted from the sector ACLs to derive the annual sector landings limits (commercial quota and RHL).

A **landings-based** allocation applies the allocation percentage defined in the FMP to only the portion of the ABC that is expected to be landed (landings-based steps 1 and 2 in the figures below). This requires first calculating the amount of expected dead discards from both sectors combined and subtracting that from the ABC (landings-based step 1), so that the allocation percentage can be applied to the total allowable landings (landings-based step 2). Dead discards are still projected for each sector and incorporated into the ACLs under a landings-based allocation, but the process is more complex due to the need to separate out total landings first to apply the allocation. This process evolved because management of summer flounder and black sea bass was previously based on landings limits only and did not consider dead discards. When dead discards were first incorporated into management, the allocation percentages continued to be applied to landings only and it was determined other methods were needed to split expected dead discards by sector.

As described in more detail below, in both cases, sector-specific dead discards are generally estimated based on recent trends in the fisheries. Therefore, **under a landings-based allocation, recent trends in dead discards in one sector have more of an impact on the catch and landings limits in the other sector. Under a catch-based allocation, the calculations of sector-specific catch and landings limits are more separate and recent trends in landings and dead discards in one sector have a lesser impact on the limits in the other sector**. This can have important implications due to sector-specific differences in factors such as how landings and discards are estimated, the factors influencing discards (e.g., regulations, market demand, catch and release practices), and discard mortality rates.

Under both allocation approaches, the commercial/recreational allocation percentages are fixed (until modified through an FMP action) and do not vary based on recent trends in the fisheries. They would be defined based on one of the alternatives listed in Section 4.0 of this document.

More details, including a description of the subsequent steps to arrive at the commercial quota and RHL are included below. Examples of the implications of each approach are included at the end of this section.

Projected Discards Under Both Allocation Approaches

For scup and summer flounder, the total amount of the ABC expected to come from dead discards can be projected using the stock assessment model. These projections account for variations in the size of different year classes (i.e., the fish spawned in a given year) and catch at age information from the commercial and recreational sectors. The current stock assessment model for black sea bass does not allow for these projections, so alternative methods such as recent year average proportions need to be used.

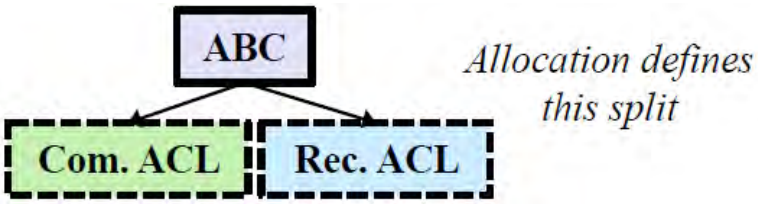
Regardless of the allocation approach, the methodology for calculating sector-specific dead discards (as opposed to total dead discards) is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.

Under both approaches, only **dead** discards are factored into the allocation percentages and the catch and landings limits calculations. Discarded fish which are presumed to survive do not factor into these calculations.

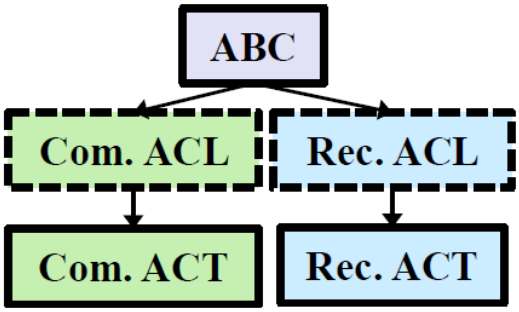
Catch-based Allocation Process

The proposed allocation percentage alternatives are listed in Section 4.1. Each alternative is then used in the specifications process as described below.

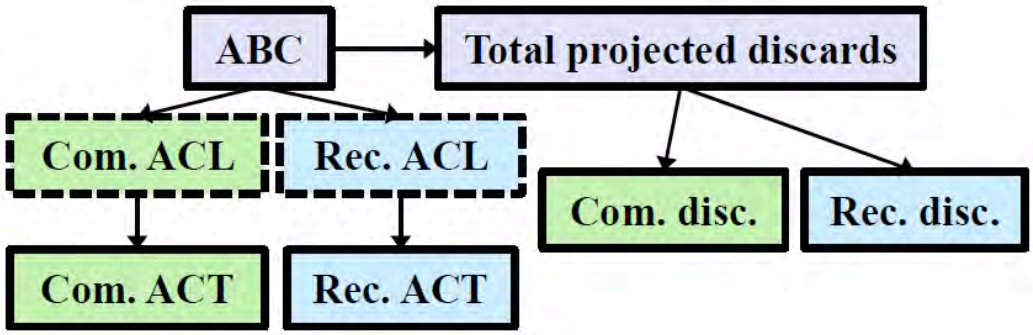
Catch-based Step 1. The ABC is divided into commercial and recreational ACLs based on the allocation percentages defined in the FMP.



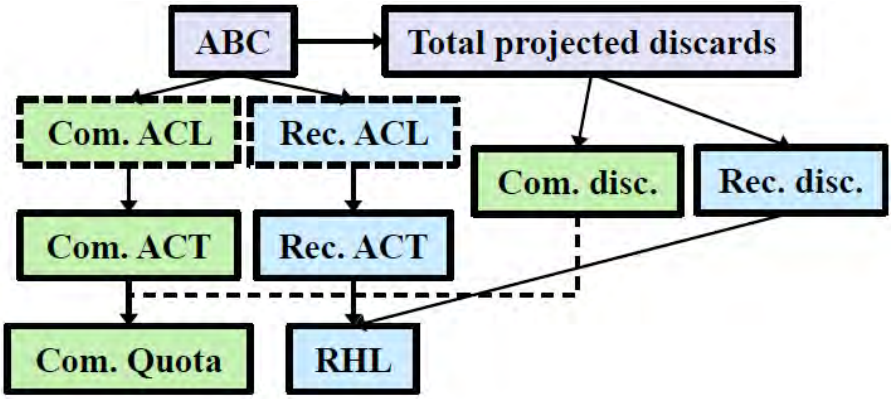
Catch-based Step 2. Commercial and recreational ACTs are set less than or equal to their respective ACLs to account for management uncertainty. The appropriate deduction for management uncertainty (if any) is not pre-defined and is based on annual considerations, including the advice of the Monitoring Committee.



Catch-based Step 3. Expected dead discards are calculated for each sector to derive the commercial quota and RHL from the sector-specific ACTs.



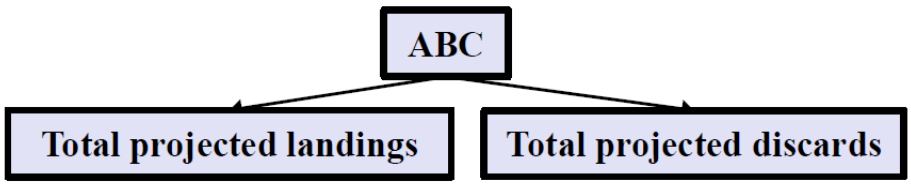
Catch-based Step 4. Commercial quotas and RHLs are determined by subtracting the sector-specific dead discards (see catch-based step 3) from the sector-specific ACTs.



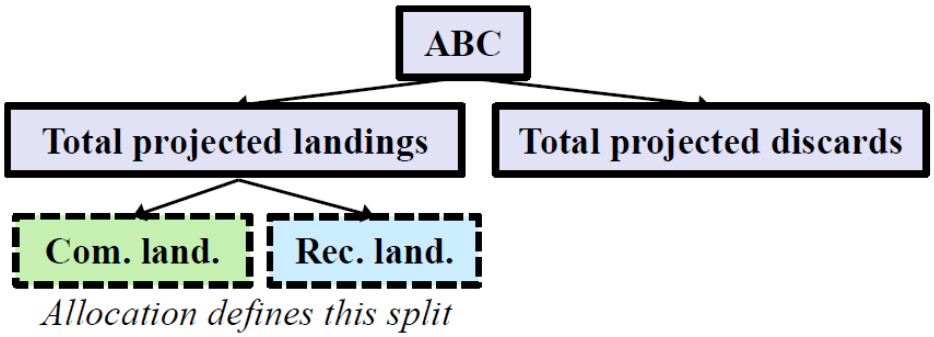
Landings-Based Allocation Process

Landings-based Step 1. The ABC is first divided into the amount expected to come from landings (total projected landings) and the amount expected to come from dead discards (total projected dead discards). The methodology for this calculation is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.

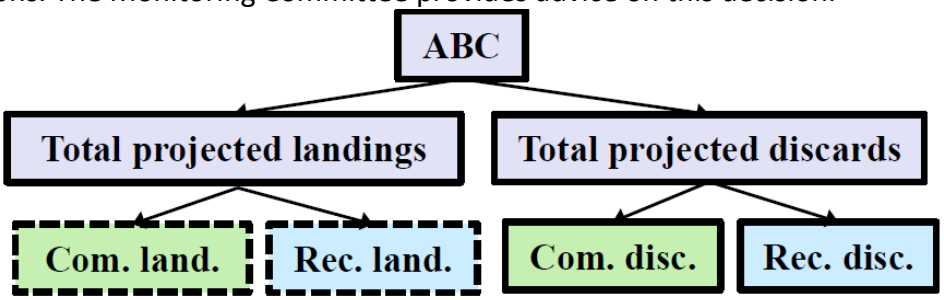
As previously stated, for scup and summer flounder, these calculations can be informed by stock assessment projections. The current black sea bass stock assessment does not model landings and dead discards separately; therefore, calculations of total projected landings and dead discards for black sea bass cannot be informed by stock assessment projections. Instead, other methods, such as those based on recent year average proportions, must be used.



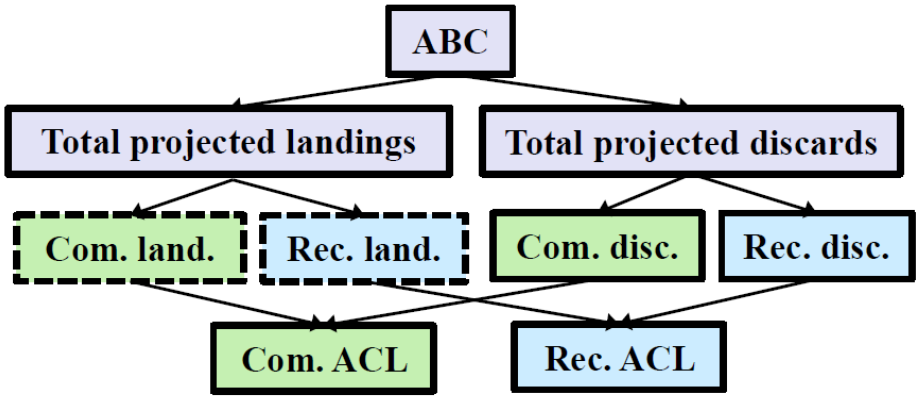
Landings-based Step 2. The total projected landings are allocated to the commercial and recreational sectors based on the allocation percentages defined in the FMP.



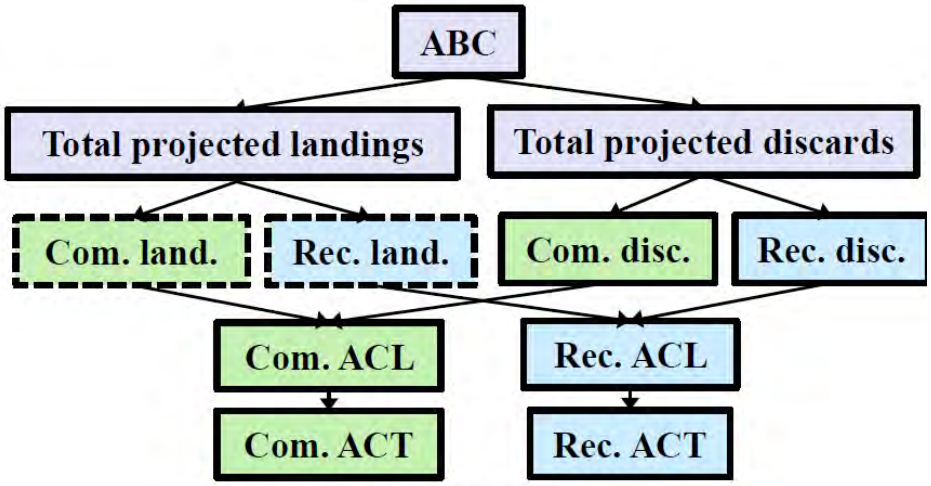
Landings-based Step 3. The total projected dead discards are split into projected commercial dead discards and projected recreational dead discards. The methodology for calculating sector-specific dead discards is not defined in the FMP and can vary based on annual considerations. The Monitoring Committee provides advice on this decision.



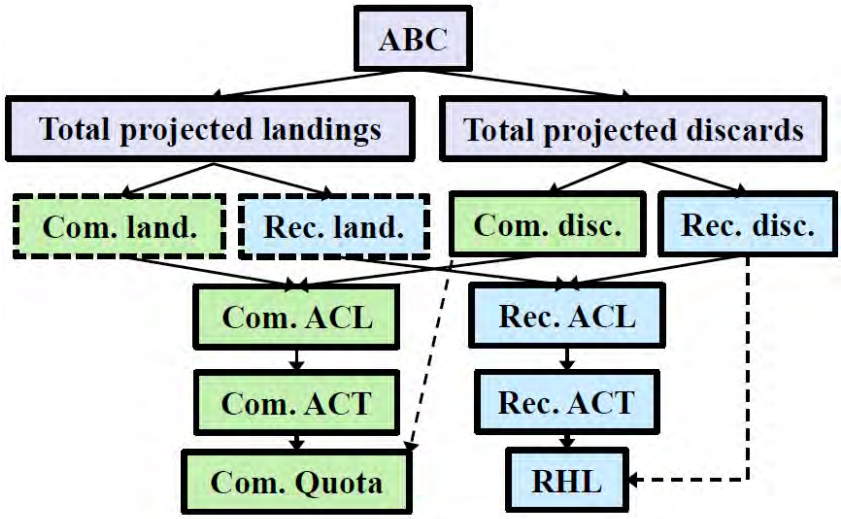
Landings-based Step 4. Commercial and recreational ACLs are calculated by adding the landings amount allocated to each sector and the sector-specific projected dead discards (see Steps 2 and 3 above).



Landings-based Step 5. Commercial and recreational ACTs are set less than or equal to their respective ACLs to account for management uncertainty. The appropriate deduction for management uncertainty (if any) is not pre-defined and is based on annual considerations, including the advice of the Monitoring Committee.



Landings-based Step 6. Commercial quotas and RHLs are determined by subtracting sector-specific discards from the sector-specific ACTs.



Implications of Catch vs. Landings-Based Allocation Approaches

One of the major differences between catch-based and landings-based allocations is at which step in the process the commercial/recreational allocation is applied to derive catch and landings limits. Under a catch-based allocation, the commercial/recreational allocation is applied in the first step of the process after the ABC is determined. Under a landings-based allocation, decisions about the total amount of expected landings and dead discards must be made before the commercial/ recreational allocation is applied. The commercial/recreational allocation is then applied to the total amount of expected landings (Figure 26).

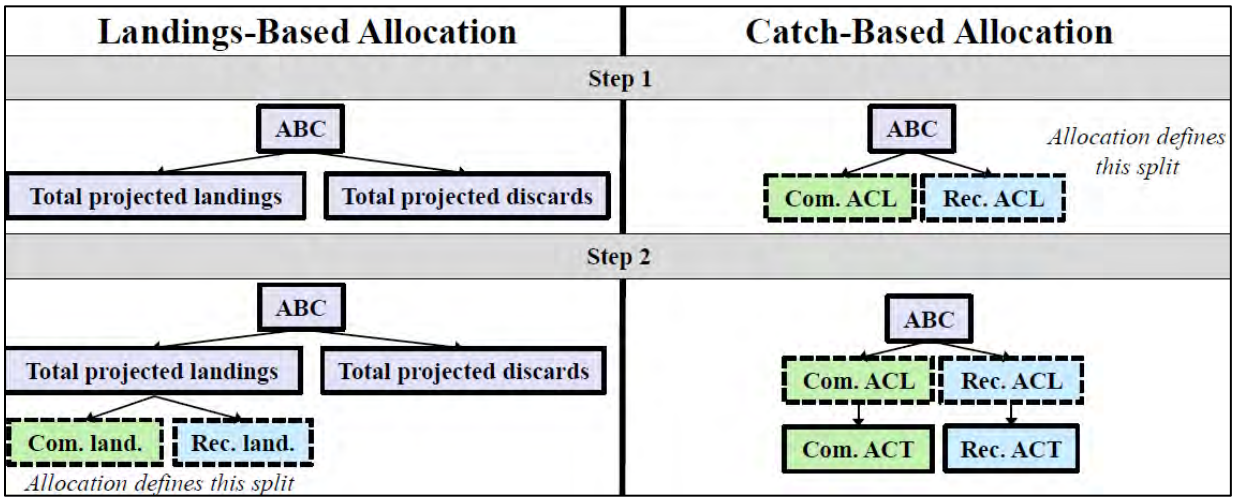


Figure 26. Comparison of first two steps of calculating commercial and recreational catch and landings limits under catch and landings-based allocations.

The method for determining total expected landings and dead discards under a landings-based approach is not specified in the FMP and can vary based on annual considerations. In practice, this typically involves consideration of stock assessment projections and/or recent trends in landings and dead discards, depending on the species. In this way, considerations of recent trends in the stock and discard trends in either the commercial or recreational fishery impacts both sector's catch and landings limit under a landings-based allocation to a greater extent than under a catch-based allocation.

Under a catch-based allocation, the total ABC is always allocated among the commercial and recreational sectors in the same way (i.e., based on the allocation percentages defined in the FMP) regardless of recent trends in year classes or landings and dead discards in each sector. Put another way, under a catch-based allocation, changes in landings and dead discards in one sector do not influence the other sector's ACL as the entire ABC is always split among the sectors based on the allocation defined in the FMP, regardless of recent trends in landings and discards by sector. In theory, this can allow each sector to see the benefits of a reduction in their own dead discards to a greater extent than under a landings-based allocation. Under a catch-based allocation, a reduction in dead discards in one sector can result in an increase in that sector's landings limit in a future year. This was part of the rationale for implementing the current catch-based allocation for scup as it was expected to incentivize a reduction in commercial dead discards, which were of concern during development of Amendment 8. Under a landings-based allocation, changes in landings and dead discards in one sector can influence the catch and landings limits in both sectors; therefore, the benefits of a reduction in dead discards (or the negative impacts of an increase in dead discards) in one sector can also be felt by the other sector.

Although catch- and landings-based allocations may create different incentives for reducing dead discards in each sector, in reality, this may be a long-term impact. With the exception of the no action alternatives, all the proposed allocation alternatives are based on historical patterns in the fisheries considering the best available recreational and commercial data, either using the original base years or considering data through 2018 or 2019, depending on the alternative (Section 4.1). Therefore, the catch or landings-based allocations under many of the alternatives may not create an immediate notable incentive for change compared to recent operating conditions. Selection of catch versus landings-based allocations does have an immediate effect on each sector's landings limit. Appendix II presents a methodology for projecting landings limits under the catch- and landings-based allocation alternatives, and Section 4.1 compares recent trends in landings data to the projected landings limits under each allocation alternative.

1.4 HABITAT CONSIDERATIONS

1.4.1 Description of Physical Habitat

Summer flounder, scup, and black sea bass inhabit the northeast U.S. shelf ecosystem, which extends from the coast to the edge of the continental shelf from the Gulf of Maine through Cape Hatteras, including the slope sea offshore to the Gulf Stream. The northeast shelf ecosystem includes the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope (Figure 27).

The Gulf of Maine is a semi-enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, North Carolina.

The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

The continental shelf in this region was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet and the subsequent rise in sea level. Currents and waves have since modified this basic structure. Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth) at the shelf break. Numerous canyons incise the slope and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf; however, the Hudson Shelf Valley is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

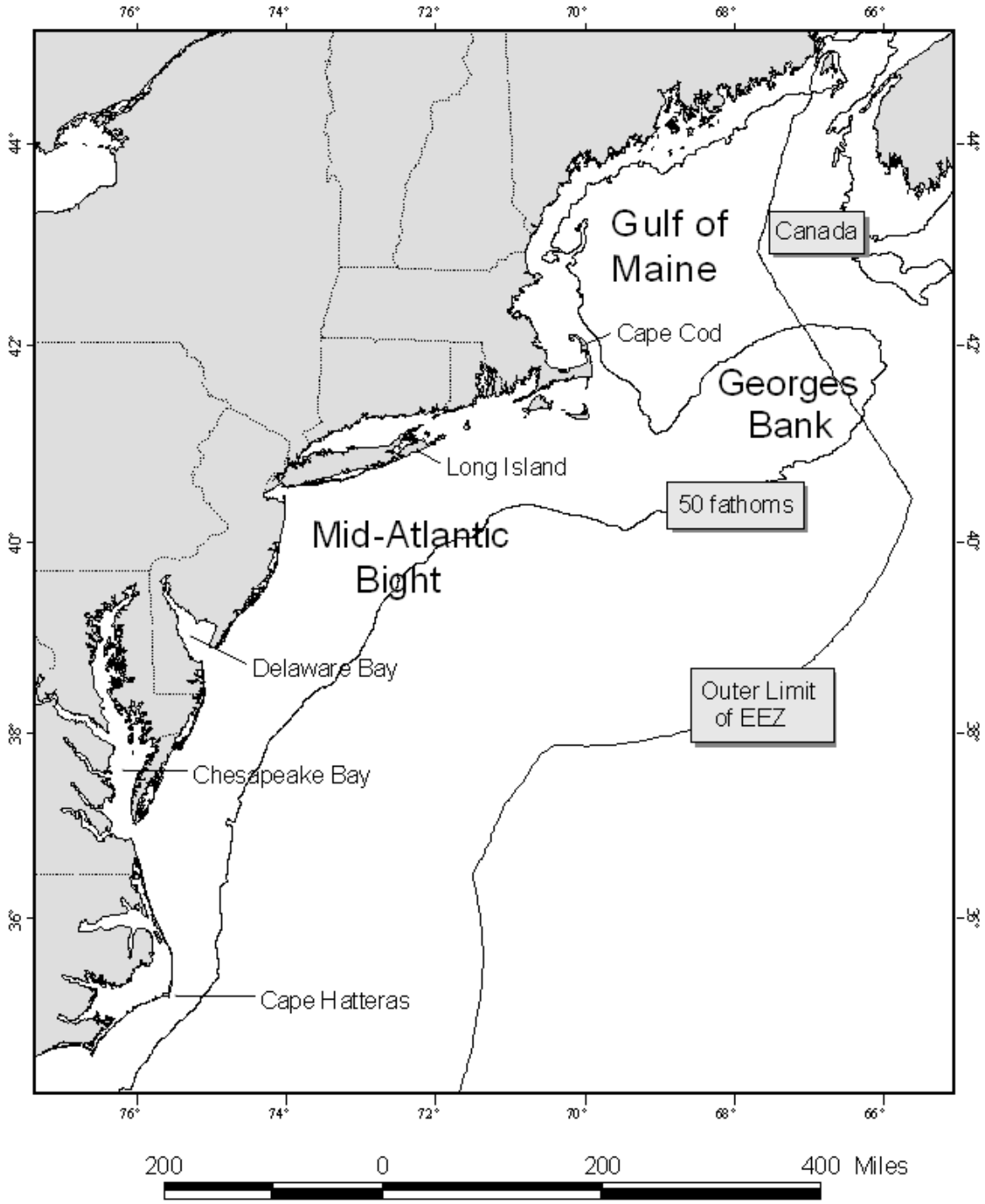


Figure 27. Northeast U.S. Shelf Ecosystem.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the less physically rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% fine on the slope. On the slope, silty sand, silt, and clay predominate (Stevenson et al. 2004).

Greene et al. (2010) identified and described Ecological Marine Units (EMUs) in New England and the Mid-Atlantic based on sediment type, seabed form (a combination of slope and relative depth)[4], and benthic organisms.[5] According to this classification scheme, the sediment

[4] Seabed form contains the categories of depression, mid flat, high flat, low slope, side slope, high slope, and steep slope.

[5] See Greene et al. 2010 for a description of the methodology used to define EMUs.

composition off New England and the Mid-Atlantic is about 68% sand, 26% gravel, and 6% silt/mud. The seafloor is classified as about 52% flat, 26% depression, 19% slope, and 3% steep.

Artificial reefs are another significant Mid-Atlantic habitat. These localized areas of hard structure were formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). While some of these materials were deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations, or may be behaviorally attracted to the reef structure.

Like all the world's oceans, the western North Atlantic is experiencing changes to the physical environment due to global climate change. These changes include warming temperatures; sea level rise; ocean acidification; changes in stream flow, ocean circulation, and sediment deposition; and increased frequency, intensity, and duration of extreme climate events. These changes in physical habitat can impact the metabolic rate and other biological processes of marine species. As such, these changes have implications for the distribution and productivity of many marine species. Several studies demonstrate that the distribution and productivity of several species in the Mid-Atlantic have changed over time, likely because of changes in physical habitat conditions such as temperature (e.g., Weinberg 2005, Lucey and Nye 2010, Nye et al. 2011, Pinsky et al. 2013, Gaichas et al. 2015).

1.4.2 Environmental Requirements of Summer Flounder, Scup, and Black Sea Bass

Summer Flounder

Summer flounder habitat includes pelagic waters, demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas from the Gulf of Maine through North Carolina. The center of its abundance lies within the Middle Atlantic Bight from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina. Summer flounder exhibit strong seasonal inshore-offshore movements, although their movements are often not as extensive as compared to other highly migratory species. Adult and juvenile summer flounder normally inhabit shallow coastal and estuarine waters during the warmer months of the year and remain offshore during the fall and winter.

Juvenile summer flounder have been shown to make use of several substrate types, including sand, shell, oyster bars, and mud, as well as transition areas between sand to silt/clay. Substrate preferences of juvenile summer flounder may be correlated to presence and types of predators and prey. Juveniles make extensive use of marsh creeks and other estuarine habitats. Other studies have shown that juvenile summer flounder also make use of vegetated habitats such as sea grass beds, as well as aggregations of macroalgae (Packer et al. 1999).

Adult summer flounder generally prefer sandy habitats, including areas of quartz sand, coarse sand, and shell, but can be found in a variety of habitats with both mud and sand substrates including marsh creeks, seagrass beds, and sand flats. As with juvenile summer flounder, adults are also known to utilize vegetation such as seagrass beds, where they are able to ambush prey and avoid predation (Packer et al. 1999).

Scup

Scup habitat includes estuaries, demersal waters, mixed sand and mud substrate, eelgrass beds, mussel flats and other reef structures. Adult and juvenile scup habitat preference is highly dependent on season. During the warmer months, scup exhibit a strong preference for mixed sand and mud sediments (Gottschall et a. 2000), whereas the presence of structure can be important to scup in offshore, deeper habitat during the winter Auster *et al.* (1991, 1995). Scup spawn once a year along the inner continental shelf beginning in the spring during the inshore migration (Kendall 1973). Most spawning occurs over sandy and weed-covered bottom in southern New England from Massachusetts Bay south to the New York Bight, including eastern Long Island Sound, Peconic and Gardiners Bays, and Raritan Bay (Bigelow and Schroeder 1953; Wheatland 1956; Richards 1959; Finkelstein 1969; Sisson 1974; Morse 1978; Clayton *et al.* 1978).

During warmer months, juvenile scup live inshore in a variety of coastal habitats and can dominate the overall fish population in larger estuarine areas during that time of year. Juvenile scup may be found over a variety of substrates, but are most abundant over unstructured bottom and in depths ranging from 3 to 5 m (Able and Fahay 2010). Studies have shown that juveniles make use of biogenic depressions in the sediments off southern New England in the fall, and can use biogenic depressions, sand wave troughs, and possibly mollusk shell fields for shelter in winter Gray (1990) and Auster *et al.* (1991, 1995).

Adult scup prefer habitats that are similar to those used by juveniles and include soft, sandy bottoms, on or near structures such as rocky ledges, wrecks, artificial reefs, and mussel beds in euryhaline areas (Briggs 1975a; Eklund 1988; MAFMC 1996). Adults collected in the fall NEFSC trawl survey (1963-1997) were most commonly caught at about the same depth and water temperatures as juveniles. However, during migration, scup tend to school by size. (Neville and Talbot 1964; Sisson 1974; Morse 1978).

Black Sea Bass

Black sea bass habitat includes pelagic waters, demersal waters, and structured habitats (rocky reefs, cobble/rock fields, stony coral, and sponge patches) and polyhaline regions of many estuaries (Drohan et al. 2005). The Mid-Atlantic black sea bass stock extends from Cape Hatteras to the Gulf of Maine. In the Mid-Atlantic Bight, juvenile and adult black sea bass migrate from nearshore continental shelf habitats to outer shelf over-wintering areas as bottom temperatures decline in the fall. The center of biomass of black sea bass in the spring when fish are offshore has moved northward by about 150-200 km between 1972 and 2008 (Bell et al. 2015).

Juveniles are relatively common in estuaries south of Cape Cod. Within estuaries, young fish use shallow shellfish, sponge, amphipod, seagrass beds, and cobble habitats as well as manmade structures such as wharves, pilings, wrecks, reefs, crab and conch pots (Drohan et al. 2005). Young juveniles are rare on unvegetated sandy intertidal flats and beaches (Allen et al. 1978) as well as deeper, muddy bottoms (Richards 1963). Juvenile black sea bass also demonstrate a high degree of habitat fidelity during the summer and fall months in estuaries (Able and Hales 1997).

Adult black sea bass appear to remain near complex structures during day, and move to adjacent soft-bottom habitats to feed at night (Steimle and Figley 1996). Primary summer habitats on the nearshore shelf are <60 m deep, but adults may also occupy complex habitats in the lower reaches of large estuaries (~5 m depth). Temperature seems to be especially important components of black sea bass habitat during winter months. At temperatures near 6°C adults become inactive and rest in holes and crevices (Adams 1993). They are also known to burrow into soft sediments during especially cold winters off NC/SC coast (Parker 1990).

1.4.3 Identification and Distribution of Essential Habitat

EFH for summer flounder, scup, and black sea bass was designated through Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass FMP (MAFMC 1998). EFH designations for each life stage for all three species are described below and pictured in Figures Figure **28**, Figure 29, and Figure 30.

Summer Flounder

Eggs: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of the all the ranked ten-minute squares for the area where summer flounder eggs are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral, Florida, to depths of 360 ft. In general, summer flounder eggs are found between October and May, being most abundant between Cape Cod and Cape Hatteras, with the heaviest concentrations within 9 miles of shore off New Jersey and New York. Eggs are most commonly collected at depths of 30 to 360 ft.

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where summer flounder larvae are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the nearshore waters of the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral Florida, in nearshore waters (out to 50 miles from shore). 3) Inshore, EFH is all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database, in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones. In general, summer flounder larvae are most abundant nearshore (12-50 miles from shore) at depths between 30 and 230 ft. They are most frequently found in the

northern part of the Mid-Atlantic Bight from September to February, and in the southern part from November to May.

Juveniles: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where juvenile summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is all of the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database for the "mixing" and "seawater" salinity zones. In general, juveniles use several estuarine habitats as nursery areas, including salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37 ^{o}F and salinities from 10 to 30 ppt range.

Adults: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where adult summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is the estuaries where summer flounder were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally summer flounder inhabit shallow coastal and estuarine waters during warmer months and move offshore on the outer Continental Shelf at depths of 500 ft in colder months.

<u>Scup</u>

Eggs: EFH is estuaries where scup eggs were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55 and 73 °F and in salinities greater than 15 ppt.

Larvae: EFH is estuaries where scup were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general scup larvae are most abundant nearshore from May through September, in waters between 55 and 73 °F and in salinities greater than 15 ppt.

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where juvenile scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel

and eelgrass bed type substrates and in water temperatures greater than 45 °F and salinities greater than 15 ppt.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45 °F.

Black Sea Bass

Eggs: EFH is the estuaries where black sea bass eggs were identified in the ELMR database as common, abundant, or highly abundant for the "mixing" and "seawater" salinity zones. Generally, black sea bass eggs are found from May through October on the Continental Shelf, from southern New England to North Carolina.

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all ranked ten-minute squares of the area where black sea bass larvae are collected in the MARMAP survey. 2) EFH also is estuaries where black sea bass were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, the habitats for the transforming (to juveniles) larvae are near the coastal areas and into marine parts of estuaries between Virginia and New York. When larvae become demersal, they are generally found on structured inshore habitat such as sponge beds.

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked squares of the area where juvenile black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juveniles are found in the estuaries in the summer and spring. Generally, juvenile black sea bass are found in waters warmer than 43 °F with salinities greater than 18 pp and coastal areas between Virginia and Massachusetts, but winter offshore from New Jersey and south. Juvenile black sea bass are usually found in association with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas; offshore clam beds and shell patches may also be used during the wintering.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where adult black sea bass were identified as being common, abundant, or highly abundant in the ELMR database for the

"mixing" and “seawater" salinity zones. Black sea bass are generally found in estuaries from May through October. Wintering adults (November through April) are generally offshore, south of New York to North Carolina. Temperatures above 43 °F seem to be the minimum requirements. Structured habitats (natural and man-made), sand and shell are usually the substrate preference.

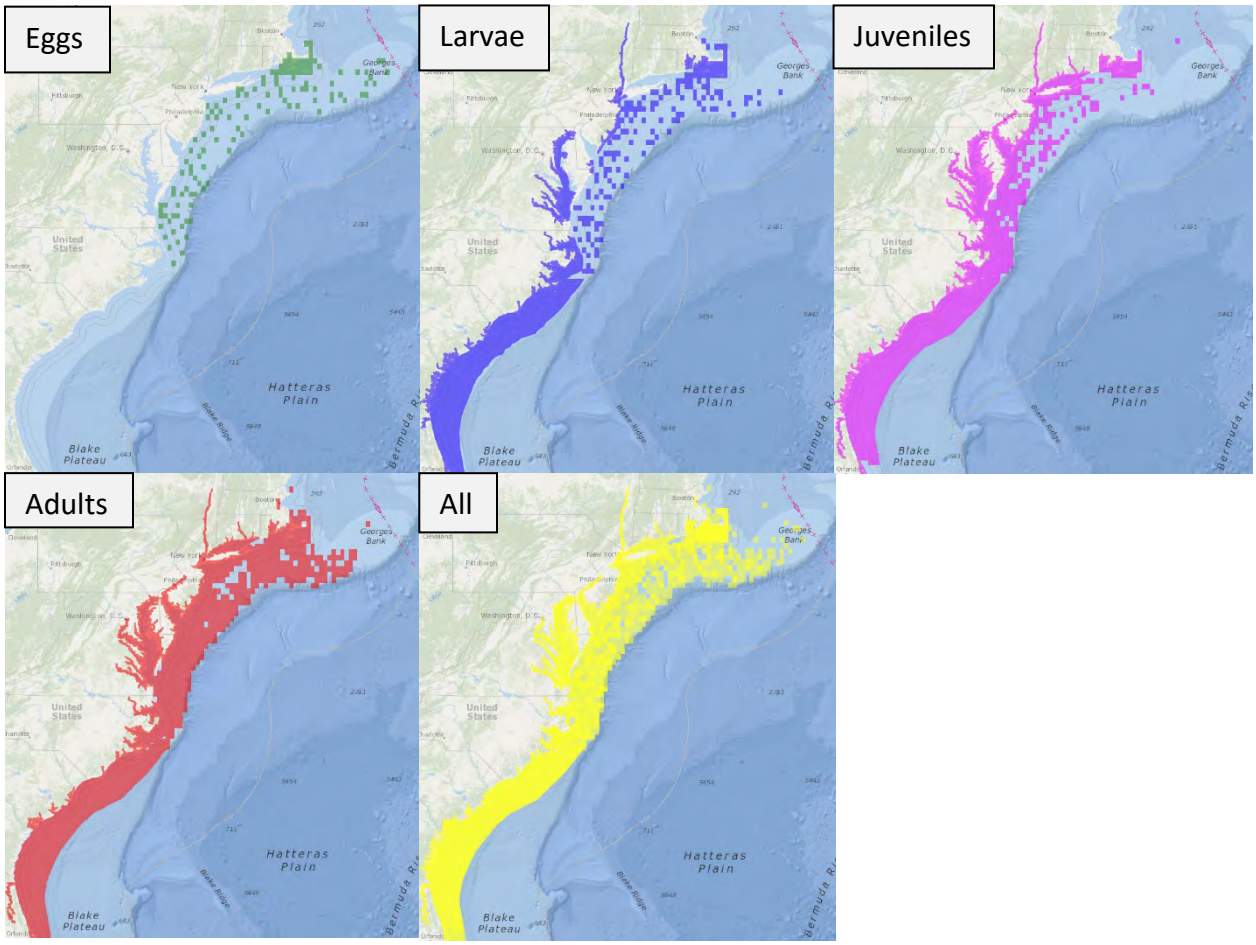


Figure 28. Designated EFH for summer flounder at various life stages. Image source: NOAA Office of Habitat Conservation EFH Mapper.

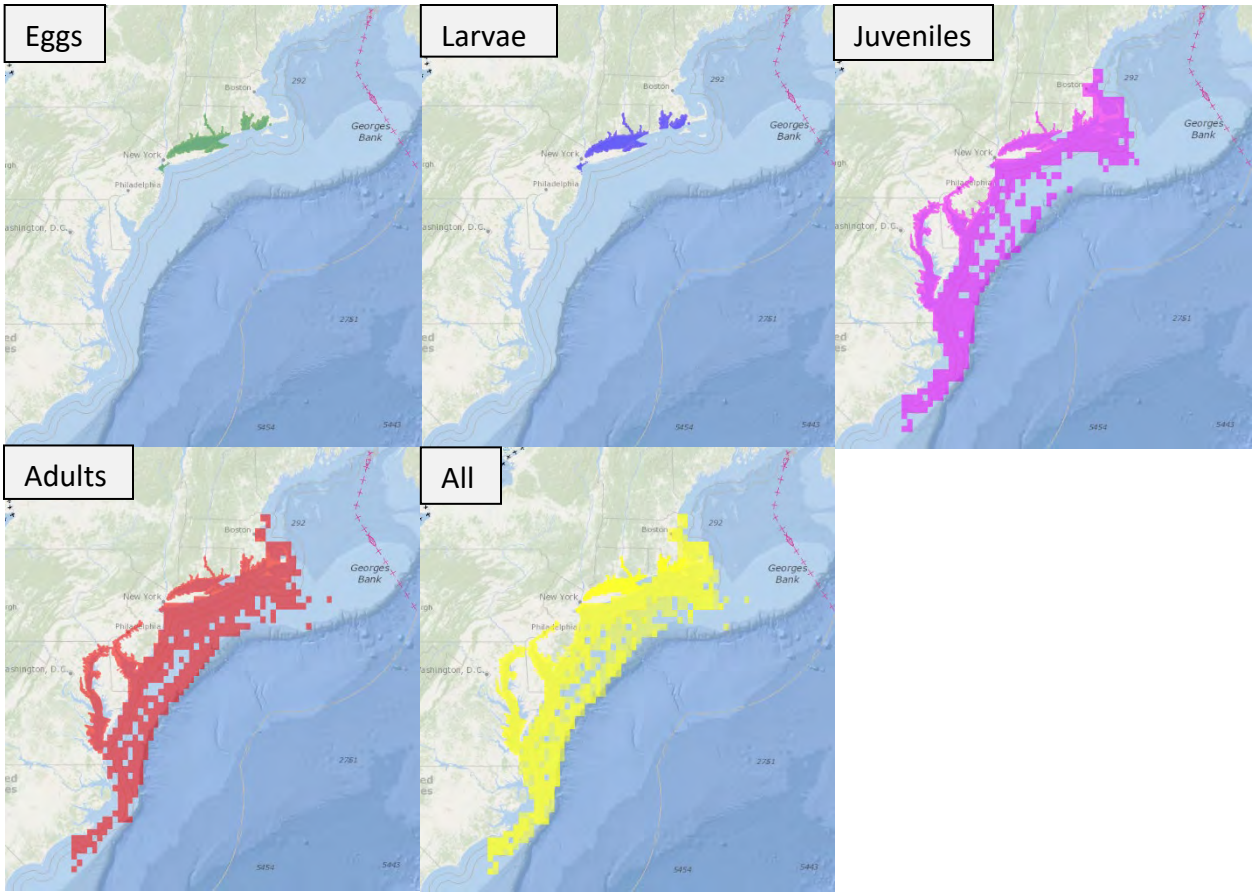


Figure 29. Designated EFH for scup at various life stages. Image source: NOAA Office of Habitat Conservation EFH Mapper.

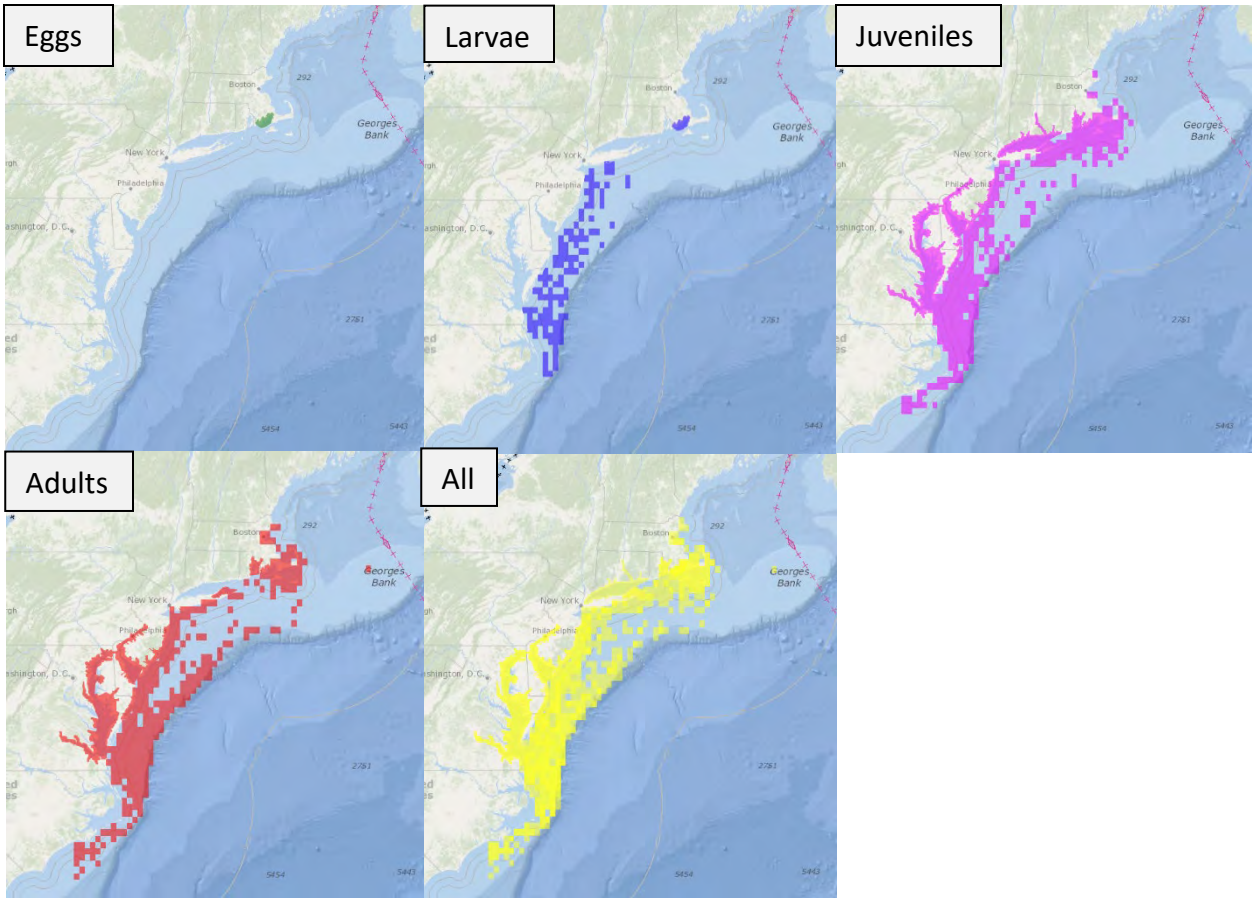


Figure 30. Designated EFH for black sea bass at various life stages. Image source: NOAA Office of Habitat Conservation EFH Mapper.

1.4.4 Anthropogenic Impacts on Summer Flounder, Scup, and Black Sea Bass and Their Habitat

Only those gear types which contact the bottom impact physical habitat. The actions proposed in this document are relevant to both the commercial and recreational summer flounder, scup, and black sea bass fisheries. The recreational fisheries for all three species are almost exclusively hook and line fisheries. Recreational hook and line gears generally have minimal impacts on physical habitat and EFH in this region (Stevenson et al. 2004). Weighted hook and line gear can contact the bottom, but the magnitude and footprint of any impacts resulting from this contact is likely minimal. Thus, the recreational fisheries are expected to have very minor or no impacts on habitat.

The commercial fisheries for all three species are primarily prosecuted with bottom trawl gear. Within the dealer data, from 2014-2019, otter trawls accounted for about 90% of all summer flounder commercial landings, 82% of scup landings and 57% of black sea bass commercial landings. Black sea bass had a higher proportion of landings from pot and trap gear, estimated at 23% from 2015-2019, and 11% from handlines (Table 20).

Table 20. Percent of reported commercial scup and black sea bass landings taken by gear category from 2015-2019 based on dealer data.

Dealer Data (2015-2019)	Summer flounder	Scup	Black Sea Bass
BOTTOM TRAWL	90.3%	82.4%	57.0%
OTHER OR UKNOWN	5.2%	11.1%	8.3%
POT AND TRAP	0.2%	3.3%	23.0%
HANDLINE	2.9%	2.3%	11.0%
GILLNET	1.1%	1.0%	0.8%
SCALLOP DRED	0.3%	0.0%	0.0%

Stevenson et al. (2004) compiled a detailed summary of several studies on the impacts of a variety of gear types on marine habitats. Conclusions relevant for this action are briefly summarized below with a focus on bottom trawl gear since this is the predominant gear type used in commercial harvest of all three species.

Otter trawl doors can create furrows in sand, mud, and gravel/rocky substrates. Studies have found furrow depths that range from 2 to 10 cm. Bottom trawl gear can also re-suspend and disperse surface sediments and can smooth topographic features. It can also result in reduced abundance, and in some cases reduced diversity, of benthic species such as nematodes, polychaetes, and bivalves. It can also have short-term positive ecological impacts such as increased food value and increased chlorophyll production in surface sediments. The duration of these impacts varies by sediment type, depth, and frequency of the impact (e.g., a single trawl tow vs. repeated tows). Some studies documented effects that lasted only a few months. Other studies found effects that lasted up to 18 months. Impacts tend to have shorter durations in dynamic environments with less structured bottom composition compared to less dynamic environments with structured bottom. Shallower water, stronger bottom currents, more wave

action, finer-grained sediments, and higher frequencies of natural disturbance are characteristics that make environments more dynamic (Stevenson et al. 2004).

Compared to otter trawls and dredges, Stevenson et al. (2004) summarized fewer studies on other bottom tending gears such as traps. Morgan and Chuenpagdee (2003) found that the impacts of bottom gill nets, traps, and longlines were generally limited to warm or shallow-water environments with rooted aquatic vegetation or "live bottom" environments (e.g., coral reefs). These impacts were of a lesser degree than those from bottom trawls and dredges. Eno et al. (2001) found that traps can bend, smother, and uproot sea pens in soft sediments; however, sea pen communities were largely able to recover within a few days of the impact.

1.4.5 Description of Programs to Protect, Restore, & Preserve Summer Flounder, Scup, and Black Sea Bass

The Mid-Atlantic Council developed some fishery management actions with the sole intent of protecting marine habitats. For example, in Amendment 9 to the Mackerel, Squid, and Butterfish FMP, the Council determined that bottom trawls used in Atlantic mackerel, longfin and *Illex* squid, and butterfish fisheries have the potential to adversely affect EFH for some federally-managed fisheries (MAFMC 2008). As a result of Amendment 9, closures to squid trawling were developed for portions of Lydonia and Oceanographer Canyons. Subsequent closures were implemented in these and Veatch and Norfolk Canyons to protect tilefish EFH by prohibiting all bottom trawling activity. In addition, Amendment 16 to the Mackerel, Squid, and Butterfish FMP prohibits the use of all bottom-tending gear in fifteen discrete zones and one broad zone where deep sea corals are known or highly likely to occur (81 Federal Register 90246, December 14, 2016).

Actions implemented in the Summer Flounder, Scup, and Black Sea Bass FMP that affected species with overlapping EFH were considered Amendment 13 (MAFMC 2002). The analysis in Amendment 13 indicated that no management measures were needed to minimize impacts to EFH because the trawl fisheries for summer flounder, scup, and black sea bass in federal waters are conducted primarily in high energy mobile sand and bottom habitat where gear impacts are minimal and/or temporary in nature.

1.5 IMPACTS TO THE FISHERY MANAGEMENT PROGRAM

The following sections provide a brief summary of biological and socioeconomic impacts that may result from allocation changes between the commercial and recreational fisheries for summer flounder, scup, and black sea bass. Impacts to the fisheries are alternative specific, and a more detailed discussion of alternatives and their impacts can be found in section 4.4.

1.5.1 Biological Impacts

Changes to the recreational and commercial sector allocations affect the size of each sector's landings limits. Depending on the scale of the change, a decrease in the commercial quota or additional restrictions on the recreational fishery could lead to increased regulatory discards of these species compared to recent levels. However, accountability measures are still in place and designed to prevent harvest and dead discards from exceeding the overfishing threshold. In addition, a preliminary analysis taking into account the different levels of variation of the

estimates of landings and dead discards in each sector indicates that proposed changes in the recreational and commercial sectors may not have notably different impacts on the risk of exceeding the ABC for all three species. None of the alternatives are expected to change patterns in landings, discards, or fishing effort in such a way that they negatively impact stock status for any of the three species.

1.5.2 Socioeconomic Impacts

Changes in the RHL may lead to a liberalization or restriction of recreational measures, which can impact angler access to all three species. Increased access could take the form of more fish to take home (under higher possession limits or lower minimum fish sizes) and more opportunities to target these species (under longer open seasons), while decreased access could mean the ability to retain fewer fish and reduced opportunities to target these species. This can affect angler satisfaction, revenues for for-hire businesses (e.g., by impacting demand for for-hire trips), and revenues for support businesses such as bait and tackle shops.

The proposed allocation alternatives represent either status quo or a reduction to the commercial sector allocation. As such, the commercial sector may experience a loss in revenue due to corresponding decreased quotas and a reduction in potential landings of summer flounder and black sea bass. For scup, this will depend on the degree of the decrease in the quota as the commercial scup quota has not been fully harvested since 2007 due to other factors such as market demand. For all three species, the loss in revenue associated with the reduction in quota is not expected to be linear, as the relationship between price and volume landed in the fishery is not linear and is variable by species. Other factors such as variation in costs can also affect revenue. Some negative impacts associated with quota reductions might be partially offset by the potential for increased prices paid by dealers if decreased quotas result in decreased supply. However, the degree to which this happens depends on the relationship between demand and price.

2.0 GOALS AND OBJECTIVES

2.1 HISTORY OF MANAGEMENT

The original ASMFC FMP (1982) included only summer flounder and recommended a 14" minimum size limit (for both recreational and commercial possession). The 1988 joint MAFMC-ASMFC Plan established a 13" minimum size limit, permit requirements, and a plan to begin annually reviewing fishing mortality estimates and the performance of management measures after the third year of FMP implementation. Since then, twenty-one amendments have been developed and approved. Most but not all amendments have been implemented jointly by the Commission and Council.

Amendment 1 (1990) added an overfishing definition to the FMP and proposed a minimum net mesh size to protect the 1989 and 1990 year classes. NOAA Fisheries approved the overfishing definition, but disapproved the minimum net mesh provision because the mesh size along with the existing minimum fish size would not allow the overfished resource to rebuild.

Amendment 2 (1993) was a comprehensive amendment designed to rebuild a severely depleted summer flounder stock. The amendment contained a number of management measures to regulate the commercial and recreational fisheries for summer flounder including a rebuilding schedule, commercial quotas, RHLs, size limits, gear restrictions including minimum mesh sizes, and permit and reporting requirements. Amendment 2 established a mesh size exemption for the flynet fishery, as well as the small mesh exemption area, an offshore area where fishermen participating in the winter trawl fishery may obtain an authorized exemption from the minimum mesh size regulations. Amendment 2 also established the Summer Flounder Monitoring Committee, which meets annually to review the best available biological and fisheries data and make recommendations regarding the commercial quota and other management measures.

Amendment 3 (1993) modified the demarcation line for the small mesh exempted fishery area, and increased the large mesh net possession threshold (established in Amendment 2) to 200 lbs during the winter fishery (November 1-April 30). Amendment 3 also stipulated that otter trawl vessels fishing from 1 May through 31 October could only retain up to 100 lbs of summer flounder before using the large mesh net.

Amendment 4 (1993) adjusted Connecticut's commercial landings of summer flounder and revised the state-specific shares of the coastwide commercial summer flounder quota as requested by the Commission. **Amendment 5 (1993)** allowed states to transfer or combine portions of their commercial quota. **Amendment 6 (1994)** allowed multiple nets on board if they were properly stowed and changed the deadline for publishing the overall catch limits and commercial management measures to 15 October and the recreational management measures to 15 February. **Amendment 7 (1995)** revised the fishing mortality rate reduction schedule for summer flounder.

The Scup FMP and the Black Sea Bass FMP were incorporated into the summer flounder regulations as **Amendments 8 and 9 (1996)** to the Council's Summer Flounder FMP, respectively. There are no Amendments 8 or 9 in the Atlantic States Marine Fisheries Commission's (ASMFC or Commission) FMP. The Board opted to manage Scup and Black Sea Bass under separate FMPs. The Council's Amendments 8 and 9 were major amendments that implemented a number of management measures for scup and black sea bass including commercial quotas, commercial gear requirements, minimum size limits, RHLs, and permit and reporting requirements. The FMP included a seven-year plan for reducing fishing effort and restoring the scup stock due to excessive discarding of scup and near collapse of the stock. Management measures implemented in the first year of the plan (1996) included: dealer and vessel permitting and reporting, 9-inch commercial minimum size, 4-inch mesh restriction for vessels retaining over 4,000 pounds of scup, and a 7-inch recreational minimum size along with flexibility in addressing unforeseen conditions in the fishery. The initial black sea bass FMP (1996) aimed to reduce fishing mortality using a coastwide commercial quota allocated into quarterly periods beginning in 1998, and a RHL constrained through the use of minimum size, possession limit, and seasonal closures.

Addendum 1 (1996) established the scup quota management procedure for management and distribution of the annual coastwide commercial quota. Addendum 1 also detailed the state-by-state quota system for the scup summer period (May through October) that was implemented in 1997. Each state receives a share of the summer quota based on historical commercial landings from 1983-1992.

Amendment 10 (1997) made several changes to the summer flounder regulations. Specifically, this Amendment modified the commercial minimum mesh regulations, continued the moratorium on entry of additional commercial vessels, removed provisions pertaining to the expiration of the moratorium permit, prohibited the transfer of summer flounder at sea, and established a special permit for party/charter vessels to allow the possession of summer flounder parts smaller than the minimum size.

Amendment 11 (1999) was implemented to achieve consistency among Mid-Atlantic and New England FMPs regarding vessel replacement and upgrade provisions, permit history transfer, splitting, and renewal regulations for fishing vessels issued Northeast Limited Access federal fishery permits.

Amendment 12 (1999) combined the three species' FMPs from the Commission's perspective and was approved by the Commission and MAFMC in October 1998. Amendment 12 brought the FMP into compliance with the new and revised National Standards and other required provisions of the Sustainable Fisheries Act (SFA). Specifically, the amendment revised the overfishing definitions (National Standard 1) for summer flounder, scup, and black sea bass and addressed the new and revised National Standards (National Standard 8 - consider effects on fishing communities; National Standard 9 - reduce bycatch; and National Standard 10 - promote safety at sea) relative to the existing management measures. The amendment also identified essential habitat for summer flounder, scup and black sea bass. In addition, Amendment 12 added a framework adjustment procedure that allows the Council to add or modify management measures through a streamlined public review process. For scup, the amendment set overfished and overfishing thresholds.

To address the issues of black sea bass fishery closures, large discards, and financial hardships, the Board enacted a series of Emergency Rules in 2001 that established initial possession limits, triggers, and adjusted possession limits. These measures helped reduce the length of fishery closures, but the rapidly changing regulations confused fishermen and added significant administrative burden to the states. To simplify the process for all parties, the Board approved Addendum VI to provide a mechanism for initial possession limits, triggers, and adjusted possession limits to be set during the annual specification setting process without the need for further Emergency Rules.

Addendum IV (2001) provides that upon the recommendation of the relevant monitoring committee and joint consideration with the Council, the Board will decide state regulations

rather than forward a recommendation to NOAA Fisheries. Addendum IV also made the states responsible for implementing the Board's decisions on regulations.

Addendum V (2002) was developed to avoid the necessity of developing annual Emergency Rules for scup summer period quota management. Addendum V established state shares of the summer period quota based on historical commercial landings from 1983-1992, including additional landings from Massachusetts added to the NOAA Fisheries database in 2000. State shares implemented by this addendum will remain in place until the Board takes direct action to change them.

Addendum VII (2002) established a state specific management program for Massachusetts through New York for the 2002 recreational scup fishery based on the average landings (in number of fish) for 1998-2001. Due to the extremely limited data available, the Board developed specific management measures for the states of New Jersey, Delaware, Maryland, Virginia, and North Carolina. The addendum had no application after 2002. The same addendum language was used verbatim to set management measures for the states of Massachusetts through New York for 2003 through Addendum IX.

Amendment 13 (2002) was approved by the Commission and MAFMC and implemented a federal, annual coastwide commercial quota for black sea bass that is managed in state waters by the Commission using a state-by-state allocation system. Amendment 13 also removed the necessity for fishermen who have both a Northeast Region (NER, now referred to as the Greater Atlantic Region) Black Sea Bass permit and a Southeast Region (SER) Snapper Grouper (S/G) permit to relinquish their permits for a six-month period prior to fishing south of Cape Hatteras during a northern closure.

Addendum XIII and the MAFMC's complementary Framework 5 (2004) modified the FMP so that Total Allowable Landings (TALs) for the summer flounder, scup, and/or black sea bass can be specified for up to three years.

Amendment 14 (2007) established a rebuilding schedule for scup and made the Scup Gear Restricted Areas (GRAs) modifiable through the framework adjustment process. **Amendment 16 (2007)** implemented Standardized Bycatch Reporting Methodology (SBRM).

Addendum XIX (2007) continued the state-by-state black sea bass commercial management measures, without a sunset clause. This addendum, and the MAFMC's complementary Framework 7, also broadened the descriptions of stock status determination criteria contained within the Summer Flounder, Scup, and Black Sea Bass FMP to allow for greater flexibility in those definitions, while maintaining objective and measurable status determination criteria for identifying when stocks or stock complexes covered by the FMP are overfished. It established acceptable categories of peer-review for stock status determination criteria. When these specific peer-review metrics are met and new or updated information is available, the new or revised stock status determination criteria may be incorporated by the Commission directly into

the annual management measures for each species, rather than requiring a modification to the FMP.

Addendum XX (2009) set policies to reconcile quota overages to address minor inadvertent quota overages in the black sea bass and scup summer period fisheries. It streamlines the quota transfers process and establishes clear policies and administrative protocols to guide the allocation of transfers from states with underages to states with overages. It also allows for quota transfers to reconcile quota overages after the year's end.

Amendment 15 (2011) Established Annual Catch Limits and Accountability Measures, as required by the 2007 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

Beginning in 2011 due to concerns about equitable access to the resource, a series of addenda replaced the use of uniform coastwide measures to manage the black sea bass recreational fishery. **Addendum XXI (2011)** established state shares of the RHL for 2011. **Addenda XXII, XXIII, XXV, and XXVII** implemented an ad hoc regional management approach for 2012-2017, whereby the northern region states of Massachusetts through New Jersey individually crafted state measures aimed at liberalizing or reducing harvest by the same percent to achieve the RHL, while the southern region states of Delaware through North Carolina largely set regulations consistent with the measures set for federal waters.

Amendment 19 (2013) modified the AMs for the Council's recreational fisheries. **Amendment 17 (2015)** implemented a revised version of the Standardized Bycatch Reporting Methodology (SBRM). **Amendment 18 (2015)** eliminated the requirement for vessel owners to submit "did not fish" reports for the months or weeks when their vessel was not fishing, and removed some of the restrictions for upgrading vessels listed on Federal fishing permits. **Amendment 20 (2017)** implemented management measures to prevent the development of new, and the expansion of existing, commercial fisheries on certain forage species in the Mid-Atlantic.

Addendum XXIX (2017) shortened the length of the commercial scup summer period and extended the length of the winter II period. The addendum was developed to allow for the better utilization of the commercial quota, which was under-harvested from 2011-2016. Specifically, the change in quota period length allows for higher possession limits for a longer period of time each year, thus increasing the likelihood the commercial fishery will fully harvest the quota. The quota allocation for each period remains unchanged. While Addendum XXIX is a Commission specific document, the Council also took the same action through **Framework 10.** The new quota periods are the following and were implemented for the 2018 fishing season: Winter 1, January 1-April 30 (120 days); Summer, May 1-September 30 (153 days); Winter II, October 1-December 31 (92 days).

Addendum XXX (2018) established a regional allocation of the coastwide RHL to address state concerns regarding equity and accountability in recreational black sea bass management. Based on a combination of exploitable biomass information from the latest stock assessment and

historical harvest, the RHL was allocated to three regions: 1) Massachusetts through New York, 2) New Jersey as a state-specific region, and 3) Delaware through North Carolina. The 2018 state recreational measures were then revised in May 2018 following an appeal of the Addendum to the ISFMP Policy Board by Massachusetts, Rhode Island, Connecticut and New York.

Addendum XXXI (2018) and council Framework 14 (2018) modified the FMP to allow for the option of federal conservation equivalency for the recreational black sea bass fishery beginning in 2020, and implemented transit provisions for Block Island Sound for recreational and commercial fisheries for summer flounder, scup, and black sea bass in the same area as the existing striped bass transit zone. The Council's framework action also modified the Council's FMP to allow a maximum size limit to be used in the recreational fisheries for summer flounder and black sea bass.

Addendum XXXII (2018) established a new process for developing recreational management measures for black sea bass and summer flounder whereby measures are set annually through a specifications process, rather than addenda. The Board approves measures in early spring each year, based on Technical Committee analysis of stock status, resource availability, and harvest estimates. To further aid in setting specifications, the Addendum established standards and guiding principles intended to structure the development of recreational measures on a regional basis. Public input on specifications is gathered by states through their individual public comment processes.

Amendment 21 (2020) revised the management program's goals and objectives specific to summer flounder and implemented new summer flounder state-specific commercial allocations. The new state commercial allocations are based upon a 9.55 million pound trigger point. When the annual coastwide commercial quota is at or below 9.55 million pounds, the formula for allocating the quota to the states remains status quo, i.e., the same state-specific percentages that have been in effect since 1993. When the annual coastwide quota exceeds 9.55 million pounds, additional quota above 9.55 million pounds is distributed as follows: 0.333% to the states of Maine, New Hampshire and Delaware and 12.375% to the remaining states. As a result, state allocations will vary over time based on overall stock status and the resulting coastwide commercial quotas.

In October 2019, the Board initiated **Draft Addendum XXXIII** to consider changes to black sea bass commercial state allocations. This action will consider the current distribution and abundance of black sea bass as one of several adjustment factors to achieve more balanced access to the resource. In December 2019, the Council initiated a complementary amendment which will consider including the state specific commercial allocations in the Council FMP. A draft document was approved for public comment in August 2020.

2.2 JOINT MANAGEMENT

The Council and Commission work cooperatively to develop fishery regulations for summer flounder, scup, and black sea bass off the east coast of the United States. The Council and Commission work in conjunction with NOAA Fisheries, which serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch is taken from both state (0-3 miles offshore) and federal waters (3-200 miles offshore, also known as the EEZ).

The Commission has primary authority for development of FMPs for state waters under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) of 1993. Recognizing the interjurisdictional nature of fishery resources and the necessity of the states and federal government coordination on regulations, under this act, all Atlantic coast states that are included in a Commission FMP must implement required conservation provisions of the plan or the Secretary of Commerce may impose a moratorium for fishing in the noncompliant state's waters.

The Council, under the MSA, has primary authority for developing federal FMPs for Council managed species. The Commission and the Council meet jointly at least twice a year to approve management measures for the fishery for the upcoming year or years. State fishery departments implement FMP measures under the ACFCMA, while NOAA Fisheries issues rules to implement approved FMPs prepared by the Councils.

State regulations apply to vessels fishing in state waters; however, vessels with federal permits must abide by the federal regulations regardless of where they are fishing. If state and federal measures differ, the vessel must abide by whichever measure is more restrictive. Approved regulations are enforced through cooperative actions of the U.S. Coast Guard, NOAA Fisheries Law Enforcement, and state authorities.

The Secretary of Commerce has the ultimate responsibility for measures. The Council's proposed FMPs and amendments are submitted to the Secretary of Commerce for approval, which in most cases is delegated to NOAA Fisheries. NOAA Fisheries typically prepares specifications and implementing federal regulations for the fisheries based on the recommendations of the Council and Commission, if such recommendations are deemed to be consistent with the MSA and other applicable law. NOAA Fisheries publishes proposed rules in the *Federal Register* for public comment. As mentioned above, the Secretary of Commerce also has ultimate responsibility for determining whether individual state measures are consistent with the Commission's FMP. If the Commission finds a state out of compliance and is unable to rectify this issue, the Commission may notify the Secretary. Within 30 days of receiving the Commission's notice, the Secretary must decide whether the state is out of compliance, and if so, whether the noncompliance compromises the conservation of the resource. If it does, the Secretary can impose a moratorium on all fishing (commercial and recreational) for the species in question, until the Commission and the Secretary determine that the noncompliance has ceased.

2.3 MANAGEMENT UNIT

Summer flounder, scup, and black sea bass fisheries are managed cooperatively by the Commission in state waters (0-3 miles), and by the Council and NOAA Fisheries in Federal waters (3-200 miles). The management unit for summer flounder in US waters is the western Atlantic Ocean from the southern border of North Carolina northward to the US-Canadian border. The management unit for scup and black sea bass in US waters is the western Atlantic Ocean from Cape Hatteras, North Carolina north to the Canadian border.

2.4 PURPOSE AND NEED FOR ACTION

The purposes of this Amendment are to:

1. Consider modifications to the current allocations between the commercial and recreational sectors for summer flounder, scup, and black sea bass. The commercial and recreational allocations for all three species are currently based on historical proportions of landings (for summer flounder and black sea bass) or catch (for scup) from each sector. The current allocations were set in the mid-1990s and have not been revised since that time.
2. Consider the option to transfer a portion of the allowable landings each year between the commercial and recreational sectors, in either direction, based on the needs of each sector. The current FMP does not allow for such transfers.
3. Consider whether future additional modifications to the commercial/recreational allocation and/or transfer provisions can be considered through a future FMP addendum or framework action, as opposed to an amendment.

The commercial and recreational allocations for all three species are currently based on historical proportions of landings (for summer flounder and black sea bass) or catch (for scup) from each sector. Recent changes in how recreational catch is estimated has resulted in a discrepancy between the current level of estimated recreational harvest and the recreational allocation for summer flounder, scup, and black sea bass. Some changes have also been made to commercial catch data since the allocations were established.

The commercial and recreational data revisions not only impact catch accounting, but also significantly affected our understanding of the population levels for all three fish stocks. This has management implications due to the fixed commercial/recreational allocation percentages defined in the FMP for all three species. These allocation percentages do not reflect the current understanding of the recent and historic proportions of catch and landings from the two sectors. These allocation percentages are defined in the Council and Commission FMPs; therefore, they can only be modified through an FMP amendment. This Amendment will consider whether the allocations are still appropriate and meeting the objectives of the FMP.

2.5 GOALS AND OBJECTIVES

2.5.1 Summer Flounder Goals and Objectives

The summer flounder FMP objectives were revised via Amendment 21 to the FMP (approved March 2019). The revised goals and objectives for summer flounder are as follows:

Goal 1: Ensure the biological sustainability of the summer flounder resource in order to maintain a sustainable summer flounder fishery.

Objective 1.1: Prevent overfishing, and achieve and maintain sustainable spawning stock biomass levels that promote optimum yield in the fishery.

Goal 2: Support and enhance the development and implementation of effective management measures.

Objective 2.1: Maintain and enhance effective partnership and coordination among the Council, Commission, Federal partners, and member states.

Objective 2.2: Promote understanding, compliance, and the effective enforcement of regulations.

Objective 2.3: Promote monitoring, data collection, and the development of ecosystem-based science that support and enhance effective management of the summer flounder resource.

Goal 3: Optimize economic and social benefits from the utilization of the summer flounder resource, balancing the needs and priorities of different user groups to achieve the greatest overall benefit to the nation.

Objective 3.1: Provide reasonable access to the fishery throughout the management unit. Fishery allocations and other management measures should balance responsiveness to changing social, economic, and ecological conditions with historic and current importance to various user groups and communities.

2.5.2 Scup and Black Sea Bass Goals and Objectives

The FMP objectives for scup and black sea bass were adopted via the amendments that added these species to this joint FMP (Amendment 8 for scup and Amendment 9 for black sea bass). The current FMP objectives for scup and black sea bass are:

Goal 1: Reduce fishing mortality in the scup and black sea bass fisheries to assure that overfishing does not occur.

Goal 2: Reduce fishing mortality on immature scup and black sea bass to increase spawning stock biomass.

Goal 3: Improve the yield from these fisheries.

Goal 4: Promote compatible management regulations between state and federal jurisdictions.

Goal 5: Promote uniform and effective enforcement of regulations.

Goal 6: Minimize regulations to achieve the management objectives stated above.

3.0 MONITORING PROGRAM SPECIFICATION

In order to achieve the goals and objectives of this Amendment, the collection and maintenance of quality data is necessary.

3.1 SUMMARY OF MONITORING PROGRAMS

The FMPs for summer flounder, scup, and black sea bass include no requirements regarding fishery-dependent monitoring. All state fishery management agencies were encouraged to pursue full implementation of the standards of the Atlantic Coastal Cooperative Statistics Program (ACCSP).

3.1.1 Commercial Catch and Landings Program

The reporting requirements for the summer flounder, scup, and slack sea bass commercial fisheries are specified by two general permit types: 1) state issued commercial permits and 2) federal moratorium permit. State commercial permits are issued to individuals, with qualification and reporting requirements varying by state. Weekly landings information including species landed by gear and state are submitted by the Atlantic coastal states through the Standard Atlantic Fisheries Information System (SAFIS). Landings information assembled in the SAFIS database include both state and federal landings data. ACCSP's standard for commercial catch and effort statistics requires mandatory, trip-level reporting of all commercial harvested marine species, with fishermen and/or dealers required to report standardized data elements for each trip by the 10th of each month. For federal moratorium permit holders, commercial landings information for all three species is collected from VTRs monthly and are submitted 15 days after the end of the reporting month. Discards are estimated from the NEFSC observer program, and, if needed, from the VTR data. The NEFSC weighout program provides commercial age and length information.

3.1.2 Recreational Fishery Catch Reporting Process

MRIP provides estimated summer flounder, scup, and black sea bass catches from 1981-2019. Recreational catch of these species was previously collected through the MRFSS, which was a recreational data collection program used from 1981-2003. The MRFSS program was replaced by MRIP in 2004 and was designed to provide more accurate and timely reporting as well as greater spatial coverage. The MRFSS and the MRIP were simultaneously conducted in 2004-2006 and this information was used to calibrate past MRFSS recreational harvest estimates against MRIP recreational harvest estimates.

In 2018, MRIP implemented the Fishing Effort Survey (FES) which used an improved methodology to address several concerns with the prior Coastal Household Telephone Survey. These concerns included under-coverage of the angling public, declining number of households with landline telephones, reduced response rates, and memory recall issues. Past estimates have been recalibrated to the FES. This calibration resulted in a much higher recreational catch estimates compared to previous estimates.

Recreational catches of summer flounder, scup, and black sea bass were downloaded from http://www.st.NOAA Fisheries.noaa.gov/st1/recreational/queries/index.html using the query option.

An online description of MRIP survey methods can be found here: http://www.st.NOAA Fisheries.noaa.gov/recreational-fisheries/index#meth

3.2 SOCIAL AND ECONOMIC COLLECTION PROGRAMS

Data on a number of variables relevant to social and economic dimensions of summer flounder, scup, and black sea bass fisheries are collected through existing ACCSP data collection programs and MRIP; however, no explicit mandates to collect socioeconomic data for these species currently exist. In addition to landed quantities, commercial harvesters and dealers may report ex-vessel prices or value, fishing and landing locations, landing disposition, and a variety of measures capturing fishing effort. MRIP regularly collects information on recreational fishing effort and landings, and occasionally gathers socioeconomic data on angler motivations and expenditures.

3.3 BIOLOGICAL DATA COLLECTION PROGRAMS

3.3.1 Fishery-Dependent Data Collection

Several states along with NOAA Fisheries collect biological information from commercial and recreational fisheries for summer flounder, scup, and black sea bass. The Commonwealth of Massachusetts collects trip-level data on commercial landings from both harvesters and primary buyers, and monitors their commercial quota weekly through their Fisheries Statistics Program. New York conducts a survey of recreational anglers on for-hire boats throughout the marine district that target all three species to collect length data of kept and discarded fish. Maryland compiles data on population, age, sex, and size from any fish caught in pound nets, primarily summer flounder. A statewide voluntary angler survey is conducted that records location, time spent fishing, number of fish caught, number kept, and lengths of the first 20 fish caught. The Virginia Game Fish Tagging Program has targeted and tagged fish since 1997. North Carolina collects information on catch-per-unit-of-effort for the winter trawl fishery, estuarine gill net fishery, pound net fishery, the ocean gill net fishery, commercial gig, and the long-haul seine fishery. North Carolina conducts dockside sampling of the winter trawl fishery to obtain lengths and aggregate weight data for landed species.

3.3.2 Observer Program

As a condition of state and/or federal permitting, many vessels are required to carry at-sea observers when requested. A minimum set of standard data elements are to be collected through the ACCSP at-sea observer program (refer to the ACCSP Program Design document for details). Specific fisheries priorities will be determined by the Discard/Release Prioritization Committee of ACCSP.

3.4.3 Fishery-Independent Data Collection

Several states, along with NOAA Fisheries, conduct seasonal sampling to collect biological information of summer flounder, scup, and black sea bass populations both inshore and in the EEZ. The Commonwealth of Massachusetts conducts spring and fall otter trawl surveys to collect age, length, and maturity data. These data are used to generate young of year and abundance indices for summer flounder, scup, and black sea bass. Rhode Island DEM Marine Fisheries operates a spring and fall seasonal survey to create biomass indices and a monthly trawl survey to produce mean number and weight per tow. Additionally, a beach seine survey is conducted seasonally to monitor juvenile scup abundance. The Long Island Sound Trawl survey is conducted each spring and fall by Connecticut to generate indices of abundance New York maintains both a small mesh otter trawl survey in the Peconic Bay to monitor young of year, scup yearlings, and scup adult abundance indices and a nearshore trawl survey each winter, spring, summer, and fall to monitor abundance indices. Also conducted is the Nearshore Atlantic trawl survey focuses on collecting biological information and creating indices of abundance for adult and subadult summer flounder and black sea bass. A subset of fish collected by New York on these surveys are used to collect age, length, sex, and maturity. New Jersey conducts an ocean trawl survey five times a year from which age, length and sex data for all three species are collected and catch-per-unit-of-effort and distribution information are generated for juveniles and adults. Two trawl surveys conducted annually in Delaware's estuarine waters to assess relative abundance of both adult and juvenile finfish. Maryland conducts the Coastal Bays Finfish Investigation Trawl and Beach Seine surveys, with a total of 140 trawls and 38 beach seine hauls conducted annually to estimate juvenile abundances. Indices of abundance are calculated from the Virginia Institute of Marine Science (VIMS) Juvenile Trawl Survey and the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP). NEAMAP, or the Northeast Area Monitoring and Assessment Program, Trawl Survey generates coastwide age-specific and aggregated age class indices of abundance in the fall and spring.

4.0 MANAGEMENT PROGRAM

Several aspects relating to the commercial and recreational allocation alternatives are subject to Board and Council review in the amendment. Six issues are specified below to allow for public comment and Board and Council decisions on these issues

4.1 COMMERCIAL AND RECREATIONAL ALLOCATION ALTERNATIVES

This section describes the alternatives under consideration for the commercial/recreational allocation percentages for summer flounder (Section 4.1.1), scup (Section 4.1.2), and black sea bass (Section 4.1.3), along with their expected impacts (Section 4.4). The basis for each alternative is described in more detail in Appendix I. The range of allocation alternatives for each species includes options that would maintain the current allocations as well as options to revise them based on updated data using the same or modified base years. Section 4.1.4 describes options to phase in any allocation changes over multiple years, as well as the expected impacts of these phase-in provisions.

Alternatives for both catch-based and landings-based allocations are under consideration for all three species. As described in detail of Section 1.3.5, the same types of catch and landings limits are required under both catch and landings-based allocations (i.e., commercial and recreational annual catch limits, or ACLs, and annual catch targets, commercial quota, and RHL). Dead discards (discarded fish that are assumed to die)[6] must be accounted for in the catch limits under both allocation approaches. Under both approaches, dead discards are subtracted from the catch limits to arrive at the sector-specific landings limit. **The main difference between these approaches is the step in the calculations where the commercial/recreational allocation percentage is applied.** This has implications for how those dead discards are factored into the calculations.

Catch-based allocations (currently in place for scup) apply the commercial/recreational allocation at the acceptable biological catch (ABC) level, meaning the entire amount of allowable catch (i.e. the ABC, which includes landings and dead discards) would be split based on the commercial/recreational allocation percentage defined through the alternatives listed below. Under a landings-based allocation (currently in place for summer flounder and black sea bass), the ABC is first split into the amount expected to come from landings and the amount expected to come from dead discards. The expected landings amount is then split according to the commercial/recreational allocation percentage defined through the alternatives listed below.

It is important to note that **because expected dead discards are handled differently under catch and landings-based approaches, the allocation percentages under these two approaches are not directly comparable**. To allow for comparison across all alternatives, example resulting commercial quotas and RHLs for each species are provided in Section 4.2 (see Appendix II for details on how these exampled quotas and RHLs were calculated). Actual resulting commercial quotas and RHLs will vary based on annual considerations.

[6] The current discard mortality rates assumed in the stock assessments and catch and landings limits calculations are: 10% for recreational summer flounder discards and 80% for commercial summer flounder discards; 15% for scup recreational discards and 100% for commercial scup discards; 15% for recreational black sea bass discards, 15% for commercial non-trawl black sea bass discards, and 100% for commercial trawl black sea bass discards. These discard mortality rates are used in all aspects of the management program which utilize estimates of dead discards.

Table 21 provides a summary comparison of the key differences and similarities between catch- and landings-based allocations. The implications of catch vs. landings-based allocations are further discussed in Section 1.3.5 and in Section 4.2.

Table 21 Summary of the differences and similarities between catch- and landings-based allocations.

Catch-based allocations	Landings-based allocations
• Currently in place for scup. • **Allocation at ABC level as first step:** total catch (**landings + dead discards**) split into recreational and commercial ACLs based on allocation percentage defined in FMP. • The entire ABC is always split among the sectors based on the allocation defined in the FMP, regardless of recent trends in landings and discards by sector. Because of this, changes in landings and dead discards in one sector do not influence the other sector's ACL. • Expected dead discards are calculated for each sector to subtract from the sector ACLs to determine the sector landings limits	• Currently in place for summer flounder and black sea bass. • ABC is first split into the amount expected to come from landings (Total Allowable Landings, or TAL) and the amount expected to come from dead discards. The methodology for this split is not pre-defined and is usually based on recent trends in landings and dead discards, as well as stock assessment projections where possible. • **Allocation at TAL level:** TAL is allocated among the commercial and recreational sectors based on the allocation percentage defined in the FMP. • Total expected dead discards are split by sector based on different methods, usually recent trends in discards by sector. The sector specific expected dead discards are subtracted from the sector ACLs to derive the sector landings limits. • Changes in landings and dead discards in one sector over time can impact the catch and landings limits in both sectors by impacting the division of the ABC into expected landings and expected dead discards.
Under Both Approaches: • Commercial and recreational ACLs, annual catch targets, and landings limits (i.e., commercial quota and RHL) are required. • Expected dead discards must be projected and accounted for by sector. • Only **dead** discards (discarded fish that are assumed to die) are accounted for in setting and evaluating catch limits. Neither allocation approach includes consideration of released fish that are assumed to survive. • Accountability measures are still required for each sector and tied to sector-specific ACLs. Each sector is held separately accountable for any ACL overages. **The main difference between approaches is the step in the calculations at which the commercial/recreational allocation percentages are applied, which has implications for how expected dead discards are projected and divided by sector.**	

4.1.1 Summer Flounder Allocation Alternatives

Table 22 lists the alternatives under consideration for the commercial/recreational summer flounder allocation percentages. The current allocations for summer flounder are landings-based and are represented by the no action/status quo alternative (alternative 1a-4). As described above, both catch- and landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch-based allocations and landings-based allocations. Appendix II provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Section 1.3.5 provides more details on the differences between catch- and landings-based allocations and the potential implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix I.

The alternatives in this section are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from 1a-1 through 1a-7.

Table 22. Summer flounder commercial/recreational allocation alternatives. The current allocations are highlighted in green.

Summer Flounder Catch-Based Allocation Percentages	
Alternative	**Basis (see Appendix I for details)**
1a-1: 44% commercial, **56%** recreational	2004-2018 base years
1a-2: 43% commercial, **57%** recreational	Supported by multiple approaches: 2009-2018 base years, approximate status quo harvest per sector compared to 2017/2018, and average of other approaches approved by Council/Board in June 2020
1a-3: 40% commercial, **60%** recreational	2014-2018 base years
Summer Flounder Landings-Based Allocation Percentages	
Alternative	**Basis (see Appendix I for details)**
1a-4: 60% commercial, **40%** recreational	No action/status quo (1980-1989)
1a-5: 55% commercial, **45%** recreational	Same base years, new data (1981-1989; 1980 data unavailable)
1a-6: 45% commercial, **55%** recreational	Multiple approaches: 2004-2018 and 2009-2018 base years
1a-7: 41% commercial, **59%** recreational	2014-2018 base years

4.1.2 Scup Allocation Alternatives

Table 23 lists the alternatives under consideration for the commercial and recreational scup allocation percentages. The current allocations for scup are catch-based and are represented by the no action/status quo alternative (alternative 1b-1). As described above, both catch- and

landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch- and landings-based allocations. Appendix II provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Section 1.3.5 provides more details on the differences between catch and landings-based allocations and the potential implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix I.

The alternatives in this section are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from 1b-1 through 1b-7.

Table 23 Scup commercial/recreational allocation alternatives. The current allocations are highlighted in green.

Scup Catch-Based Allocation Percentages	
Alternative	**Basis (see Appendix I for details)**
1b-1: 78% commercial, **22%** recreational	No action/status quo
1b-2: 65% commercial, **35%** recreational	Same base years, new data (1988-1992)
1b-3: 61% commercial, **39%** recreational	Multiple approaches: 2009-2018 base years and average of other approaches approved by Council/Board in June 2020
1b-4: 59% commercial, **41%** recreational	Approximate status quo harvest per sector compared to 2018/2019
Scup Landings-Based Allocation Percentages	
Alternative	**Basis (see Appendix I for details)**
1b-5: 57% commercial, **43**% recreational	Multiple approaches: Same base years, new data; 2014-2018 base years; 2009-2018 base years
1b-6: 56% commercial, **44%** rec	2004-2018 base years
1b-7: 50% commercial, **50%** recreational	Approximate status quo harvest per sector compared to 2018/2019

4.1.3 Black Sea Bass Allocation Alternatives

Table 24 lists the alternatives under consideration for the commercial/recreational black sea bass allocation percentages. The current allocations for black sea bass are landings-based and are represented by the no action/status quo alternative (alternative 1c-4). As described above, both catch- and landings-based alternatives are considered. The percentages under these alternatives are not directly comparable due to differences in how dead discards are addressed under catch-based allocations and landings-based allocations. Appendix II provides examples of potential commercial quotas and RHLs under each alternative to allow for more direct comparisons between the catch and landings-based alternatives. Section 1.3.5 provides more details on the differences between catch- and landings-based allocations and the potential

implications of each approach. The rationale behind each allocation alternative is described in more detail in Appendix II.

The alternatives in this section are mutually exclusive, meaning the Council and Board can only choose one of the alternatives from 1c-1 through 1c-7.

Table 24 Black sea bass commercial/recreational allocation alternatives. The current allocations are highlighted in green.

Black Sea Bass Catch-Based Percentages	
Alternative	**Basis (see Appendix I for details)**
1c-1: 32% commercial, **68%** recreational	Approximate status quo harvest per sector compared to 2018/2019
1c-2: 28% commercial, **72%** recreational	2004-2018 base years
1c-3: 24% commercial, **76%** recreational	2009-2018 base years
Black Sea Bass Landings-Based Percentages	
Alternative	**Basis (see Appendix I for details)**
1c-4: 49% commercial, **51%** recreational	No action/status quo
1c-5: 45% commercial, **55%** recreational	Same base years, new data (1983-1992)
1c-6: 29% commercial, **71%** recreational	Multiple approaches: Approximate status quo harvest per sector compared to 2018/2019and average of other approaches approved by Council/Board in June 2020
1c-7: 22% commercial, **78%** recreational	2009-2018 and 2014-2018 base years

4.1.4 Allocation Change Phase-In Alternatives

The alternatives listed in Table 25 consider if any changes to the allocation percentages considered through alternative sets 1a, 1b, and 1c should occur in a single year (alternative 1d-1, no phase in) or if the change should be spread over 2, 3, or 5 years (alternatives 1d-2 through 1d-4). The Council and Board agreed that 5 years is a reasonable maximum phase-in time frame as longer transition periods may not adequately address the issue an allocation change is attempting to address. The choice of whether to use a phase-in approach, and the length of the phase-in, may depend on the magnitude of allocation change proposed. A phase-in period may not be desired if the overall allocation change is relatively small. Larger allocation changes may be less disruptive to fishing communities if they are phased in over several years.

These phase-in alternatives could apply to any of the three species. The Council and Board may choose to apply different phase-in alternatives (including no phase-in) to each species if desired.

Table 25 Allocation change phase-in alternatives.

Phase-In Alternatives
1d-1: No phase-in
1d-2: Allocation change evenly spread over 2 years
1d-3: Allocation change evenly spread over 3 years
1d-4: Allocation change evenly spread over 5 years

4.2 QUOTA TRANSFERS

The following alternatives describe options for allowing annual transfer of quota between the commercial and recreational sectors as part of the specifications setting process (i.e., the annual process of setting or reviewing catch and landings limits for the upcoming fishing year). This process is similar to that currently used for bluefish, although the options below would allow transfers in either direction between sectors. Section 4.2.1 discusses quota transfer process alternatives while Section 4.2.2 addresses options for a cap on the total amount of a transfer.

4.2.1 Quota Transfer Process Alternatives

Table 26 lists the alternatives under consideration for quota transfer provisions.

Table 26 Alternatives for annual transfer of quota between the commercial and recreational sectors.

Annual Quota Transfer Alternatives
2a: No action/status quo (do not modify the FMP to allow transfers of annual quota between the commercial and recreational sectors.)
2b: Allow for optional bi-directional transfers through the annual specifications process with pre-defined guidelines and process. The transfer would consist of a portion of the total ABC in the form of a landings limit (i.e., commercial quota and RHL) transfer. Transfers would not occur if the stock is overfished or overfishing is occurring.

Under alternative 2a, transfers would not be allowed between the commercial and recreational sectors, consistent with past practice and the current FMP requirements for these species.

Under alternative 2b, each year during the setting or review of annual catch limits, the Board and Council could recommend that a portion of the total ABC be transferred between the recreational and commercial sectors as a landings limit transfer, affecting the final commercial quota and RHL. They could recommend a transfer from the commercial fishery to the recreational fishery or from the recreational fishery to the commercial fishery. If a transfer cap is adopted via one of the sub-alternatives under alternative 2c, the transfer amount could not exceed this cap.

Table 27 describes the process of how transfers would work within the Council and Board's current specifications process under alternative 2b.

Table 27 Proposed quota transfer process during a typical specifications cycle under alternative 2b.

July: **Assess the need for a transfer**	Staff and the Monitoring Committee (MC) would assess the potential need for a transfer and develop recommendations to the Council and Board as part of the specifications process. The MC would consider the expected commercial quota and RHL (pending Council and Board review/approval) in the coming year, and each sector's performance relative to landings limits in recent years. **The MC will have very limited data for the current year and would not be able to develop precise current year projections of landings** for each sector. The MC could also consider factors including but not limited to: • Projected changes in stock size, availability, or year class strength; • Recent or expected changes in management measures; • Recent or expected changes in fishing effort; The MC would consider how these factors might have different impacts on the commercial and recreational sectors. The effects of these considerations can be difficult to quantify and there is currently **no methodology that would allow the MC to quantitatively determine the need for a transfer with a high degree of precision**. **The MC would use their best judgement to recommend whether a transfer would further the Council and Board's policy objectives.**
August: **Council and Board consider whether to recommend a transfer**	The Council and Board would consider MC recommendations on transfers while setting or reviewing annual catch and landings limits. The Council and Board would need to jointly agree on a transfer direction, amount of transfer, and if setting multi-year specifications, whether the transfer would apply for one year or multiple years.
October: **Council staff submits specifications package to NOAA Fisheries**	Council staff would prepare and submit supporting documents to modify catch limits or implement or revise transfers. During a multi-year specifications review year, if a transfer is newly adopted or revised, a regulatory package may need to be developed even if catch limits do not change.
Mid-December: **Recreational measures adopted***	The Council and Board would adopt federal waters recreational measures and a general strategy for coastwide recreational management including any reductions or liberalizations needed in state waters. **These recommendations would be based on the expected post-transfer RHL which likely would not yet be implemented via final rule.**
Late December: **Final specifications published**	NOAA Fisheries approves and publishes the final rule for the following year's catch and landings limits (if new or modified limits are needed), including any new or revised transfers. During a multi-year specifications review year, if a transfer is newly adopted or revised, rulemaking will likely need to occur even if catch limits do not change.
January 1: **Fishing year specifications effective, including any transfers**	Fishing year specifications including any transfers would be effective January 1. **No post-implementation reviews or adjustments to the transfer amount would occur** given that the final rule would recently have published and recreational measures would have already been considered based on expected post-transfer RHLs.

*While this step is not directly part of the quota transfer process, the timing of the recreational measures setting process influences the necessary timeline of transfer-related decisions.

Note that while the transfer would occur at the landings limit level (commercial quota and RHL), for the purposes of maintaining accurate accounting and accountability at the ACL level, both sector's ACLs would be adjusted to reflect the transfer at the landings limit level.

If transfer provisions under alternative 2b are adopted, some changes to the accountability measures (AMs) may also need to be considered. For example, AMs could specify that if the MC determines a transfer caused the donating fishery's ACL, or the combined ABC, to be exceeded, the transfer amount could be deducted from the receiving fishery in a subsequent year. The Council and Board could consider a follow-on action to make these changes if desired. These specific changes are not considered through this Amendment.

4.2.2 Transfer Cap Alternatives

Table 28 lists the alternatives under consideration for a cap on the total transfer amount (if any). These alternatives would only be considered if transfer provisions were adopted under alternative 2b above, and would specify a maximum percent of the ABC that could be transferred from one sector to another each year in the form of a landings limit transfer.

Table 28 Alternatives for annual transfer of quota between the commercial/recreational sectors.

Annual Quota Transfer Cap Alternatives
2c-1: No transfer cap specified; the Council and Board can recommend any amount of the ABC be transferred between fisheries.
2c-2: Maximum transfer amount set at 5% of the ABC.
2c-3: Maximum transfer amount at 10% of the ABC.
2c-4: Maximum transfer amount set at 15% of the ABC.

4.3 FRAMEWORK/ADDENDUM PROVISION ALTERNATIVES

The alternatives in Table 29 consider whether the Council and Board should have the ability to make future changes related to certain issues considered through this Amendment through a framework action (under the Council's FMP) and/or an addendum (for the Commission's FMP). Frameworks/addenda are modifications to the FMPs that are typically (though not always) more efficient than a full amendment. While amendments may take several years to complete and may be more complex, frameworks/addenda can usually be completed in 5-8 months. Both types of management actions include multiple opportunities for public input; however, scoping and public hearings are required for amendments, but are optional for frameworks/addenda. Frameworks/ addenda can only modify existing measures and/or those that have been previously considered in an FMP amendment.

The framework/addenda provisions would apply to commercial/recreational allocation changes (alternative set 1) and quota transfer provisions between the commercial and recreational sectors (alternative set 2). The ability to revise commercial/ recreational allocations through a framework or addendum could make future allocation changes simpler and less time

consuming. The Council adopted an allocation review policy in 2019[7], where each relevant allocation will be reviewed at least every 10 years; however, the Council may choose to conduct reviews more frequently based on substantial public interest or other factors (including changes in ecological, social, and economic conditions). Framework/addendum provisions are also considered for transfers of quota between sectors, as this may allow for a more efficient management response to changes in the needs of the commercial and recreational fisheries for these species than if these changes needed to be considered through an FMP amendment, as is currently the case.

Allowing such changes through a framework/addendum **does not require or guarantee that this mechanism can be used for future changes**. The Council and Board can always choose to initiate an amendment rather than a framework/addendum if more thorough evaluation or additional public comment opportunities are desired. In addition, if the specific changes under consideration are especially controversial or represent a significant departure from previously considered measures, an amendment may be required, even if the type of change is identified in the FMP as a change that can be made through a framework/addendum.

Table 29 Framework/addendum provision alternatives.

Framework/addendum provision alternatives
3a: No action/status quo (no changes to framework/addendum provisions; changes to commercial/recreational allocations must be made through an amendment)
3b: Allow changes to commercial/recreational allocations, annual quota transfers, and other measures included in this Amendment to be made through framework actions/addenda

4.4 IMPACTS OF THE FISHERY MANAGEMENT PROGRAM

This Amendment includes several options which could carry potential biological, social, and economic impacts. **Analysis on impacts for each of the management alternatives can be found in Appendix I.** As described in more detail below, the impacts of these alternatives are expected to be mostly socioeconomic in nature. Potential biological impacts on the summer flounder, scup, and black sea bass stocks are also briefly discussed below. Impacts applicable to all three species are discussed in Section 4.4.1, which species specific impacts are outlined in Sections 4.4.1.1 through 4.4.1.3. A more complete impacts analysis, including consideration of the potential impacts on other components of the environment such as non-target species, habitat, marine mammals, and species listed as threatened or endangered under the Endangered Species Act, will be included in the Environmental Assessment prepared after the Council and Board select their final preferred alternatives.

Sections 4.4.1.1 through 4.4.1.3. contain example projected RHLs and commercial quotas for each allocation alternative to demonstrate potential impacts to the recreational and commercial fisheries. The 2020 ABC for each species was used to project landings limits that

[7] https://www.mafmc.org/s/MAFMC-Fishery-Allocation-Review-Policy_2019-08.pdf

reflect recent stock size and to allow for comparison to recent fishery performance. The methodology used to develop the example landings limits differs from the methodology that was used to develop the actual landings limits that were implemented for management use in 2020. For the status quo alternatives for each species, the actual 2020 RHLs and commercial quotas are presented. For the other alternatives, use of a different method was necessary to account for several assumptions that must be made about how dead discards by sector would be projected, including the effect that changing allocations could have on each sector's fishing effort and dead discards. A more detailed description of the methodology used to generate example RHLs and quotas can be found in Appendix II.

Actual future commercial quotas and RHLs under any of these alternatives cannot be determined at this time and may differ from the examples presented here based on future ABCs, which are unknown beyond 2021 as they are driven by stock assessment projections. In addition, annual assumptions about expected dead discards (total and sector-specific) may vary in future years, which will also impact future RHLs and commercial quotas. The example commercial quotas and RHLs in this document are provided only for the purposes of assessing the potential impacts of each alternative and for comparing between the alternatives.

4.4.1 Recreational and Commercial Allocation Impacts

Socioeconomic Impacts

Aside from the no action/status quo alternatives, all alternatives for all three species would result in an increased recreational allocation. This would result in higher RHLs than the current allocations. RHLs are tied to recreational measures such as possession limits, fish size restrictions, and open/closed seasons. These measures are adjusted as needed to allow harvest to meet but not exceed the RHL. Depending on the magnitude of the increase, an increased recreational allocation may not allow for liberalized recreational management measures compared to recent years in all cases. In some cases, recreational restrictions would still be needed if the allocation increase is not enough to account for recent increases in the MRIP harvest estimates.

Liberalizing or restricting recreational measures can impact angler access to all three species. Increased access could take the form of more fish to take home (under higher possession limits or lower minimum fish sizes) and more opportunities to target these species (under longer open seasons), while decreased access could mean the ability to retain fewer fish and reduced opportunities to target these species. This can affect angler satisfaction, revenues for for-hire businesses (e.g., by impacting demand for for-hire trips), and revenues for support businesses such as bait and tackle shops.

At the community level, these impacts may be greatest for communities with or near recreational fishing sites, communities where for-hire businesses are based, and communities with tourism that is impacted by recreational fishing.

Aside from the no action/status quo alternatives, all the alternatives for all three species would result in reduced allocation to the commercial sector, which is expected to result in lower

commercial quotas than the current allocations. The commercial sector may experience a loss in revenue due to corresponding lower quotas and a reduction in potential landings of summer flounder and black sea bass. For scup, this will depend on the degree of the decrease in the quota as the commercial scup quota has not been fully harvested since 2007 due to other factors such as market demand. For all three species, the loss in revenue associated with the reduction in quota is not expected to be linear, as the relationship between price and volume landed in the fishery is not linear and is variable by species. Other factors such as variation in costs can also affect revenue. Some negative impacts associated with quota reductions might be partially offset by the potential for increased prices paid by dealers if decreased quotas result in decreased supply. However, the degree to which this happens depends on the relationship between demand and price.

Impacts from a reduction in commercial quota will not be felt equally across all commercial industry participants. The coastwide commercial quota is divided into state quotas for summer flounder and black sea bass, and seasonal quota periods for scup. Of the three scup quota periods, only the summer period quota is further allocated among states. Some states fully utilize their quota year after year, while other states tend to underutilize their quota. Commercial fishermen from states that fully utilize quota are more likely to experience loss in revenue, restrictive trip limits, and seasonal closures to account for the reduced commercial quota. States that have historically underutilized their quota may still be impacted in the medium- to long-term as reduced access to quota may inhibit the ability for market expansion in the future. These states could also be impacted in the near-term depending on the magnitude of allocation reduction. If the commercial allocation is substantially reduced, quotas in some states may drop below what is currently being utilized.

Lower commercial quotas resulting from lower allocations could result in lower trip limits and shorter seasons. Lower trip limits can incentivize high-grading whereby smaller fish are discarded to allow for more landings of larger fish that can fetch a higher price per pound. Shorter seasons could result in market instability through greater fluctuations in price, as well as “race to fish” conditions if seasons are shortened substantially. A reduction in commercial quotas would not just impact commercial fishermen, it would also reduce the availability of these species to consumers. Changes in commercial allocation of these three species also affects the economic health of communities with notable participation in these commercial fisheries through employment in the harvesting, processing, distribution, and retail aspects of the commercial fisheries. The scale of the impacts will depend on the scale of the change and the degree of local economic dependence on these commercial fisheries.

There are also impacts for both sectors associated with switching from a landings-based allocation (currently implemented for summer flounder and black sea bass) to a catch-based allocation (currently implemented for scup). It could be perceived as a benefit that the catch and landings limits for each sector can be calculated independently from each other under a catch-based allocation. As described in Section 1.3.5**,** under a catch-based allocation, changes in landings and dead discards in one sector do not influence the other sector’s allocation as the entire ABC is always split among the sectors based on the allocation defined in the FMP,

regardless of recent trends in landings and discards by sector. In theory, this can allow each sector to see the benefits of a reduction in their own dead discards to a greater extent than under a landings-based allocation. Under a catch-based allocation, a reduction in dead discards in one sector can result in an increase in that sector's landings limit in a future year. This was part of the rationale for implementing the current catch-based allocation for scup as it was expected to incentivize a reduction in commercial dead discards, which were of concern during development of Amendment 8 when the commercial/recreational scup allocations were first developed. Under a landings-based allocation, changes in landings and dead discards in one sector can influence the catch and landings limits in both sectors; therefore, the benefits of a reduction in dead discards (or the negative impacts of an increase in dead discards) in one sector can also be felt by the other sector.

Under all alternatives considered in this action, the commercial and recreational sectors will continue to be separately held accountable for overages of their catch and landings limits. There will be no changes to the accountability measures for either sector[8].

Biological Impacts to Summer Flounder, Scup, and Black Sea Bass Stocks

As described above, all but the no action/status quo alternatives would reduce the commercial allocations, which would in turn result in lower commercial quotas than the no action/status quo alternatives.

As described in more detail in the species-specific sections below, some alternatives which would increase the recreational allocation may still require additional restrictions in the recreational fisheries compared to the measures used in recent years due to the mismatch between the revised MRIP data and the RHLs which could result from the allocations under many alternatives.

Depending on the scale of the change, a decrease in the commercial quota or additional restrictions on the recreational fishery could lead to increased regulatory discards of these species compared to recent levels. Actual changes in discards will depend on many factors. For example, fishing behavior in both sectors is influenced by many factors in addition to the regulations (e.g., weather, availability of other target species, market demand). Discards are also influenced by availability of each species, both overall abundance and by size class. For example, high availability of fish smaller than the minimum size limit can lead to high regulatory discards. Lower availability of legal-sized fish can lead to decreased discards. For these reasons, it is challenging to predict future discards based on changes in allocations.

In all cases, total dead catch (i.e., landings and dead discards) will continue to be constrained by the overall ABC, which is set based on the best scientific information available and is intended to prevent overfishing. In this way, none of the alternatives are expected to change patterns in

[8] A summary of the current accountability measures for summer flounder, scup, and black sea bass can be found at: https://www.mafmc.org/s/AMs-description_SF_scup-BSB_Dec2020.pdf.

landings, discards, or fishing effort in such a way that they negatively impact stock status for any of the three species.

Landings and discards in the commercial and recreational sectors are monitored and estimated in different ways. A preliminary analysis taking into account the different levels of precision of the estimates of landings and dead discards in each sector for all three species suggests the risk of exceeding the ABC does not vary greatly under a wide range of different proportions of total dead catch from each sector. This suggests changes in the commercial/recreational allocation, especially changes within the range currently under consideration, may not have notably different impacts on the risk of exceeding the ABC.

4.4.1.1 Summer Flounder

Many stakeholders across regions and fishing modes view the summer flounder recreational minimum size and bag limit to be overly restrictive. Shore-based anglers in particular are concerned about the high minimum size. Depending on the alternative selected and annual considerations, an increase in allocation to the recreational sector may allow for a liberalization of these measures and could increase access to anglers. A reduction in the minimum size limit may be particularly impactful to those who fish from shore and typically encounter smaller fish. Allowing more fish to be retained increases angler satisfaction and provides greater access to fish to bring home to eat.

Table 30 compares example quotas and RHLs under each allocation alternative using the 2020 ABC (see Appendix II for methodology) to the actual quota and RHL implemented in 2020. All alternatives represent an increase in allocation to the recreational sector relative to the no action/status quo alternative (1a-4), and therefore an increase in the RHL. Likewise, each alternative other than the status quo alternative represents a decrease in allocation and resulting commercial quota for the commercial sector. Relative to the actual 2020 limits, example limits would range from no change (under the status quo alternative 1a-4) to a 34% decrease in the commercial quota and 43% increase in the RHL (under alternative 1a-7). Again, these limits are examples. Actual future quotas and RHLs are likely to differ from these examples based on future ABCs, discard assumptions, and other considerations.

Figure 31 compares the example quotas and RHLs (using the 2020 ABC, **Error! Reference source not found.**30) to commercial and recreational landings for summer flounder from 2004 through 2019. Since 2004, landings in each sector have varied with annually varying quotas and RHLs and other factors. In most years since 2004, commercial landings have been above the example commercial quotas, particularly under alternatives 1a-1, 1a-2, 1a-3, 1a-6, and 1a-7. This indicates that if the overall ABC remains similar to 2020, reduced commercial landings may be required relative to most recent years. However, most example quotas are above commercial landings for 2016-2018, indicating that relative to these more recent years, commercial landings may not need to be cut, depending on future ABCs.

For the recreational fishery, harvest in most years since 2004 has been above the example RHLs using the 2020 ABC. However, the example RHLs under most alternatives are higher than

recreational harvest during 2017-2019, meaning that recreational measures may be able to be liberalized relative to these years if ABCs remain similar to 2020 levels, depending on actual RHLs and current and future harvest trends.

As previously stated, the summer flounder commercial quota is further allocated among the states based on allocation percentages defined in the FMP. Starting January 1, 2021, as the result of Amendment 21 to the FMP,[9] the commercial allocations of the summer flounder quota among the states will vary based on the overall coastwide commercial quota amount. When the quota is below 9.55 million pounds, it will be allocated among states based on the states allocations that have been in place since Amendment 2 (1993). Any surplus quota above 9.55 million pounds will be allocated differently. As shown in Table 30, some of the example quotas (using the 2020 ABC as an example for future quotas under recent biomass levels) would be above that threshold while some would fall below. Therefore, some of these alternatives could have implications for how the summer flounder quota is allocated among states.

Along with summer flounder commercial landings potentially varying under the allocation alternatives, ex-vessel prices may also change (Figure 32). Using the equation in Figure 32, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1a-7 (7.65 million pounds under a 25.03 mil pound ABC), the average ex-vessel price is predicted to be $2.75 per pound and would yield $21.0 million in total ex-vessel revenue (both in 2019 dollars). If the same process is followed for the alternative 1a-4 example quota (11.10 million pounds), the average ex-vessel price would fall to $1.82 per pound and revenues would decrease to $20.2 million, despite the higher quota. These are rough estimates, and price is influenced by many other factors aside from landings, such as changes in consumer preferences or product substitution. This simplified example does offer some limited support that full utilization of the quota under the highest commercial quota alternative may not maximize fishery-wide revenues.

The Council funded a study consisting of an economic model to evaluate the current 60/40 summer flounder landings allocation. The model, developed by Dr. Kurt Schnier (University of California, Merced) and Dr. Rob Hicks (College of William & Mary), aimed to determine which allocations would maximize marginal economic benefits (the marginal value to each sector of an additional pound of summer flounder allocation at a given allocation) to the commercial and recreational sectors. The original model was peer reviewed in November 2016 with a final report completed in 2017.[10] In 2019 and 2020, the model was updated with the revised MRIP estimates released in 2018, as well as more recent commercial fishery data. The results of the updated model suggest that the existing 60/40 commercial/recreational allocation is not suboptimal from an economic efficiency perspective. However, it also suggested that modest

[9] See https://www.mafmc.org/actions/summer-flounder-amendment for additional information on this Amendment.

[10] The final 2017 report is available at: https://www.mafmc.org/s/Hicks-Schnier-Summer_flounder_allocation_report_final_4_11_2017.pdf.

allocation changes in either direction would not likely lower the economic benefits received from both sectors of the fishery combined.[11] Using the new recreational data, the value of the fishery to the recreational sector increased relative to the results of the prior report. The point estimate of the recreational sector's marginal willingness to pay is higher and would potentially support higher recreational allocations; however, the confidence intervals for the recreational and commercial sectors' willingness to pay estimates have substantial overlap due to high uncertainty in these estimates, particularly for the recreational sector. This means that due to data limitations, more concrete guidance about optimal allocations could not be generated due to the inability to more precisely estimate the recreational sector's value.

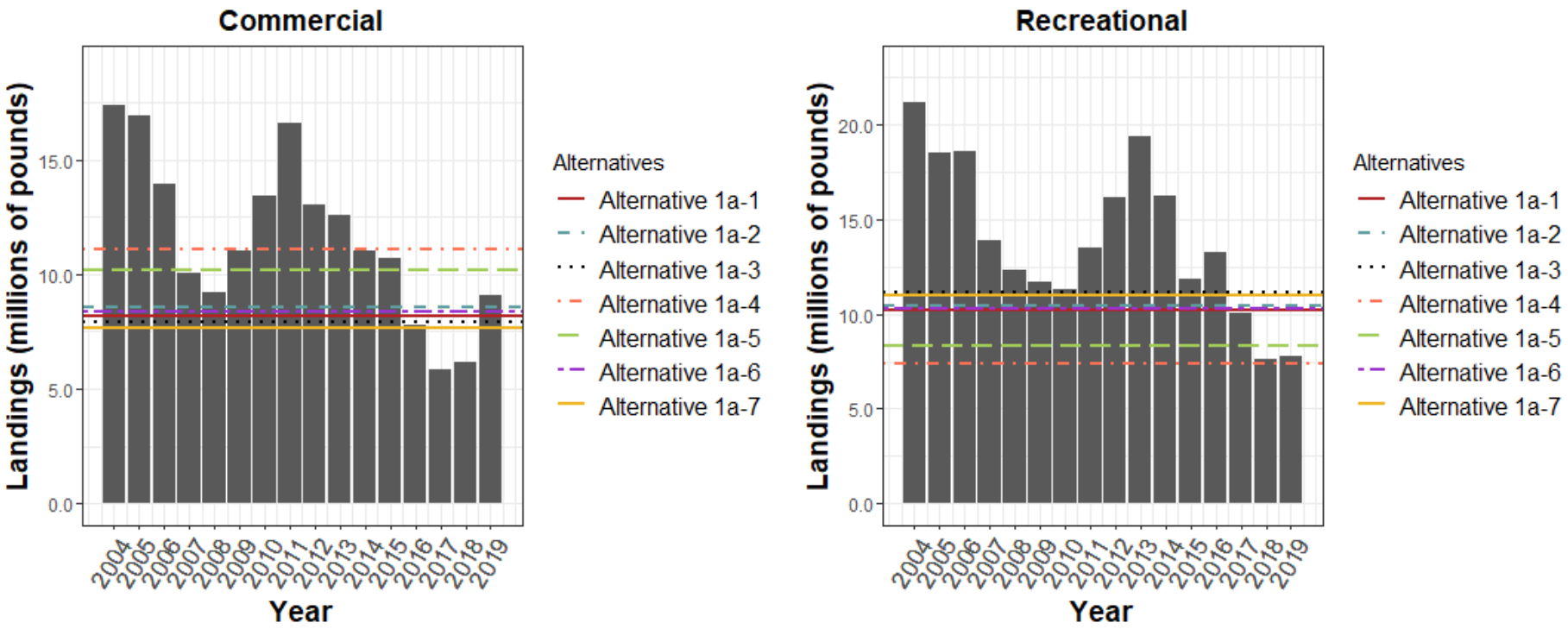
Table 30. Example commercial quotas and RHLs for each allocation alternative under the 2020 ABC (25.03 million pounds) and the assumptions outlined in Appendix II with comparison to the 2020 implemented limits. Actual future limits will vary based on future ANCs and discard assumptions.

Alternative	1a-1	1a-2	1a-3	1a-4 [a]	1a-5	1a-6	1a-7
	Catch-based			Landings-based			
Com. allocation	44%	43%	40%	60%	55%	45%	41%
Rec. allocation	56%	57%	60%	40%	45%	55%	59%
Example commercial quota	8.79	8.57	7.92	11.53 [b]	10.20	8.38	7.65
% Difference from 2020 commercial quota	24%	26%	31%	0%	12%	27%	34%
Example RHL	10.24	10.47	11.15	7.69[b]	8.34	10.25	11.02
% Difference from 2020 RHL	33%	36%	45%	0%	8%	33%	43%

[a] Alternative 1a-4 is the no action/status quo alternative for summer flounder (i.e., the current commercial/recreational allocations).

[b] The actual implemented commercial quota and RHL for 2020 are shown under Alternative 1a-4 (no action/status quo).

[11] The updated report (December 2020) is available at: https://www.mafmc.org/s/Hicks-Schnier_Summer_Flounder_allocation_report_UPDATE-Dec-2020.pdf.



It is important to note that all alternatives under consideration are assuming that the ABC is similar to the 2020 ABC for summer flounder.

Figure 31 Recent (2004-2019) commercial and recreational summer flounder landings with comparison to example commercial quotas and RHLs developed using the 2020 ABC (see Appendix II for methodology).

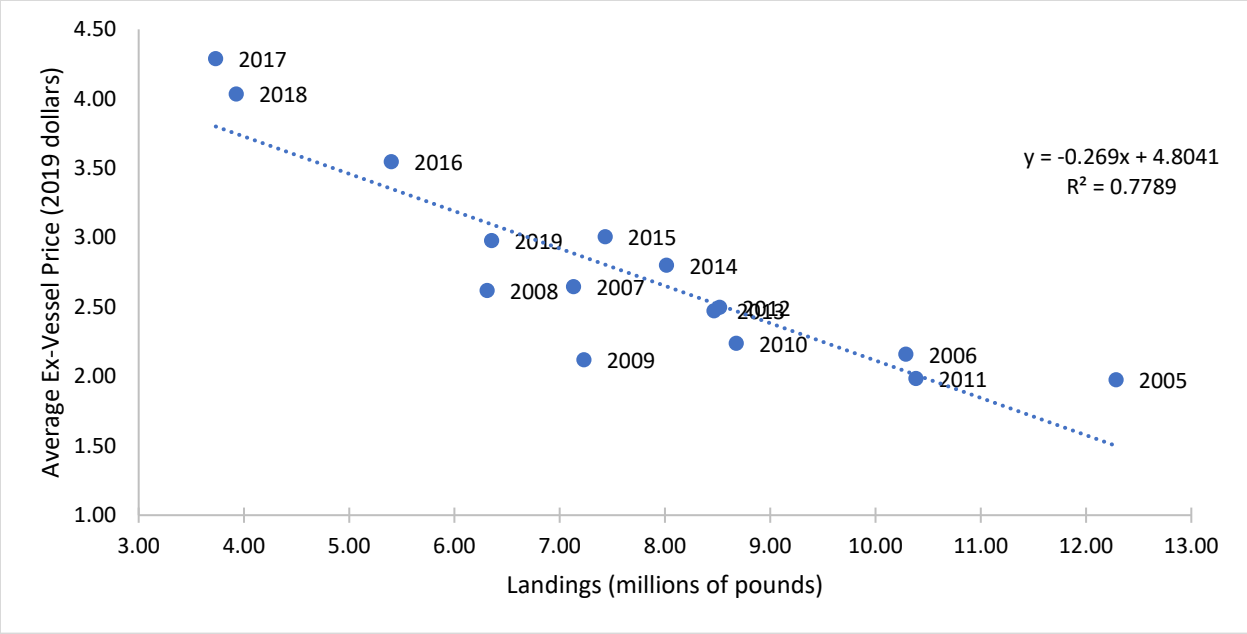


Figure 32. Commercial summer flounder landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.4.1.2 Scup

Table 31 compares example quotas and RHLs under each allocation alternative using the 2020 ABC (Appendix II for methodology) to the actual quota and RHL implemented in 2020. Relative to the actual 2020 limits, example limits would range from no change (update the status quo/no action alternative 1b-1) to a 33% decrease in the commercial quota and 127% increase in the RHL (under alternative 1b-7). Actual future quotas and RHLs are likely to differ from these examples based on future ANCs, discard assumptions, and other considerations. Figure 33 compared the exampled quotas and RHLs (using the 2020 ABC, Table 31) to commercial and recreational landings for scup from 2004 through 2019.

Under the no action/status quo alternative for scup (alternative 1b-1), restrictions to the bag limit, minimum size, and/or season would need to be implemented to prevent exceeding the RHL. This is because the revised MRIP harvest estimates for recent years are notably higher than the RHLs that result from the current allocation (assuming recent ABC levels; Figure 33). Alternatives 1b-2 through 1b-7 results in the highest example RHL, and is the only alternative that projects an example RHL that is higher than 2004-2019 recreational harvest (Figure 33). Therefore, alternative 1b-7 would provide the most benefit to the recreational sector in the form of higher angler satisfaction, greater economic opportunity, and more revenue to the for-hire sector compared to the other allocation alternatives. Recreational harvest in recent years is variable in Figure 33, however alternatives 1b-3 through 1b-6 have the potential to allow for harvest at similar levels to recent years.

Alternatives 1b-2 through 1b-7 include lower commercial allocations than the no action/status quo alternative (1b-1). The commercial sector has not fully utilized its quota since 2007 so a

decrease in allocation would not necessarily lead to a decrease in commercial landings or revenues compared to recent levels. Commercial landings from 2004 through 2012 and 2018 through 2019 fall below the example quotas shown in Figure 33 for all alternatives. However, alternatives 1b-2 through 1b-7 may limit the potential for market expansion and future increases in landings and ex-vessel revenue compared to the no action/status quo alternative (1b-1).

In 2018, the scup stock was at 198% of the biomass target level and trending down to the target. The compounding effects of reductions in allocation to the commercial sector combined with a reduction in the overall ABC could result in lower commercial quotas in the future. The reduction in commercial quota under alternatives 1b-2 through 1b-7 may not constrain harvest on a coastwide basis but may negatively impact commercial industry members in states that fully utilize their state quota during the summer scup quota period. Impacts may be felt more equally across states in the winter 1 and 2 period scup fishery with the coastwide trip limit.

Ex-vessel prices may change if changes in the allocation result in changes in commercial landings (Figure 34). Using the equation in Figure 34, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1b-7 (14.81 million pounds under a 35.77 million pound ABC), the average ex-vessel price is predicted to be $0.54 per pound and would yield $7.9 million in total ex-vessel revenue. Full utilization of the quota under some of the higher quota alternatives, such as 1b-1, would decrease revenues following these methods. Average scup landings over the last three years are 14.20 million pounds, meaning full utilization of the quota would appear unlikely under a number of the allocation alternatives and the current ABC. Based on the price responses to changes in quantity, achieving full utilization of the quota may not be economically desirable for the commercial scup fishery as a whole.

Table 31. Example commercial quotas and RHLs for each allocation alternative under the 2020 ABC (35.77 million pounds) and the assumptions outlined in Appendix II, with comparison to the 2020 implemented limits. Actual future limits will vary based on future ABCs and discard assumptions.

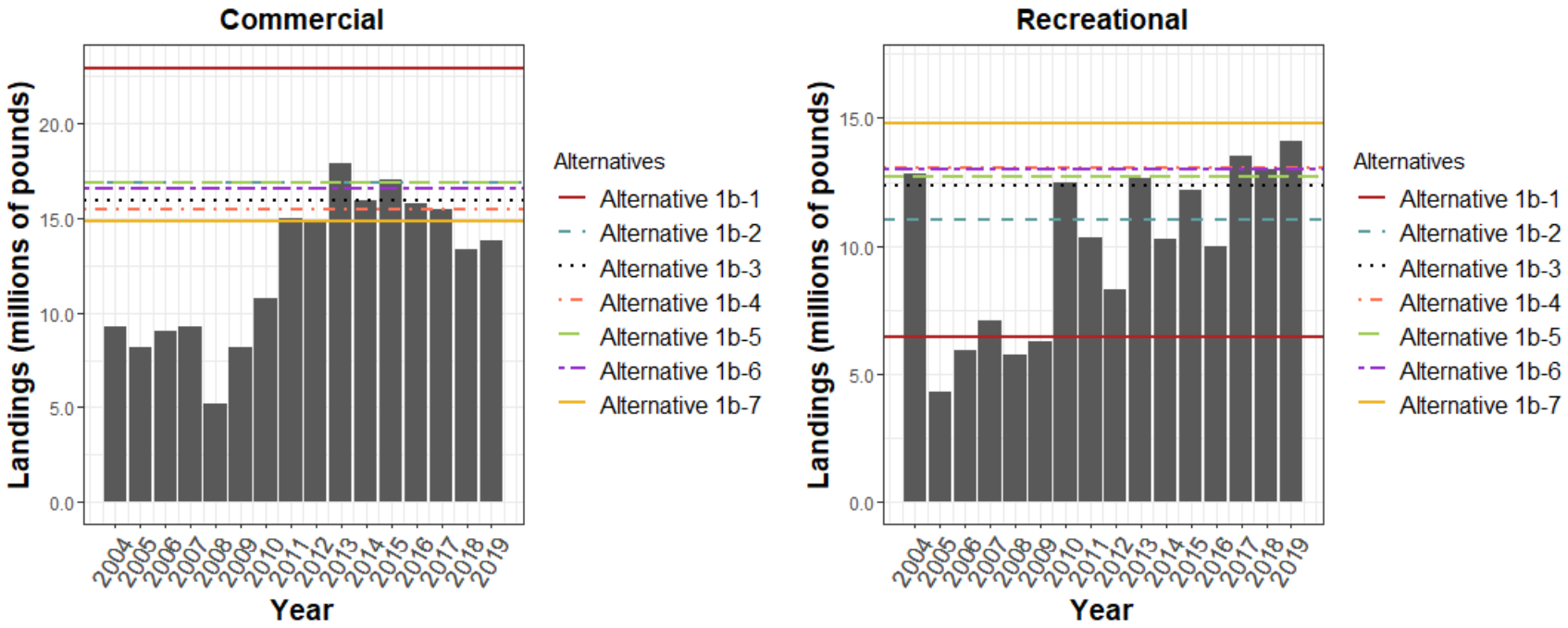
Alternative	1b-1[a]	1b-2	1b-3	1b-4	1b-5	1b-6	1b-7
	Catch-based				Landings-based		
Com. allocation	78%	65%	61%	59%	57%	56%	50%
Rec. allocation	22%	35%	39%	41%	43%	44%	50%
Example commercial quota	22.23[b]	16.90	15.92	15.44	16.85	16.56	14.81
% Difference from 2020 commercial quota[c]	0%	-24%	-28%	-31%	-24%	-26%	-33%
Example RHL	6.51[b]	11.04	12.37	13.04	12.71	13.01	14.81
% Difference from 2020 RHL[d]	0%	70%	90%	100%	95%	100%	127%

[a] Alternative 1b-1 is the no action/status quo alt. for scup (i.e., the current commercial/recreational allocations).

[b] The actual implemented commercial quota and RHL for 2020 are shown under alt. 1b-1 (no action/status quo).

[c] The header previously read "% Difference from 2017-2019 com. landings", this was corrected on 3/15/21.

[d] The header previously read "% Difference from 2017-2019 rec. landings", this was corrected on 3/15/21.



It is important to note that all alternatives under consideration are assuming that the ABC is similar to the 2020 ABC for scup.

Figure 33. Recent (2004-2019) commercial and recreational scup landings with comparison to example commercial quotas and RHLs developed using the 2020 ABC (see Appendix II for methodology).

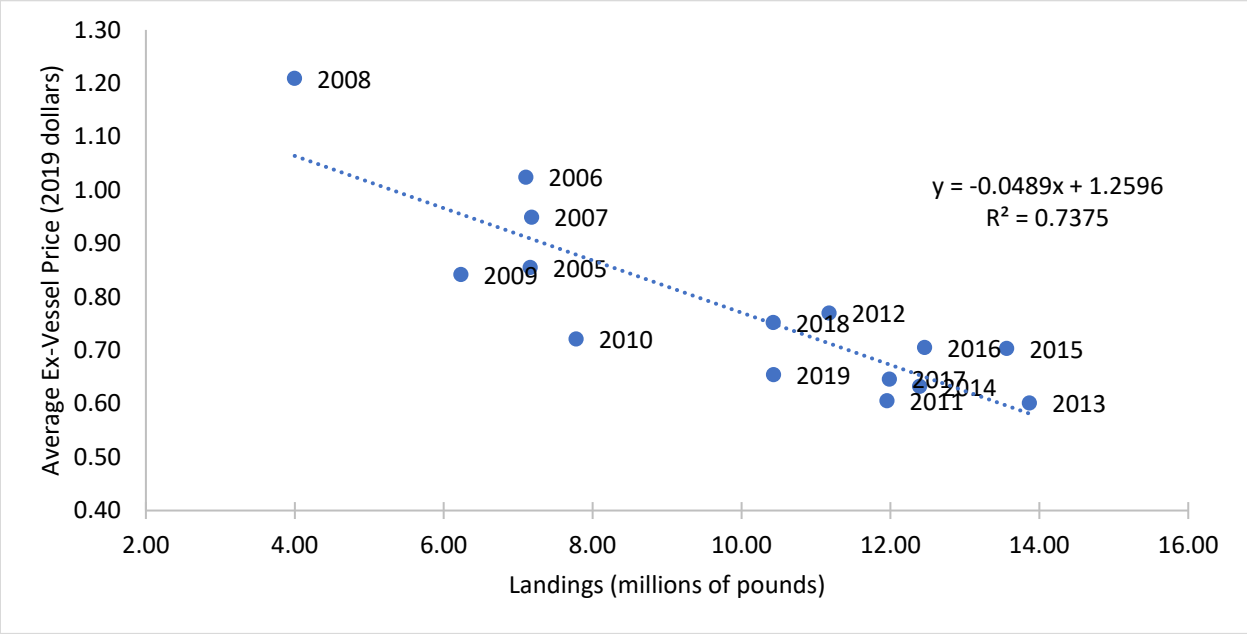


Figure 34. Commercial scup landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.4.1.3 Black Sea Bass

All black sea bass alternatives, with the exception of the no action/status quo alternative (1c-4) would increase the recreational allocation and decrease the commercial allocation. Table 32 compares example quotas and RHLs under each allocation alternative using the 2020 ANC (see Appendix II for methodology) to the actual quota and RHL implemented in 2020. Relative to the actual 2020 limits, example limits would range from no change (under the status quo/no action alternative 1c-4) to a 53% decrease in the commercial quota and 60% increase in the RHL (under alternative 1c-7). Again, these limits are examples. Actual future quotas and RHLS are likely to differ from these examples based on future ABCs, discard assumptions, and other considerations.

Figure 35 compares the example black sea bass quotas and RHLs (using the 2020 ABC, Table 32) to commercial and recreational landings from 2004 through 2019. Throughout this time period, commercial and recreational landings varied with changes in the landings limits, changes in black sea bass availability, and other factors. It is important to note that all example quotas and RHLs assume that the ABC is similar to the 2020 ABC, which was higher than any previous ABC for black sea bass. In all years shown in Figure 35, the commercial and recreational fisheries operated under landings limits that were set based on ABCs lower than the 2020 ABC.

As shown in Figure 35, commercial landings were below the example quotas under alternatives 1c-4 and 1c-5 during 2004-2019, largely because the fishery was constrained by much lower quotas during those years. The other alternatives result in example quotas that are lower than commercial landings in 2 (alternatives 1c-1 and 1c-6), 4 (alternative 1c-2), or 6 (alternatives 1c-3

and 1c-7) of the 16 years during 2004-2019. The highest commercial landings during this time period occurred during 2017-2019. Therefore, if future ABCs are similar to the 2020 ABC, commercial landings may need to be restricted compared to recent years (i.e. 2017-2019) under all but alternatives 1c-4 and 1c-5. The greatest restrictions would be necessary under alternatives 1c-3 and 1c-7 (Figure 35). Reductions in commercial landings could lead to reduced revenues and negative socioeconomic impacts for commercial fishery participants and support businesses.

Ex-vessel prices for commercial landings may also change in response to the different potential quota levels under each alternative (Figure 36). Using the equation in Figure 36, prices can be estimated under different landed quantities. For example, assuming full utilization of the example commercial quota in alternative 1c-7 (2.61 million pounds under a 15.07 million pound ABC) the average ex-vessel price is estimated to be $3.25 per pound and would yield $8.5 million in ex-vessel revenue. If the same process is followed for the alternative 1c-4 example quota (5.43 million lbs.), the average ex-vessel price would fall to $2.48 per pound. Despite this reduced average price, revenues would continue to increase to $13.5 million. These are rough estimates, and price is influenced by many other factors aside from landings, such as changes in consumer preferences or product substitution. These results, however, do suggest that black sea bass commercial revenues would increase under higher quotas with full utilization.

As shown in Figure 35, the example RHLs under all alternatives are lower than recreational harvest in at least 3 of the 16 years from 2004-2019. Alternative 1c-4 results in the lowest example RHL, which is lower than harvest during 9 of the 16 years from 2004-2019, followed by alternative 1c-5, which results in an example RHL which is lower than harvest in 8 of the 16 years. However, when considering only 2018-2019, only alternatives 1c-4 and 1c-5 result in example RHLs that are lower than harvest in those years. Therefore, if future ABCs are similar to the 2020 ABC, and depending on future considerations about expected harvest, recreational harvest may not need to be notably restricted compared to recent years (specifically, 2018-2019), under all but alternatives except 1c-4 and 1c-5. Alternatives 1c-4 and 1c-5 could require notable restrictions for the recreational fishery, compared to recent years. Figure 35 suggests that it is not likely that any of the alternatives would allow for increased harvest or notable liberalizations in recreational management measures compared to recent years. Depending on the alternative and annual considerations, all but alternatives 1c-4 and 1c-5 could allow for roughly status quo recreational management measures, or they could require slight to moderate restrictions. As previously stated, more restrictive management measures would be expected to have negative socioeconomic impacts for the recreational sector due to reduced angler satisfaction, reduced demand for for-hire trips, and reduced revenues for for-hire businesses and other recreational fishery support businesses.

Based on the information shown in Figure 35, none of the alternatives would be expected to prevent a need for restrictions in both the recreational and commercial sectors, based on the comparison of example quotas and RHLs against recent landings shown in Figure 35. As previously stated, none of the alternatives are expected to allow for increased recreational harvest compared to recent levels if the ABC remains similar to 2020. The alternatives which,

depending on annual considerations, may allow for close to status quo recreational harvest (alternatives 1c-1 through 1c-4, and 1c-6 and 1c-7) would require varying levels of reduction in commercial landings, depending on the alternative, (Figure 35).

Table 32. Example commercial quotas and RHLs under each allocation alternative using the 2020 ABC (15.07 million pounds) and the assumptions outlined in Appendix II, with comparison to the 2020 limits. Actual future limits will vary based on future ABCs and discard assumptions.

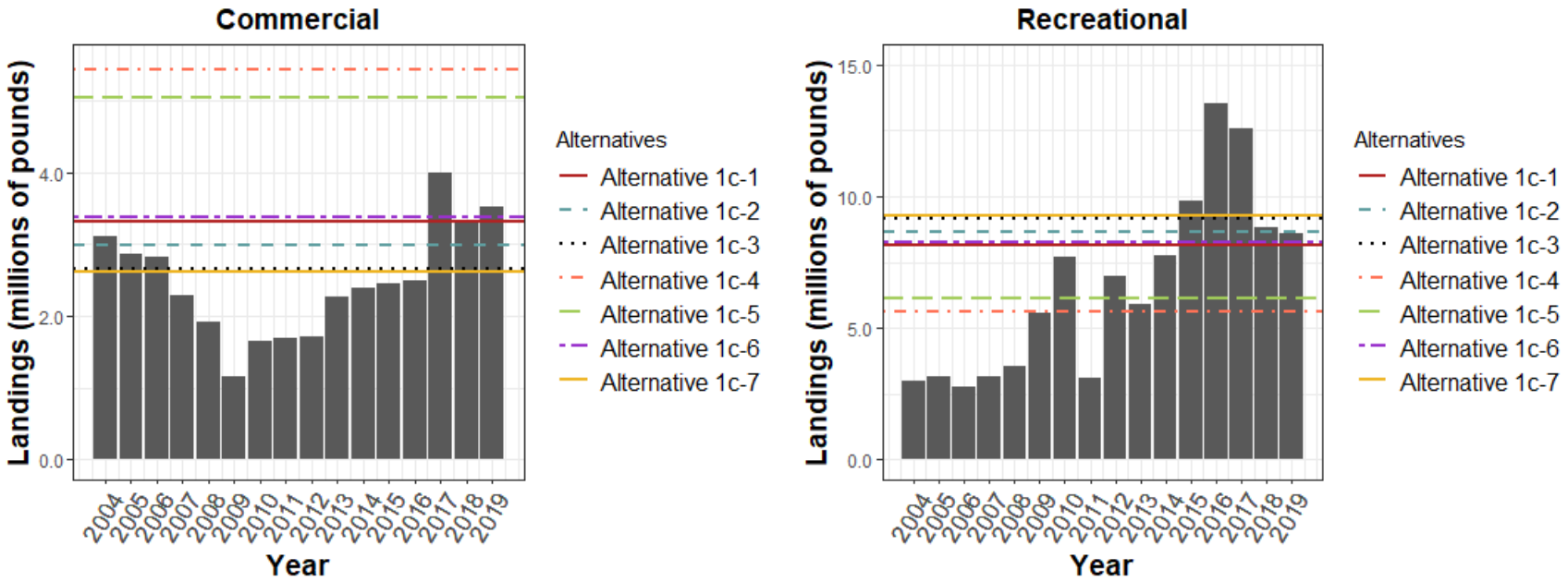
Alternative	1c-1	1c-2	1c-3	1c-4[a]	1c-5	1c-6	1c-7
	Catch-Based			**Landings-Based**			
Com. allocation	32%	28%	24%	49%	45%	29%	22%
Rec. allocation	68%	72%	76%	51%	55%	71%	78%
Example commercial quota	**3.31**	**2.99**	**2.66**	**5.58[b]**	**5.04**	**3.38**	**2.61**
% Difference from 2020 commercial quota [c]	**-41%**	**-46%**	**-52%**	**0%**	**-10%**	**-39%**	**-53%**
Example RHL	**8.16**	**8.65**	**9.14**	**5.81[b]**	**6.15**	**8.28**	**9.27**
% Difference from 2020 RHL [d]	**40%**	**49%**	**57%**	**0%**	**6%**	**43%**	**60%**

[a] Alternative 1c-4 is the no action/status quo alternative for black sea bass (i.e., the current commercial/recreational allocations).

[b] The actual implemented commercial quota and RHL for 2020 are shown under Alternative 1c-4 (no action/status quo).

[c] The header previously read "% Difference from 2018-2019 com. landings", this was corrected on 3/15/21.

[d] The header previously read "% Difference from 2018-2019 rec. landings", this was corrected on 3/15/21.



It is important to note that all alternatives under consideration are assuming that the ABC is similar to the 2020 ABC, which was higher than any previous ABC for black sea bass.

Figure 35. Recent (2004-2019) commercial and recreational black sea bass landings with comparison to example commercial quotas and RHLs developed using the 2020 ABC (see Appendix II for methodology).

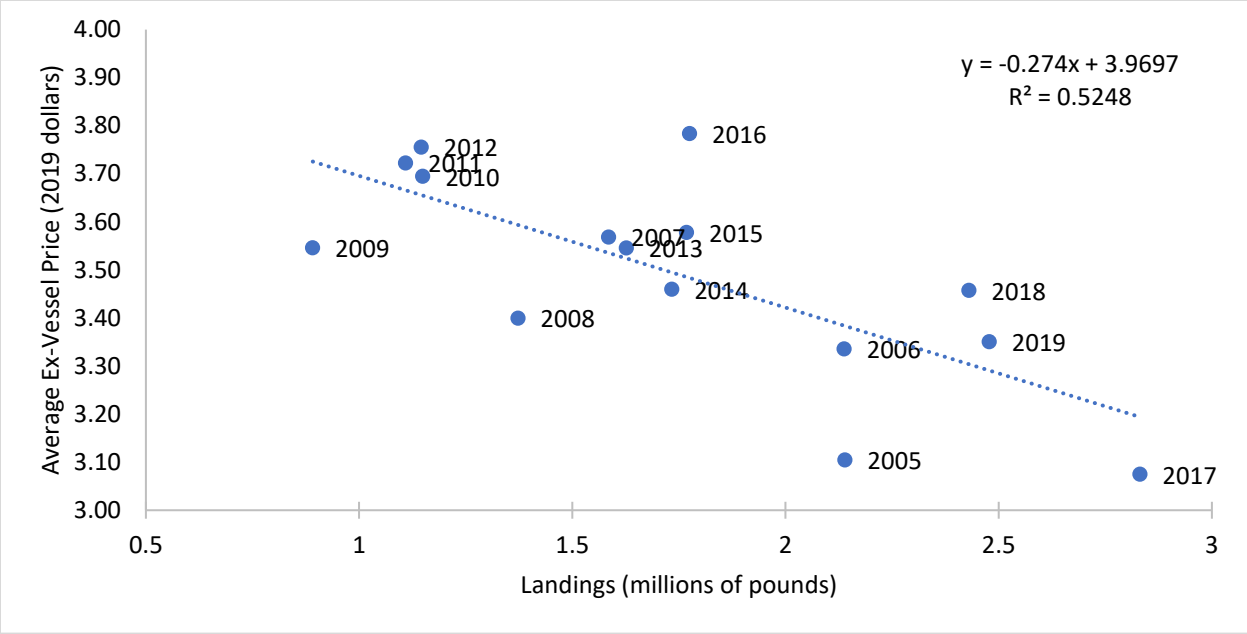


Figure 36. Commercial black sea bass landings and average ex-vessel prices, 2005-2019, in 2019 dollars. Source: NEFSC Social Sciences Branch, personal communication.

4.4.2 Phase-In Alternatives

The biological, social, and economic impacts of the phase-in alternatives are dependent on two things: 1) the difference between the status quo allocation percentage and the allocation percentage selected, and 2) the duration of the phase-in period. Based on the range of allocation percentages across the three species (Section 4.1), the commercial and recreational sector allocations could shift by as much as 13.5% per year, or as little as 0.8% per year under the above phase-in timeframes of 2-5 years. Sections 4.3.2.1 through 4.3.2.3 describe the associated percent shifts per year for each species, and the impacts of these phase-in approaches.

Both catch- and landings-based allocation alternatives are being considered for all three species. As previously stated, summer flounder and black sea bass are currently managed under a landings-based allocation and scup is currently managed under a catch-based allocation. It is straightforward to calculate the annual percent shift in allocation under each phase-in alternative if the allocation remains landings-based for summer flounder and black sea bass or catch-based for scup.

The phase-in transition is more complicated when transitioning from a landings-based to a catch-based allocation or vice versa. Under a landings-based allocation, the division of expected dead discards to each sector is typically calculated using a moving average of recent trends. As a result, under a landings-based allocation, the percentage of the ABC (landings + dead discards) assigned to each sector typically varies from year-to-year and usually does not match the landings-based allocation percent. To illustrate this, the 2021 percent split of landings, dead

discards, and sector ACLs for each species are shown in Table 33. As described below, when transitioning from a landings-based to a catch-based allocation or vice versa, the total and annual phase-in amounts should not be calculated starting from the existing FMP allocation, as the actual split of catch does not match the landings-based allocation for summer flounder and black sea bass, and the actual split of landings does not match the catch-based allocation for scup. The phase-in amounts for each alternative can instead be calculated by using the 2021 measures as a starting point since these are the implemented measures that the transition would be away from. This includes the actual division of catch (for transition to a catch-based allocation) or landings (for transition to a landings-based allocation) in 2021. Additional details for each species are discussed below.

Table 33 The currently implemented recreational/commercial split for total landings, dead discards, and total dead catch for 2021 specifications. The current FMP-specified allocations for each species are highlighted in yellow.

Currently Landings-Based Allocations						
	Comm. % of TAL (allocation)	**Rec. % of TAL (allocation)**	**Expected comm. % of discards in 2021**	**Expected rec. % of discards in 2021**	**Comm ACL % of ABC in 2021**	**Rec ACL % of ABC in 2021**
Summer flounder	60	40	34	66	54	46
Black sea bass	49	51	68	32	55	45
Currently Catch-Based Allocation						
	Comm. % of TAL in 2021	**Rec. % of TAL in 2021**	**Expected comm. % of discards in 2021**	**Expected rec. % of discards in 2021**	**Comm ACL % of ABC (allocation)**	**Rec ACL % of ABC (allocation)**
Scup	77[a]	23	81	19	78	22

[a]Minor correction to this value was made on 3/8/21.

NEFSC Social Sciences Branch crew survey results (

Table 34) suggest that while a limited number of crew from the summer flounder, scup, and black sea bass fisheries were surveyed, the majority of those surveyed agreed it was hard to keep up with changes in regulations. A phase-in approach to reallocation would still involve regulatory change, though limiting year-to-year change in allocation could possibly make it easier for industry members to adapt to these changes. However, phase-in approaches may also require more frequent changes in management measures such as open seasons and possession limits during the phase-in period. Therefore, consideration should be given to balancing regulatory stability and economic stability.

Table 34 NEFSC Social Sciences Branch Crew Survey results for reactions to the statement "the rules and regulations change so quickly it is hard to keep up." Results presented for crew primarily involved in the summer flounder, scup, and black sea bass fisheries over the 2012-2013 survey, 2018-2019 survey, and the combined results.

Survey Wave	2012-13	2018-19	Total
Strongly agree	3 (27%)	10 (45%)	13 (39%)
Agree	4 (36%)	7 (32%)	11 (33%)
Neutral	1 (9%)	2 (9%)	3 (9%)
Disagree	3 (27%)	3 (14%)	6 (18%)
Strongly disagree	0 (0%)	0 (0%)	0 (0%)
Total	11 (100%)	22 (100%)	33 (100%)

4.4.2.1 Summer Flounder

If the summer flounder allocation is modified but a landings-based allocation is maintained (alternatives 1a-5 through 1a-7), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (

Table 35).

Under a transition from a landings-based to a catch-based allocation (alternatives 1a-1 through 1a-3), dead discards would first need to be incorporated into the current baseline to determine the total and annual percent shift. Any allocation changes adopted are meant to take effect starting in 2022; therefore the specifications for 2021 can serve as this baseline for the current split of catch by sector. Specifically, the percentage of the ABC that each sector will receive in 2021 as a sector ACL is used as the starting point for calculating transition percentages below.

For summer flounder, in 2021, the commercial ACL represents 54% of the ABC and the recreational ACL represents 46% of the ABC (Table 33). From these starting percentages, the total amount of catch-based allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (

Table 35).

Across all summer flounder alternatives, the total allocation shift (if allocations are modified) from the commercial to the recreational fishery would range from 5-19% from the current allocations, and the annual phase-in would range from 1.7% per year to 9.5% per year depending on the allocation change and the phase-in alternative selected (Table 35).

As described in Section 4.2, a decline in commercial allocation is expected to lead to a decline in landings and revenue, especially in states where the commercial allocation is fully utilized. The potential decline in landings may result in higher ex-vessel prices due to a price/volume relationship, potentially tempering declines in ex-vessel revenue. The recreational sector for summer flounder is expected to experience positive social and economic impacts under any of the allocation changes proposed in alternatives 1a-1 through 1a-7 (with the exception of the no action/status quo alternative 1a-4). However, the positive impacts may be partially offset by an inability to meaningfully liberalize measures under a higher allocation given the transition to revised MRIP estimates. The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well sector participants are able to adapt to any changes.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) may result in a sudden loss of income and jobs due to a more sudden drop in revenue in the commercial fishery. Commercial sector participants who are highly dependent on summer flounder may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for summer flounder. This could allow for a smoother transition to modified business models such as diversifying target species.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) is expected to have social and economic benefits as this allows for a faster transition to an allocation that supports the recent recreational harvest under the revised MRIP data (Figure 31). This has implications for recreational management measures, which could be liberalized more quickly if a faster transition to a revised allocation occurs. For summer flounder recent recreational harvest under the revised MRIP estimates are at similar levels as recent RHLs, so it is possible that recreational measures could be liberalized in the coming years if allocation to the recreational sector is increased (e.g Figure 31). However, this is also dependent on future projections of stock biomass, trends in recreational catch and effort, and other factors. If recreational measures can be liberalized, this could result in a decrease in recreational discards. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for summer flounder. This may mean recreational measures and fishing opportunities could be maintained at current levels for longer, or liberalized more slowly, though it is important to note that possible liberalizations depend on many different factors and are not guaranteed.

Table 35. Percent shift in summer flounder allocation per year for 2, 3, and 5 year phase-in options for all summer flounder allocation change alternatives.

Catch-Based Alternatives	**Total amount of allocation percent shift needed**[a]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1a-1: 44% commercial, **56%** recreational	**10%**	**5%** shift per year	**3.3%** shift per year	**2%** shift per year
1a-2: 43% commercial, **57%** recreational	**11%**	**5.5%** shift per year	**3.7%** shift per year	**2.2%** shift per year
1a-3: 40% commercial, **60%** recreational	**14%**	**7%** shift per year	**4.7%** shift per year	**2.8%** shift per year
Landings-Based Alternatives	**Total amount of allocation percent shift needed**[b]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1a-4 (status quo): 60% commercial, **40%** recreational	**0%**	**N/A**	**N/A**	**N/A**
1a-5: 55% commercial, **45%** recreational	**5%**	**2.5%** shift per year	**1.7%** shift per year	**1%** shift per year
1a-6: 45% commercial, **55%** recreational	**15%**	**7.5%** shift per year	**5%** shift per year	**3%** shift per year
1a-7: 41% commercial, **59%** recreational	**19%**	**9.5%** shift per year	**6.3%** shift per year	**3.8%** shift per year

[a] For catch-based alternatives, the starting point for this calculation is the current (2021) split of the sector-specific ACLs (which incorporates dead discards) instead of the landings limit allocation. Here, this shift is calculated by starting from the 2021 specifications which includes a commercial ACL that is 54% of the ABC, and a recreational ACL that is 46% of the ABC.

[b] For landings-based alternatives, the starting point for this calculation is the specified landings-based allocation (60% commercial/40% recreational). This does not account for dead discards, which would continue to be split using different methods with the resulting percentages varying depending on the year.

4.4.2.2 Scup

The current allocation for scup is catch-based. If the allocation is modified but a catch-based allocation is maintained (alternatives 1b-2 through 1b-4), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (Table 36).

Under a transition from a catch-based to a landings-based allocation (alternatives 1b-5 through 1b-7), dead discards would first need to be separated from the current baseline to determine the total and annual percent allocation shift. Because any allocation changes adopted are

meant to take effect starting in 2022, the specifications for 2021 can serve as this baseline for the current split of landings by sector. Specifically, the percentage of the total allowable landings (TAL) that each sector will receive in 2021 as sector landings limits (commercial quota and RHL) is used as the starting point for calculating transition percentages below (Table 33).

For scup, in 2021, the commercial quota represents 77% of the TAL and the RHL represents 23% of the TAL (Table 33). From these starting percentages, the total amount of landings-based allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (Table 36).

Across all the alternatives for scup, the total allocation shift needed (if allocations are modified) from the commercial to the recreational fishery would range from 13-27% from current allocations, and the annual phase-in would range from 2.6% per year to 13.5% per year depending on the allocation change and the phase-in alternative selected (Table 36).

As described in Section 4.2, depending on the scale of the change, a decline in commercial allocation could to lead to loss of revenue from scup or it may not impact revenues as commercial landings have been below the full allowed amount for several years due to market factors. Any potential loss in revenue for fishermen may be partially offset by increases prices paid by dealers if a price/volume relationship impacts prices under lower quotas (Figure 34). The recreational sector is expected to experience positive social and economic impacts under any of the allocation changes proposed in alternatives 1b-1 through 1b-7 (with the exception of the no action/status quo alternative 1b-1). However, the positive impacts may be partially offset by an inability to meaningfully liberalize measures under a higher allocation given the transition to revised MRIP estimates (Figure 33). The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well sector participants are able to adapt to any changes.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) may result in a more sudden loss of income and jobs due to a more sudden drop in revenue. Commercial sector participants who are highly dependent on scup may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for scup. This could allow for a smoother transition to modified business models such as diversifying target species.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) is expected to have positive social and economic benefits as this allows for a faster transition to an allocation that matches the recent recreational harvest under the revised MRIP data. This has implications for recreational management measures, which for scup, are currently resulting in harvest levels higher than the current RHL. Under the current allocation, this should require more restrictive measures to be implemented for the recreational fishery. However, under an increased allocation to the recreational fishery, it is possible that recreational scup measures could remain the same (avoiding severe restrictions

that would otherwise be taken). Recreational measures are also dependent on factors such as future projections of stock biomass, trends in recreational catch and effort, and other trends. It is possible that if scup biomass is projected to increase in the coming years, recreational measures may be able to be liberalized under an increased allocation. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for scup. This is likely to mean that recreational measures and fishing opportunities will need to be restricted during the transition years, possibly severely given recent MRIP estimates, though it is important to note that adjustments to recreational measures depend on many different factors.

Table 36. Percent shift in scup allocation per year for 2, 3, and 5 year phase-in options for all scup allocation change alternatives.

Catch-Based Alternatives	**Total amount of allocation percent shift needed**[a]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1-b1 (status quo): 78% commercial, **22%** recreational	**0%**	**N/A**	**N/A**	**N/A**
1b-2: 65% commercial, **35%** recreational	**13%**	**6.5%** shift per year	**4.3%** shift per year	**2.6%** shift per year
1b-3: 61% commercial, **39%** recreational	**17%**	**8.5%** shift per year	**5.7%** shift per year	**3.4%** shift per year
1b-4: 59% commercial, **41%** recreational	**19%**	**9.5%** shift per year	**6.3%** shift per year	**3.8%** shift per year
Landings-Based Alternatives	**Total amount of allocation percent shift needed**[b]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1b-5: 57% commercial, **43%** recreational	**20%**	**10%** shift per year	**6.7%** shift per year	**3.4%** shift per year
1b-6: 56% commercial, **44%** recreational	**21%**	**10.5%** shift per year	**7%** shift per year	**4 %** shift per year
1b-7: 50% commercial, **50%** recreational	**27%**	**13.5%** shift per year	**9%** shift per year	**5.4%** shift per year

[a] For catch-based alternatives, the starting point for this calculation is the FMP-specified allocation percentage (78% commercial/22% recreational).

[b] For landings-based alternatives, the starting point for this calculation is the current (2021) split of the sector-specific landings limits (commercial quota and RHL). Here, this shift is calculated by starting from the 2021 specifications which includes a commercial quota that is 77% of the total allowable landings, and an RHL that is 23% of the total allowable landings (Table 33). This does not account for dead discards, which going forward would be split using different methods with the resulting percentages varying depending on the year.

4.4.2.3 Black Sea Bass

If the black sea bass allocation is modified but a landings-based allocation is maintained (alternatives 1c-5 through 1c-7), the annual percent shift amounts are easily calculated by taking the difference between the starting and ending allocations for each sector and evenly dividing that percentage among the 2, 3, or 5 years of phase-in depending on the phase-in alternative (Table 37).

Under a transition from a landings-based to a catch-based allocation (alternatives 1c-1 through 1c-3), dead discards would first need to be incorporated into the current baseline to determine the total and annual percent shift. Specifications for 2021 can serve as this baseline for the current split of catch by sector. Specifically, the percentage of the ABC that each sector will receive in 2021 as a sector ACL is used as the starting point for calculating transition percentages below (Table 37).

For black sea bass, in 2021, the commercial ACL represents 55% of the ABC and the recreational ACL represents 45% of the ABC (Table 37). From these starting percentages, the total amount of allocation shift can be calculated, and evenly divided among the 2, 3, or 5 years depending on the phase-in alternative (Table 37).

Across all the alternatives for black sea bass, the total allocation shift needed (if allocations are modified) from the commercial to the recreational fishery would range from 4-31%, compared to the current allocations, and the annual phase-in would range from 0.8% per year to 15.5% per year depending on the allocation change and the phase-in alternative selected (Table 37).

As described in Section 4.2, a reduced commercial allocation is expected to lead to loss of revenue, depending on the magnitude of the allocation change, especially in states where the commercial allocation is fully utilized. However, the potential loss in revenue may be partially offset by an increase in prices paid by dealers to fishermen if a price/volume relationship impacts prices under lower landings (Figure 36). The recreational sector is expected to experience positive social and economic impacts under any of the allocation changes proposed in alternatives 1c-1 through 1c-7 (with the exception of the no action/status quo alternative 1c-4). However, the positive impacts may be partially offset by an inability to meaningfully liberalize recreational management measures under a higher allocation given the transition to revised MRIP estimates, depending on the alternative (Figure 35). The phase-in option selected would affect how quickly these negative and positive impacts are felt by each sector, which could influence how well sector participants are able to adapt to any changes. For both sectors, these impacts will vary depending on the magnitude of the total allocation change, as well as the length of the phase-in period.

For the commercial industry, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) may result in a sudden loss of income and jobs due to a more sudden drop in revenue in the commercial fishery. Commercial sector participants who are highly dependent on black sea bass may have more difficulty remaining in business while evaluating options for maintaining revenue streams, such as shifting effort to other target

species. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition time for the commercial industry to adapt to loss of fishing opportunity for black sea bass. This could allow for a smoother transition to modified business models such as diversifying target species.

For the recreational fishery, a more abrupt transition to a revised allocation (alternative 1d-1 and to a lesser extent 1d-2) could have social and economic benefits as this would allow for a faster transition to an allocation that matches the recent recreational harvest under the revised MRIP data. This has implications for recreational management measures, which for black sea bass, are currently resulting in harvest levels much higher than the current RHL. If the current allocation, is maintained more restrictive measures may need to be implemented to constrain harvest to the RHL. Under an increased allocation to the recreational fishery, it is possible that recreational black sea bass measures could remain the same (avoiding severe restrictions that could otherwise be required; Figure 35). Recreational measures are also dependent on factors such as future projections of stock biomass, trends in recreational catch and effort, and other trends. It is possible that if black sea bass biomass is projected to increase in the coming years and this allows for a higher ABC, recreational measures could be liberalized under an increased allocation. Alternatively, further restrictions could be needed if the ANC decreases. Alternatives 1d-3 and 1d-4 (a 3- or 5-year phase-in, respectively), would provide a longer transition to an increased recreational allocation for black sea bass. This could mean that recreational measures and fishing opportunities will need to be restricted during the transition years, possibly severely given recent MRIP estimates (Figure 35), though it is important to note that adjustments to recreational measures depend on many different factors.

Table 37. Percent shift in black sea bass allocation per year for 2, 3, and 5 year phase-in options for all black sea bass allocation change alternatives.

Catch-Based Alternatives	**Total amount of allocation percent shift needed**[a]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1c-1: 32% commercial, **68%** recreational	**23%**	**11.5%** shift per year	**7.7%** shift per year	**4.6%** shift per year
1c-2: 28% commercial, **72%** recreational	**27%**	**13.5%** shift per year	**9.0%** shift per year	**5.4%** shift per year
1c-3: 24% commercial, **76%** recreational	**31%**	**15.5%** shift per year	**10.3%** shift per year	**6.2%** shift per year
Landings-Based Alternatives	**Total amount of allocation percent shift needed**[b]	**1d-2: 2 year phase-in**	**1d-3: 3 year phase-in**	**1d-4: 5 year phase -in**
1-c4 (status quo): 49% commercial, **5**1**%** recreational	**0%**	**N/A**	**N/A**	**N/A**
1c-5: 45% commercial, **55%** recreational	**4%**	**2%** shift per year	**1.3%** shift per year	**0.8%** shift per year
1c-6: 29% commercial, **71%** recreational	**20%**	**10%** shift per year	**6.7%** shift per year	**4%** shift per year
1c-7: 22% commercial, **78%** recreational	**27%**	**13.5%** shift per year	**9%** shift per year	**5.4%** shift per year

[a] For catch-based alternatives, the starting point for this calculation is the current (2021) split of the sector-specific ACLs (which incorporates dead discards) instead of the landings limit allocation. Here, this shift is calculated by starting from the 2021 specifications which includes a commercial ACL that is 55% of the ABC, and a recreational ACL that is 45% of the ABC for black sea bass (Table 33).

[b] For landings-based alternatives, the starting point for this calculation is the specified landings-based allocation (49% commercial/51% recreational). This does not account for dead discards, which would continue to be split using different methods with the resulting percentages varying depending on the year.

4.4.3 Transfer Impacts

A major disadvantage of the process proposed in Section 4.2.1 is that it requires an annual evaluation of the need for a transfer in the upcoming year using data from the previous year (and potentially older data). Because in-year landings projections are not feasible with this timeline, this would cause at least a two-year disconnect in the timing of the data used to evaluate the need for transfer and the year in which the transfer would apply. This could result in a mismatch between the recommended transfer amount and direction and the reality of the fishery conditions and needs for the upcoming year.

The need for a transfer in any given year may be difficult to determine, due to several factors in addition to the timing of the data availability described above. These fisheries (particularly summer flounder and black sea bass) tend to fully or mostly utilize their allocation and sometimes experience overages. Annual changes in management measures are sometimes needed (especially in the recreational fisheries), and the effects of both past and expected future changes on expected harvest must be considered when determining a transfer amount. It is also difficult to predict changes in market factors that may influence whether the commercial fishery would utilize additional quota or has quota to spare.

Past sector performance for these fisheries may not be very informative when it comes to determining how often transfers will be needed. Because the recreational data currency has recently changed, pre-revision MRIP performance relative to the RHLs is not likely to be useful since the changes were not a simple linear scaling. In addition, any allocation changes implemented through this action may reduce the need for transfers. For these reasons, predicting the need for a transfer may be more straightforward in the future after additional years of evaluating harvest against catch and landings limits set in the new MRIP currency, and after any allocation changes implemented through this action have been in place for a few years. In this way, the ability to use transfers may be a useful "tool in the toolbox" for future years, as opposed to an option that is likely to be used in the more immediate future.

Looking solely at past trends in sector performance, transfer provisions may be most useful for the scup fishery given that the commercial quota has not been fully utilized for several years, but again, it is difficult to determine future transfer needs given the many uncertainties discussed here.

The MC recommendations for a transfer amount and direction would be based on an expected set of landings limits which would not yet have been reviewed or adopted by the Council and Board (Table 27). If these landings limits are modified by either the Council and Board or NMFS (e.g. if NMFS determines that a modification is necessary to account for a past year's overage), the MC's transfer recommendation may no longer be appropriate and it could be difficult for the Council and Board to adopt a modified transfer in time for the upcoming fishing year. The intent is that any transfer would be implemented before January 1 of the relevant fishing year, meaning that a mid-year quota change due to a transfer is not expected.

The conclusion about whether a transfer is needed could result in increased political discussion and potentially increased tensions between sectors during the specifications setting or review process.

As described in Section 5.1.1, recreational measures (typically determined in December) would need to be set using the expected post-transfer RHL. While typically there are no changes to the Council and Board's adopted RHL during the implementation process, it is possible that NOAA Fisheries may change the RHL if circumstances require such modifications, such as if a recreational payback for an ACL overage is required. In practice, this may not represent a problem, since recreational measures are typically set based on the expected RHL. However,

the use of transfers may further complicate this process if NOAA Fisheries modifies or does not adopt the Council and Board recommendation for transfer.

If the Council and Board determine that the ability to use transfers during specifications is not desired, they could consider allowing for temporary transfers via FMP frameworks/addenda instead. This could be specified through alternative set 3 (Section 6.0). Annual transfers though a framework/addendum process would provide some additional flexibility in adapting to changing sector needs but would not allow for as timely of a response as would be possible through the specifications process.

4.4.3.1 Socioeconomic Impacts of Transfers

The impacts of transfers depend on the frequency of transfer, the amount transferred in each year, the direction of transfer between sectors, and to what extent each sector has been or is expected to achieve their limits. The impacts of a transfer are also dependent on the marginal economic value of additional allowable landings for each sector (in terms of commercial and for-hire revenues and revenues for associated commercial and recreational businesses), as well as the positive or negative impacts on angler satisfaction that may arise from modifying or maintaining recreational measures. As described below, many additional factors can influence how the commercial and recreational fisheries may be impacted by a transfer, including market conditions, overall availability of the species, availability of substitute species, and trends in effort driven by external factors.

Commercial to Recreational Transfers

If the recreational fishery receives a transfer, they would experience positive socioeconomic impacts due to outcomes such as the potential for liberalized measures, the ability to maintain status quo measures when a restriction may otherwise be needed, and/or a reduced risk of an RHL or ACL overage that may impose negative consequences in a future year. These outcomes could result in maintained or increased revenues for recreational businesses as well as improved or maintained levels of angler satisfaction, compared to if no commercial to recreational transfer occurred.

In this scenario, the commercial sector would give up quota that is not expected to be fully utilized. In theory, if the decision to transfer is based on a pattern of underutilization in the commercial sector, the economic impacts to the commercial sector from such a transfer would be neutral. However, the commercial sector could experience a loss in revenue if the potential for underutilization is incorrectly evaluated. This could be due to a disconnect in the data used to evaluate the transfer and conditions in the relevant fishing year, possibly driven by changes in market conditions or fishery participation and effort.

Impacts to the commercial fisheries are not likely to be felt equally across states given different commercial quota management systems and differing quota utilizations by state. While coastwide commercial landings can fall short of the total commercial quota, individual states vary considerably in utilizing or underutilizing their individual quotas. A coastwide projected

underutilization could occur even if one or more states would be expected to fully utilize their quota in the upcoming year. This could have negative economic impacts to the commercial industries in states that regularly achieve their quotas.

Recreational to Commercial Transfers

If the commercial fishery receives a transfer, they would experience positive socioeconomic impacts in the year of the transfer due to increased revenue earning potential associated with higher potential landings. In general, quota increases tend to result in higher revenues, although some of these benefits may be partially offset by decreases in price per pound that can be associated with higher quotas. As described in Section 4.2, average ex-vessel price for each species tends to decrease with increasing landings. This relationship depends on the magnitude of the change in quota as well as other market factors in addition to total landings, so this relationship is difficult to predict. The relationship is also stronger for summer flounder and scup compared to black sea bass, so positive impacts of the commercial sector receiving a transfer are likely to be greater for black sea bass.

In theory, if the decision to transfer is based on a pattern of underutilization by the recreational sector, negative socioeconomic impacts to the recreational sector from such a transfer may not be realized. However, this would limit the potential for liberalizing recreational management measures. For these species, particularly for summer flounder and black sea bass, many stakeholders are of the opinion that recreational measures are currently overly restrictive. Because recreational harvest is more difficult to predict and control than commercial harvest, recreational management measures are frequently adjusted in order to strike an appropriate balance between conservation and angler satisfaction. Therefore, it may be less likely that a recreational to commercial transfer would actually occur.

Impacts of Transfers in Either Direction

The impacts of transfers should be considered in combination with the short-term and long-term impacts associated with commercial/recreational allocation modifications under alternative set 1. However, it is difficult to do so quantitatively given the uncertainties about allocation changes as well as the uncertainties in the frequency, amount, and direction of potential transfers. In general, any annual transfers away from a sector can compound the negative impacts experienced due to a reduction in that sector's total allocation, or in the short term could partially offset the positive impacts of an increase in allocation. Annual transfers to a sector can simultaneously create additional positive impacts on top of the positive impacts of reallocation from the perspective of the receiving sector, and also exacerbate negative impacts of a loss in allocation for the donating sector.

The impacts of transfers would also be influenced by annual reductions or increases in the overall ABC based on changes in projected stock biomass and the application of the Council's risk policy. The recipient of a transfer could have some negative socioeconomic impacts from ABC reductions mitigated by receiving a transfer, while the transferring sector may experience

exacerbated negative economic impacts from ABC reductions. Conversely, if the ABC were increasing, this could offset negative impacts to the transferring sector and provide additional benefits to the sector receiving the transfer.

As described above, the impacts of transfers may differ by state or region. For the commercial industry, the negative impacts associated with losing quota or the positive impacts associated with receiving a transfer are influenced by the method of quota allocation for each species. For summer flounder, commercial quota allocation will be revised as of January 1, 2021, and the state allocations are will then be tied to the overall coastwide commercial quota amount. This means that a transfer to or from the commercial quota could influence whether the coastwide commercial quota is above or below the quota threshold for modified allocations, which is currently specified at 9.55 million pounds. For black sea bass, a management action to potentially revise state commercial allocations is currently in development but a preferred alternative has not been identified, so it is difficult to predict the state or regional impacts of proposed quota transfers in combination with potential state allocation changes.

The impacts of transfers can also be impacted by the availability and management of substitute species for a particular sector. High availability and access to recreational or commercial substitute species would help mitigate negative impacts of a transfer away from a given sector, while lower availability and access would compound these negative effects.

Availability of a target species in a given year can also affect the outcome of a transfer, in the sense that availability influences catch rates and search costs associated with commercial and recreational trips. In general, it has been more difficult to calibrate recreational measures to constrain catch below the target level when availability for a species is high. This could drive managers to adopt commercial-to-recreational transfers more frequently under high availability conditions in order to avoid recreational overages.

4.4.3.2 Impacts to Transfer Cap Alternatives

Alternative set 2c (Section 4.2.1) contains options for setting a cap on the total amount of transfer between sectors, as a percentage of the ABC.

Alternative 2c-1 would specify that there is no transfer cap, meaning the Council and Board could recommend any amount of the ABC be transferred between sectors during the annual specifications process. This allows for maximum flexibility in changing the effective allocation in each year; however, this is also associated with a higher likelihood of politically contentious discussions during the annual specifications setting process and greater uncertainty about future effective sector allocations. The Council and Board could effectively consider large temporary reallocations on an annual basis. No transfer cap could also mean a very wide range of potential transfer amounts to consider and analyze. This could lead to less predictability and more frequent fluctuations in sector-specific landings limits from year to year, which could be amplified by changes in overall catch limits resulting from fluctuating stock projections. This could partially negate some of the positive impacts experienced by the sector receiving

transfers, given that it could mean their adjustments in the following year may be more severe than if a transfer did not occur the prior year.

Alternatives 2c-2, 2c-3, and 2c-4 provide options for transfer caps set at 5%, 10%, and 15% of the ABC, respectively. This would provide less flexibility in adapting to circumstances where there may be a surplus of allocation in one sector but a deficit in the other. However, a transfer cap also limits consideration of larger allocation transfers through the specifications process and would limit the politically contentious nature of this discussion and provide greater certainty in the effective sector allocations. Transfer caps would limit the allocation changes that could occur from year to year. Transfer caps would somewhat streamline the process of transfer consideration given that it would limit the range of what could be considered. A lower transfer cap (alternative 2c-2) would accomplish this more so than a larger cap (alternative 2c-4).

Under all alternatives, increased fluctuation in allocation from year to year could increase instability and unpredictability in landing limits, which could partially negate the positive impacts from a transfer even if a cap is in place, although transfer caps under alternatives 2c-2 through 2c-4 would lower the likelihood or severity of this, particularly if the cap is lower.

Under all transfer alternatives, if larger and/or more frequent transfers are adopted, this may indicate that the allocation is not properly specified in the FMP and consideration should be given to modifications to the allocation percentages.

Table 38 shows 5%, 10%, and 15% transfer caps in millions of pounds under the 2017-2021 high and low ABCs for each species. This is meant to provide an example of the amounts that could have been transferred between sectors under recent high and low ABCs. This does not represent a theoretical minimum or maximum amount of quota transfer in pounds, given that the transfer cap alternatives are specified as a percent of the ABC and will vary as ABCs change.

Between 2017-2021, alternative 2c-2 (5% cap) would have resulted in a cap between 0.45 and 1.96 million pounds depending on the species and year. Alternative 2c-3 (10% cap) would have resulted in a cap between 0.89 and 3.91 million pounds depending on the species and year. Alternative 2c-4 (15% cap) would have resulted in a cap between 1.34 and 5.87 million pounds depending on the species and year. Over this time period, scup would have had the highest average transfer cap given the highest average ABC, followed by summer flounder and then black sea bass.

Table 38. Example transfer caps under alternatives 2c-2 through 2c-4 for the 2017-2021 high and low ABCs for each species, in millions of pounds. Note that these are only examples using recent ABCs and do not represent a theoretical maximum or minimum transfer am

		Summer Flounder	Scup	Black Sea Bass
ABC for comparison	2017-2021 Low ABC	11.30	28.40	8.94
	2017-2021 High ABC	27.11	39.14	17.45
2c-2: 5% of ABC	2017-2021 Low Transfer Cap	0.57	1.42	0.45
	2017-2021 High Transfer Cap	1.36	1.96	0.87
2c-3: 10% of ABC	2017-2021 Low Transfer Cap	1.13	2.84	0.89
	2017-2021 High Transfer Cap	2.71	3.91	1.75
2c-4: 15% of ABC	2017-2021 Low Transfer Cap	1.70	4.26	1.34
	2017-2021 High Transfer Cap	4.07	5.87	2.62

4.4.4 Impacts of Framework/Addendum Provision Alternatives

The impacts of alternatives 3a and 3b are briefly described below. These alternatives are primarily procedural in nature. The purpose of modifying the list of “frameworkable items” in the FMP is to demonstrate that the concepts included on the list have previously been considered in an amendment (i.e., they are not novel).

Alternative 3a would make no changes to the current list of framework provisions in the Council's FMP and no changes to the current list of measures subject to change under adaptive management in the Commission’s FMP. Any future proposed modifications to the commercial/recreational allocations or proposed allocation transfer systems would likely require a full FMP amendment. The timeline and complexity of such an amendment would depend on the nature of the specific options considered.

Alternative 3b would allow changes to commercial/recreational allocations and sector allocation transfer provisions to be implemented through a framework action (for the Council) and/or an FMP addendum (for the Commission). This alternative is intended to simplify and improve the efficiency of future actions to the extent possible and would not have any direct impacts on the environment or human communities as is primarily procedural in nature. As previously stated, under alternative 3b, the Council and Board could still decide it is more appropriate to use an amendment if significant changes are proposed. The impacts of any specific changes to the commercial/ recreational allocations or transfers between the sectors considered through a future framework/ addendum would be analyzed through a separate process with associated public comment opportunities and a full description of expected impacts.

4.5 ALTERNATIVE STATE MANAGEMENT REGIMES

4.5.1 General Procedures

A state may submit a proposal for a change to its regulatory program or any mandatory compliance measure under this Amendment to the Commission. Such changes shall be submitted to the Chair of the Plan Review Team (PRT), who shall distribute the proposal to appropriate groups, including the Board, the PRT, the TC, and the AP.

The PRT is responsible for gathering the comments of the TC and the AP. The PRT is also responsible for presenting these comments to the Board for decision.

The Board will decide whether to approve the state proposal for an alternative management program if it determines that it is consistent with the target fishing mortality rate applicable as well as the goals and objectives of this Amendment.

In order to maintain consistency within a fishing season, new rules should be implemented prior to the start of the fishing season. Given the time needed for the TC, AP, and Board to review the proposed regulations, as well as the time required by an individual state to promulgate new regulations, it may not be possible to implement new regulations for the on-going fishing season. In this case, new regulations should be effective at the start of the following season after a determination to do so has been made.

4.5.2 Management Program Equivalency

The technical committee, under the direction of the PRT, will review any alternative state proposals under this section and provide its evaluation of the adequacy of such proposals to the Board via the PRT. The PRT can also ask for reviews by the Law Enforcement Committee (LEC) or the AP.

4.5.3 De minimis Fishery Guidelines

The Commission's Interstate Fisheries Management Program Charter defines *de minimis* as a situation in which, under existing conditions of the stock and scope of the fishery, conservation and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by an FMP or amendment. Commission FMPs commonly include *de minimis* provisions to relieve regulatory and monitoring burdens for states that meet predetermined conditions and follow a defined request process.

De minimis status currently is only applicable to the summer flounder FMP, and is not applicable to scup or black sea bass. Any state in which commercial summer flounder landings during the last preceding calendar year for which data are available were less than 0.1 percent of the total coastwide quota for that year could be granted *de minimis* status for the summer flounder commercial fishery by NOAA Fisheries and Commission upon the annual recommendation of the Council and Commission, by way of a formal written request from the

state and subsequent review and recommendation of the Summer Flounder Monitoring Committee. The following conditions would apply:

(1) The *de minimis* status will be valid only for that year for which the specifications are in effect, and will be effective upon filing by the NOAA Fisheries of the final specifications for the commercial summer flounder fishery with the Office of the Federal Register.
(2) The total quota allocated to each *de minimis* state will be set equal to 0.1 percent of the total yearly allocation, and will be subtracted from the coastwide quota before the remainder is allocated to the other states.
(3) In applying for *de minimis* status, a state must show that it has implemented reasonable steps to prevent landings from exceeding its *de minimis* allocation.

4.6 ADAPTIVE MANAGEMENT

The Board may vary the requirements specified in this Amendment as a part of adaptive management in order to conserve the summer flounder, scup, and black sea bass resources. The elements that can be modified by adaptive management are listed in *Section 4.6.2*. The process under which adaptive management can occur is provided below.

4.6.1 General Procedures

The PRT will monitor the status of the fishery and the resource and report on that status to the Board annually or when directed to do so by the Board. The PRT will consult with TC, the SASC, and the AP in making such review and report, if necessary.

The Board will review the report of the PRT, and may consult further with the TC, or AP. The Board may, based on the PRT report or on its own discretion, direct the plan development team (PDT) to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement the new provisions.

The PDT will prepare a draft addendum as directed by the Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The PDT will also request comment from federal agencies and the public at large. After at least a 30-day review period, staff, in consultation with the PDT, will summarize the comments received and prepare a final version of the addendum for the Board.

The Board shall review the final version of the addendum prepared by the PDT, and shall also consider the public comments received and the recommendations of the TC, LEC, and AP. The Board shall then decide whether to adopt, or revise and then adopt, the addendum.
Upon adoption of an addendum by the Board, states shall prepare plans to carry out the addendum, and submit them to the Board for approval according to the schedule contained in the addendum.

4.6.2 Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the Board:

(1.) Minimum fish size.
(2.) Maximum fish size.
(3.) Gear restrictions.
(4.) Gear requirements or prohibitions.
(5.) Permitting restrictions.
(6.) Recreational possession limit.
(7.) Recreational seasons.
(8.) Closed areas.
(9.) Commercial seasons.
(10.) Commercial trip limits.
(11.) Commercial quota system including commercial quota allocation procedure and possible quota set asides to mitigate bycatch.
(12.) Recreational harvest limit.
(13.) Annual specification quota setting process.
(14.) FMP Technical Monitoring Committee composition and process
(15.) Description and identification of essential fish habitat (EFH) and fishing gear management measures that impact EFH.
(16.) Description and identification of habitat areas of particular concern.
(17.) Overfishing definition and related thresholds and targets.
(18.) Regional gear restrictions.
(19.) Regional season restrictions (including option to split seasons).
(20.) Restrictions on vessel size (LOA and GRT) or shaft horsepower.
(21.) Operator permits
(22.) Any other commercial or recreational management measure
(23.) Any other management measures currently included in the FMP.
(24.) Set aside quotas for scientific research.
(25.) Commercial/recreational sector allocations
(26.) Commercial/recreational sector transfers.

4.6.3 Proposed Adaptive Management Measures

This alternative set would add certain issues considered through this Amendment to the list of measures subject to change under adaptive management. Under this action, the adaptive management measures would apply to commercial/recreational allocation changes and quota transfer provisions between the commercial and recreational sectors.

Alternative 4a: No action/status quo

This alternative makes no changes to the list of measures subject to change. Future changes to commercial/recreational allocations must be made through an amendment.

Alternative 4b: Allow changes to commercial/recreational allocations
This alternative adds annual quota transfers, and commercial/recreational allocations to the list of measures subject to change through adaptive management.

4.7 EMERGENCY PROCEDURES

Emergency procedures may be used by the Board to require any emergency action that is not covered by, is an exception to, or a change to any provision in this Amendment. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2019).

4.8 MANAGEMENT INSTITUTIONS

4.8.1 Atlantic States Marine Fisheries Commission and ISFMP Policy Board

The Commission and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's fisheries management activities. The Commission must approve all fishery management plans and amendments, including this Amendment. The ISFMP Policy Board reviews any non-compliance recommendations of the various Boards and, if it concurs, forwards them to the Commission for action.

4.8.2 Summer Flounder, Scup, and Black Sea Bass Management Board

The Board was established under the provisions of the Commission's ISFMP Charter (Section Four; ASMFC 2019) and is generally responsible for carrying out all activities under this Amendment.

The Board establishes and oversees the activities of the Plan Development Team, Plan Review Team, Technical Committee, and the Advisory Panel. In addition, the Board makes changes to the management program under adaptive management, reviews state programs implementing the amendment, and approves alternative state programs through conservation equivalency. The Board reviews the status of state compliance with the management program annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP Policy Board under the terms of the ISFMP Charter.

4.8.3. Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment Fishery Management Action Team and Plan Development Team

The Fishery Management Action Team (FMAT) and the Plan Development Team (PDT) is composed of personnel from state and federal agencies who have scientific knowledge of summer flounder, scup, and black sea bass and management abilities. The FMAT/PDT is responsible for preparing and developing management documents, including amendments, using the best scientific information available and the most current stock assessment information. FMAT and PDT membership and purpose are identical, the key distinction is the FMAT is convened in accordance with MAFMC guidelines and the PDT is convened in accordance with the Interstate Fisheries Management Program Charter. For ease of reading,

the PDT/FMAT is simply referred to as FMAT throughout this Amendment. The ASMFC FMP Coordinators are members of the FMAT/PDT. The FMAT/PDT will either disband or assume inactive status upon completion of this Amendment.

4.8.4 Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment Plan Review Team

The Plan Review Team (PRT) is composed of personnel from state and federal agencies who have scientific and management ability and knowledge of summer flounder, scup, and black sea bass. The PRT is responsible for providing annual advice concerning the implementation, review, monitoring, and enforcement of this Amendment once it has been adopted by the Commission. After final action on the amendment, the Board may elect to retain members of the PDT as members of the PRT, or appoint new members.

4.8.5 Summer Flounder, Scup, and Black Sea Bass Technical Committee

The Summer Flounder, Scup, and Black Sea Bass Technical Committee (TC) consists of representatives from state or federal agencies, Regional Fishery Management Councils, the Commission, a university, or other specialized personnel with scientific and technical expertise, and knowledge of the summer flounder, scup, and black sea bass fisheries. The Board appoints the members of the TC and may authorize additional seats as it sees fit. The role of the TC is to assess the species' population, provide scientific advice concerning the implications of proposed or potential management alternatives, and respond to other scientific questions from the Board, PDT, or PRT.

4.8.6 Summer Flounder, Scup, and Black Sea Bass Advisory Panel

The Summer Flounder, Scup, and Black Sea Bass Advisory Panel (AP) is established according to the Commission's Advisory Committee Charter. Members of the AP are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about summer flounder, scup, and black sea bass conservation and management. The AP provides the Board with advice directly concerning the Commission's summer flounder, scup, and black sea bass management program.

4.8.7 Federal Agencies

4.8.7.1 Management in the Exclusive Economic Zone

Management of summer flounder in the EEZ is within the jurisdiction of one Regional Fishery Management Council (the Mid-Atlantic Fishery Management Council) under the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). The Council annually makes recommendations on catch and landings limits as well as gear modifications to the NOAA Fisheries through the specification process. More information can be found in section 4.1.

4.8.7.2 Federal Agency Participation in the Management Process

The Commission has accorded USFWS and NOAA Fisheries voting status on the ISFMP Policy Board and the Summer Flounder, Scup, and Black Sea Bass Management Board in accordance with the Commission's ISFMP Charter. NOAA Fisheries can also participate on the Summer Flounder, Scup, and Black Sea Bass FMAT, PRT, and TC.

4.8.7.3 Consultation with Fishery Management Councils

At the time of adoption of this Amendment, the Mid-Atlantic Fishery Management Council is the only Regional Fishery Management Council to have implemented a management plan for summer flounder, scup, and black sea bass; no other Councils have indicated an intent to develop a plan.

4.9 RECOMMENDATIONS TO THE SECRETARY OF COMMERCE FOR COMPLEMENTARY ACTIONS IN FEDERAL JURISDICTIONS

The summer flounder, scup, and black sea bass fishery management plan is jointly managed between the Commission, Council, and NOAA Fisheries. The proposed alternatives in this Amendment will affect both state and federal permit holders operating in the commercial and recreational summer flounder, scup, and black sea bass fisheries in both state and federal waters. The Atlantic states (through the Commission), the Council, and NOAA Fisheries through joint management coordinate to ensure consistency in management between state and federal waters. Therefore, a specific recommendation to the Secretary of Commerce for complementary action in federal jurisdictions is unnecessary at this time. The Board may consider further recommendations to the Secretary if changes to this Amendment occur through the adaptive management process (*Section 4.6*).

4.10 COOPERATION WITH OTHER MANAGEMENT INSTITUTIONS

The Board will cooperate, when necessary, with other management institutions during the implementation of this Amendment, including NOAA Fisheries and the New England, Mid-Atlantic, and South Atlantic Fishery Management Council.

5.0 COMPLIANCE

The full implementation of the provisions included in this Amendment is necessary for the management program to be equitable, efficient, and effective. States are expected to implement these measures faithfully under state laws. The Commission will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan.

The Board sets forth specific elements that the Commission will consider in determining state compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fishery Management Program Charter (ASMFC 2019).

5.1 MANDATORY COMPLIANCE ELEMENTS FOR STATES

A state will be determined to be out of compliance with the provision of this fishery management plan according to the terms of Section Seven of the ISFMP Charter if:

- Its regulatory and management programs to implement this Amendment have not been approved by the Board; or

- It fails to meet any schedule required by Section 5.2, or any addendum prepared under adaptive management (*Section 4.6*); or

- It has failed to implement a change to its program when determined necessary by the Board; or

- It makes a change to its regulations required under *Section 4* or any addendum prepared under adaptive management (*Section 4.6*), without prior approval of the Board.

5.1.1 Regulatory Requirements

To be considered in compliance with this fishery management plan, all state programs must include a regime of restrictions on summer flounder, scup, and black sea bass fisheries consistent with the requirements of *Section 3.1.1: Commercial Catch and Landings Programs; Section 3.3: Biological Data Collection Programs;* and *Section 4.0: Management Program*. A state may propose an alternative management program under *Section 4.5: Alternative State Management Regimes*, which, if approved by the Board, may be implemented as an alternative regulatory requirement for compliance. This document complements other regulatory requirements and standards pertaining to summer flounder, scup, and black sea bass fisheries. The recreational management measures specifications process for summer flounder and black sea bass (Addendum XXXII), scup commercial quota management (Addendum XXIX), etc. Each species' key compliance items requested through the annual compliance review are listed below in section 5.3.

5.2 COMPLIANCE SCHEDULE

States must implement this Amendment according to the following schedule:

Month Day, 202X:	Submission of state plans to implement the amendment for approval by the Board, if it is necessary to change state law or regulation.
Month Day, 202X:	Implementation date of the Amendment. This date may change based on the timing of Final Approval of the Council FMP by the Secretary of Commerce.

5.3 COMPLIANCE REPORT CONTENT

5.3.1 Summer Flounder Compliance Report Content

Each state must submit to the Commission an annual report concerning its summer flounder fisheries and management program for the previous year, no later than June 1st. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.
The report shall cover:

Request for *de minimis*, where applicable.

Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimis* status.

Previous calendar year's fishery

a. Activities of fishery dependent monitoring (provide a brief review of results including monitoring of gear restrictions; prohibition of transfers at sea; and minimum size limit).
b. Activities of fishery independent monitoring (provide a brief review of results).
c. Copy of regulations that were in effect for 2019. Has the state implemented the required measures as mandated in the FMP, listed below? Please answer with either 'yes' or 'no'.

Commercial

Has the state implemented the required measure?	yes	no
14" minimum size		
5.5" diamond or 6" square minimum mesh		
Threshold to trigger minimum mesh size requirements: (200 lbs 11/1 - 4/30; 100 lbs from 5/1 - 10/31)		
Prohibition of transfers at sea		

Recreational

Provide state specific measures for the previous and current fishing season.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Planned management programs for the current calendar year

Summarize any changes from previous years

5.3.2 Scup Compliance Report Content

Each state must submit to the Commission an annual report concerning its scup fisheries and management program for the previous year, no later than June 1st. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

Request for *de minimis*, where applicable.

Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimis* status.

Previous calendar year's fishery

a. Activities of fishery dependent monitoring (provide a brief review of results including monitoring of gear restrictions and quota management for the winter I & II and summer periods; minimum size).
b. Activities of fishery independent monitoring (provide a brief review of results).
c. Copy of regulations that were in effect for the most recent year. Has the state implemented the required measures as mandated in the FMP, listed blow? Please answer with either 'yes' or 'no'.

Commercial

Has the state implemented the required measure?	yes	no
9" minimum size		
Minimum diamond mesh: Otter trawls must have a minimum mesh size of 5" for the first 75 meshes from the terminus of the net and a minimum mesh size of 5" throughout the net for codends constructed with fewer than 75 meshes		
Maximum roller rig trawl roller diameter: 18"		
Threshold to trigger minimum mesh requirements: (1,000 lbs 10/1 - 4/15; 2,000 lbs from 4/15 - 6/15; 200 lbs 6/15 - 9/30)		
Pot and trap escape vents: 3.1" circular escape vents, 2.25" square escape vent, or rectangular escape vent of equivalent size.		
Pot and trap degradable fastener provisions: a) untreated hemp, jute, or cotton string 3/16" (4.8 mm) or smaller; b) magnesium alloy timed float releases or fasteners; c) ungalvanized, uncoated iron wire of 0.094" (2.4mm) or smaller		

Recreational

Provide state specific measures for the previous and current fishing season

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Planned management programs for the current calendar year

Summarize any changes from previous years.

5.3.3 Black Sea Bass Compliance Report Content

Each state must submit to the Commission an annual report concerning its summer flounder fisheries and management program for the previous year, no later than June 1st. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

Request for *de minimis*, where applicable.

Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimis* status. (Amendment 13)

Previous calendar year's fishery

a. Activities of fishery dependent monitoring (provide a brief review of results including monitoring of gear restrictions and minimum size).
b. Activities of fishery independent monitoring (provide a brief review of results).
c. Copy of regulations that were in effect for 2019. Has the state implemented the required measures as mandated in the FMP, listed below? Please answer with either 'yes' or 'no'.

Commercial

Has the state implemented the required measure?	yes	no
11" minimum size		
4.5" minimum mesh size for entire net or 4.5" diamond mesh in codend (for large trawl nets)		
Threshold to trigger minimum mesh requirements: (500 lbs for January - March; 100 lbs from April- December)		
2.5" circular escape vents, 2" square escape vent, or 1.375" X 5.75"rectangular escape vent for pots/traps. Two vents required in parlor portion of pot/trap.		
Pot and trap degradable fastener provisions: a) untreated hemp, jute, or cotton string 3/16" (4.8 mm) or smaller; b) magnesium alloy timed float releases or fasteners; c) ungalvanized, uncoated iron wire of 0.094" (2.4mm) or smaller. The opening covered by a panel affixed with degradable fasteners would be required to be at least 3"x 6".		

Recreational

Provide state specific measures for the previous and current fishing season.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Planned management programs for the current calendar year

Summarize any changes from previous years.

5.4 PROCEDURES FOR DETERMINING COMPLIANCE

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section Seven (ASMFC 2019). In brief, all states are responsible for the full and effective implementation and enforcement of fishery management plans in areas subject to their jurisdiction. Written compliance reports as specified in the amendment must be submitted annually by each state with a declared interest. Compliance with this FMP will be reviewed at least annually; however, the Board, ISFMP Policy Board, or the Commission may request the PRT to conduct a review of state's implementation and compliance with the FMP at any time.

The Board will review the written findings of the PRT within 60 days of receipt of a State's compliance report. Should the Board recommend to the Policy Board that a state be determined out of compliance, a rationale for the recommended noncompliance finding will be addressed in a report. The report will include the required measures of this FMP that the state has not implemented or enforced, a statement of how failure to implement or enforce required measures jeopardizes the species in question's conservation, and the actions a state must take in order to comply with requirements of this FMP.

The ISFMP Policy Board will review any recommendation of noncompliance from the Board within 30 days. If it concurs with the recommendation, it shall recommend to the Commission that a state be found out of compliance.

The Commission shall consider any noncompliance recommendation from the ISFMP Policy Board within 30 days. Any state that is the subject of a recommendation for a noncompliance finding is given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the ISFMP Policy Board, it may determine that a state is not in compliance with this Amendment, and specify the actions the state must take to come into compliance.

Any state that has been determined to be out of compliance may request that the Commission rescind its noncompliance findings, provided the state has revised its conservation measures.

5.5 ANALYSIS OF ENFORCEABILITY OF PROPOSED MEASURES

All state programs must include law enforcement capabilities adequate for successfully implementing that state's summer flounder, scup, and black sea bass regulations. The LEC will monitor the adequacy of a state's enforcement activity.

6.0 MANAGEMENT AND RESEARCH NEEDS

The following lists of research needs have been identified to enhance knowledge of the summer flounder, scup, and black sea bass resources. These research needs are drawn from the most recent benchmark stock assessments for each species; the MAFMC's Five Year Research

Plan (2020-2024); and the Commission's Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management. The list of research recommendations are classified into 1) stock assessment and population dynamics; 2) research and data needs.

6.1 SUMMER FLOUNDER MANAGEMENT AND RESEARCH NEEDS

6.1.1 Stock Assessment and Population Dynamics

1. Continue to explore changes in the distribution of recruitment. Develop studies, sampling programs, or analyses to better understand how and why these changes are occurring, and the implications to stock productivity.

2. Evaluate the size distribution of landed and discarded fish, by sex, in the summer flounder fisheries.

3. Explore the potential mechanisms for recent slower growth that is observed in both sexes.
4. Incorporate sex -specific differences in size at age into the stock assessment.

5. Continue efforts to improve understanding of sexually dimorphic mortality and growth patterns. This should include monitoring sex ratios and associated biological information in the fisheries and all ongoing surveys to allow development of sex-structured models in the future.

6. Apply standardization techniques to all of the state and academic-run surveys, to be evaluated for potential inclusion in the assessment.

6.1.2 Research and Data Needs

1. Collect data to evaluate the length, weight, and age compositions of landed and discarded fish in the summer flounder fisheries (recreational and commercial) by sex. Focus should be placed on age sampling of summer flounder 24 inches or larger in total length, using paired hard part samples (i.e., scales, and when possible, otoliths).

2. Evaluate Summer Flounder discard survival under different environmental variables and gear configurations with survey design considerations that account for to feeding and predation.

3. Continue to evaluate the causes for decreased recruitment, changes in recruitment distribution, and changes in the recruit-per-spawner relationship in recent years. Develop studies, sampling programs, or analyses to better understand how and why these changes are occurring, and the implications to stock productivity.

4. Evaluate changes in habitat use/availability by early life stage summer flounder.

6.2 SCUP MANAGEMENT AND RESEARCH NEEDS

6.2.1 Stock Assessment and Population Dynamics

1. A standardized fishery dependent CPUE of scup targeted tows, from either Northeast Fisheries Observer Program observer samples or the commercial study fleet, might be considered as an additional index of abundance to complement survey indices in future benchmark assessments.

2. Explore additional sources of length/age data from fisheries and surveys in the early parts of the time series to provide additional context for model results.

3. Explore experiments to estimate catchability of scup in NEFSC and other research trawl surveys (side-by-side, camera, gear mensuration, acoustics, etc.)

4. Quantification of the biases in the catch and discards, including non-compliance, would help confirm the weightings used in the next stock assessment model.

5. Experimental work to better characterize the discard mortality rate of scup captured by different commercial gear types should be conducted to more accurately quantify the magnitude of scup discard mortality.

6. A scientifically designed survey to sample larger and older scup would likely prove useful in improving knowledge of the relative abundance of these larger fish.

7. Explore the applicability of the pattern of fishery selectivity in the model to the most recent catch data to determine whether a new selectivity block in the model is warranted.

6.2.2 Research and Data Needs

1. A management strategy evaluation of alternative approaches to setting quota.

2. Evaluate the spatial and temporal overlap of Scup and squid to better understand and characterize Scup discard patterns.

3. Characterize the pattern of selectivity for older ages of scup in both surveys and fisheries.

4. Explore the relationship between Scup market trends, regulatory changes, and commercial landings and discards.

5. Evaluate the role and relative importance of implemented strategies (i.e., gear restricted areas, increased minimum mesh size, and minimizing scup and squid fishery interactions) versus the long-term climate variability to the increases in stock abundance and high recruitment events since 2000.

6. Characterize the current Scup market and explore the development of new markets.

6.3 BLACK SEA BASS MANAGEMENT AND RESEARCH NEEDS

6.3.1 Stock Assessment and Population Dynamics

1. Continue and expand the tagging program to provide increased age information and increased resolution on mixing rates among putative populations

2. Expand on previous genetic studies with smaller spatial increments in sampling.

3. Consider the impact of climate change on black sea bass, particularly in the Gulf of Maine.

4. Evaluate population sex change and sex ratio, particularly comparing dynamics among communities.

5. Study black sea bass catchability in a variety of survey gear types.

6. Investigate and document social and spawning dynamics of black sea bass.

7. Evaluate use of samples collected by industry study fleets.

8. Explore alternative assessment models, including non-age based alternatives

6.3.2 Research and Data Needs

1. Increase sampling of commercial landings

2. Increase sample size of at sea observers and dockside validation of headboats. Increase recreational fisheries sampling.

3. Determine depth, temperature, and season specific discard mortality rates. Assess and incorporate the impact of circle hook fishing regulations on discard mortality. Obtain more depth specific information from the private recreational fleet, MRIP At-Sea observer program, and Headboat Survey in the range of the southern stock.

4. Collect better spatial information in black sea bass fisheries to determine potential localized depletion effects.

5. Conduct a pot survey throughout the range of the northern management unit and consider for an index of abundance.

6. Expand fishery-independent surveys to sample all sizes and age classes to develop more reliable catch-at-age and CPUE.

7. Expand sampling to cover the entire range of the southern stock over a longer time period.

8. Conduct at sea sex sampling to determine trend of sex change timing and assess the potential influence of population size on sex switching.

9. Develop a reliable fishery independent index for black sea bass for habitats not effectively sampled with existing methodologies.

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APPENDIX I: SUPPLEMENTAL INFORMATION ON BASIS FOR ALLOCATION ALTERNATIVES

This appendix describes the rationale behind each of the commercial/recreational allocation percentage alternatives listed in alternative sets 1a-1c (Table 39). These alternatives were initially developed by the FMAT (Fishery Management Action Team) and approved by the Council and Board for inclusion in this Amendment.

Table 39. Alternatives considered through this Amendment for commercial/recreational allocation percentages (i.e., alternative sets 1a – summer flounder, 1b - scup, and 1c – black sea bass) grouped according to the approach used to derive the alternatives.

Approach	Description	Associated Alternatives
A	No action/status quo	1a-4, 1b-1, 1c-4
B	Same base years as current allocations (varies by species) but with new data	1a-5, 1b-2, 1b-5*, 1c-5
C	2004-2018 base years	1a-1, 1a-6*, 1b-6, 1c-2
D	2009-2018 base years	1a-2*, 1a-6*, 1b-3*, 1b-5*, 1c-3, 1c-7*
E	2014-2018 base years	1a-3, 1a-7, 1b-5*, 1c-7*
F	Approximate status quo harvest per sector compared to 2017/2018 (summer flounder) or 2018/2019 (scup, black sea bass)	1a-2*, 1b-4, 1b-7, 1c-1, 1c-6*
G	Average of other approaches approved by Council/Board in June 2020	1a-2*, 1b-3*, 1c-6*

*indicates an alternative supported by multiple approaches.

Approach A (no action/status quo)

The no action/status quo alternatives consider the consequences of taking no action and retaining the current commercial/recreational allocations. It is required that all Council and Commission amendments consider no action/status quo alternatives.

Approach B (same base years as current allocations but with new data)

This approach would use updated recreational and commercial data from the same base years as the current allocations to inform new allocation percentages. This is the basis (or, depending on the alternative, part of the basis) for alternatives 1a-5, 1b-2, 1b-5, and 1c-5.

Both catch and landings-based alternatives using this approach are considered for scup (alternatives 1b-2 and 1b-5, respectively). However, for summer flounder and black sea bass, only landings-based alternatives using this approach are considered (alternative 1a-5 for summer flounder and 1c-5 for black sea bass). This is because dead discard estimates in weight are not available for all the current base years for summer flounder (i.e., 1980-1989) and black sea bass (i.e., 1983-1992). Estimates of landings and dead discards in weight in both sectors are available for all the current base years for scup (i.e., 1988-1992).

MRIP does not provide estimates of recreational catch or harvest prior to 1981; therefore, the full 1980-1989 base years for summer flounder cannot be re-calculated for the recreational fishery. Instead, alternative 1a-5 uses 1981-1989 as the base years.
The rationale behind the selection of the current base years for each species is not explicitly defined in the FMP amendments that first implemented the commercial/recreational allocations. The current base years for scup and black sea bass are all years prior to Council and Commission management. For summer flounder, the Commission FMP was adopted in 1982 but contained mostly management guidelines rather than required provisions. The joint Council and Commission FMP was adopted in 1988, toward the end of the 1980-1989 base year period used to develop allocations. The management program for summer flounder was quite limited until Amendment 2 was implemented in 1993. The current base years for each species were likely chosen based on a desire to use as long of a pre-management time period as possible considering the limitations of the relevant data sets.

The approach of revising the commercial/recreational allocations using the same base years and new data allows for consideration of fishery characteristics in years prior to influence by the commercial/recreational allocations, while also using what is currently the best scientific information available to understand the fisheries in those base years.

Approach III (2004-2018 base years), approach D (2009-2018 base years), and approach E (2014-2018 base years)

Under approaches C, D, and E, the commercial/recreational allocation for each species would be based on the proportion of catch or landings from each sector during the most recent 15, 10, or 5 years through 2018, respectively. Final 2019 data from both sectors were not available during initial development of these alternatives; therefore, this Amendment only considers catch and landings data through 2018.

The fisheries have changed notably since the commercial/recreational allocations were first implemented in 1993 for summer flounder, 1997 for scup, and 1998 for black sea bass. Most notably, all three species were under rebuilding programs when these allocations were first implemented. According to the most recent stock assessment information, none of the three species are currently overfished or experiencing overfishing. Black sea bass and scup biomass levels are particularly high, at 237% and 198% of the target levels in 2018, respectively. Summer flounder biomass was at 78% of the target level in 2017.[12]

Other characteristics of the fisheries have also changed. Limited access programs for the commercial fisheries were implemented after the initial allocation base years. Possession limits and required minimum fish sizes in both sectors were implemented and have constrained both commercial and recreational harvest. Reporting and monitoring systems and requirements in both sectors have improved. Socioeconomic conditions such as demand for seafood and the demographics and number of both commercial and recreational fishermen have also shifted.

[12] Stock assessment reports for these species can be found at: https://www.fisheries.noaa.gov/resource/publication-database/northeast-stock-assessment-documents-search-tool.

For these reasons, this Amendment will consider allocation percentages based on more recent trends in the fisheries compared to the initial base years. The FMAT, Council, and Board agreed that the most recent 15, 10, and 5 years (through 2018) are reasonable time periods to consider.

During these time periods, the fisheries were theoretically constrained by the current allocations. However, the commercial fisheries were generally held closer to their allocations than the recreational fisheries, even when measuring recreational harvest with the pre-calibration MRIP data available prior to 2018. Due to the nature of these fisheries, the commercial fisheries have been much more comprehensively monitored in a more timely manner than recreational fisheries during these time periods. All federally permitted commercial fishermen are required to sell their catch to federally permitted dealers, and those dealers must submit landings reports on a weekly basis. If commercial fisheries are projected to land their full quota prior to the end of the year or quota period, they can be shut down. The commercial fisheries have rarely exceeded their quotas by notable amounts over the past 15 years due to close monitoring and reporting.

Recreational harvest is monitored through a combination of voluntary responses to MRIP surveys and VTR data from federally permitted for-hire vessels. Preliminary MRIP data are provided in two month "wave" increments and are not released until approximately two months after the end of the wave. Final recreational data are generally not available until the spring of the following year. Due to the delay in data availability, in-season closures are not used for these recreational fisheries. Recreational fisheries are primarily managed with a combination of possession limits, minimum fish sizes, and open/closed seasons that are projected to constrain harvest to a certain level. However, recreational harvest is influenced by a number of external factors, and the level of harvest associated with a specific combination of possession limits, minimum fish sizes, and open/closed seasons can be difficult to accurately predict. Compared to commercial effort, recreational effort is more challenging to manage, especially considering the recreational sector is an open access fishery. For these reasons, recreational harvest is not as tightly controlled and monitored as commercial landings.

In summary, there are tradeoffs associated with allocations based on recent fishery performance. These allocations could better reflect the current needs of the fisheries and be more responsive to changes in the fisheries and stocks compared to allocations using the initial base years. However, these alternatives would reallocate based on time periods when the recreational fishery was effectively less constrained to their limits than the commercial fishery. The implications may be different for each of the three species, and the issues should be carefully considered. From 2004-2018, scup tended to have more consistent quota and RHL underages in both sectors than summer flounder and black sea bass, and black sea bass had much more consistent RHL overages than the other two species (in all cases considering the pre-calibration MRIP data available prior to 2018).

Approach F: Approximate status quo harvest per sector compared to 2017/2018 (summer flounder) or 2018/2019 (scup, black sea bass)

Rationale

The intent behind this approach is to modify the percentage allocations to allow for roughly status quo landings in both sectors under the 2020-2021 ABCs for all three species compared to year(s) prior to the recent catch limit revisions based on the most recent stock assessments. This approach was developed prior to the August 2020 Council and Board meeting when both groups agreed to revise the 2021 ABCs for all three species; therefore, this approach considers the previously implemented 2021 ABCs. Compared to the previously implemented 2021 ABCs, the revisions approved by the Council and Board in August 2020 represent an increase of 8% for summer flounder, 13% for scup, and 9% for black sea bass.

The most recent stock assessments for all three species incorporated the revised MRIP data as well as updated commercial fishery data and fishery-independent data through 2017 for summer flounder and 2018 for scup and black sea bass. Catch and landings limits based on these assessments were implemented in 2019-2021 for summer flounder and 2020-2021 for scup and black sea bass. Identical catch and landings limits across each year were implemented for summer flounder and black sea bass. For scup, the catch and landings limits varied across 2020-2021.

For summer flounder, these changes resulted in a 49% increase in the commercial quota and RHL in 2019 compared to 2018. Despite the increase in the RHL, recreational management measures could not be liberalized because the revised MRIP data showed that the recreational fishery was already harvesting close to the increased RHL. The increased commercial quota allowed for an increase in commercial landings.

For black sea bass, these changes resulted in a 59% increase in the commercial quota and RHL for 2020 compared to 2019. Status quo recreational measures for black sea bass were expected to result in an overage of the increased 2020 RHL; however, the Council, Board, and NOAA Fisheries agreed to maintain status quo recreational management measures for 2020 to allow more time to consider how to best modify recreational management in light of the new MRIP data. Commercial landings appear to have increased in response to the increase in the quota; however, they are not likely to increase by the full 59% due to the impacts of the COVID-19 pandemic on market demand.

For scup, these changes resulted in a decrease in the commercial quota (-7%) and RHL (-12%) in 2020 compared to 2019. Status quo recreational measures for scup in 2020 were maintained based on similar justifications described above for black sea bass as well as the expectation that the commercial fishery would continue to under-harvest their quota due to market reasons. Given these circumstances, an attempt was made to calculate revised commercial/recreational allocations for all three species such that harvest in each sector could remain similar to pre-2019 levels for summer flounder and pre-2020 levels for scup and black sea bass (i.e., the years prior to implementation of the most recent stock assessments for all three species), at least on

a short-term basis under the current ABCs. This would require lower commercial quotas than those currently implemented for all three species. However, the Council and Board agreed that this approach warrants further consideration given that the commercial quotas for summer flounder and black sea bass increased by 49% and 59% respectively as a result of the most recent stock assessments, the commercial scup quota has been under-harvested for over 10 years. The recreational black sea bass and scup fisheries are facing the potential for severe restrictions based on a comparison of the revised MRIP data in recent years to the current RHLs under the existing allocations.

Defining status quo for each species and sector

Due to unique circumstances in each fishery, the status quo harvest target under this approach was not defined the same way across all species and sectors. Recreational harvest can vary notably from year to year, even under similar management measures. For this reason, recreational status quo for all three species was defined as average recreational harvest in pounds during the two years prior to the most recent catch limit revisions (i.e., 2017-2018 for summer flounder and 2018-2019 for scup and black sea bass). Commercial scup landings are also variable and have been below the quota since 2007 for market reasons. Therefore, status quo for the commercial scup fishery was also defined as a recent two-year average of harvest (2018-2019). For summer flounder and black sea bass, commercial status quo was defined as landings in the last year prior to revisions based on the most recent assessments (i.e., 2018 for summer flounder and 2019 for black sea bass). This reflects the fact that commercial summer flounder and black sea bass landings are generally close to the quotas.
Status quo levels of discards for each species and sector were defined using the same years described above for landings. At the time that this approach was developed, discard estimates in weight for 2019 were not available for either sector; therefore, it was assumed that 2019 discards would be equal to the 2016-2018 average for all species and sectors. Because the Council and Board approved specific allocation alternatives in August 2020, this analysis was not updated with the 2019 discard data that has since become available.

Methodology for calculating allocations

This approach considers the 2020 - 2021 ABCs (or, in the case of scup, the average of the 2020 and 2021 ABCs). Because this approach would modify the commercial/recreational allocation percentages, expected harvest and discards in each sector could not be calculated with the same methods used for setting the 2020-2021 specifications. Instead, initial values for expected dead discards by sector were calculated by dividing the 2020-2021 ABCs into expected total (i.e., both sectors combined) landings and total dead discards based on the average proportion of total landings and dead discards during 2017-2019 (see note above about 2019 discards). The expected total amount of dead discards was then divided into commercial and recreational discards based on the average contribution of each sector to total dead discards during 2017-2019. Initial expected harvest was defined as the status quo level of landings in each sector described above. These were the target commercial quotas and RHLs. As described below,

these initial values for both harvest and dead discards were modified during subsequent steps of the analysis.

For summer flounder, total expected catch was 18% below the 2020-2021 ABC. This surplus allowable catch was split evenly among the two sectors. The resulting catch and landings limits, including expected dead discards in each sector, were modified to account for this surplus. For scup, total expected catch was 9% above the 2020-2021 average ABC. For black sea bass, total expected catch was 2% above the 2020-2021 ABC. For both scup and black sea bass, the catch reduction necessary to prevent an ABC overage was evenly split between the two sectors. Thus, true status quo was not be maintained for any of the three species under this example. For summer flounder, both sectors were able to slightly liberalize compared to the definition of status quo described above. For scup and black sea bass, both sectors had to be slightly restricted. The resulting catch and landings limits were then used to define the allocation percentages in Table 40. These are the allocation percentages for consideration under this approach.

Table 40. **Allocations aiming to allow approximately status quo landings in each sector under the 2020-2021 ABCs compared to recent years prior to catch limit revisions based on the most recent stock assessments.**

Sector	**Catch-based**			**Landings-based**		
	Summer flounder	Scup	Black sea bass	Summer flounder	Scup	Black sea bass
Commercial	43%	59%	32%	43%	50%	29%
Recreational	57%	41%	68%	57%	50%	71%

Approach G (average of other approaches approved by Council/Board in June 2020)
The FMAT developed several allocation alternatives during May and June 2020. Many of these approaches resulted in very similar allocation percentages. The Council and Board refined the list of alternatives under consideration in June 2020 and agreed that it would be appropriate to consider an option for each species that averages the other alternatives in recognition of the similarities in outcomes across many alternatives.

Although this approach does not have a quantitative basis that is distinct from the other alternatives, the FMAT agreed that this is appropriate. They also emphasized that there is not necessarily a clear, objective scientific basis for a single best way to approach these allocations, and that the final decision will be a policy and judgement call between a number of defensible options.

APPENDIX II: EXAMPLE QUOTAS AND RHLS UNDER EACH ALLOCATION ALTERNATIVE

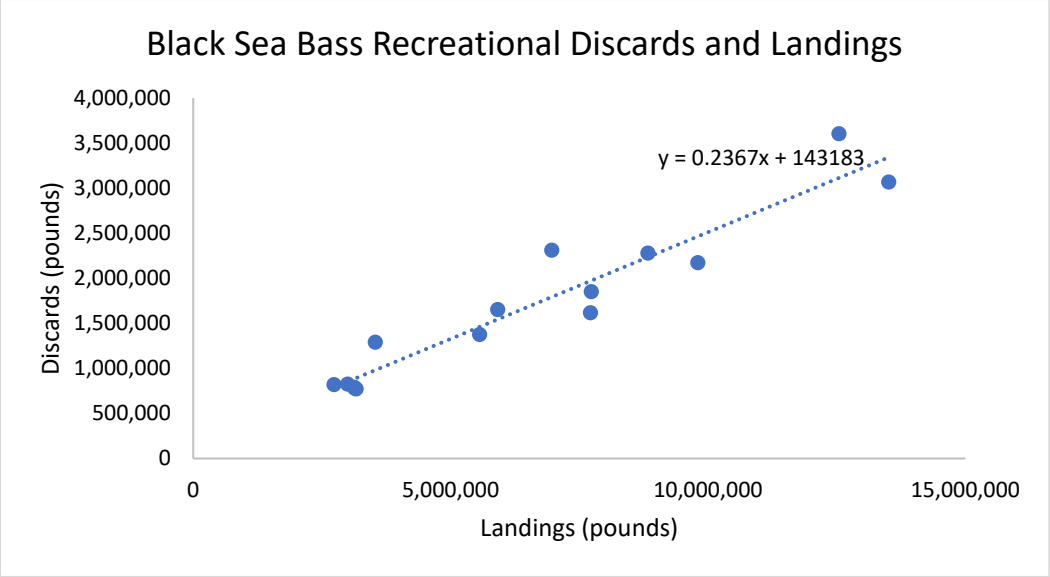
This appendix provides examples of potential quotas and RHLs for each of the commercial/recreational allocation percentage alternatives listed in alternative sets 1a-1c (Table 39). Commercial quotas and RHLs are developed or reviewed annually through consultation with the MC and approved upon Council and Board review. As described below, given several assumptions that need to be made about how dead discards are handled, it is not possible to precisely predict what quotas and harvest limits would be under each allocation. This analysis provides the best approximation of possible limits available at this time.

Dead Discard Projection Methodology

Projecting dead discards is a key component in developing landings limits. Typically, summer flounder and scup total dead discards are based on the stock assessment projections and black sea bass total dead discards are based on a 3-year average of dead discards as a percent of total dead catch. The MC then takes into consideration recent trends and other relevant factors to split the total projected dead discards into dead discards by sector. Projecting expected future commercial quotas and RHLs under revised allocations is complicated because large shifts in allocations are expected to impact recreational and commercial effort, which may result in changes in dead discards for each sector in addition to changes in landings. As such, under modified allocations there would be a transition period where recent trends in dead discards by sector would not be particularly informative for projecting what sector discards would be under new allocations. Expected dead discards by sector under revised allocations are thus better predicted by modeling the relationship between dead catch, landings and discards. This can then be used to project dead discards under example catch and landings limits for each allocation alternative. The modeling process involves assumptions and like any model it is imperfect, but hopefully informative as well. This method is not necessarily the method that the MC will have to use in future specifications development, and they will still have the opportunity to adjust the dead discard projections based on expected changes in stock size, or year class strength, recent changes in management measures, and recent changes in fishing effort.

The following methodology for producing dead discard projections was based on the assumption that there is a relationship between dead discards and catch/landings. Examination of recent trends in black sea bass dead discards and catch/landings reveals a strong positive linear relationship in both the recreational and the commercial fisheries. This is to be expected for catch which is comprised of both landings and discards, but the positive relationship between landings and dead discards is informative for the projection of dead discards. As an example, Figure 37 displays a scatterplot of black sea bass recreational discards and landings for reference. The positive relationship between dead discards was also present in the commercial and recreational scup and summer flounder fisheries.

Figure 37. Scatterplot of black sea bass recreational discards and landings (2004-2018).



Deriving Landings Limits for Catch-based Allocation Shares

Projecting discards for catch-based allocations relies upon simple linear regression with catch as the dependent variable and discards as the independent variable. As such, discards were regressed on catch for the years 2004-2018 for all three species by sector. While the coefficients for catch were not statistically significant at the 90% confidence interval for all species and sectors, in all instances the regression analyses revealed a positive linear relationship. The regression output provides an understanding of how discards scale with catch. By combining this understanding with an example ABC and a specific allocation share, it becomes possible to project a RHL and commercial quota for each allocation alternative.

Deriving Landings Limits for Landings-Based Allocations

Projecting landings limits for landings-based allocations also relies upon simple linear regression, but with landings as the independent variable and discards as the dependent variable. Discards were regressed on landings for the years 2004-2018 for all three species by sector. Although the coefficients for landings were not all statistically significant at the 90% the regression analyses did reveal a positive linear relationship for all three species. The use of regression analysis provides a model for how discards may potentially scale with landings. Through algebraic manipulation, it is possible to solve for the RHL and commercial quota given a specific allocation share and an example ABC.

Example RHLs and Quotas Under Allocation Alternatives

The following tables provide the example commercial quotas and RHLs for each species under each allocation alternative using the methodology described above. As previously stated, the regressions were based on landings and discards data from 2004-2018. In addition, the 2020

ABC value was used. For the status quo allocation alternatives, the actual 2020 commercial quota and RHL values are displayed for comparison.

When interpreting these tables, it may be helpful to also reference the basis for each alternative as described in more detail in Appendix I, an explanation of the implications of catch versus landings-based allocations in Section 1.3.5, and view a comparison of recent landings trends to the projected landings limits for each allocation alternative (including status quo which is highlighted) in Section 4.4.1.

Table 41. Black sea bass example quotas and RHLs in millions of pounds, under 2020 ABC of 15.07 million pounds.

Black Sea Bass							
2020 ABC: 15.07 mil lb.	CATCH-BASED			LANDINGS-BASED			
Alternative	**1c-1**	**1c-2**	**1c-3**	**1c-4**[a]	**1c-5**	**1c-6**	**1c-7**
Com. allocation	**32%**	**28%**	**24%**	**49%**	**45%**	**29%**	**22%**
Rec. allocation	**68%**	**72%**	**76%**	**51%**	**55%**	**71%**	**78%**
Commercial ACL	4.82	4.22	3.62	7.94	7.32	4.69	3.47
Commercial discards	1.51	1.23	0.95	2.51	2.28	1.31	0.85
Commercial quota	**3.31**	**2.99**	**2.66**	**5.43**	**5.04**	**3.38**	**2.61**
Recreational ACL	10.25	10.85	11.45	7.13	7.75	10.38	11.60
Recreational discards	2.08	2.20	2.32	1.48	1.60	2.10	2.34
RHL	**8.16**	**8.65**	**9.14**	**5.65**	**6.15**	**8.28**	**9.27**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented in 2020, not example measures using the methodology described in this appendix.

Table 42. Scup example quotas and RHLs in millions of pounds, under 2020 ABC of 35.77 million pounds.

Scup							
2020 ABC: 35.77 mil lb.	CATCH-BASED				LANDINGS-BASED		
Alternative	**1b-1**[a]	**1b-2**	**1b-3**	**1b-4**	**1b-5**	**1b-6**	**1b-7**
Com. allocation	**78%**	**65%**	**61%**	**59%**	**57%**	**56%**	**50%**
Rec. allocation	**22%**	**35%**	**39%**	**41%**	**43%**	**44%**	**50%**
Commercial ACL	27.90	23.25	21.82	21.10	21.49	21.18	19.27
Commercial discards	5.67	6.35	5.90	5.67	4.65	4.62	4.46
Commercial quota	**22.23**	**16.90**	**15.92**	**15.44**	**16.85**	**16.56**	**14.81**
Recreational ACL	7.87	12.52	13.95	14.67	14.28	14.59	16.50
Recreational discards	1.36	1.48	1.58	1.62	1.57	1.59	1.70
RHL	**6.51**	**11.04**	**12.37**	**13.04**	**12.71**	**13.01**	**14.81**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented in 2020, not example measures using the methodology described in this appendix.

Table 43. Summer flounder example quotas and RHLs in millions of pounds, under 2020 ABC of 25.03 million pounds.

Summer Flounder							
2020 ABC: 25.03 mil lb.	CATCH-BASED			LANDINGS-BASED			
Alternative	**1a-1**	**1a-2**	**1a-3**	**1a-4**[a]	**1a-5**	**1a-6**	**1a-7**
Com. allocation	**44%**	**43%**	**40%**	**60%**	**55%**	**45%**	**41%**
Rec. allocation	**56%**	**57%**	**60%**	**40%**	**45%**	**55%**	**59%**
Commercial ACL	11.01	10.76	10.01	13.67	12.69	10.72	9.92
Commercial discards	2.22	2.19	2.10	2.58	2.49	2.33	2.26
Commercial quota	**8.79**	**8.57**	**7.92**	**11.10**	**10.20**	**8.38**	**7.65**
Recreational ACL	14.02	14.27	15.02	11.36	12.34	14.31	15.11
Recreational discards	3.77	3.80	3.87	3.96	3.99	4.07	4.10
RHL	**10.24**	**10.47**	**11.15**	**7.40**	**8.34**	**10.25**	**11.02**

[a] This is the no action/status quo alternative. The values shown here represent the catch and landings limits implemented in 2020, not example measures using the methodology described in this appendix.

APPENDIX III: ACRONYMS AND ABBREVIATIONS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
AM	Accountability Measure
AP	Advisory Panel
Board	The Commission's Summer Flounder, Scup, and Black Sea Bass Management Board
Commission	Atlantic States Marine Fisheries Commission
Council	Mid-Atlantic Fishery Management Council
EEZ	Economic Exclusive Zone
EFH	Essential Fish Habitat
FMAT	Fishery Management Action Team
FMP	Fishery Management Plan
MC	Monitoring Committee
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevenson Act
NEFSC	Northeast Fisheries Science Center
RHL	Recreational Harvest Limit
SFA	Sustainable Fisheries Act
TAL	Total Allowable Landings
VTR	Vessel Trip Report