Atlantic States Marine Fisheries Commission

Atlantic Striped Bass Management Board

October 20, 2021
1:00 – 5:15 p.m.
Webinar

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order (*D. Borden*)	1:00 p.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from August 2021	1:00 p.m.
3.	Public Comment	1:05 p.m.
4.	Consider Draft Amendment 7 for Public Comment *(E. Franke)* **Action** (includes a 15 minute break at 3:00 p.m.)	1:15 p.m.
5.	Consider Draft Addendum VII for Public Comment *(E. Franke)* **Action**	4:00 p.m.
6.	Other Business/Adjourn	5:15 p.m.

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

MEETING OVERVIEW

Atlantic Striped Bass Management Board
October 20, 2021
1:00 p.m. – 5:15 p.m.
Webinar

Chair: David Borden (RI) Assumed Chairmanship: 02/20	Technical Committee Chair: Kevin Sullivan (NH)	Law Enforcement Committee Rep: Kurt Blanchard (RI)
Vice Chair: Martin Gary (PRFC)	Advisory Panel Chair: Louis Bassano (NJ)	Previous Board Meeting: August 3, 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 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. Draft Amendment 7 (1:15 – 4:00 p.m.) Action
(includes a 15-min break at 3:00 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.
- The Plan Development Team (PDT) and the Technical Committee met multiple times between May and September 2021 to develop Draft Amendment 7 **(Briefing Materials).**
- The Advisory Panel met in September 2021 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. Draft Addendum VII to Amendment 6 (4:00 – 5:15 p.m.) Action

Background

- In May 2021, the motion to include the commercial quota allocation issue in Draft Amendment 7 failed for lack of a majority. Many Board members recognized that Delaware has raised this issue for some time and Delaware has been asking for a more equitable allocation. In addition there were some individuals that expressed an interest in reviewing more recent data to consider in the allocations.
- Although many Board members recognized these concerns, some Board members noted the Draft Amendment process is not the right time to address this because allocation discussions could make the process significantly longer and more complex. Some Board members suggested addressing quota allocation in a separate management document after Amendment 7 is complete.
- In August 2021, concurrent with the development of Draft Amendment 7, the Board initiated Draft Addendum VII to Amendment 6 to consider allowing the voluntary transfer of commercial striped bass quota between jurisdictions that have commercial quota.
- In September 2021, the PDT discussed Draft Addendum VII to Amendment 6 **(Supplemental Materials)**.

Presentations

- Overview of Draft Addendum VII to Amendment 6 for public comment by E. Franke

Board Actions for Consideration

- Approve Draft Addendum VII to Amendment 6 for public comment.

6. Other Business/Adjourn (5:15 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 in response to the 2018 benchmark assessment and relating to development of Draft Amendment 7
- 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), 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), Justin Davis (CT), 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
August 3, 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

ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)
Sen. David Miramant, ME (LA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Mike Armstrong, MA, proxy for Dan McKiernan (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Jason McNamee (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Rep. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Matt Gates, CT, proxy for Sen. Miner (LA)
Maureen Davidson, 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, 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)
Pat Geer, VA, proxy for S. Bowman (AA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Jerry Mannen, NC (GA)
Bill Gorham, NC proxy for Rep. Steinberg (LA)
Marty Gary, PRFC
Nicole Lengyel-Costa, RI DEM
Max Appelman, NMFS
Mike Millard, USFWS
Lowell Whitney, USFWS

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

Ex-Officio Members

Kurt Blanchard, Law Enforcement Representative

Staff

Bob Beal
Toni Kerns
Tina Berger
Pat Campfield
Lisa Carty
Laura Leach
Maya Drzewicki
Emilie Franke
Lisa Havel
Chris Jacobs
Dustin Colson Leaning
Savannah Lewis
Kirby Rootes-Murdy
Sarah Murray
Joe Myers
Caitlin Starks
Deke Tompkins
Geoff White

Guests

Karen Abrams, NOAA
Fred Akers
Pat Augustine, Coram, NY
Mike Bednarski, VA DWR
John Bello, CCA VA
Peter Benoit, Ofc. Sen. King (ME)
Colleen Bouffard, CT DEP
Rob Bourdon, MD DNR
Rick Brame
Jeff Brust, NJ DEP
Erika Burgess, FL FWC
Mike Celestino, NJ DEP
Sarah Cho
Richard Cody, NOAA

Guests (continued)

Allison Colden, CBF
Margaret Conroy, DE DFW
Heather Corbett, NJ DEP
Jessica Daher, NJ DEP
Monty Deihl
Patrick Denno
Steve Doctor, MD DNR
Paul Eidman
Peter Fallon, Maine Stripers
Lynn Fegley, MD DNR
Dawn Franco, GA DNR
Anthony Friedrich, SGA
Shaun Gehan, Gehan Law
Lewis Gillingham, VMRC
Willy Goldsmith, SGA
Pam Lyons Gromen, Wild Oceans
Jake Hardy
Jon Hare, NOAA
Helen Takade-Heumacher
Peter Himchak, Cooke Aqua
Carol Hoffman, NYS DEC
Jeffrey Horne, MD DNR
Harry Hornick, MD DNR
Jesse Hornstein, NYS DEC
Edward Houde, UMCES
Bob Humphrey
James Jewkes
Adam Kenyon, VMRC
Rob LaFrance, Quinnipiac Univ
Ben Landry, Omega Protein
Wilson Laney
Carl Lobue, TNC
Chip Lynch, NOAA
Pam Lyong
Shanna Madsen, VMRC
John Maniscalco, NYS DEC
Casey Marker, MD DNR
Dan McKiernan, MA (AA)
Conor McManus, RI DEM
Nichola Meserve, MA DMF
Steve Meyers
Steve McKinnen, FL FWS
Chris Moore, CBF
Jeffrey Morgan
Brandon Muffley, MAFMC
Allison Murphy, NOAA
Kennedy Neill
Robert Newberry
Jeff Nichols, ME DMR
George O'Donnell, MD DNR
Tyler O'Neill
Noah Oppenheim, Homarus Strategies
Derek Orner, NOAA
Kelly Place, Williamsburg, VA
Michael Plaia
Nick Popoff, FL FWS
Will Poston, SGA
Michael Quinan, Thompson McMullan Law
Jill Ramsey, VMRC
Kathy Rawls, NC (AA)
Story Reed, MA DMF
Harry Rickabaugh, MD DNR
Tara Scott, NOAA
Olivia Siegal, VMRC
Jared Silva, MD DMR
Thomas Sminkey, NOAA
Somers Smott, VMRC
Ross Squire
Renee St. Amand, CT DEP
Mike Stangle DE DFW
David Stormer, DE DFW
Marek Topolski, MD DNR
Aaron Uehara
Jim Uphoff, MD DNR
Beth Versak, MD DNR
Mike Waine, ASA
Angel Willey, MD DNR
Charles Witek
Michael Woods
Spud Woodward, GA (GA)
Jon Worthington
Chris Wright, NOAA
Jordan Zimmerman, DE DFW
Erik Zlokovitz, MD DNR
Renee Zobel, NH F & G

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Tuesday, August 3, 2021, and was called to order at 9:00 a.m. by Chair David V. Borden.

CALL TO ORDER

CHAIR DAVID V. BORDEN: My name is David Borden; I'm the Striped Bass Board Chairman. I'm the Governor's Appointee from the state of Rhode Island, and I get to moderate the session today. In terms of process. I've asked Toni to follow the following rules. She's basically going to call on individuals.

If the Board members who want to speak will have to raise your hand. You'll go on a list. Toni will call on you in order. She will not call on you twice, until we go through the list. Hopefully, everyone on the list gets an opportunity to talk, at least once, and if we have more time we'll go back through the list, and let individuals who have a particular interest in a subject to possibly speak on an issue twice.

CHAIR BORDEN: The process today, we're going to move through the agenda, hopefully orderly. I would anticipate that on most of these issues we will not need motions. I would prefer to do the business of the Board by consensus, if that's possible.

APPROVAL OF AGENDA

CHAIR BORDEN: I'm going to take the items as they appear on the published agenda, approval of the agenda. Are there any additions, deletions on the agenda, or changes? Any hands up, Toni?

MS. TONI KERNS: No hands, David.

CHAIR BORDEN: Okay, so the agenda stands approved as distributed.

APPROVAL OF PROCEEDINGS

CHAIR BORDEN: We have two sets of proceedings that we need to approve. Are there any comments on the March, 2021 proceedings? Any hands up?

MS. KERNS: No hands, David.

CHAIR BORDEN: Then the March, 2021 proceedings stand approved by consensus. May, 2021, any comments, additions, deletions to those proceedings? Any hands up?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so the May, 2021 proceedings stand approved by consensus.

PUBLIC COMMENT

CHAIR BORDEN: Public Comments. The two aspects of public comments. We normally afford the public an opportunity to comment on issues which are not on the agenda. You're going to be limited to a minute or two, depending upon how many individuals. Then during the actual meeting, I may or may not take public comments, if we get to motions. It depends on the nature of the issue, and whether or not there has been an opportunity for the public to already weigh in on the issue. Are there any individuals that would like to speak to an issue which is not on the agenda, and if so, please raise your hand?

MS. KERNS: Don't see any. No hands.

CHAIR BORDEN: No hands, so there are not hands up, so there is no public comment.
The first item of business is Consider the Fishery Management Plan Review and State Compliance for 2020, Emilie Franke, please.

CONSIDER THE FISHERY MANAGEMENT PLAN REVIEW AND STATE COMPLIANCE FOR 2020 FISHING YEAR

MS. EMILIE FRANKE: Can everyone see my slide up on the screen?

MS. KERNS: Yes.

MS. FRANKE: Great, thanks so much, Toni. This morning, as the Chair mentioned, our first agenda item is the Fishery Management Plan Review for the 2020 fishing year. The Plan Review Team reviewed state compliance reports for 2020 in July, and drafted the FMP Review Report, which was included in the supplemental materials.

I would like to thank the Plan Review Team members for their time reviewing the compliance reports, and preparing the draft for the Board's review today. There is a lot of detail in the written report, so in today's presentation I'll just go over some key points. To start out, I'll just give a brief overview of the status of the stock, followed by the status of the fishery management plan, focused on Addendum VI.

Then I'll move into the status of the fishery, the status of the management measures, and then conclude the presentation today with comments from the Plan Review Team. Starting with status of the stock. Based on the results of the 2018 benchmark stock assessment, the striped bass stock is overfished and experiencing overfishing.

Just as a reminder, the benchmark does incorporate the newly calibrated MRIP estimates. In 2017, female spawning stock biomass was estimated at 58,476 metric tons, which is below both the target and the threshold for spawning stock biomass. Fishing mortality was estimated at 0.31 in 2017, which is above the threshold of 0.24.

You can see in the figure here of female spawning stock biomass, which is the blue-shaded area, that spawning stock biomass has declined steadily since the time series high in about 2003, and has been below the threshold since 2013. There was a period of low recruitment since about 2005, and recruitment is those orange bars there. However, there were a few strong year classes in 2011, 2014, and 2015.

This is a figure of fishing mortality, and you can see here that fishing mortality was estimated to be at or above the threshold for 13 of the last 15 years. Moving on to status of the fishery management plan. Amendment 6 and the Addenda I through VI set the management program for fishing year 2020. The Addendum VI measures that were designed to reduce total removals by 18 percent, relative to 2017 levels, were implemented by the states by April 1 of 2020. Addendum VI also requires the mandatory use of circle hooks, when fishing with bait in the recreational fishery. Those measures were implemented in 2021. Then finally, Draft Amendment 7 is under development, which we'll discuss later in the agenda today.

But that draft amendment will address four issues, recreational release mortality, conservation equivalency, management triggers, and measures to protect the 2015-year class. As I mentioned, Addendum VI measures were implemented in 2020, to reduce total recreational removals by 18 percent. The measures reduced state commercial quotas by 18 percent.

The measures implemented a 1-fish bag limit and a 28-inch to less than 35-inch spot limit for the ocean fisheries, and a 1-fish bag limit and an 18-inch minimum size limit in the Chesapeake Bay. Some states implemented alternative regulations through a conservation equivalency. Those regulations had to achieve an 18 percent reduction in total removals statewide.

This figure here shows fishery performance over time by sector. You can see at the bottom there, commercial harvest is in blue, and commercial discards are in red. Those have been relatively stable over time, since the fishery has been managed by a static quota system since 2015. Most of the removals of striped bass are coming from the recreational sector.

You can see recreational harvest in green on this figure, and recreational release mortality in purple.

In 2020 the recreational sector, so the total harvest and release mortality, accounted for about 88 percent of total striped bass removals. Recreational removals have been variable through time, but you can see they've been decreasing in recent years.

This slide is a broad view of fishery performance in 2020, and any percent change you see here on this slide is a percent change as compared to the previous year of 2019. Again, as a reminder, 2020 was the first year that Addendum VI measures were implemented. In 2020, the commercial fishery harvested an estimated 3.39 million pounds, or about 531,240 fish.

This is a 20 percent decrease by weight relative to 2019, and a 19 percent decrease by number. On the recreational side, in 2020 total recreational harvest was estimated at about 1.71 million fish, which is a 21 percent decrease relative to 2019. As we've discussed, the vast majority of the recreational striped bass catch is released alive, and 9 percent of those fish that are released alive are assumed to die, as a result of being caught.

In 2020, recreational anglers caught and released an estimated 30.7 million fish, and of those about 2.8 million were assumed to have died. This is a 7 percent increase relative to 2019. Then overall the recreational release mortality, so those 2.8 million fish that are assumed to have died, were about 54 percent of total striped bass removals from both sectors in 2020.

Here you can see a summary of commercial quota and harvest by state. In 2020 there were no quota overages, either in the ocean fishery or in the Chesapeake Bay fishery. In 2020, commercial harvest from the Chesapeake Bay accounted for about 62 percent of total commercial landings by weight. Again, as I mentioned, the majority of striped bass that are caught recreationally are released alive. This figure here shows that while the recreational catch varies from year to year, the proportion of fish that are released alive remains pretty high, about 90 percent per year, going back to the early 1990s, and in 2020, 95 percent of fish that were caught recreationally were released alive. As I mentioned, this recreational release mortality was over half of total removals of striped bass in 2020.

One thing that the Plan Review Team included in the FMP Review this year is a note about 2020 MRIP data. The component of MRIP that samples the dockside catch rate data was interrupted by COVID-19, so due to this interruption, the catch-rate-data were imputed as needed, so using data from 2018 and 2019 to generate those total catch estimates for 2020.

The PRT included this table here in the report, which shows the contribution of imputed data for striped bass, which varies by state and by estimate, as shown in the table here. If you see a higher percentage of imputed data, that indicates that data from 2018 and 2019 are having more of an impact on those 2020 estimates.

Moving on to the status of management measures. The first is the analysis of the juvenile abundance indices. This year's analysis evaluated the 2018, 2019, and 2020 JAI values. If any surveys JAI falls below their first quartile for three consecutive years, which is defined in Addendum II, then appropriate action should be recommended by the Technical Committee.

The next agenda item will cover this in more detail. But North Carolina, which is down here in the lower right-hand corner, met the criteria for recruitment failure for 2018, 2019, and 2020. Again, we'll hear more about this in the next agenda item. Maine's juvenile abundance index, which is up here in the upper left-hand corner, was below its first quartile in 2019 and 2020.

Then Maryland's juvenile abundance index, which is up here in the upper right-hand corner, was below its first quartile value in 2020. Moving on to Addendum VI. In 2020, a 28 percent reduction in total removals coastwide in numbers of fish was

realized, relative to the total removals coastwide in 2017.

Again, as a reminder, Addendum VI was designed to achieve an 18 percent reduction in total removals relative to 2017. This table here on the screen shows those coastwide reductions by sector, so you see coastwide there is about a 14 percent reduction from 2017 for the commercial sector, and for the recreational sector there was about a 30 percent reduction from 2017. Again, this is coastwide in numbers of fish.

This table here on the screen is included in the report, and lists the realized change for recreational removals in numbers of fish by state from 2017 to 2020. At the request of the Board, this table also shows the predicted reduction in recreational removals from those states that implemented conservation equivalency plans.

You can see that the reductions vary by state, and the Plan Review Team notes that differences in performance are influenced by a number of factors, including changes in effort, changes in fish availability, year classes moving along the coast, as well as environmental factors. Another note, as you can see as that increases in recreational releases in the Mid-Atlantic in New Jersey, Delaware, and New York contributed to those realized reductions being less than predicted for those states. Again, this is included, this full table is included in the reports. On the commercial side this table shows the percent change in commercial harvest by weight by state from 2017 to 2020. For reference, it also shows the percent change in commercial quota. Again, some states chose to take less than an 18 percent reduction through conservation equivalency, so you can see the percent change in commercial quota there on the right, and then in the middle you can see the percent change in commercial harvest by weight in 2020, relative to 2017.
In the ocean we saw about a 38 percent decrease in commercial harvest, and in the Bay, we saw about a 23 percent decrease in commercial harvest in pounds. To wrap up here, I'll go through the comments from the Plan Review Team. In 2020, all states implemented a management and monitoring program consistent with the provisions of the striped bass fishery management plan.

The PRT notes that there is one inconsistency, and that is that New York's recreational regulations state a slot limit of 28 inches to 35 inches, and this does not explicitly indicate whether the upper limit is inclusive or not. Then as far as de minimis, there were not requests for de minimis status in 2020.

Looking in to 2021, the PRT noted that Maryland's 2021 summer closure period, so this year it was a no-targeting closures from July 16 to July 31, is inconsistent with their approved 2020 closure period, which was no targeting in August, August 16-31. Then as far as the circle hook requirements that were implemented in 2021, the PRT noted that some states have implemented more restrictive definitions of bait than the definition that the Board approved back in March.

Several states have implemented the incidental catch guidance that the Board also discussed in March. Then there is one delay in the circle hook rule, and that's in New Jersey. That rule has been delayed, but is expected to be fully implemented in October of this year. Then finally, the PRT had a couple comments on commercial tagging. The PRT noted that in multiple states only about half or less than half of the issued commercial tags were reported used.

The PRT emphasizes the importance of tag accounting for unused tags. Maryland was not able to conduct a tag audit, due to COVID-19. Just as a general follow up, the PRT recommends that Commission staff work with the Law Enforcement Committee to regularly follow up with all states on tag accounting moving forward. That is all I have, Mr. Chair, I'm happy to take questions if there are any.

CHAIR BORDEN: Thank you very much, Emilie. The good news from the report is the Commission met

its Addendum VI target of 18 percent, actually exceeded it substantially, so that is good news. What I would like to do is take the comments in two segments, just general comments on the report if there are any. Then I would like to talk specifically about the recommendations from the PRT, in regards Maryland and New York, and I'll take those up separately. Anyone want to comment generally on the report at this phase, or ask questions? Any hands up, Toni?

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

CHAIR BORDEN: Okay, so does anyone want to comment on the Plan Review Team recommendation on New York, in particular, or does someone from the New York delegation want to speak to the point? Any hands up?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so no comment on the New York issue. On Maryland, the Plan Review Team also gave us a recommendation. Does somebody from the delegation in Maryland want to comment on it, or does someone on the Board want to comment? Any hands up?

MS. KERNS: Mike Luisi has his hand up.

CHAIR BORDEN: Mike, you're next, and then I'll take anyone else.

MR. MICHAEL LUISI: This came to our attention when the Plan Review Team was going through our changes in regulation. I think just for transparency, I just wanted to clear the air, and let everyone know that in 2020, when we put our conservation equivalency plan together, and we came up with a two-week closure period in August.

The second week of August was the closure that we implemented in 2020, with a cap, as far as not extending that into any future year. We did so because of the timing of our regulation process, and the addendum process, and it did not allow for us to put the closure where we wanted it to be, which was during that time period in July, which is what we did this year.

Now, the analysis that was done for our conservation equivalency, a closure period in August, and a closure period in July were the exact same number of days during the same wave, during Wave 4. We felt that the analysis would have been no different from what it had been the previous year.

However, the water quality indicators, as far as temperature and air temperature, are much worse in the second half of July than they are at the end of August. We made a concerted effort to find that period of time where the water quality is at its peak, as far as the poor water quality for striped bass. That is when we implemented our closure for this year.

We made a more conservative effort to protect those fish in July, while they were at kind of their weakest point, as far as the conditions in the Bay. You know that is what we decided internally. We had hearings on it, and we dealt with the issue at hand. The analysis would be no different at all, because it's still within Wave 4.

The reduction that was part of our conservation equivalency program that was approved, would have been no different, because every day in Wave 4 counts for the same amount of reduction. I'll leave it there, Mr. Chairman, and I'm happy to answer questions. I also have a graph that we used from another area.

You can see this is the graph that kind of gave us the information that we used to implement those measures. You can see that on the far right the block was the August time period, and this is Bay water temperature, surface water temperatures. We backed up that time period to the second half of July, which you can see on the left it's the dotted line. That is when we see our peak in poor water quality, and that's why we made the decision that we did. I'm happy to answer any questions if people have questions about that.

But I'll leave it up to you, Mr. Chairman. But that is the reason for the change, and we didn't feel that we needed to do another conservation equivalency program or another conservation equivalency document, since it was all within Wave 4.

CHAIR BORDEN: Thank you, Mike, does anyone else want to comment on this issue? Toni?

MS. KERNS: I have no hands, Mr. Chairman. I will say that I noticed Maureen opened her microphone, but she didn't raise her hand. I wasn't sure if she was trying to speak prior to the New York issue.

CHAIR BORDEN: Let's finish with this issue, and I'll go back to Maureen if she would like to speak. Anyone else care to speak on this issue? If not, we'll go back to the New York situation. Any hands up, Toni?

MS. KERNS: No hands up currently, no.

CHAIR BORDEN: Okay, Maureen, do you want to go back to the New York issue? I'll afford you an opportunity to comment if you would like to.

MS. MAUREEN DAVIDSON: Thank you. I just really wanted to say that our calculated reduction, with the numbers that we used, was greater than what was required. We felt that we were fine, since we were going to have a larger reduction than was required. The difference that is currently in question right now is not really something that's enforceable, and our law enforcement is out on the water. We felt that the numbers that we went with were fine.

CHAIR BORDEN: Thank you, Maureen, any questions for Maureen or the New York delegation?

MS. KERNS: You have Adam Nowalsky.

CHAIR BORDEN: Adam.

MR. ADAM NOWALSKY: I actually wanted to go back to general questions when you're done with this New York issue, if you will afford me that opportunity. I couldn't get my hand up quick enough before. Thank you.

CHAIR BORDEN: Certainly. Any questions for Maureen? If not, any hands up, Toni?

MS. KERNS: No other hands.

CHAIR BORDEN: Okay, so Adam, you're back to general questions.

MS. KERNS: Mike Armstrong actually did put his hand up, sorry. It was a little slow.

CHAIR BORDEN: Okay, we will take Mike Armstrong, and then I'm going to go to Adam. Mike.

MR. MICHAEL ARMSTRONG: Sorry for the delay. If we could go back to Maryland a minute. I just need to recollect, for Mike. The closure was only for recreational, right? Not for the commercial fishery, which I believe is hook and line at the same time.

MR. LUISI: Yes, Mr. Chairman, I can jump in if you're okay with that.

CHAIR BORDEN: Certainly.

MR. LUISI: Yes, so the closure was a target closure, so there is no catch and release, it's a complete closure with no targeting of striped bass for both the for-hire and the recreational fishery. The commercial fishery still operated during that time period. What I will say is that since we've gone to the individual transferrable quota system, from back in 2013, 2014-ish time period. We have very few hook-and-line fishermen anymore.

The average number of boats on the water in any given day is about five. They continued to operate. They operate differently than the recreational fishery, obviously. They are there to catch their quota and move on. They are not there to catch

and release and throw fish back. But yes, Mike, hopefully that answers your question.

Each year we've committed to reviewing whether or not the commercial fishery should continue to operate during this closure period. This year the administration decided to leave it open, but next year is another story. We work with our advisors, and we get information from them, both commercial and recreational. We try to make that decision each year, based on the best available information we have.

CHAIR BORDEN: Mike, did that address your question?

MR. ARMSTRONG: Yes. Thank you.

CHAIR BORDEN: Thank you very much, Mike Luisi for doing that. Any other questions, other than Adam? If not, we're going to move back to Adam on the general question. Adam.

MR. NOWALSKY: You're doing a great job, and moving very efficiently this morning. My question was with regards to the total removals as a combination of the dead discards and the landings. As part of the FMP review, does staff compile a trend analysis of the percentage of removals that come as a function of the landings versus the dead discards from release mortality, or is that something that can be compiled elsewhere and found elsewhere?

CHAIR BORDEN: Emilie or Katie, want to address that?

MS. FRANKE: Sure, this is Emilie. Thanks for the question, Adam. We do have that information available; we just typically have not included that in the report. But we could add it as a table, for example to the report, if that would be helpful, just showing the contribution of each of those parts of the fishery, commercial removals, commercial discards, recreational removals, recreational discards, their contribution to the total removal.

MR. NOWALSKY: I would be very interested in seeing that, and I would recommend that that certainly be part of future fishery management plans, unless there was objection to that. Thank you.

CHAIR BORDEN: Any other general comments or questions?

MS. KERNS: Ritchie White.

CHAIR BORDEN: Ritchie.

MR. G. RITCHIE WHITE: Question for Emilie. New Jersey is not making the reduction, 18 percent reduction. Could that be or is it attributable to their conservation equivalency regulations, and is that something that could be determined?

MS. FRANKE: Thanks for the question. That is not something that the PRT could determine, again since performance is influenced by a variety of factors, including changes in effort, availability of year classes. Looking at a state specific performance in comparison to the predicted change from their conservation equivalency plan. The PRT can't pinpoint exactly what factors caused that change, or that percent reduction to be less than what was predicted. Katie, please feel free to add anything.

DR. KATIE DREW: No, I think you've covered it. It's definitely again, if you look at the change in effort, is certainly a big component, as is the fact that New Jersey was one of the states that had a fairly high impact of the APAIS change, and therefore you're pulling more years of data from before, or more records from before that management change as well. All of those things are hard to separate out from the actual management measures themselves.

MR. WHITE: Thank you.

CHAIR BORDEN: Anyone else?

MS. KERNS: No other hands.

CHAIR BORDEN: The action on this is to approve the report as submitted. Is that correct, Emilie?

MS. FRANKE: Yes, and I believe Maya has a draft motion. Maya, if you want to take the control back of the screen.

CHAIR BORDEN: Well, yes. If you could put the draft motion up. Given the lack of questions and controversy, I think we can probably do this by consensus. But I think it would be helpful to have a motion up on the board. All right, **so the motion is to approve the FMP Review for 2020 fishing year and state compliance reports.** Is there any objection to approving this by consensus? Does anyone object? Any hands up, Toni?

MS. KERNS: No hands, but Mr. Chairman, if we could have a maker and a seconder, and we had hands up, Emerson Hasbrouck as a maker, and Mike Armstrong as a seconder.

CHAIR BORDEN: Okay, so we've got a motion and a second. Thank you for keeping me on track. Any objection to approving this by consensus? Any hands up? **Motion stands approved by unanimous consensus.**

REVIEW JUVENILE ABUNDANCE INDEX FOR ALBEMARLE SOUND/ROANOKE RIVER

CHAIR BORDEN: All right next item on the agenda is Item 5, which is a Review of the Juvenile Abundance Index for Albemarle Sound, and we're going to start off with a Technical Committee report by Carol Hoffman. Carol.

TECHNICAL COMMITTEE REPORT

MS. CAROL HOFFMAN: Good morning everyone. The Juvenile Abundance Index for the Albemarle Sound/Roanoke River stock showed recruitment failure for three consecutive years in 2018, '19, and '20. That tripped our recruitment trigger that was established in Amendment 6, which showed that if there were three consecutive years where the JAI was below the first quartile, then appropriate action should be recommended to the Board.

In response to this the TC met on July 15 of this year. The solid black line near the X axis on the screen is the first quartile for JAI for value for the period of 1955 to 2009, and that is 1.33, and in 2018 it was 0.4, 2019 it was 1.2, and 2020 it was 0.02. In addition, there was already management action that North Carolina has taken, because in 2020 there was a stock assessment that showed that the stock was overfished, and that overfishing is occurring.

In response to this, the TAL, the total allowable landings were reduced in 2021, and for 2022 as well. They were reduced from 275,000 pounds to about 51,000 pounds, to get at fishing mortality to the target level. In addition, North Carolina did an analysis of flow, and showed a correlation between young of the year recruitment and increased flow above a certain range, and showed that as flow increases above a certain level, year class strength decreases, particularly in May, when striped bass is spawning.

The low JAI values, again from 2017 actually to 2020, aligned with high flow rates that exceeded that limit. In response to this, North Carolina has developed a stocking contingency plan. If the flows from the Roanoke Rapids Dam meet or exceed 12,000-cubic feet per second, which is the rate at which the river starts to overflow, for at least 14 days, from May 1 to June 10, which is critical spawning and transport period.

Then there is a stocking program for striped bass to be stocked in western Albemarle Sound nursery area. AT this time the TC recommends no action be taken by the Board, considering that North Carolina has already taken management action by reducing their total allowable landings, and also by having their contingency stocking program by monitoring and analysis of river flow. In summary, the JAI was low for three years in a row, which tripped the stock recruitment failure trigger per Amendment 6. The TC met to recommend appropriate action, and the

TC recommends no action by the Board, due to the fact that North Carolina has already reduced the total of allowable landings, and because they have their contingency stocking program in place. Does anyone have any questions?

CHAIR BORDEN: All right, thank you, Carol. Let me just interject that it does not appear that this item requires any action by the Board. North Carolina has been very proactive, and taken action in advance. Let me just ask for questions, and then if there is nothing of substance that comes up, we'll move on. I don't believe it requires any action at all, even to accept the report. Questions for Carol.

MS. KERNS: Carol, just a reminder to turn off your microphone when you're not speaking, and then we have Mike Armstrong followed by Mike Luisi.

CHAIR BORDEN: Mike Armstrong.

MR. ARMSTRONG: I applaud, you know the proactive measures that North Carolina has done very quickly, and I hope things turn around. Just one question. The quota was 275,000. You reduced it to 50 something thousand. Was in fact the 275 being fully utilized?

MS. HOFFMAN: I would have to go back and look at that. But I know that the 50,000 was to reduce the F down to the target.

MS. KERNS: Mr. Chair, you have Chris Batsavage, who can probably answer that question.

CHAIR BORDEN: Chris.

MR. CHRIS BATSAVAGE: I think it depends on the commercial and recreational sectors, and also while we have a commercial fishery, which takes a big percent of the TAL, and then the recreational is the other 50, which is split between Albemarle Sound and the Roanoke River.

If memory serves me, I don't think the quota was reached every year in those years overall, mostly in the commercial fishery. I think on the recreational fishery it depended. You know they might hit their allocation in the Roanoke River but not Albemarle Sound, and vice versa. It wasn't full utilization of the 275 every year.

CHAIR BORDEN: Mike Armstrong, are you finished, or do you have a follow up?

MR. ARMSTRONG: No, I'm all set, thank you.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: This question might be for Chris as well, since he's on the line. Chris, do you guys do a spawning stock biomass survey in the spring? Are you sampling the fish that are coming in that spawn? I just wonder if some of the reason for the recruitment failure might just be that the fish aren't moving into the Sounds anymore, and they are moving more north. I don't know if you have any thoughts on that, or if you have any data that would suggest that maybe just spawning isn't occurring there anymore.

MR. BATSAVAGE: Yes, Mr. Chair, if it's okay I can attempt to answer that at least. Yes, thanks for the question, Mike. Yes, we do have a spawning stock survey, an adult gillnet survey in Albemarle Sound. It was suspended last year due to COVID concerns. There is also electrofishing survey on the upper Roanoke River on the spawning grounds.

We do monitor that. That information goes into the stock assessment. In terms of are we seeing just less spawning fish due to the movement north. I don't know. I think that would probably be answered better by our technical staff that I don't think are on the call today. However, it's probably more of a function of just in terms of these poor year classes, the river flow.

Stock status probably plays a role as well, but as we know, a small spawning stock can produce a large

year class, if conditions are optimal. In the last few years, we haven't seen that. It's kind of a long-winded way of saying I'm not real sure. But I just wanted to give a little bit of background information and answer at least part of your question.

MR. LUISI: Yes, I appreciate that, Chris. Thanks, Mr. Chairman, that's all I had.

CHAIR BORDEN: Thank you, Chris. Any other questions on this? Any hands up, Toni?

MS. KERNS: No additional hands.

CHAIR BORDEN: Okay, so I would just like to thank the North Carolina delegation for the way they've handled this issue. I think they've been, as I indicated before, extremely proactive, and that is exactly the type of leadership we need. Thank you very much to the entire delegation.

PROGRESS REPORT ON DRAFT AMENDMENT 7

CHAIR BORDEN: We're going to move on to the next item, which is a Progress Report on Draft Amendment 7. Emilie, you're up. Before Emilie starts, I'll provide some guidance on how I want to handle the issues at the conclusion of her presentation. Emilie.

MS. FRANKE: Go ahead, Mr. Chair.

CHAIR BORDEN: I'm finished. If you could, do the report, please?

MS. FRANKE: All right, thanks for your patience. Today I will be providing an update, as the Chair mentioned, on the development of Draft Amendment 7, and highlighting where the Plan Development Team and Technical Committee are requesting Board guidance on some of the issues being developed for the Amendment.

I'll start with a brief background, and the timeline for Amendment 7, and then I'll move into each issue, and provide a brief overview of what the Plan Development Team and Technical Committee have been discussing, and identify where they are requesting guidance from the Board. Just to recap a little background here. In August, 2020, the Board initiated the development of Amendment 7 to address a number of issues facing striped bass management. The purpose of the Amendment is to update the management program to reflect current fishery needs and priorities, since the status and understanding of the resource has changed considerably since Amendment 6 was approved in 2003. In February of this year, the Board approved for public comment the Public Information Document or PID for Draft Amendment 7.

This scoping document sought public input on a number of important management issues, and after the public comment period on the PID, at the May Board meeting the Board approved four issues for development in Draft Amendment 7. Those issues are recreational release mortality, conservation equivalency, management triggers, and measures to protect the 2015-year class.

Over the past few months, the Plan Development Team and the Technical Committee have met multiple times to begin developing options and analysis for the draft amendment. During these meetings the PDT and the TC identified specific questions requesting guidance from the Board on the type of options that should be developed for some of these issues.

Guidance from the Board at this point in the process is important to ensure that the draft options meet the Board's intent and objectives for these issues in the Draft Amendment. Based on guidance provided by the Board today, the PDT will continue developing options for Draft Amendment 7 over the next several weeks.

Here is the current timeline for Amendment 7. As I mentioned, the Board started this process in August of last year, and the PID process was completed this spring. We're in this current step of the PDT developing the draft amendment document. Again, between now and October the PDT will prepare the draft amendment, with the intent of presenting it to

the Board in October, when the Board could consider approving the draft for public comment.

Then after our public comment period, the earliest the final amendment could be approved is February of next year. For the remainder of my slides today, I'll provide a brief overview of what the PDT and TC have discussed for each issue. But most of the presentation will focus on the specific questions requesting guidance from the Board.

Those questions for the Board are related to recreational release mortality, conservation equivalency, and the recruitment trigger. I'll pause after each question or set of questions, if okay with the Chair, and if the Board would like to discuss and provide guidance on some of these questions before moving on to the next issue.

PLAN DEVELOPMENT TEAM REPORT

MS. FRANKE: The memos from the Plan Development Team and the Technical Committee that were prepared for this meeting were part of the main meeting materials, and they outline all of these questions and challenges in more detail. I would like to thank the PDT and TC members for all their time these past few months, and in the coming weeks.

To kick us off here, I'll start out with recreational release mortality. In order to reduce recreational release mortality, the Board could consider two approaches. The Board could consider additional gear restrictions to help increase the chance of survival after being released. For example, Addendum VI requires the use of circle hooks when fishing recreationally with bait, to reduce this post-release mortality. Another approach would be for the Board to consider effort controls, to reduce the number of trips interacting with striped bass, and therefore reduce the overall number of striped bass releases. The PDT is considering the following types of options to address recreational release mortality, and the PDT is still working through these potential options, so this is not a final list, just hopefully to give the Board an idea of the types of options that the PDT is discussing.

For gear restrictions, the PDT is discussing various options, including the use of non-lethal devices for removing striped bass from the water. For example, and the use of barbless hooks. For fish handling, the PDT is discussing a potential option to require the in-water release of large fish. For outreach and education, the PDT is discussing options for public outreach campaigns in the states, and also an option for an educational video and quiz.

Then finally, for effort controls, the PDT is primarily discussing seasonal closures. Today the PDT is requesting guidance on these effort control seasonal closures, which again, are intended to reduce the number of live releases by reducing the number of fishing trips that interact with striped bass.

The primary question from the PDT to the Board today is what types of effort control options should be included in the draft amendment. The PDT has identified three decision points for the Board on this issue. The first is related to the geographic scope of the closures. The next is related to a reduction target, or lack thereof, and the third is related to the type of closure, so thinking about a no targeting closure versus a no harvest closure.

First for the geographic scope, closures could be either coastwide, or they could be state or region specific. From a coastwide perspective, coastwide closures would ensure consistency in the timing of closures across all the states. But one of the primary challenges here would be equitability. Since recreational fisheries operate very differently along the coast, coastwide closures would result in different levels of effort reduction across the states.

These closures would impact each state fishery differently, based on the timing and what fish are available at that time in certain areas. Then also

based on the current management measures that are already in place within each state. Then on the other hand, state specific or regional closures could help account for unique biological or socioeconomic considerations, as well as regulatory consistency.

However, state specific closures could result in more of a patchwork of different closures as we move along the coast. For state specific closures, the PDT would not be able to develop specific options for each state. States would need to develop their own proposals for closures, that they would then pursue through their state regulatory and public processes, and they would also submit to the Commission for a TC review and Board approval as part of their state implementation plans.

The PDT could develop some options that might set some parameters on the scope of state closures. However, the state level MRIP data needed to look at these different types of closures, would likely have high PSEs, particularly when looking at specific waves. The second decision point related to seasonal closures is related to the target reduction or the basis for a closure. Without a specific target reduction in mind, it's difficult for the PDT to develop specific closure options. Without a target for reducing effort, for example a percent reduction the Board is looking for to reduce effort, then the PDT requests guidance from the Board on which days or months or waves the Board would like to consider for the closures. Then without any additional direction at this point, the PDT would only be able to focus on options for biological and ecological-based closures. For example, closures based on spawning or closures based on peak temperature periods. Then the final decision point is on the type of closure.

As I mentioned, the Draft Amendment could include options for both no harvest and no targeting closures, or the options could only focus on one type of closure. The PDT assumes a maximum reduction of effort, and therefore a reduction in number of releases would be achieved with a no targeting closure.

The PDT does recognize that there are some concerns about enforceability with no targeting closures, and there is also some uncertainty around the level of compliance. For a no harvest closure, the PDT notes that anglers may shift their trips to catch and release trips, and this could increase the number of releases, which would then be counter to the objectives of reducing releases.

Overall, choosing which type of closure may depend on the reason for the closure. But with any type of closure there will still be fishing trips that incidentally interact with striped bass, and then there will also be some striped bass trips that shift effort to target other species. Then finally, different closure scenarios could be explored with MRIP effort data.

But again, there are some challenges in that changes in angler behavior are unpredictable, and also catch and release trips are not separable in MRIP. With that, Mr. Chair, those three decision points for effort controls to address recreational release mortality are summarized here on the screen. If you want to pause for Board discussion on this before we move on to the next issue.

PROVIDE GUIDANCE TO THE PDT FOR DRAFT AMENDMENT 7

CHAIR BORDEN: Thank you, Emilie. What I would like to do is take each one of these questions that are up on the Board, and basically go through them one by one, and try to get a consensus on it, without a motion, if possible. Keep in mind that what we're developing is a draft public hearing document, with a range of options.

It's quite possible we can have more than one option, or a couple of different options developed, and then review them at the next meeting. Obviously, you want to narrow the choices, so that it limits the scope of the work that the technical people have to do. But I think it's desirable to go

through these one by one, and get some comments on it.

See if we can get a consensus, and then move on. Just remember that you're going to see this all again with greater detail at the next meeting. General comments on what type of effort control option should be included. The first question is, should the closures be coastwide, or should they be state specific. Does anyone want to speak to that point?

MS. KERNS: I'm waiting for hands to come up, Mr. Chair. We have Ritchie White, then Marty Gary.

CHAIR BORDEN: Ritchie, and then Marty.

MR. WHITE: I would favor the state regional option. I think it's too difficult for the length of season, when you look at northern states in relation to southern states, if the southern states have a much longer time period. If so, I would think that a closure ought to be a percentage, and that would be difficult. I mean that would work for the amount of time that striped bass are in a jurisdiction. That would be my recommendation.

CHAIR BORDEN: Marty.

MR. MARTIN GARY: I'm inclined to agree with Ritchie, although I guess part of me is wondering. I would like to hear from the public. My sense is Ritchie is right, you know the regional scope is probably more applicable. I just wonder, and I know the PDT, I don't want to frustrate them by giving them a lack of guidance. But unless we absolutely have to narrow it down. This is one that maybe we still need to hear from the public about, keep them both in. I would like to hear from others if they had a thought on it.

MS. KERNS: You have Mike Luisi then Tom Fote.

CHAIR BORDEN: Taking Tom next, Mike.

MR. THOMAS P. FOTE: Dave, who did you call on, Mike or me first?

CHAIR BORDEN: Mike.

MR. LUISI: Yes, I Have to agree with Ritchie. I think there is enough difference in the geographic range of this species, that state specific or regional closures should be where the PDT should be focused, rather than a coastwide closure for all states at the same time. As we just talked about maybe half an hour ago, you know we have certain information in our state here in Maryland that suggested that we have a closure period that may be completely different from what Virginia has on record, or Delaware or New Jersey.

I would like to see the state regional closure explored more, and have that allowance for the states to come up with whatever that closure is. Now, I guess you're going to get into the reduction target, and I'm interested to hear what people have to say about the target, as to how we're going to reduce releases. But that's my point at this time.

CHAIR BORDEN: Tom Fote.

MR. FOTE: I can understand what Ritchie is saying, but when we look at the reduction that goes on, and if you do an area closure, and I'll point out the Raritan Bay, because there are some suggestions, we do it in Raritan Bay. If you close that door at a certain period of time, that might be the only period of time, like in the Chesapeake Bay, where people actually because of the regulations, because we don't have sporting area regulations, but just coastwide regulations. They only see fish big enough to catch during that period of time. On the reduction in that region, it would be greater, although we would be equalized at reduction it's the same reduction up and down the coast for the Pacific time period that each state needs to put them in to accomplish that reduction. That is what I'm looking at with fair and equitable.

CHAIR BORDEN: Anyone else with their hands up, Toni?

MS. KERNS: Chris Batsavage, Justin Davis, and Mike Armstrong.

CHAIR BORDEN: Chris.

MR. BATSAVAGE: I agree with the regional target, the regional closures, as opposed to coastwide, with the thought of trying to reduce discard mortality during the hot summer months, when the water temperatures are high. I think that is not going to be applicable coastwide, it will be probably more in the Mid-Atlantic states down to North Carolina. I'm not sure about a target reduction, but maybe look at months, days, or waves.

Like Wave 4, that is done up in Maryland, you know to focus the closure periods. It would probably depend on the states, as far as exactly when those dates would be. As far as the type, it would definitely need to be no targeting, and probably no harvest at the same time. Just no harvest will mean that people will go out and catch and release, and I don't think that's new to the objective of what we're trying to do, if we're really concerned about release mortality during when the water temperatures and air temperatures are high.

CHAIR BORDEN: Dr. Davis.

DR. JUSTIN DAVIS: I just want to clarify. Are you looking for comments at this point just on the first issue of geographic scope, or sort of the whole slate of things that are up here on the slide?

CHAIR BORDEN: I realize there is a relationship between these, but I prefer to keep them separate, if we can do that, at least now at this stage.

DR. DAVIS: Okay, fair enough. On the issue of geographic scope. I think the only thing I could support would be regional closures. I think a coastwide closure, uniform up and down the coast just doesn't make sense, based on the migratory nature of the stock. There would be no way to have sort of an equitable distribution of harvest, or effort reduction up and down the coast with one-size-fits-all coastwide closure.

I think going to the other extreme, a state-by-state closure, I think it leans into the weakness of the MRIP data, and I think it was also really clear from the Addendum VI process, and the discussion of conservation equivalency there, that there was a pretty resounding rejection by the public and the Board of the idea of moving towards patchwork state-by-state regulations for this species. I think state-by-state closures, opening up that possibility just starts to go down that road, and I don't think that's a place we want to go. I think the only thing I could support would be regional closures.

CHAIR BORDEN: Mike Armstrong.

MR. ARMSTRONG: You know as usual; I think this is way more complicated than it looks like on the surface. To me, if we're looking to decrease release mortality, and by nature that means we decrease the B-2s. We have to have a no targeting closure. I don't mean to jump ahead, but that has ramifications.

If we go with, we want to cut effort during a period when the discards are very high, which would be coastwide. There may in fact be a time, you know July, where in Massachusetts and Maryland, there are both times when it's a whole lot of discards. On the other hand, if we go with an environmental thing like temperature, then that by nature has to be state and regional.

I think there is another question that hasn't been addressed yet, and maybe we'll do it in the next blurb, is how do we want to do this? Is it get people off of catching fish, or get people off catching fish when it's so warm that mortality is very high? To me that hasn't been decided, but I welcome anyone else's opinion. But I think we need to decide that.

Clearly the effect is very different, I think, as maybe Chris noted. The effect in the Mid-Atlantic with temperature guided things would be probably much greater than they were up north. It's a whole other thing to think about, so I'll just throw that out there.

MS. KERNS: I have Cheri Patterson and then John McMurray.
CHAIR BORDEN: Cheri, you're next.

MS. CHERI PATTERSON: I also agree with a state-regional approach, as opposed to coastwide closures, on several manners. We're dealing with a migratory species whose length of residency in any area is variable. We don't know from a coastwide perspective necessarily, what other species are being targeted, where the striped bass might be a bycatch, and we're still not achieving our effort controls that we are intended, if we go through a coastwide closure. I just think we have a better picture of objectives by the influence of states and regions being more familiar with when the striped bass are in those areas.

CHAIR BORDEN: John McMurray.

MR. JOHN G. McMURRAY: I have one question and a comment. Have we gone down the road of establishing an overall target reduction with discards? I think that's relevant to what we're talking about here. I'm not sure why we're trying to narrow it down at this point. For sure I have an opinion about effort controls and state, regional and coastal closures in particular.

Of course, regional and state closures make more sense, given the variability amongst states. But I don't see any reason at this point to take any of these options out of the document. I think we need to see what some of these options might look like, and we need to hear from the public about them. I know the PDT wants us to narrow this down, but in my opinion, we should include all options in the document at this point.

CHAIR BORDEN: All right, anyone else on the list, Toni?

MS. KERNS: That's all the hands.

CHAIR BORDEN: Okay, so the majority of the speakers identified a preference for regional approach, but I would note that I thought that the individuals talked about coastwide implications and concerns made some valid points. I think where we are as a Board is, we definitely want the regional strategy to be developed.

But it also sounds like the Board, at least some members of the Board, want to keep some language in there about the coastwide issue, without getting into the specifics of how the coastwide measure would work out at this stage. I think that is kind of where we are. I mean we could keep both in, but the whole point of this exercise is to kind of narrow the range, and focus PDT work. The Board definitely wants regional closures in. Does anyone object to having a discussion of some of the points that were made about coastwide issues in the same document?

MS. KERNS: We have an objection. Tom Fote has his hand up.

CHAIR BORDEN: Yes. Justin.

MS. KERNS: Tom Fote

CHAIR BORDEN: Okay, Tom Fote.

MR. FOTE: I don't have an objection. What I'm basically saying is we already have a coastwide closure when you look at the EEZ. It would be interesting to get the public's comment on how they think that closure is working. I mean a lot of us know that a whole bunch of catch and release fishery goes in the EEZ. They say they're not targeting, but we know they're targeting striped bass when they are out there, because that is what is available, maybe an occasional bluefish. I would like to hear from the public what they think about coastwide closures.

MS. KERNS: Mr. Chair, Dennis Abbott, and then Megan Ware.

CHAIR BORDEN: Dennis, and then Megan.

MR. DENNIS ABBOTT: I think the object this morning was to focus on what we wanted to do, and probably to narrow down things. It's clear to me that coastwide closures isn't something that would end up being in our final decision document, nor would it be accepted by the vast majority of the states. I agree with John McMurray, and I do personally believe that we should be as broad as can be in putting a document out.

But at the same time, I think we have to be cognizant of the fact that some things are not going to fly, and coastwide closures is definitely a nonstarter, especially here in the northern range. I mean I could have, not envisioned, but think of the fact that New Hampshire have a closure in July, you know July and August is really the only time that we see fish. It was previously stated in a migratory species, you know it makes a big difference to us, so a coastwide closure would have a negative effect on our state, Massachusetts and Maine. I just don't think that coastwide closures work, and I don't think it should go any further than the document.

CHAIR BORDEN: I've got Megan Ware next. Megan.

MS. MEGAN WARE: Yes, I agree with Dennis there. I think the issue with the coastwide closure is there are equity issues kind of on both spectrums. You could have a closure in the winter months, which is primarily that burden is going to be on the Mid-Atlantic states, or you can have one in the summer.

That could take 25 percent of the fishing opportunity, in terms of time, in some of the New England states. I think there is kind if inequity potential on both sides of the spectrum, and so I think the way to best get around that is with more of a regional approach with a percent reduction.

MS. KERNS: You have Roy Miller followed by Pat Geer.

CHAIR BORDEN: Roy and then Pat.

MR. ROY W. MILLER: One thing we haven't mentioned in regard to coastwide closures, are spawning ground closures. Our practice has been historically, most if not all the states have some type of spawning ground closure. But in many cases, like in the Delaware River, it is not a prohibition against targeting striped bass if they're fishing catch and release.

It's a prohibition on harvesting striped bass on the spawning ground during the spawning season. Maybe that is something we might want to consider under the heading of coastwide closures, is additional clarification of what you can do on spawning grounds, thank you.

CHAIR BORDEN: Pat Geer.

MR. PAT GEER: Yes, I'm going to agree with Dennis on what he said. I think that having the PDT spend their time and efforts on developing any kind of options or coastwide closures, while we're saying that it's probably not going to go anywhere. It's not a good use of their time and effort. I'm more supportive of the state and regional approaches, and having the PDT delve more into those, to spend more time on that than looking at an option that, quite frankly, is probably not going to be approved by the states or even considered by the states.

MS. KERNS: That's all your hands, Mr. Chair.

CHAIR BORDEN: Let me suggest. I think we have a consensus on this, not unanimous, to use a regional closure option. But I also would reiterate what I said before that I think there should be dialogue developed around the coastwide issue, to include some of the points that have just been made by various Commissioners, so that is part of the document. Then we let the public comment on it. Is there any objection to doing that? Any hands up, Tonti?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so Emilie, does that meet your requirement on that item?

MS. FRANKE: Yes, Mr. Chair, I think we have some good feedback, and as was mentioned, the discussion on the next item will also help inform these options.

CHAIR BORDEN: Okay, so on the next item, and Emilie will introduce it. My own thinking on this is we just need a range of targets to put into it. It's more important to me to figure out how to do this and make it work, than it is to reach a particular target. I'm going to let Emilie introduce the issue in greater detail if she wants, and then we'll take questions on it. Emilie, do you want to speak some more on this? Emilie, do you have anything else to say on that item?

MS. FRANKE: Yes, just as a reminder. Without a specific percent reduction, it is difficult to develop specific closure options. If the Board does have a specific percent reduction in mind, that would be feedback for the PDT. If the Board did not have a specific percent reduction in mind, the Board could provide some guidance on times of the year, days, months or waves the PDT should focus on. Then if there is no guidance on that, then the PDT would only focus on those biological or ecological closures, as was mentioned, such as spawning closures or closures based on temperatures.

CHAIR BORDEN: We're going to do comments. Any hands up?

MS. KERNS: We have Ritchie White.

CHAIR BORDEN: Ritchie.

MR. WHITE: I think that unless we hear a report from the Law Enforcement saying that targeting closures are enforceable, I think that that should not be part of this document. Because I believe, especially in New England, it is not enforceable. There is no way of proving, if you have a wire leader on, that you're not blue fishing in Maine, New Hampshire, Mass, probably Connecticut, which makes targeting a striped bass. I mean you can be targeting striped bass with a wire leader, and that would just not hold up in court. Anyway, I think that is a wasted effort.

CHAIR BORDEN: Toni, other hands up?

MS. KERNS: We have Justin Davis followed by Mike Luisi.

CHAIR BORDEN: Justin.

DR. DAVIS: I guess these last two items here on the slide really do relate to each other, as Ritchie just alluded to. I share his concern about the prospect of a no targeting closure. I really worry that we would be going down a road, again sort of similar like to what we just went through with the circle hook mandate out of Addendum VI, where when we start to work on it, we realize that the degree to which that no targeting closure would be enforceable from jurisdiction to jurisdiction might vary quite a bit.

We could sort of be getting ourselves into a place where due to the different regulatory scenarios in each state, the way each state's fisheries operate. It just really may not be trackable. I feel like if we're not talking about no targeting closures, then I'm not sure what we're doing here, because a no harvest closure to me, does not really address the issue of recreational release mortality.

If we close additional periods of time to harvest, we're not telling people they can't go out and catch and release striped bass, and if people go out and catch and release striped bass, potentially maybe catch and release more fish, because they can't harvest, and then switch to fishing to something else. We might be inadvertently increasing recreational release mortality with a no harvest closure.

To me this just sort of relates, as well as to this issue of what is our target. It's not entirely clear to me here what we're trying to accomplish. You know, I can understand the PDTs uneasiness with not sort

of being given a clear goal of what we're actually trying to achieve here. I don't think we have technical guidance that tells us what level of effort or discard reduction is necessary to achieve some goal related to ending overfishing, or returning the stock out of an overfished state.

Unlike Addendum VI, where we sort of had a clear target for removal reduction, this just seems to me like an effort to make an ad hoc move to address a specific source of mortality. We could come up with ranges of days or months. I don't know how we explain to the public how we pick those ranges.

How they relate to the overall goals we're trying to achieve, other than just a sense of, well anything we can do to reduce removals of mortality can help rebuild the stock faster. But I don't know if this is really helpful input, in terms of trying to decide where to go here. But I just really have concerns about generally what we're trying to achieve here.

Also given that the fishery is primarily catch and release in recreational, there will always be some level of discard mortality, and it's likely to be high in this fishery, just given the level of effort, and that it's primarily catch and release. I don't really have any specific reduction target in mind. I don't know how to go about deciding what the appropriate target is, particularly if we're not talking about a no-targeting closure, which I worry about really the feasibility of that.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: I have to disagree with Ritchie on the no targeting closure, but I also want to say that I do agree with your comment regarding taking a look at a range of reduction options focused on minimizing release mortality. This is an issue that came up a couple years ago, and we all know the severity of release mortality, as it relates to the stock health.

We can't move forward with just a no harvest closure without, as Justin just mentioned, it's going to just translate into more catch and release, which is what we're trying to address here. I think the no targeting closure is a must. It has to be in the document. It's a new concept. We've been doing it for two years now. Not everybody is following the rules, I would imagine. We've talked with our enforcement agency, and they are doing their best to try to get people off fish when they see them catching stripers during the closure periods. It's an evolution of understanding and behavior, and I think over time the no-targeting closures will be much better understood. If individuals are really interested in making sure that the striped bass stock is sustainable for the future, that they will follow those rules. I think it is a must for this document to have no targeting closures in place.

But I do like your idea of a range of reductions, whether it's 10, 25, 50 percent from the release mortality that we know is a major issue in this fishery. I think those two in combination with each other should be combined and put together in an alternative that we can consider in the future. I appreciate the time, thank you, Mr. Chairman.

MS. KERNS: You have Bill Hyatt followed by Tom Fote.

CHAIR BORDEN: Bill.

MR. WILLIAM HYATT: Yes, I just want to chime in that I am strongly opposed to no targeting closures. I think that they are broadly recognized as unenforceable. I think their reputation amongst our angling constituency is that they are a joke. I think by considering them further and implementing them, that it reduces public confidence in virtually all that we do. I would support strongly removing them from further consideration. Thank you.

CHAIR BORDEN: Thanks, Bill, Tom Fote.

MR. FOTE: If you remove no targeting closures from the document, then why are we having harvest closures? I mean truly they are not the problem. We're basically controlling the amount of

fish that are basically landed, according to the percentages that we're reducing the catch by. What we're not reducing the catch by is the hook and release mortality.

You say it makes people have no confidence. Well, people have no confidence in harvest closures, when they know that people out there and the people that are promoting that we should close the areas are the catch and release fishermen that are causing the problem, as far as they're concerned. There is the credibility problem, and I have a great difficulty in it.

I mean I look at what happens in the EEZ, and back over the years we've seen that the people just don't abide by, especially catch and release fishermen, don't abide by the closures in the EEZ. They are out there fishing all the time, and these are the same people calling for us to do closures in the different areas, because it is not going to affect them and their customers. But if you start basically doing closures in an area, as far as harvest, you do expect certain captains that basically deal with people that want to take food home to eat, not just play with it.

MS. KERNS: That's all your hands.

CHAIR BORDEN: All right, so lacking any direction, the PDT is going to focus on biological and ecological closures.

MS. KERNS: I'm sorry, Mr. Chair, you had a couple hands go up after I said you don't have any hands, and I'm going on your rule for those that have not spoken to this issue yet, and I have Marty Gary and John McMurray.

CHAIR BORDEN: Marty.

MR. GARY: I apologize, I wanted to wait to hear a few folks, unlike the first time I commented, and I was glad I did. I don't want to protract this, but after listening, almost everybody was right. A prohibition on targeting is unenforceable. We have two law enforcement agencies that work with us on the Potomac; Maryland DNR and DMRC, and they pretty much told us on the public record at our meetings, they can't enforce a no targeting.

But despite that, our Advisory Committee and our Commission were fully supportive of a no targeting prohibition, when we implemented our Addendum VI reductions with our closure. Part of that is this regional issue we have in the Chesapeake Bay with habitat compression when we have high water temperature and high volumes of hypoxia.

Basically, our situation in the Potomac, we can have a very low or no salinity. We had a Frechette in '18 and '19, where we saw for great stretches of our tidal Potomac a near zero salinity. High temperatures low salinity, I think everybody on this call knows what that means. It made perfect sense to implement that, and I think the moral of the story for us was, give the fish a break during this metabolically challenging time.

But then when you get up into New England, where Ritchie and up in Maine and New Hampshire you have salinity, you have cool water temperatures. I can see the paradox here, and I don't know that I'm offering you any kind of solution, but the targeting thing, I agree with Mike in the Chesapeake, the no targeting rather, it's a valuable tool for us. But it may not be a great tool up in the northeast and in the north. I think we need to keep it in play. We clearly, I think believe in the Chesapeake it's a valuable tool. Thank you for letting me speak at the end here.

CHAIR BORDEN: John McMurray.

MR. McMURRAY: I'm not opposed to keeping no target options in the Amendment, because again, I think we need a full suite of options, and the public needs to be able to comment on them. But let's not be naïve on compliance here. It's 100 percent non-enforceable, and people are going to fish for stripers no matter what.

To Tom's point, of course discards are a problem, regulatory discards and just straight up recreational discards. But to claim that they are the bigger issue

is not correct. I did want to point out that 52 percent of mortality is harvest, and 48 percent is discards. Harvest is certainly the easier thing to control.

MS. KERNS: Mr. Chair, you have one repeat Commissioner, and one member of the public.

CHAIR BORDEN: We're going to take the Commissioner first.

MS. KERNS: Ritchie White.

CHAIR BORDEN: Ritchie White, you get a second bite, maybe a first one, Ritchie.

MR. WHITE: I'll be short. I agree with the input that we're looking to lower mortality. Release mortality certainly is, I think, part of that. But a harvest closure would reduce mortality, so I think it's important to leave that in. Thank you.

CHAIR BORDEN: All right, so we really don't have a consensus here on this. I guess my only suggestion is on this specific issue, as I indicated before. Without some kind of direction, the PDT will continue to focus on biological and ecological closures.

But it seems to me that there is some merit in having the section on this in the document reflect the discussion that just took place. About particularly the points that Marty raised about it may be an appropriate technique in some areas and not the appropriate technique in other areas. Then seek the public's guidance on it. Would members feel comfortable with that? Any hands up, Toni?

MS. KERNS: Dave Sikorski.

CHAIR BORDEN: David.

MR. DAVID SIKORSKI: I'm just raising my hand to say yes, I'm comfortable with that.

CHAIR BORDEN: Does anyone else want to comment on this concept? If there are any other hands up, Emilie, does that help at all if we do that?

MS. FRANKE: I think so. There has been a lot of feedback on a couple different points, so I think the PDT can develop a couple different types of options. There seemed to be more focus, as you mention, on the biological and ecological closures, so that is something the PDT can kind of focus on within this suite of options.

MS. KERNS: Emerson Hasbrouck has his hand up.

CHAIR BORDEN: Emerson.

MR. EMERSON C. HASBROUCK: I was just going to say that I agree with your suggestion that you made a few minutes ago.

CHAIR BORDEN: Okay, so I'm not going to take any public comments on this, because this document in particular, this section of the document we obviously have divergent views. It's going to be further refined. Any member of the public that wants to weigh in has the option of talking directly to their own Commissioner on this.

Then we're going to have another bite at it at the next meeting. We'll see what was developed, and then if members of the public want to weigh in on that, they talk to their commissioners, and hopefully the Commissioner's bring the concerns to the table at that. We may also have opportunity for public comment. Without anything else at this stage, I'm going to move on to Item 3. Emilie, do you have anything further on the type?

MS. FRANKE: I don't. It sounded like there has already been a lot of discussion on this. Again, some divergent views with some not in favor of no targeting closures, some in favor of no targeting closures, then maybe a few still in favor of the no harvest closures.

CHAIR BORDEN: I guess my own view is that I think that if you do what Mary suggested, that is going to be fleshed out as part of this item and the previous item, you know the merits of the two strategies and

the weaknesses will be fleshed out. Does anyone else want to speak on this issue? If not, Emilie, could you advance the slide?

MS. KERNS: You have Joe Cimino.

CHAIR BORDEN: Joe, please.

MR. JOE CIMINO: I just kind of wanted to take a step back to the comments about, it isn't just about release mortality. I thought that's what this Amendment was. Obviously, this slide is. But I didn't know we were also targeting a reduction in fishing mortality again. I thought we did that last time around, and this Amendment is specifically started to address release mortality, CE, and sorry one other item, and management triggers. I know we're going to get to the other two in a minute, but I don't understand why we just, there were some comments that were very dismissive of release mortality just now, and how to deal with it, and I'm kind of confused.

CHAIR BORDEN: Does anyone care to respond to that?

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so I'm going to have to think on that, Joe, as we move along, and maybe come back to it. Emilie, could you advance the slide, please?

MS. FRANKE: Yes, Mr. Chair. Moving us on to Conservation Equivalency, which is our next issue. I'll again provide a little bit of background, and then there are a couple sets of questions for the Board to consider. Again, just to recap. Conservation Equivalency provides flexibility for the states, but there are some challenges which were identified in the PID.

These challenges include regulatory inconsistency between neighboring states, the challenge of evaluating the effectiveness of CE programs, also limited guidance on how and when CE should be pursued, and how equivalency is defined. Then again, the challenge of the use of state level MRIP data, which is less precise than the regional or coastwide MRIP estimates.

The PDT is considering the following types of options to address these concerns about the use of CE. The PDT is thinking about the applicability of restrictions on CE, so which sectors would any CE restrictions apply to. The PDT is considering restrictions on when CE can be used, including options for restrictions that are based on stock status, and options that would be based on specific justifications. The PDT is considering options around CE proposal requirements. These types of options could include limiting the number or scope of proposals, setting some data standards for proposals, implementing or requiring an uncertainty buffer for proposals, and also defining equivalency.

The PDT has also discussed probability of success metrics, as well as CE accountability measures. The requested guidance today on CE focuses on five main topics that are highlighted here. We'll take these in sort of sets of one or two questions for the Board to consider. This is the discussion that the PDT identified as sort of a starting point to inform the development of the CE options going forward.

The question for the Board is, whether the Board can specify at this point, which sector or sectors of the fishery would be subject to new restrictions on the use of conservation equivalency. Based on the PID and previous Board meetings, most of the issues and concerns around CE seem to apply to non-quota managed recreational fisheries.

That would not include recreational bonus programs. However, the Board has not decisively indicated whether new restrictions for CE would apply across the board through all sectors, or would apply only to certain sectors. It would be helpful if the Board were able to specify which of these options the PDT would focus on.

The first option would be new restrictions on the use of CE would apply to recreational fisheries that are not managed by quota, so that would not

include recreational bonus programs. The second option is new restrictions on these the CE would apply to all recreational fisheries. That would include the bonus programs.

The third option would be new restrictions on the use of CE would apply to all recreational and commercial fisheries. The PDT included two notes in the memo. First, when comparing quota managed to non-quota managed fisheries, and thinking about effectiveness. Quota managed fisheries are accountable to a quota, using census level harvest data, while non-quota managed fisheries rely on survey-based harvest estimates, to determine if they are exceeding the harvest target.

Then second, thinking about regulatory consistency. The PDT Notes that the commercial fishery will have variations, both among and within states, in terms of seasons, trip limits, et cetera, even without CE, because there are some pretty large differences in gear participation and quota by state across the commercial sector, even without CE. With that, Mr. Chair, this might be a helpful place to pause for discussion, before we move on to the rest of the questions about CE.

CHAIR BORDEN: All right, comments from the Board.

MS. KERNS: I have Megan Ware, followed by Jay.

CHAIR BORDEN: Megan.

MS. WARE: This is actually more of a question for Emilie, but I guess I would agree with the PDTs assessment that generally the challenges we have seen have been with the recreational fisheries. I guess kind of a complicating factor here, may be the fact that some states have been moving reductions between sectors in previous addendum. Then just curious if the PDT has discussed that, and maybe potential implications such that if one sector has more liberal CE requirements than another, if that could result in some situations that we either don't foresee or don't want.

MR. FRANKE: Thanks for the question, Megan. If I'm remembering correctly, the PDT hasn't specifically discussed that. For example, thinking about Addendum VI, and sort of studying the reduction between two sectors. That's not something the PDT has discussed that could be discussed, thinking about, in what scenarios would it be difficult to sort of limit these restrictions to only part of the fishery? Yes, that's something we can discuss.

CHAIR BORDEN: Megan, do you want a follow up?

MS. WARE: Just to say that yes, I think that might be a helpful discussion for something the PDT to think through, because I do see that as a potentially complicating factor.

CHAIR BORDEN: Okay Toni, the second name.

MS. KERNS: Jason McNamee.

CHAIR BORDEN: Jason. Dr. McNamee.

DR. JASON McNAMEE: Yes, so similar to Commissioner Ware, I have kind of a clarifying question. I too kind of get the point of the group that potentially you could drop the commercial fisheries out of this. However, I think the best way for me to do this is to offer an example for the floating fish trap fishery in Rhode Island, way back.

We made an adjustment to the minimum size, and then through an analysis, you know translated that adjustment in minimum size to the quota. Again, it was eventually related back to the quota. That part of it I think is in line with what was in the presentation here. But I'm wondering if that is considered a conservation equivalency.

If so, that would be a complicating factor. It would probably hinge around the minimum size by and large, and adjustments to the minimum size, because some of the commercial fisheries, in particular in the north, have larger minimum sizes.

But that is my question. I'm not sure if Emilie is going to have an answer to that right now. But I just wanted to get that out on the table for consideration.

CHAIR BORDEN: Emilie.

MS. FRANKE: Yes, thanks for the question. One of the things that the PDT Did discuss is that it would be helpful to develop for the draft amendment a list of current CE programs that are in place, just to get a better idea of, you know thinking about exactly where these restrictions on CE would apply. I think that would kind of fall into that discussion of making it clear to the Board and to the public what is currently implemented through CE, to better be able to address this question.

CHAIR BORDEN: Jason, do you want to follow up?

DR. McNAMEE: No, I'm perfectly fine with that. Thank you, Mr. Chair.

CHAIR BORDEN: All right, Toni, who else do you have on the list?

MS. KERNS: I currently don't have any hands up.

CHAIR BORDEN: I'm not sure that we've provided enough guidance on this. But if people don't have specific suggestions, we can come back to it. I'll just make a note that we'll come back to it. Individuals can think about the discussion and the issues, and we'll come back and give you another round of opportunity to comment on it.

MS. KERNS: I just got two more hands, Mike Luisi and Dennis Abbott.

CHAIR BORDEN: Mike.

MR. LUISI: If you're looking for a direct recommendation. My recommendation would be to focus on Option 3 here, and allow for both recreational and commercial fisheries to be included in the conservation equivalency programs. We just had a conversation about states, and all states are different, and we might need to make adjustments as needed within that state.

I think excluding commercial fisheries in the conservation equivalency program would be a mistake. I would like to see how Option 3 would be developed, to allow for both recreational and commercial fisheries to be included in those CE programs. If you're looking for direct input that is my input, and we'll see what others have to say. Thanks.

CHAIR BORDEN: Thanks, Mike, that was helpful. Dennis.

MR. ABBOTT: Yes, thank you, Mr. Chair. I was just sitting here thinking that we're dealing with conservation equivalency of striped bass. Would the results of this lead us to apply the same regulations, or whatever you want to call them, to all species that we manage? Would we consider that? Kind of an off-the-wall question, but.

CHAIR BORDEN: Well, it's a question that is probably beyond the scope of the Board's authority to debate. You might want to raise that at a Policy Board meeting. Anyone else on the list?

MS. FRANKE: Mr. Chair, this is Emilie. I just have a quick clarification. Just to clarify, the PDT is not necessarily looking for input on which sectors would be permitted or would be able to use CE. This question is more focused on which sectors would be subject to these potential new restrictions on the use of CE. For example, if the Board was looking at options that would limit the types of proposals that could be submitted. Would that sort of restriction apply to all CE programs across the commercial and recreational sectors, or would those types of restrictions only apply to the recreational sector, given that that is where a lot of these concerns about CE sort of originate. I just wanted to clarify that this question is focused on which sectors would be subject to restrictions on

the use of CE, and not which sectors would be able to use CE at all.

CHAIR BORDEN: Comments.

MS. KERNS: I have Ritchie White.
CHAIR BORDEN: Ritchie.

MR. WHITE: Thank you, Mr. Chair, I support all sectors. Thank you.

CHAIR BORDEN: Thanks, Ritchie, anyone else?

MS. KERNS: Giving people a moment. Right now, I don't have any hands.

CHAIR BORDEN: Okay, so we've got some input on those points, Emilie, if you would like to move on. Mike Luisi suggested Number 3, so if somebody feels a compelling need to come back to that, we can come back to that at the end. Emilie, if you would advance the dialogue, please?

MS. FRANKE: The next question is related to restricting conservation equivalency based on justification. For example, justification could be limited, or justification could include biological reasons, such as the size availability of fish in an area being smaller than what the coastwide measure stipulates.

The idea here is that conservation equivalency would be limited to times when a real hardship would occur, due to the implementation of the FMP standards. The question for the Board is, how does the Board want to proceed with these types of options for restricting CE based on justification? The PDT could identify general justification categories.

For example, CE could be used if there is a biological reason or if there is a reason related to fair and equitable access. But the PDT is concerned that these sort of general justification categories may not provide enough guidance, and then most requested conservation equivalency plans would qualify under these general categories.

The other option is the PDT could develop specific justification categories, so for example specifying what types of biological reasons would justify using CE, and this would provide more guidance, but this might result in a valid reason potentially being left out of the Amendment document. That is one question, and I'll go through one more question, and then we can sort of address two questions at once here.

The next question for the Board is related to the number of alternatives in conservation equivalency proposals. The Board had previously requested options that would restrict the number of management alternatives that a state could submit within a CE proposal. The PDT recognizes the challenges that are caused by the high number of alternatives, for example submitted as part of the Addendum VI process. However, the PDT also identified some challenges in situations where a larger number of alternatives might be necessary.

First, if the timing of the CE proposal deadline is before a state's public comment or a regulatory process, a larger number of alternatives might be needed, in anticipation of public hearings. Another situation might be if states are trying to coordinate with neighboring states, then more alternatives might be needed for their proposal, again making it challenging to restrict the number of alternatives the state could submit.

Then finally, thinking about management complexity. States with multiple fishery components, for example different seasons or different areas, might need more flexibility on the number of alternatives, based on that complexity. The question to the Board here is that, thinking about these administrative challenges with limiting the number of alternatives a state could submit.

Does the Board still want the PDT to pursue options for specific number limitations, and if so, if the Board would like to see a hard cap on the number of alternatives a state would be allowed to submit,

what would that number be? Mr. Chair, here I have pulled up the last few questions, if you would like to take discussion on these.

CHAIR BORDEN: Thanks, Emilie. Did the, question from a Chair. Did the PDT discuss having an arrangement, where we would have a cap, and I'll just pick one arbitrarily, three or four options with some kind of provision in the document for an exception. If a state had some compelling reason, they could appeal directly to the Board, and then the Board could grant them an exception to exceed whatever number gets selected. Was that concept discussed?

MS. FRANKE: The PDT haven't specifically discussed exceptions, although we are considering options where potentially for each management action, either the Board or the TC could put some bounds on the types of proposals that could be submitted. For example, you know maybe for a certain management action, the Board could say, we won't see any alternatives with a size limit greater than X. The PDT is considering those types of options that would sort of provide that flexibility within the amendment, but we haven't talked about a specific cap with an exception.

CHAIR BORDEN: Okay, and then the follow up would be, have we, well actually I'm going to skip the question. Let me go to the Board, and see whether or not the Board wants to weigh in. Comments, hands up, Toni?

MS. KERNS: Yes, I'll start with the first two names I saw, Jason McNamee and Roy Miller, and then I'll give you more after that.

CHAIR BORDEN: Jason and then Roy.

DR. McNAMEE: A couple of comments here. Again, really, I appreciate the presentation and the information provided. I think, so I'll start with the first one and that is on justification. I think it would be extremely difficult for us to come up with. The only way to do this, I'm in agreement, is to define specific criteria for the justification categories. I just don't see us being able to do that in a really comprehensive way through this document, and I can, with high probability, can say that the very first one we get would have a justification that didn't fall into one of our categories, but that we all thought was legitimate, and we would end up in kind of a tough spot as a Board.

I don't think we really need to define justification. I think the Technical Committee, upon their review, they give us hints. Sometimes they give us very overt comments about, you know what they think about any particular justification. You know some recent ones, where I think we've gone a little askew is on like circle hooks, and assigning a specific value to the reduction achieved, and mortality.

Things like that is where we start to get outside of the bounds of what we can actually quantify. I think we can make those types of judgments as a Board. We need to step up a little bit, and be a little more bold, to say look, we're not accepting that as a justification. But to try and define all of the possible justifications here in this document. I don't think we should do that.

Then quickly on the number. I know this is another area, I think it becomes a talking point of, oh my God, so and so submitted 50 proposals, when really what they submitted was, you know variations of a single method. I don't think I've ever seen a situation where there was like even more than three or four different methods that were proposed by a single state.

I don't think states have the resources to produce more than that. Putting an arbitrary cap on the number of CEs that can be submitted, I don't think that's valuable either. Again, I think we shouldn't require a state to put forward the full continuum of possibilities within a single method. It should be the method that they are giving to the Technical Committee, and then one or two, just to show the range of what they're thinking about. But we don't need the full continuum. I guess what I'm

suggesting is, I don't think we need either of these in the document.

CHAIR BORDEN: Thanks, Jason, Roy.

MR. MILLER: I would like to agree pretty much with what Jason said. With regard to the second question there on the hard cap. I think it's too difficult to set a hard cap in advance. I think as a general recommendation, none of us like to review a whole multitude of options from a particular state.

I think that could be, the number of options could be winnowed down at the state level, before submission to the Board, rather than throw a whole number of options up there, and see which one's stick. That should be done at the state level. I think just a general recommendation, states should make every attempt to limit the number of options proposed, before submitting to ASMFC, would be sufficient in this case. I don't think we need a hard cap.

CHAIR BORDEN: Other comments. It sounds like we've got two individuals in agreement, general justification with no cap. Toni.

MS. KERNS: I have, for people who have kept their hands up, I have Justin Davis, followed by Joe Cimino, Eric Reid, and Ritchie White.

CHAIR BORDEN: Justin, and then Joe, and I'll go back to Toni on the names.

DR. DAVIS: I appreciate the thoughtful comments from Dr. McNamee and Roy Miller. I feel like my support for having specific justification categories, and potentially looking at a hard cap was my experience in the Addendum VI process, where I thought sort of the overwhelming number of CE proposals that got submitted, created substantial challenges for those folks on the Technical Committee to effectively vet them before the Board had to take action.

I think also led to a really long and drawn-out Board meeting. I guess I'm really hesitant to go back to a situation where we just stay with the status quo, and just hope that won't happen again. I do think potentially trying to provide some options for specific justification categories in the document, could help focus the discussion a bit on what people think are the appropriate justifications for using conservation equivalency.

It was my impression during the Addendum VI process that many jurisdictions didn't even offer any justification for why they were pursuing conservation equivalency. It was just sort of understood that every state was going to go ahead and do that, because the option was available. I don't know that for this species and this management program, we want to have a situation where the default expectation is once we settle on a coastwide standard.

Every state takes a look, to see if they want to do something different just to see if they can, to provide something that's a little bit better for their fishery. I feel like I would like to see some pursuit of development of specific justification categories, and on the hard cap, I get that it can be tough to set an arbitrary number.

But I wonder if it's possible to go back and look at the last few management document processes we've been through, and look at the number of proposals that were submitted. It may be possible in looking at that, that there is some cap we could identify that wouldn't have limited, you know 80 or 90 percent of instances of proposals being submitted, but maybe there is a few sorts of outliers, where we might say yes, that is too many in a cap. Sort of in between makes sense. Those are my thoughts on the topic, thanks.

CHAIR BORDEN: Justin, you basically recommending on the cap that the technical people do an analysis, and look at the history, and then calculate some percentages that would generate some numbers, a cap that would generate a percentage reduction, so we could look at it and look at actual history, and make a determination.

Is there any objection to doing that? I think that would further the dialogue on the cap. Any objection to doing this? Emilie, that's a task under that issue, so let's focus on the general justification versus the specific justification. I've got Joe Cimino.

MR. CIMINO: I agree with everything that Jason said on this, and to that end one part of that is at odds with what Justin suggested, and that's that there were some overwhelming in number of choices that would have made it difficult for the TC to review. If this was fluke or seabass, we wouldn't have seen those huge tables with options, because the methodology would have been approved, and it would have boiled down to what was probably just a couple of options for the states. I think that that needs to be given some consideration.

We manage other species where conservation equivalency is used constantly, and the methodology is approved, so that if you're shifting two to three days or a week within a wave, it wouldn't have to result in a table full of options, it would simply be a single option. I think that should have been something that was given more consideration and discussion for this, and now we have a new Amendment to do just that. I think that is something that we should be looking at as we move forward.

CHAIR BORDEN: Thanks, Joe. Toni, the next two names, please.

MS. KERNS: Eric Reid then Ritchie White.

CHAIR BORDEN: All right, Eric, and then Ritchie.

MR. ERIC REID: I just have a general question about CEs in general, is that okay to put in at this point?

CHAIR BORDEN: Certainly.

MR. REID: Okay, thanks. CE is a mechanism, it's actually a tool, a luxury to avoid hardship. You know we've had discussions about the probability of success, uncertainty buffers, depending on MRIP, et. cetera. My question is, is it possible to require any CE proposal to exceed whatever the target release mortality, recreational mortality, mortality in general, by X percent.

You know if it's 20 percent you have to exceed it by 10 percent, that makes it 22. Make it 20 percent, it's 24, because of the uncertainty. It's a luxury. In my mind you won't have to pay for a luxury, so that is my question. Can we require it to be more restrictive than the coastwide target in general?

CHAIR BORDEN: Emilie, do you want to speak to that point?

MS. FRANKE: Yes, and thanks for the question. The PDT is considering that type of option under this category of uncertainty buffer under the CE proposal requirements. The PDT Is looking at options that would require CE proposals to exceed the required reduction, as a potential option for the Draft Amendment.

MR. REID: Thank you.

CHAIR BORDEN: Thanks, Emilie. Ritchie White.

MR. WHITE: I request an option that requires CE to be submitted as part of the management document, so addendum or amendment, so that the public gets to see them, and the public gets to comment on them. I think what has caused a lot of problems is, that the Board selects a set of regulations, the public comments on that.

Then, after the fact, CEs come in, and the public never really have a chance across the board to comment, so you have regulations changing in abutting jurisdictions, and the general public never got a chance to comment on those. That is my request, to allow the public to comment on an option that requires the CEs to be part of the document that goes out to the public. Thank you.

MS. KERNS: Mr. Chair, just to respond to Ritchie's request. If we did that, that would mean every time conservation equivalency was being contemplated,

we would have to do an addendum. Sometimes conservation equivalency is asked by a state we don't have an addendum process going on.

In addition, it would slow down the addendum process, probably by three to six months, because we get the management options out first, and then you know immediately go into the process. We would need the states to come back and give us all of their proposals immediately. We can put that in the document, but I just want to control that expectation.

MR. WHITE: Follow up, Mr. Chair?

CHAIR BORDEN: Yes, Ritchie, follow up.

MR. WHITE: I think having that in this option to explain those things is fine. But I think the public gave us a pretty strong message on conservation equivalency. I think that it is important to allow the public to comment on all aspects of how this process works. I think this is an important one, to see if they think it's very important, that they be part of the final process of approving a conservation equivalency.

CHAIR BORDEN: All right, any other comments on this?

MS. KERNS: You have Mike Luisi, followed by Tom Fote.

CHAIR BORDEN: Mike, and then Tom.

MR. LUISI: I just wanted to make a comment regarding Mr. Reid's comments about conservation equivalency and the certainty or I guess uncertainty, of how it compares with the coastwide alternative. I would say that there is uncertainty in both. I don't necessarily know that when a coastwide alternative is proposed through the development of an amendment or an addendum, that there is any more certainty that those measures are going to provide for the reductions needed, than a conservation equivalency document.

You know I think if we're going to go down that road of looking at the certainty of conservation equivalency proposals. There should be some analysis of where the certainty lies within the coastwide alternative as well. Having worked with my staff, you know within our agency on developing some of these alternatives. There is just as much uncertainty as to how they work as the conservation equivalency programs. I'll stop there and leave it there. I do agree, and while I have the microphone, I do agree with Dr. McNamee.

I think we should leave this conservation equivalency kind of open and general, and I don't necessarily know that we should use a hard cap on a number of specific proposals that go forward. You know within the states, we sometimes start with a large number, and we whittle it down to the best we can.

I think the states should just take that upon themselves to try to put forth something that is actually realistic, to the Technical Committee for review, rather than sending them 20 options for review, when they know that 18 of those options aren't going to be workable. I do agree with Jason and others that spoke in favor of the comments he made, and I appreciate the time.

CHAIR BORDEN: Tom Fote.

MR. FOTE: Yes, I agree with Mike and what Jason said. I also don't understand what Ritchie is talking about. When you do conservation equivalency, it is for your state, it's not how other states look at it. It's you're accomplishing a reduction according to the conservation equivalency. That might have a different size than you have in a different state, but it's still doing the same method with taking a shorter season.

Only looking at certain part of the regulations, well, they're taking the smaller fish, like in Chesapeake Bay. All of a sudden, we have other states who all think that's what they should be doing in the Chesapeake Bay, because we don't like that size limit. Ritchie, that is not practical, what you're talking about.

First of all, the time involved. Most of the time you go to a public hearing in your state, and you put the conservation equivalency. That is one of the reasons you ask for a list of options, is because you take it to the public in your state, and say what option to accomplish this reduction do you want in our state. That is what basically how it works. That's how it's worked for years.

CHAIR BORDEN: All right, so we've had a number of good suggestions here. It seems like there is a consensus not to put a cap on the number, and I think if I'm reading the comments correctly, the group wants the majority of the individuals who have spoken want to stick with the general justification. Anything else on this?

MS. KERNS: Mr. Chair, I have one repeat, Justin Davis.

CHAIR BORDEN: Justin.

DR. DAVIS: I just wanted to note quickly. Even though I am in favor of the specific justification categories and the cap, I don't feel strongly enough about it that I would want the PDT to do that work based on just my comments earlier. It is apparent to me, as you noted, that the majority if in favor of general justification categories, and not considering a cap, and I'm fine with that.

CHAIR BORDEN: Thank you very much, Justin. Emilie, do you want to move on?

MS. FRANKE: Sounds good, thanks, Mr. Chair. We just have one more set of questions for CE. The final two questions for consideration for conservation equivalency are about probability of success, and accountability measures. For the probability of success, the PDT recognized that there is Board and public interest in considering a probability of success metric for CE proposals.

But after some discussion, the PDT does not recommend pursuing a probability of success metric for CE proposals. This is primarily because a probability of success metric is not available, and can't be calculated at the state level. While it would be possible to calculate coastwide the probability of success, for example of achieving the fishing mortality target for all different combinations of CE proposals that are submitted. That would add considerable time and complexity to the process.

For example, if a state submitted several different CE proposals, and with all the combined CE proposals there was a lower probability of success of achieving the fishing mortality target, then the question would become, which states would have to change their proposals, and by how much would they have to change them. Again, at this point the PDT does not recommend pursuing a probability of success metric for CE proposals.

MS. KERNS: Emilie, just really quick, your slides, they are not moving forward, just as an FYI.

MS. FRANKE: Thank you, Toni.

CHAIR BORDEN: While Emilie is adjusting that, you heard the recommendation. Any comments? Toni, do we have any comments, hands up?

MS. KERNS: We have Ritchie White, and then followed by Megan Ware.

CHAIR BORDEN: Ritchie.

MR. WHITE: I guess I don't understand this, because if we cannot determine probability of success, then how are we approving conservation equivalent proposals? It seems like what we're being told is, we don't know if they are going to work or not. Am I not seeing this correctly?

CHAIR BORDEN: Emilie, or somebody on the staff.

MS. FRANKE: Right, so the way that the model is set up to quantify that uncertainty around achieving the F target and the spawning stock biomass, that uncertainty could be quantified at a coastwide level.

But we can't quantify that at a state level. Therefore, we can't calculate a probability of success for a specific CE proposal. I'm going to phone a friend here, and see if Katie can add anything to help address your comment.

DR. DREW: Yes, I think it really comes down to kind of how we can't quantify the major sources of uncertainty that are causing both the coastwide measures, and the conservation equivalency measures to succeed or fail. When we tell you we need this level of removals to have a 50 percent chance of being at the F target in 2020.

The uncertainty around that is really coming from the stock assessment model, that has uncertainty in, you know what is the population size when we start these projections, what is recruitment going to be like in the next couple of years. We can say, if we achieve this level of reduction, then we will have this probability of success, based on the uncertainty in sort of stock status, and where the population is at, and where it is going to be.

But we don't really have a way to say, what is effort going to be like in 2020? That is one of the major drivers of uncertainty in these conservation equivalencies, and also the bag and size limit analyses that we do for the overall coastwide measure. We can't say, changing the size limit will have an X percent probability of giving you this reduction, because we don't know what effort is going to be like.

We can roughly approximate the size structure and the availability of fish in a couple years, but we don't know for sure what that is going to be like, and we really can't quantify the uncertainty around it. We can't give you a hard probability of success or failure. I will also say, we don't give you a hard probability of achieving that.

You know we don't say, this coastwide measure is going to have an X percent chance of giving you the reduction. We say, if we meet our assumptions about effort and size availability of fish, we'll get this level of reduction, which translates into a probability of success at the assessment level. We can't say that this conservation equivalency measure is has a 50 percent chance of giving you an 18 percent reduction, because we can't really quantify those major drivers of uncertainty.

I think we could give you a better handle on some of the uncertainty, for both the coastwide and the conservation equivalency measures. But we don't have hard, quantifiable ways to give you what's the probability that this change in management will give you the change in removals that you're expecting.

MR. WHITE: Follow up, Mr. Chair.

CHAIR BORDEN: Yes, go ahead, Ritchie.

MR. WHITE: Thank you that is helpful, and as a result of that answer I would certainly support Eric Reid's earlier suggestion that we have options that require, say 110, 125 percent of the requirement as a buffer, as an uncertainty buffer. I think that is important that we have options such as that for the public. Thanks.

CHAIR BORDEN: Yes, as was indicated, Ritchie, those are already being developed. Next on the list I have Megan.

MS. WARE: I think maybe my comment gets to where Ritchie's comment got. I was simply kind of bummed to see that this isn't possible, because I thought it might be a way to hold CE proposals to a certain percent probability of success. But I do think, you know if it is not possible and it gets removed, it does put more pressure or onus on something like an uncertainty buffer, as a way to counteract some of that uncertainty that we can't quantify. I look forward to seeing those options.

MS. KERNS: The next two names I have are Jason McNamee and then Dennis Abbott. Then I'll have some more names.

CHAIR BORDEN: Jason.

DR. McNAMEE: You know interestingly, I think our previous discussions on this topic I felt were kind of veering off into this notion of like punitive accountability, which I didn't think was the right way to go, because there are so many variables here that aren't in a state's control. I really appreciated Commissioner White and Dr. Drew's discussion there a moment ago.

I think, so I agree with what Dr. Drew said. But I will kind of hearken back to what Mr. Reid said during the last discussion. While we can't necessarily define probabilities of success for the reasons, I think we could, but those tools need to be developed. We're working on some stuff like that for fluke, scup, black sea bass right now.

But in the absence of that, in the short term what you can do, is apply precautionary buffers, as Eric suggested earlier, and that is to say, you know you are trying to achieve some level of reduction, and we want you to go 10 percent more than that, because we have uncertainty that this will be successful.

I think we can probably borrow; you don't need to make that up on a whole cloth right now, we can probably borrow from the risk and uncertainty process that is also being developed by the Commission right now. It is not ready for striped bass yet, but eventually, I hope, it will get around to striped bass.

I think some of the inputs for the Risk and Uncertainty Decision Tree could be useful in this context. But I think in the short term that is something that we could pursue in this process that is tractable, and that is to just add a precautionary buffer of some level, probably working in proportions is the easiest way to go.

CHAIR BORDEN: Dennis Abbott.

MR. ABBOTT: I have been enjoying this conversation immensely. I have a layman's hypothetical question for Katie, nothing that I would really suggest, but hypothetically. If New Hampshire proposed a conservation equivalency of a 12 inch or 16-inch minimum size limit, and that was given to the Technical Committee, and you calculated that coastwide. Could New Hampshire's request for a very low size limit be accepted?

DR. DREW: I think it would depend on, so if we said, you know if we put in a 12-inch size limit, and that met the 18 percent reduction that we needed, would that qualify for a conservation equivalency approval at the TC level? I think it would depend on what kind of standards the TC is using to review that analysis.

Right now, I think the focus is on, are you meeting that reduction in removals that we are expecting. I think the question of, how would that impact say long term SPR of the stock. It's certainly a different question, and I think that is maybe something that the TC would flag as a concern, in terms of you may be meeting the law of the reduction.

But are you meeting the spirit of the reduction, in terms of preventing negative impacts to the overall stock, which maybe falls under something like the biological justification of why you're asking for this, versus the TCs biological justification for approving or not approving a CE proposal? I think it definitely would be something that the TC would discuss, but I don't think we have hard and fast rules about what meets the spirit versus the letter of a conservation equivalency proposal.

MR. ABBOTT: Yes, follow up, Mr. Chair.

CHAIR BORDEN: Yes, briefly, Dennis, because I want to move on.

MR. ABBOTT: Yes, thank you. But again, Katie, are we required to comply with the spirit, or are we required to comply with the law?

DR. DREW: I think we would take that information to the Board and say, here is the conservation equivalency proposal, it meets the spirit of the reduction, but the TC has concerns about the

potential impact on spawning potential in the future. How does the Board want to deal with this?

The Board is the one in the end, who approves or disapproves conservation equivalency. The TC can help provide the technical guidance on whether this meets the reduction, whether this meets the intent of the regulations that you are trying to be equivalent to. But it is the Board in the end who decides whether or not that proposal is approved.

MR. ABBOTT: Thank you, Katie.

CHAIR BORDEN: Emilie, let's move on.

MS. KERNS: You had a couple other hands, let me know what you want to do.

CHAIR BORDEN: If there is an individual with their hand up that wants to make a point that has not been made, I'll recognize you. Who are these two individuals?

MS. KERNS: I have Joe Cimino and Bill Hyatt with their hands still up.

CHAIR BORDEN: Okay so Joe and Bill, I would just as soon not get into a repetitive dialogue on this. If there is something new, by all means bring it forward. Joe.

MR. CIMINO: Yes, I'm just curious. You know it's a question maybe to Katie. What would be used to determine if something is more uncertain? A state like New Jersey has fairly low PSEs for striped bass. I mean, I 'm assuming that PSEs have to play a role. Is there some other way to say that a single state's proposal is less uncertain than a region, when that state may have lower PSEs and higher harvest than an entire region?

DR. DREW: For sure. Some of that is stuff that we can quantify, so for example PSEs, and PSEs not just maybe your PSE is good for your whole state, but once you start breaking it down into wave or into sector, or into region, you are going to increase those PSEs, and you are going to have a more uncertain proposal compared to the coastwide data that we're using to develop the coastwide measures. That is stuff we can quantify, you know PSEs if they are region versus a state, versus a wave or mode level.

But other stuff about, you know how is effort going to change in New Jersey, compared to how it is going to change overall on the coast. That is difficult to quantify, and similarly, how is availability in fish in New Jersey waters is going to compare to coastwide availability or size structure of the entire population. That is another additional source of uncertainty that is going to feed into whether or not you can make your required reduction, that we don't have a good way to quantify at the moment.

CHAIR BORDEN: Bill.

MR. HYATT: I apologize if this is slightly repetitive, I lost connection for a good period of the last discussion. I was going to speak in favor of the uncertainty buffer and the concept. I was hoping however, that in setting those uncertainty buffers, it wouldn't be just sort of the selection of arbitrary percentages.

That rather, there could be analysis performed based upon the precision of MRIP samples, and the conservation equivalency proposals being put forward, that could sort of refine what is an acceptable uncertainty buffer, and what is unacceptable. I also was hoping that analysis could identify in certain cases, whether or not a state would have the option of increasing its commitment to funding additional MRIP sampling within its borders.

Therefore, make a conservation equivalency proposal fall within a specified uncertainty buffer. But I guess on part of what I was hearing, I'm questioning whether or not those concepts are even possible. Recognizing that I might have missed some relevant discussion on that, just a real quick answer from Katie would be appreciated. Thank you.

CHAIR BORDEN: Yes, Katie, if you would like to offer some thoughts. I would just reinforce what I said before, you are going to get another bite of this at the next meeting. It is going to be more detail on this. Katie.

DR. DREW: I think we could, I guess it depends on how much work you want the TC to do on this particular issue. I think sure, theoretically we could develop uncertainty buffers based on, for example, a management strategy evaluation, to say this level of uncertainty around the reduction translates into this level of ability to hit the target.

But without like a full simulation study on that, you know we don't have a way to quantify what the right level of an uncertainty buffer is at the moment. I think it comes back to sort of risk and uncertainty tolerance for the Board, as Dr. McNamee was alluding to. I think similarly, we could certainly provide maybe tiers of buffers to say, if your PSEs are in this range, then you have to have this level of a buffer.

If your PSEs are in a better range, then you can have a lower buffer. If you're trying to do a regional proposal with a group or a couple of states, you can have a different buffer. We could provide tiers of buffers, but it wouldn't necessarily be like, this is the exact right number to give you this exact probability of rebuilding the stock in 10 years. I don't know if that is helpful or not, but I think there are ways forward, and we can provide different levels of input on that. But there still remains a lot of unquantified uncertainty in these analyses.

As for the question of, could we require states to increase MRIP sampling, in order to move them down to a different buffer, or to accept a conservation equivalency proposal. I think that is certainly something the Board can discuss as a potential option to make conservation equivalency more aggressive or more restrictive.

CHAIR BORDEN: Thanks, Katie. Emilie, we're going to move on.

MS. FRANKE: The final question for conservation equivalency is related to accountability. Again, based on Board interest, the PDT has discussed options that could require accountability measures for those instances when a state's harvest or catch under a CE program exceeds its target, or in other words if a state's CE program does not achieve the required reduction.

These accountability measures could be, for example, a requirement to revert to the FMP standards, or it could be a requirement to implement additional measures estimated to achieve the target. However, after some discussion the PDT recommends removing these types of options for accountability from consideration in the Draft Amendment.

The PDT really emphasizes here the challenges with evaluating the performance of CE. Again, this was discussed earlier in the FMP Review agenda item as well. The effects of implementing any management measures can't be isolated from the effects of changes in effort, or changes in fish availability.

The PDT is also concerned about potentially the amount of time the Board could spend on CE in the future, if accountability measures are required. From the PDTs perspective, these other front-end measures that we've been discussing, like restrictions on when conservation equivalency can be used, requirements for CE proposals. For example, these uncertainty buffers in data standards would be more effective than having accountability requirements for CE. Again, the PDT is recommending removing these accountability measures from consideration. Just related to that, we had a request from a Board member to evaluate the performance of CE, and again as just discussed, the PDT does not consider this performance analysis to be feasible. Again, due to these influences of changes in effort, fish availability, and year class strength. Just to wrap up, Mr. Chair. We covered this first recommendation already, but the final question for the Board on CE is, does the Board

support the PDTs recommendation to remove accountability from consideration?

CHAIR BORDEN: Comments. Any hands, Toni?

MS. KERNS: First two names, Mike Luisi and Jason McNamee.

CHAIR BORDEN: Mike, and then Jason.

MR. LUISI: I will say that I fully support the PDTs recommendation for removing conservation equivalency accountability options from consideration, due to the challenges that were just presented by Emilie. Based on my previous comments regarding uncertainty surrounding, not only the conservation equivalency programs that are developed, but the coastwide measures as well.

I feel that holding a state accountable in a different way, if they don't implement the coastwide measure because of certain reasons, and they come up with a solid plan to make sure that they are trying the best that they can to manage the reductions to the point for which they would be compliant with the FMP.

I don't think that those states that put conservation equivalency proposals together, should be held at a different level of accountability. We're all professionals, we're all trying to do the right thing, and I do agree with the PDTs recommendation. I'll leave it there, and thank you for the time.

CHAIR BORDEN: Dr. McNamee.

DR. McNAMEE: This one's tough, because it is hard to say you are not for accountability. I think accountability is great. I think the accountability should happen on the front end, and what we were discussing in the last section, so applying precautionary buffers before implementing management, that sort of thing.

For the reasons the PDT noted, I'm in agreement on this one. All of us are subject to potential statistical anomalies. That is what we are using for this fishery, the vast majority of this fishery. That is a hard thing to hold yourself accountable to. I really liked Commissioner Hyatt's comment, just sort of incentive to increase MRIP sampling.

I like that if that can be worked in to the mix here somehow. I think that helps the cause, but in the end, you know any one of us, any state listening in right now. You could be subject to some statistical anomaly in any given year due to no faults of your management or your fishermen, or the fish themselves. What we should be working towards is being precautionary as we implement management, not on the back end, after the management has been implemented.

CHAIR BORDEN: Toni.

MS. KERNS: Yes, you have Justin Davis followed by Dennis Abbott.

CHAIR BORDEN: All right, Justin, you're up.

DR. DAVIS: I can also support the PDTs recommendation here. I think I would want to assure those members of the public who have strong interest in seeing greater accountability for CE, that I think what we're doing here is listening to the PDT and what they are telling us about the best possible option to create some sort of guardrails, or greater accountability for CE.

The best option is to do that on the front end, not try to do accountability on the back end. I think a lot of time this interest from the public in accountability stems from instances in which there is perception that CE proposals did not produce the projected outcome. Sometimes the public wants to get into assigning fault over that, or motive.

You know I don't think that is really productive. As Dr. McNamee was noting, statistical anomalies can affect any state. They can affect a state if you implement the standard coastwide measure. I think the PDT has made a good recommendation here to

pursue front end options to provide some more guardrails on CE, and that is where we should focus.

One sort of note, this builds a little bit off of what Dr. McNamee was saying, that I also like the idea of this sort of potential requirement for a state pursuing CE to do a little bit more MRIP sampling, or some sort of sampling to improve, you know recreational data collection providing some incentive there.

I think that option fell under the CE accountability section in the document, and I am hoping that is not going to get sort of thrown out here if we remove CE accountability options. I would just advocate for trying to keep that in the document, and keep it in the discussion somehow. Thanks.

CHAIR BORDEN: We've got three in agreement, Dennis Abbott.

MR. ABBOTT: I fully believe in accountability in everything that we do in our life. I would like to see accountability here. However, I agree with Jason McNamee that it's not possible practically in fisheries, to determine accountability from year to year. Therefore, I think that the rigor on the front end, as previous speakers have mentioned, should be very strong, and as Eric Reid said, I think earlier, there is a luxury to what's CE, and you should really be looking to pay a price up front, before you are granted conservation equivalency. Thank you.

CHAIR BORDEN: Okay, so we have four in agreement. Does somebody want to raise their hand if they want to speak in opposition to what has been said? Is there anybody that wants to speak in opposition? Otherwise, I think we have a consensus.

MS. KERNS: I see no hands.

CHAIR BORDEN: No hands, I think we have a consensus on the issue. Does anyone got anything new to add on this that was not stated? I'll recognize you.

MS. KERNS: Megan Ware, and that's it.

CHAIR BORDEN: Megan.

MS. WARE: Mr. Chair, my comment is just about CE in general, and potentially another option not about accountability. I can hold that or say it now.

CHAIR BORDEN: No, you can do it now.

MS. WARE: Okay, thank you. I guess I'm wondering if it is possible to have an option, either in this document or Toni, you can let me know or Emilie, if this is more appropriate for, like a Policy Board discussion about general CE procedures. You know we've had a state change their CE closure from what they had presented.

I really appreciate Mike providing that figure, because I think it provides a lot of rationale for why Maryland made their change. But I think it is appropriate for a state to notify the Board, if they are going to change their CE measures, you know ahead of that change being finalized in state regulations. I don't know if that is something that can be added into this document, but it notifies the Board, and make sure that people don't feel caught off guard, kind of after something has already happened.

MS. KERNS: Megan, that is already part of the procedures. It's one of the reasons why the Plan Review Team pointed it out to the Board. It is something that is supposed to happen.

MS. WARE: Okay, thank you, Toni. I'll just highlight that in the future that would be kind of great for states to follow. Thank you.

CHAIR BORDEN: Emilie, we're going to move on.

MS. FRANKE: I'm just moving on here to the last bit of this Amendment 7 presentation, and it's related to the management triggers. Again, as outlined in the PID, there are some shortfalls with the triggers

that have been identified. Again, sort of the variable nature of fishing mortality and continued need for a management action.

The Board has the desire for management stability, and there is some uncertainty with using point estimates. Also, some concern about making changes to management before the stock has a chance to respond to previous management measures, and then for the recruitment trigger there have been these longer periods of below average recruitment, and there is some question about the performance of the current recruitment trigger.

To account for all the different combinations of management trigger methods and timeframes, the PDT is looking at four tiers for the management triggers. The first tier will outline a set of alternatives for the fishing mortality triggers, the second tier will outline alternatives for the spawning stock biomass triggers. The third tier will outline options for the recruitment trigger, and the fourth tier will outline options for deferring management action. Those options would, for example, if a management trigger was tripped within a certain number of years, and some other criteria are met around spawning stock biomass, the Board could consider options for a differing management action. Then within each tier there will be some options for the Board to consider, and as Mr. Chair mentioned, we'll see these in more detail in the draft document.

But just as an example again, for the fishing mortality triggers, there is a set of alternatives thinking about the timeline to reduce fishing mortality to the target, a set of alternatives looking at the F threshold triggers, and a set of alternatives looking at the F target triggers. Then for the spawning stock biomass triggers, there will be a set of alternatives looking at a potential deadline to implement a rebuilding plan, a set for the spawning stock biomass threshold trigger, and then also a set for the spawning stock biomass target trigger.

The PDT is working to more fully develop the options for the next Board meeting. We did get a request from a Board member that any newly proposed triggers be tested to evaluate their performance. Asking that question of how would different triggers have performed in the past. The PDT did discuss this. The TC did as well, and the PDT does not recommend conducting this retrospective analysis at this time, because the stock assessment, the reference points have changed over time.

There have been updates to the assessment model, and our understanding of stock status have changed over time. It would be difficult to know how the stock would have responded if different triggers were in place, that maybe led to different management actions. The TC also pointed out that a full management strategy evaluation would be needed to fully answer this question.

Further recruitment triggers specifically, this is where the PDT and TC have some questions for the Board today. As we heard earlier, the recruitment trigger was triggered once by the North Carolina JAI in 2020. There is concern about the trigger performance, given this period of below average recruitment, and the TC has been working on exploring alternative options.

The TC took a look at, these are the six state JAIs, and took a look at the current recruitment trigger, and noted that that current trigger for recruitment failure, would have been tripped historically for most of these indices during the late 1970s and early 1980s, and you can see those little filled in yellow dots are times when the trigger would have been tripped.

Those correspond to a time period of very low abundance and poor recruitment. The first question for the Board is, just confirming what information does the Board want the trigger to provide? The TC noted that if the intent of the trigger is to identify true periods of recruitment failure for these long periods of very low recruitment events, like in the 1970s and 1980s, then the current trigger is sufficient to indicate

when these recruitment failure periods are happening.

However, if the Board is interested in the trigger tripping for periods of below average recruitment that aren't necessarily at historically low levels, but might allow the Board to be more precautionary with management, then the trigger would need to be revised. Overall, the TC is looking at several different options. They are looking at different trigger mechanisms, so for example a three-year average, a different reference point, for example a median. A different reference period that would exclude those periods of low recruitment. The PDT has found that in order for the trigger to be more sensitive, those years with very low recruitment need to be excluded from that reference period.

The TC is also considering options to only use a subset of the six juvenile abundance indices that are currently used, and the TC has discussed, at the recommendation of the Board, the potential to look at Age 1 indices. But those indices did not provide any additional or different information, so the TC does not recommend including those.

Finally, the TC is thinking about the estimates of recruitment from the model, and how those could be used versus the JAIs, which are currently used. Then the second question for the Board is how the Board intends to use a trigger that would trip during these periods of below average recruitment. Really, what type of management response would the Board consider?

Right now, the Board decides on the appropriate management response when the trigger is tripped, so there is no specific management response that is required. A potential option for this to consider in this Amendment would be to update that management response to a more specific action that would protect those weak year classes.

The TC, in thinking about what are some potential options that the Board could consider. The TC noted the Board could consider redefining the fishing mortality target, or the rebuilding framework to be more precautionary. For example, if recruitment is below average, then the calculated fishing mortality target, assuming this low recruitment regime, would actually be lower than the current F that is calculated based on average recruitment over that time period.

If the recruitment trigger was tripped, the Board could, for example, take action to reduce fishing mortality to that lower fishing mortality target; that takes into account that low recruitment. The Board could also use this low recruitment assumption when they are developing a rebuilding plan, and thinking about the actions that would need to be taken to achieve the target.

MS. FRANKE: Just in summary here, Mr. Chair, in these two questions for the Board feedback is, what information does the Board want the recruitment trigger to provide, and then how does the Board intend to use the trigger, and what type of management response would be considered, and for example this option of potentially redefining the fishing mortality target. Is that something that the Board would consider as a potential response to this trigger?

CHAIR BORDEN: All right, you've got two questions, let's take them in order. In terms of the recruitment trigger, what is the preference of the Board on the two options? Hands up?

MS. KERNS: Right now, I have Mike Armstrong.

CHAIR BORDEN: Mike.

MR. ARMSTRONG: I think we have a real opportunity to be precautionary, and to do something that could be very effective. Right now, we track recruitment failure, and sometimes it's a surprise, sometimes it is not. Again, our ability to address the causes of that, it's usually not SSB, it's usually environmental, so that is difficult. But the only thing we can do is to reduce F and try and

maintain SSB. Towards that, I think we should be targeting a period of low recruitment, rather than recruitment failure.

We had five years of average to poor recruitment. We did not that much very quickly, and we ended up with the SSB we have now, which is reduced. I think to be more precautionary, we should look at a trigger that is geared around below average, as opposed to recruitment failure. I have a lot more to say about that, but I won't say it now.

CHAIR BORDEN: Thanks, Mike, Mike prefers Option 2, other comments.

MS. KERNS: I don't have any other hands.

CHAIR BORDEN: Does anyone object to including Option 2? Any objection?

MS. KERNS: John Clark.

CHAIR BORDEN: John Clark.

MR. JOHN CLARK: Not an objection, I was just, a little more explanation there, based on what Mike Armstrong said. I thought we still don't have a strong stock recruit relationship for striped bass, so I'm just curious as to what the object would be to reduce F early on in the process of having like the poor recruitment, we've seen these past few years. Is this really going to make a difference? Just more curious. I guess that's more of an assessment question there. Thanks.

CHAIR BORDEN: Anyone else on this issue? Then we'll include Option 2.

MS. KERNS: I have a couple of hands up. Mike Luisi and then I think Mike Armstrong wants a second bite of the apple.

CHAIR BORDEN: Mike Luisi.

MR. LUISI: This is a question for Emilie maybe, in regards to the discussions that have been ongoing with the PDT. When there is a recruitment failure, let's say a couple years go by and depending on what that failure is defined as, and there is action that is necessary. Those fish that are part of that failure, they maintain residency within certain nursery areas for a number of years. Has the PDT been discussing what actions would be necessary?

Would those actions fall to the areas for which the recruitment failure happened, or would it be a coastwide consideration of the failure, and changes to future management? I just wonder what you guys have been talking about, as far as where the focus would be when there is a recruitment failure, whether it is in the Hudson or Delaware or Chesapeake. You know we just heard about down in North Carolina there is failure down there as well. Where would that focus be, as far as who needs to take those necessary reductions?

MS. FRANKE: The TC has really kept the discussion at a coastwide level. I think part of it is currently the status quo response is that it's at the Board's discretion what the appropriate action would be. But since the trigger hasn't been tripped until this year, there haven't been any examples of, you know what the appropriate action might be if only one juvenile abundance index, for example, showed recruitment failure in a certain area. The TC hasn't really discussed, if a specific region would have to take on the responsibility of responding to the trigger.

Everything has been coastwide at this point. One of the things the TC has discussed is again, thinking about which juvenile abundance indices would be part of the trigger, even potentially thinking about, should the trigger require that more than one abundance index trips the trigger, or some combination of that? I think indirectly the TC is sort of thinking about the spatial differences. But as far as a management response, the discussion has only been at the coastwide level.

MR. LUISI: Okay, thanks, Emilie for that, I appreciate it. Thanks, Mr. Chairman, that's all I have.

CHAIR BORDEN: Toni, anyone else with their hand up?

MS. KERNS: It was just Mike Armstrong.

CHAIR BORDEN: Mike, you get the last word on this issue.

MR. ARMSTRONG: I just wanted to respond. You know low recruitment, it's a warning that SSB is going to drop if we keep removals at the same rate. That is just going to happen. It's not just about SSB. The relationship is very loose, until you get to lower SSB, and then there is a relationship.

But it also reflects that the fishing experience gets lousy. People are complaining, and it's clear they want more bank. They don't say SSB, but ultimately that's what it means. They want more fish and big fish in the water. I'm talking about using low recruitment as a proactive way to start management actions, probably a few years before we actually see it coming along. That's how I see it.

CHAIR BORDEN: We're going to move on to the second question, you've got two options. Preferences, please put your hands up.

MS. KERNS: No hands yet.

CHAIR BORDEN: No hands up, no preferences? Does anyone have an opinion?

MS. KERNS: Megan Ware, and then followed by Mike Armstrong.

CHAIR BORDEN: Megan and then Mike.

MS. WARE: I think this may be more of a question for Emilie, but it seems like for that second question there, if you have two different F targets, one for low recruitment and one for regular recruitment. You would have to have two sets of measures, and that starts to sound like the harvest control rule that is happening in the Rec Reform Document. I'm wondering if the PDT has had any discussion about relationship to kind of that style of management.

MS. FRANKE: The TC, you know in terms of how long would this F target be in place, if the Board were to respond to their recruitment trigger by redefining the F target to that lower, under that F target under that low recruitment assumption. The example thus far has been that until the recruitment trigger is no longer tripped, the TC could potentially come up with a few other options.

Maybe it's that new F is in place for a couple of years, or until the next assessment. But in terms of that changing reference points over time, that sort of general challenge hasn't really been discussed at the TC level. But I assume it will be something that comes up at the PDT level, in terms of the complexity associated with this type of management response.

CHAIR BORDEN: Thanks, Emilie. Mike Armstrong.

MR. ARMSTRONG: We're prolonging things too much. I'll just say, if you believe what I said on the first piece, that we should react to below average recruitment, rather than recruitment failure. I think the reaction should be to reduce F, and to consider using projections using as low recruitment regime.

It's the precautionary approach, and I would like to hear the opinions of the people. You know, they are going to have to pay a price to be precautionary, but do they want a high stock and less ability to harvest more fish? Anyway, I think the second option, but I'm not against keeping in both too, moving forward.

CHAIR BORDEN: Any other hands up, Toni?

MS. KERNS: Jason McNamee, and then Craig Pugh.

CHAIR BORDEN: Jason, and then we'll go to Craig.

DR. McNAMEE: You know I agree with what Mike Armstrong just said. My preference is, I like that second bullet there under the question as well. I guess what I was pondering, without raising my

hand in the beginning there was, so the status quo response is just Board discretion, right? Maybe I'm wrong on that.

But I guess I was thinking that the first bullet was inclusive of the second bullets. I wasn't inclined to remove either. But just to make the comment, I do like this idea of accounting for periods of low productivity, and sort of accounting for that, you know I think is a good idea, just like Mike just said. It's more a matter of what the first bullet means, and I thought it meant it's discretionary for the Board.

CHAIR BORDEN: Thanks, Jason. Craig.

MR. CRAIG D. PUGH: Yes, my question would be, in periods of the opposite, in higher recruitment, would that result in a sunset of these restrictions, as we go on with these discussions? It seems as though we're focused on this low recruitment, as though it's going to be an anomaly that stays with us forever. But if we do have periods of high recruitment, what is going to be the response back to the fishery?

MS. FRANKE: This is Emilie, Mr. Chair. The TC has discussed the potential for you know if there is this option to calculate a new F based on a low recruitment assumption, then there could be an option to calculate a new fishing mortality target, based on a high recruitment assumption. That is something that the TC could include in the draft, or could recommend that the PDT include in the Draft Amendment.

CHAIR BORDEN: Anyone else? I would just make the simple point that to some extent, the Board always maintains the option to do an addendum in response to a condition like this. That is also on the table.

MS. KERNS: You have one last hand, and that is Tom Fote.
CHAIR BORDEN: Tom Fote.

MR. FOTE: We basically manage for recruitment, yet when we do stock assessments and we look at the stock assessment, we say spawning stock like summer flounder, has no affect it seems on recruitment, I mean half the spawning stock biomass that we had in summer flounder, we had better recruitment.

We've been trying to maintain this high spawning stock biomass, and just had poor recruitment all along. When we basically shut down weakfish, and we shut down winter flounder, it hasn't done anything for recruitment. We basically stopped fishing for them. I'm not ready to basically start panicking when we have average or below average recruitment.

CHAIR BORDEN: Emilie, it sounds like we've got a few different positions here. I guess my take is let the PDT kind of develop both, unless somebody objects.

MS. KERNS: No hands.

CHAIR BORDEN: Okay, so we're going to move on, because we're going to run out of time here. Anything else on this agenda item, Emilie?

MS. FRANKE: I just have one more slide on the 2015-year class, in case folks were wondering why that issue hasn't come up yet. Again, there is concern the 2015s are entering the slot limit, some concern they have already entered the slot limit, and the TC is currently working on analysis, both to estimate the size at age of these year classes over time, and also to estimate the distribution of those year classes by size. The TC is working on this analysis, and will report to the PDT with those recommendations. Then just to wrap up, the PDT and TC will continue to meet over the next several weeks. Again, with the intent of providing the Board with a draft amendment document in October. That's all I have, Mr. Chair. I just want to say thanks so much to all the Board members for all their feedback today.

REVIEW OPTIONS FOR ADDRESSING COMMERCIAL QUOTA ALLOCATION IN A FUTURE MANAGEMENT DOCUMENT

CHAIR BORDEN: Okay, Emilie, if you would like to move on to Item 7 on the agenda, please? While you're getting organized, let me just say that in anticipation that this issue came up at the last Board meeting. The vote as most of you will recall was a tie vote, so it failed.

As a response to that I requested that given the number of individuals that spoke in favor of trying to do something, I asked the state of Delaware delegation to meet with the Commission staff, and further develop options for consideration at this Board meeting. That has been done, and you're going to get a report on that, so Emilie.

MS. FRANKE: I have pulled up the presentation here on the screen. I just have a couple of slides that just outline the content that was in the memo that was part of supplemental materials. As the Chair just mentioned, he requested that staff from the Commission in the state of Delaware prepare options and timelines for addressing this issue.

Delaware has raised this issue for several years, and there was some interest at the last Board meeting in reviewing more recent data for commercial allocation. There was also some concern that addressing commercial allocation in Draft Amendment 7 would make the amendment process longer, and more complex.

In response to that request, the Commissioners from the state of Delaware developed options to potentially address their concern, and then Commission staff prepared some perspective on the process and timeline, considering that Draft Amendment 7 is currently being developed at this time. This is the list of options that the state of Delaware has developed to address their concerns about commercial quota allocation, and a full description of each is included in the memo.

Just as a quick overview, staff perspective on these issues. Thinking about Option B, which is allowing for a commercial quota transfer, voluntary transfers from a staff perspective, this option could potentially be developed as an addendum to Amendment 6, concurrent with the development of Draft Amendment 7.

Also, since this option is less complex, it doesn't have that same complexity as some of the other options. The Board could potentially consider adding it to Draft Amendment 7 to sort of streamline that process. For the rest of the options, starting with Sub-Option 2, which is voluntary transfers, but only to other states that filled their commercial quota.

Reallocating commercial quotas based on historical quotas, fishery management and fishery performance, and then the option where quotas would be adjusted based on contribution of the estuary to the coastal spawning stock. From staff perspective, the complexity of those options would mean that those would likely need to be addressed after Amendment 7 is approved in an addendum to Amendment 7. Again, a little bit more specific perspective. If the Board decided to pursue this proposed option that would allow voluntary quota transfers, from staff perspective this option could potentially be developed alongside Amendment 7 as an addendum to Amendment 6, with some caveats.

Commission staff would not be available to conduct individual state hearings, but could conduct up to three webinar hearings. States could hold additional hearings on their own. Commission staff would have a preference for collecting public comment via a survey. If this option were developed as an addendum to Amendment 6, this could potentially be implemented in 2022.

Additionally, since this option doesn't have the same complexity as some of the other options do, the Board could potentially consider including this type of voluntary transfer option in Draft Amendment 7. From a staff perspective, this would streamline the development of that option with the current Amendment 7 process, and the estimated implementation date for that would be 2023.

That is the Commission staff perspective on this Sub-option 1, voluntary transfers. Then for the

remaining options, again Sub-option 2, voluntary transfers, but only to other states that filled their commercial quota. Option C, which would reallocate quotas based on certain criteria related to Amendment 6 historical quotas, fishery management, and recent fishery performance, as well as Option D, which would adjust the quotas based on contribution of the estuary through the spawning stock.

From a Commission staff perspective, the complexity of these options would result in these options likely needing to be pursued as an addendum to Amendment 7. That would be after final action is taken on Draft Amendment 7. This is the same slide that I had up before, just a quick summary, and again I just want to say thank you to the Commissioners from the state of Delaware for developing these options, and I will turn it back over to you, Mr. Chair.

CHAIR BORDEN: What I would like to do is I would like to go to the Delaware delegation of the Board, John Clark and his delegation, an opportunity to offer any comments, and then we'll take general questions on this or comments, so John.

MR. CLARK: Thank you Mr. Chair, thank you Emilie, and thanks to Emilie and Toni for working with us to develop these options. Tried to keep it very simple, and tried to look for a option, you know as Emilie pointed out, the first option there is voluntary transfers. We are not trying to do a full reallocation everywhere, because we know how fraught that process would be. Just looking to get more in the simplest way possible here.

We also understand that there might be some concern with just voluntary transfers, because it could end up with more questions of states asking for transfers that maybe they don't really need, or what have you. We added some criteria first with the Sub-option 2 there, to at least make sure that transfer would only go to states that had filled their quota the previous year. For Option C, adding the specificity there we thought would help, it would really narrow down where the quota could come from, and where the quota could go to. I'm sure if anybody who has read through it saw that really the only state that would qualify under all three criteria would be Delaware. Some of the performance measures I put in there, or the criteria that we put in there, also demonstrate just the small scale of the fishery in Delaware. I mean the fact that striped bass are over 50 percent of our total commercial finfish landings for each of the past five years, shows that we are very traditional, small-scale fishery here.

The fact that one of the other criteria was double tagging the fish. Our fishermen tag the fish, another tag has to be put on by a weigh station. It just shows how we are managing this fishery very carefully. The fishermen cooperate fully in that. Finally, the last option there was just to bring back the whole idea that we've brought up several times to the Board about the producer area status.

It was just a very back of the envelope thought exercise there, but if there was any desire to start looking into producer area status again, put that in there also. But as I said, tried to keep things simple, and hopefully we can use this process to increase Delaware's quota without causing a huge debate over reallocation. Thank you, Mr. Chair.

CHAIR BORDEN: Thanks, John. Any other representatives from Delaware want to speak to this?

MS. KERNS: Craig Pugh has his hand up.

CHAIR BORDEN: Craig.

MR. PUGH: I also want to thank staff for helping us develop this. It's been a long time coming to have this conversation, and it's been our long-term thought here, and then it's the undeniable fact that the inequities and balance that are supposed to be provided to us through the charter and the five-year strategic plan, have not applied to the state of Delaware.

For some reason we've been shuffled out here, and we would like to be included in a more fair, balanced, equitable dispersion of the allocation. We feel as though maybe some of these options if allowed, will help us along with that process. I guess the last point I want to make is kind of laughable.

But about half hour ago that the TC recommended that the 1970s and 1980s data is unacceptable for their triggers, but yet it is the acceptable commercial harvest process that we live under, which seems to have encumbered this problem upon the state of Delaware. It's kind of nice to see that some of these conversations are able to be had, and I'm looking forward to this Board discussion. Thank you.

CHAIR BORDEN: Thanks, Craig. Anyone else on this? If there are no hands up from the delegation, let me ask for general comments on this. My assumption, Emilie, is this will require a motion at the end, if we're going to proceed with one course of action, obviously we could delay action until the next meeting, and let everybody digest this. But let's take a few comments. Comments on the concept.

MS. KERNS: We have Mike Armstrong and Pat Geer.

CHAIR BORDEN: Mike and then Pat.

MR. ARMSTRONG: Thank you, just a quick question. If we added Option B, Sub-option 1, voluntary transfers to this Amendment. You mentioned the implementation would be 2023. I thought the original timeline for the Amendment was 2022, in spring. Are you saying if we add this to the Amendment we would prolong the timeframe, or just for the implementation of this particular option?

MS. FRANKE: Hi Mike, this is Emilie. I think the implementation date for Amendment 7 conservatively is 2023, if we stay on this timeline of approving the final Amendment 7 it's February. I think there is some question as to what provisions from that Amendment could be implemented that same year in 2022.

To answer your question, would adding this particular issue to the Amendment prolong the full Amendment timeline? No, it would not. I think a final implementation date for Amendment 7, you know maybe some parts of it could be implemented in '22, I think the PDT just isn't sure if this Amendment is approved in February, what could be implemented immediately.

CHAIR BORDEN: Toni, was it Pat Geer?

MS. KERNS: Yes, followed by Emerson Hasbrouck.

CHAIR BORDEN: Pat.

MR. GEER: Thank you, Chairman. I just have a question to one of our striped bass historians about why transfers are not allowed in this fishery. You know, does someone have an answer to that? Why has it never been allowed?

CHAIR BORDEN: Does someone want to speak to that?

MS. KERNS: I can't say why the Board chose not to allow them, but it was considered in a previous document. I see Bob has his hand up. Maybe he can say why.

CHAIR BORDEN: Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Pat, my recollection is that they were not allowed while we were, even before my time the Board was trying to rebuild the striped bass stock. Then once it was rebuilt, the Board sort of felt comfortable with not allowing transfers. Part of it had to do with where those fish came from.

If you move fish from North Carolina to Maine, well North Carolina to Massachusetts, that's probably the farthest commercial quotas. You know with that impact differentially, where those fish came from and the spawning populations and that sort of

thing. But again, most of it is a holdover from the rebuilding days of the early '90s.
MR. GEER: Okay, thanks.

CHAIR BORDEN: Then Mike Armstrong.

MR. ARMSTRONG: Yes, Mr. Chair, I already asked my question.

CHAIR BORDEN: Who did I miss, Toni?

MS. KERNS: You have Emerson Hasbrouck followed by Roy Miller.

CHAIR BORDEN: Emerson and then Roy.

MR. HASBROUCK: I would certainly support consideration of Option B, Sub-option 1, voluntary transfers, either as an addendum to Amendment 6, or to add this into Draft Amendment 7. I would support moving that forward in some fashion, or at least considering moving that forward in some fashion, and let's hear what the public has to say about it. In terms of anything with Option C and Option D, reading the details that were in the memo in our meeting materials.

I have some issues and concerns about Option C and Option D. I don't know that right now is the time to get into that, especially if we're not considering any action on those. But once we do or if we do go forward with anything in Option C and D, I think we need to have an in-depth discussion about that.

CHAIR BORDEN: My question to staff is, do we need, obviously it would be helpful to provide some guidance on where we want to go to the staff today. But do we need to make the final decision today to commit to a path, or will that, because you've got two options, or will that decision be made at a subsequent meeting? Emilie, I think that is probably a question to you.

MS. FRANKE: Toni, correct me if I'm wrong, but I think if a Board wanted to pursue Sub-option 1, voluntary transfers, through either an addendum to Amendment 6, or through adding that to Draft Amendment 7. That would need to be addressed today, in order to get that process started, because we intend to have a draft amendment document by next meeting, so we would need to know if we were to add it to that document, and in order to have an estimated implementation of 2022 through and addendum to Amendment 6, I think that would also need to start today.

CHAIR BORDEN: Thank you, that is helpful. Toni, who else do you have on the list?

MS. KERNS: I had Roy Miller, Joe Cimino, and Ritchie White.

CHAIR BORDEN: Okay Roy, you're up.

MR. MILLER: Thank you, Mr. Chair, I'll be very brief. I just wanted to agree with what Bob said regarding the history of this process. We were in a rebuilding mode from the 1980s until the mid-1990s. This is from someone who was there during that time. It carried over into the restoration of the coastwide stock, and even the Delaware stock in the mid-1990s. It's just something we haven't dealt with since then, so those transfers when we were in a rebuilding mode no one wanted to consider transfers. Once the stock was declared restored, the subject hadn't come up again until very recently. Thank you.

CHAIR BORDEN: Thanks, Roy. Joe Cimino.

MR. CIMINO: I do have some concern with starting an addendum process in the midst with all of this. I am not opposed to Option B, Sub-option A being carried out to the public, and I think maybe having that done in Draft Amendment 7 makes sense. I could support that. Thank you.

CHAIR BORDEN: Okay, let's see, Ritchie White.
MR. WHITE: Question. Where this was not in the first document to go out to the public, when we do an amendment, is it appropriate that we bring something in at this time? That's just a question.

Secondly, I'm not opposed to the Sub-option 1, but would there be any constraints on that?

With a look at North Carolina, and even Massachusetts not sowing theirs in the last few years. It could be fairly substantial transfers that get harvested that then increase mortality. I guess that would be a concern. I guess I have concern over, can we bring this in at this time in an amendment, would be the biggest question. Thank you.

CHAIR BORDEN: Ritchie, to that point, and the staff can take a counterpoint if they believe this is incorrect. This issue was raised during the scoping meetings, I believe, by the representatives from Delaware. I'm not sure I totally understand your point. It has been raised as part of Amendment 7, and obviously the Board has the right to do an addendum as part of Amendment 6. I'm missing the point. It was raised as part of the process, and the staff please correct me if I misspeak.

MR. WHITE: A follow up.

CHAIR BORDEN: Yes, just let's try to get the staff to give us a history, instead of going on my recollection. Was this raised as part of the scoping process?

MS. KERNS: You are correct.

CHAIR BORDEN: I'm correct, okay, so Ritchie, you want to follow up?

MR. WHITE: Yes. It's bringing it back into the Amendment, where it was not voted to continue in, and the public saw that. I guess I'm more comfortable with an addendum than bringing it back into the Draft Amendment.

CHAIR BORDEN: Does anyone from the Delaware have a draft motion that they would like the Board to consider? It seems to be, and I'm not trying to put words in everybody's mouth. You've got some support around Option B, particularly Sub-option 1. There have been a number of people have spoken in favor of that, and talked about the complications with Option C and D. John, do you or somebody on your delegation want to make a motion?

MR. CLARK: Yes, I sure would, Mr. Chair, **and I would move to initiate an addendum to allow voluntary transfers of striped bass quota.** If I could just, for Ritchie's concern about the transfers, that is why we had the other options in there, Ritchie, to try to limit where the transfers would go. But obviously that would be an issue once the Amendment is actually done.

CHAIR BORDEN: I have a motion by Mr. Clark, is there a second to the motion?

MS. KERNS: I have Pat Geer.

CHAIR BORDEN: Seconded by Pat Geer, discussion on the motion. Any hands?

MS. KERNS: Mr. Chair, just really quickly before we go to comments, and I'm going to recreate my list. **Can we say allow voluntary transfers of commercial striped bass quota?**

CHAIR BORDEN: John, do you agree to that perfection?

MR. CLARK: That's fine with me, yes.

CHAIR BORDEN: How about you, Pat, do you agree?

MR. GEER: Yes, I'm fine with that.

CHAIR BORDEN: Okay, so any other perfections, Toni?

MS. KERNS: That is all my perfections. I have on the list here Megan Ware and Mike Armstrong, and I'll have additional names for you.

CHAIR BORDEN: Okay, I've got Megan and then Mike.

MS. WARE: I'm not really sure how I'm going to vote on this, and I think what's giving me pause is,

because of the history recap we've had on transfers the Board decided not to use transfers in a rebuilding period, yet we're finding ourselves in that same situation now. I'm a little concerned that transfers are going to increase the catch.

Is that counter kind of to the status of the stock that we're in right now? I actually think Delaware has a very strong argument for wanting to review allocation, particularly when we discussed it on the Striped Bass Work Group. They had a lot of merits to their argument. I'm not sure how I'm going to vote on this, but I am a little concerned about kind of what this could lead to in the status of our stock.

CHAIR BORDEN: Mike Armstrong.

MR. ARMSTSRONG: I would vote against this right now. I think the actual addendum needs to be pretty comprehensive, and I think there are more options that need to be considered, than what Delaware has brought forward. I think the first one of voluntary transfers, if I was Delaware, would not be very satisfying to me, to have to come with your hand out and depend on the largesse of Massachusetts, for instance. I don't know how you plan your commercial fishery that way.

I think we need a full amendment with a fair amount of options and a lot of discussion. For that reason, I would rather it be an addendum to Amendment 7, which will only delay the process. We'll be essentially done, hopefully in February. I don't think it's kicking the can down the road too much, and I think it would be more effective to be able to concentrate fully on an addendum like this.

CHAIR BORDEN: Anyone else, Toni, on the list?
MS. KERNS: Yes. Tom Fote and then Mike Luisi.

CHAIR BORDEN: All right Tom and then Mike.

MR. FOTE: We have a striped bass stock that we say is overfished and overfishing is taking place. We are putting a lot more restrictions on the recreational sector. At the same time, we're going to allow transfers of unused commercial fish from one state to another, and also where states are leaving fish in the water.

I mean it will make the public hearing process a lot more interesting. I don't know, I think it's better that we finish Amendment 7, and do this in an addendum after the Amendment 7 is passed, because this is going to complicate the public hearing process. I can see everything else getting drowned out by people that don't want to see any increases in the commercial fishery.

CHAIR BORDEN: Mike Luisi, and let me encourage future speakers to start by saying they are in favor or opposed. It would be useful. Mike Luisi.

MR. LUISI: I'm in favor of the concept. I fully support my colleagues in Delaware for their interest in trying to find a way to add to their commercial striped bass quota. What I don't understand from the motion is the timing, and it goes to the last two commenters. It says initiate an addendum. Is that an addendum to Amendment 6 that is going to start now? Is that an addendum to Amendment 7, which as Mike and Tom just alluded to will be finalized hopefully in late winter, early spring of next year.

You know that is a question for John, as to what the intent here is. Personally, I would prefer that we get through Amendment 7 first, and then work on an addendum to Amendment 7, where this commercial issue, as Mike mentioned, could be more fleshed out. There could be other options discussed, and it would just be more comprehensive. That's a question for John, and then for you, Mr. Chairman. I support the concept, I'm just not sure as to what it actually means, based on the language in the motion.

CHAIR BORDEN: John, could you provide a little bit more guidance?

MR. CLARK: Sure, thanks, Mr. Chair. I had intended for an addendum to Amendment 6, based on the input we just had from Emilie and Toni that to start an addendum for Amendment 6 we would have to start today. But I understand some of the hesitation. This is obviously a very basic motion here.

If you look at our memo, what we were getting at here, A) the Board would have to approve any transfers, B) it would only be for a year. If you look at the situation, the main situation we have where quota is going unused is North Carolina, which has about close to 300,000 pounds of coastal striped bass commercial quota that is being unused. Delaware would not be asking for all of that by any means. I just want to allay fears of what we would be asking for.

I think this could work. You know as I said, we try to do things as simply as possible, and in a way that would have the least amount of impact obviously to the stock, and also to other states, and to the commercial fishery in general. If there are any other questions about what we were intending here, I could answer those. But I hope that explains it a little more. Thanks
.

CHAIR BORDEN: John, do you want to perfect the motion so it reads, move to initiate an addendum to Amendment 6? Add in Amendment 6.

MR. CLARK: Yes, that would be good, thank you, Mr. Chair.

CHAIR BORDEN: Pat, is that perfection all right with you?

MR. GEER: Yes. Yes, I'm fine with that. I wanted to open the discussion on this, so I'm fine with this.

CHAIR BORDEN: Additional discussion on this, hands up, Toni.

MS. KERNS: I have Roy Miller. John Clark, I don't know if your hand is intentionally still up, no it's not, and I think Roy just took his hand down, and then Cheri Patterson.

CHAIR BORDEN: Roy, I'm unclear whether your hand is up or down.

MR. MILLER: I put it down, Mr. Chair.

CHAIR BORDEN: Okay, thank you, because I can't see the hands, so Cheri.

MS. PATTERSON: Yes, I'm still kind of waffling on this one. I think that there is some unintended consequences that aren't really defined here, that I think needs to be further fleshed out. That might happen when you initiate this addendum. One of my concerns here is, all of a sudden seeing states that don't have a commercial fishery for striped bass currently, you know they have no quota, no fishery.

All of a sudden, those states can now receive commercial striped bass quota? I don't think that is the intent of Mr. Clark. I'm thinking he's just thinking it's going to move around similar to what we do with menhaden and such. But I think there are some unintended consequences here that need to be further thought through. Do we want to allow voluntary transfers of commercial striped bass quota, and just put a caveat that this is only for states that have a commercial quota?

MS. KERNS: You have John Clark.

CHAIR BORDEN: John.

MR. CLARK: Sorry, Mr. Chair, not to change the motion yet again, but perhaps it would allay some of Cheri's concerns there if we put in there, allow voluntary transfers of commercial striped bass quota, as outlined in the memo of July, what was the date there? The memo of July 26, 2021 to the Striped Bass Management Board regarding these transfers.

CHAIR BORDEN: All right, we've got another perfection. Pat, are you okay with this perfection?

MR. GEER: I'm okay with this. I might suggest doing it a little simpler by saying, voluntary commercial striped bass quota transfers from any state presently holding quota, or something like that. But I mean, it's in the memo. I was just trying to, instead of referencing the memo saying it's only for states that presently hold quota.

CHAIR BORDEN: John, is that what your intent is, and if you say yes, I think we can leave the motion the way it is.

MR. GEER: Yes, that's fine.

MR. CLARK: Yes, because the motion as was Amendment 6. We're only talking about states that have commercial striped bass quota. Thank you.

CHAIR BORDEN: I ask that that be part of the record. Further discussion on this.

MS. KERNS: I have Ritchie White, and then I'll have a follow up question at the end, Mr. Chairman.

CHAIR BORDEN: We're over our time slot here, and we still have got one agenda item on the agenda, so I am going to limit the discussion, and basically call the question on this after a couple more points. Ritchie.

MR. WHITE: I'm opposed to this as written. I could support if it was an addendum to Amendment 7. We're rushing this too fast. There are a lot of issues that are not flushed out yet. I'm in favor of the general concept, but concerned with some of the details. I'm just saying that any state that has a commercial quota.
New Hampshire has a couple thousand pounds, Maine has, I think 400 or something. The idea that then those states could open up, you know a substantial commercial fishery, I think is not the direction the Board wants to go. I would like to see this slow down a little bit, and see it be an addendum to Amendment 7. Thank you.
CHAIR BORDEN: Toni, you want to comment, but is there anyone else on the list?

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

CHAIR BORDEN: Okay, so Toni, you get the last word, and then I'm going to ask for a two-minute caucus period. Then we're going to call the question.

MS. KERNS: I just want to reiterate the sort of preferences of staff, in terms of how the amendment process would work. One of the reasons that we said we could do this is that we said we would do three virtual public hearings, we would not hold individual state hearings. I just want to make sure that that is clear.

Staff has a strong preference to conduct the comments by survey. It still includes the ability to do open comments, but it will help us sort the comments in a much more efficient way. I just want to put those two things out there, to make sure that everyone understands that that is what we would be agreeing for at least the hearings we would be agreeing to.

CHAIR BORDEN: Toni, thank you for raising that. That was part of Emilie's presentation, and I would just point out my interpretation was there was no objection by any Board member to doing that. I think you've got a directive from the Board to conduct the hearings in that manner. I'm going to declare a two-minute break for a caucus. We'll reconvene at 12:54. We've got the timer on. Thank you. All right, time is up. Are we back on?

MS. KERNS: I'm here.

CHAIR BORDEN: Okay, are you ready for the question?

MS. KERNS: I'm ready.

CHAIR BORDEN: Okay, Toni, so we have a clear vote, could you call a role please?

MS. KERNS: I can. I can call off the names.

CHAIR BORDEN: Or would you prefer to just call the vote? We need to have the states individually identified how they vote.

MS. KERNS: Yes, I'll do that when they raise their hands. Can you read the motion?

CHAIR BORDEN: All those states in favor of the motion to initiate an addendum to Amendment 6, and I'll read it in the record. Move to initiate an addendum to Amendment 6 to allow voluntary transfers of commercial striped bass quota as outlined in the memo of July 26, 2021 to the Atlantic Striped Bass Management Board regarding these transfers. It was a motion by Mr. Clark, seconded by Mr. Geer. All those in favor of the motion signify by raising your hands.

MS. KERNS: I have Connecticut, Delaware, Virginia, New York, Rhode Island, Maryland, North Carolina, Potomac River Fisheries Commission, and Maine.

CHAIR BORDEN: Okay, thank you. If you would put down the hands. All those in opposition to the motion, please put up your hands.

MS. WARE: Toni, just to clarify. Maine did not vote yes on that is my understanding.

MS. KERNS: I'm going to need to put the hands down, and people are going to have to re-raise their hand for those in opposition, and I have removed Maine from a yes. I need to have the hands come back up now, for those in opposition. I have NOAA Fisheries, Maine, New Jersey, Pennsylvania, Massachusetts, New Hampshire, and Fish and Wildlife Service.

CHAIR BORDEN: All right, if you would put the hands down, Toni, if you could.

MS. KERNS: I'm ready.

CHAIR BORDEN: Are you ready? Any null votes, any hands up?

MS. KERNS: I have no hands.

CHAIR BORDEN: Any abstentions?

MS. KERNS: I have no hands.

CHAIR BORDEN: Toni, could you give me the count, the final count, please?

MS. KERNS: Emilie, did you get eight?

MS. FRANKE: Yes, I had 8 in favor, 7 opposed.

CHAIR BORDEN: All right, so the final vote is 8, 7, 0, 0 motion passes. Okay, anything else on this issue?

OTHER BUSINESS

APPROVAL OF ADVISORY BOARD MEMBERS

CHAIR BORDEN: If not, we've got one other item on the agenda, which is approval of Advisory Board members**.** Tina Berger.

MS. TINA L. BERGER: Thank you, Mr. Chairman. I offer for your consideration and approval two advisory nominees from Maryland; Chris Dollar, an outdoor columnist and fishing guide, and Charles Green, a for-hire captain. Both of these nominees fill vacant seats on the panel. Thank you.

CHAIR BORDEN: Any questions on that? Any hands up, Toni? Any objection to approving this recommendation?

MS. KERNS: I have no hands in objection.

CHAIR BORDEN: No hands up, the motion stands approved with unanimous agreement. Any other issues to come before the Board?

MS. BERGER: Mr. Chair, I think we need a motion maker and seconder.

MS. KERNS: You have Mike Luisi and Marty Gary as maker and seconder.

CHAIR BORDEN: That's the second time I've gotten ahead of myself today. Thank you, Mike and Marty for the motion. We have a motion, any objections to the motion**? If there are no hands up, the motion stands approved by unanimous consent.**

MS. KERNS: No hands are up.

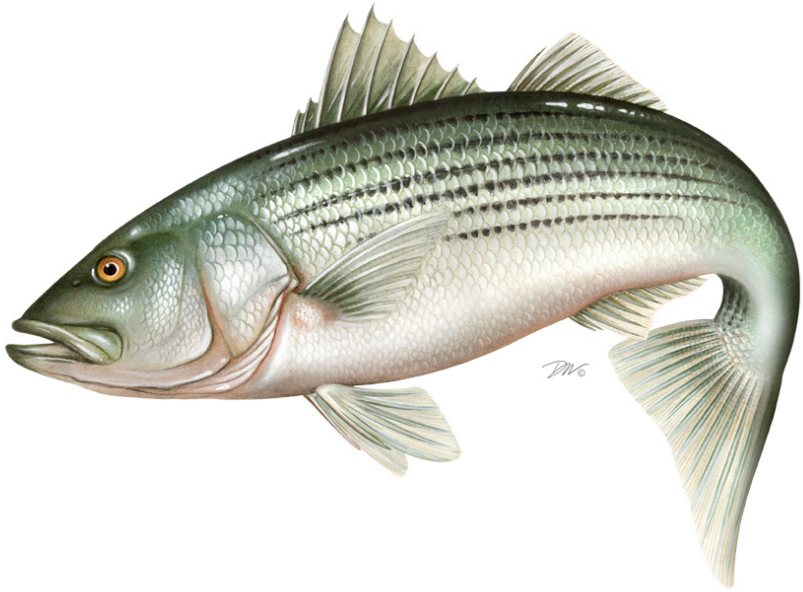
ADJOURNMENT

CHAIR BORDEN: Okay, so is there anything else to come before the Board today? We're close to being on time, I would point out. If no hands up, the meeting is adjourned. Thank you very much, all, and Emilie, thank you for all your work on this, and Toni and the rest of the staff, thank you.

(Whereupon the meeting adjourned at 1:00 p.m. on Tuesday, August 3, 2021)

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.

October 2021

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

Plan Development Team Members:
Max Appelman, National Marine Fisheries Service
Simon Brown, Maryland Department of Natural Resources
Brendan Harrison, New Jersey Department of Environmental Protection
Nicole Lengyel Costa, Rhode Island Department of Environmental Management
Nichola Meserve, Massachusetts Division of Marine Fisheries
Olivia Phillips, Virginia Marine Resources Commission
Greg Wojcik, Connecticut Department of Energy and Environmental Protection
Emilie Franke (Chair), Atlantic States Marine Fisheries Commission

DRAFT

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
Fax: (703) 842-0741

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 - September 2021	Preparation of Draft Amendment
October 2021	Board reviews Draft Amendment and considers approving for public comment ***Current Step***
November 2021- January 2022	Public comment on Draft Amendment
February 2022	Board reviews public comment and selects final measures for the Amendment; Policy Board and Commission approve the Amendment

TABLE OF CONTENTS

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 (ASMFC, 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 meeting, the Board approved the following four issues for development in Draft Amendment 7:

- Management Triggers (see *Section 4.1*)*;*
- Measures to Protect the 2015 Year Class (see *Section 4.2.2 Ocean Recreational Fishery*)*;*
- Recreational Release Mortality (see *Section 4.2.3*)*;* and
- Conservation Equivalency (see *Section 4.5.2*).

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. It has been raised by stakeholders and the Board that protection of emerging, strong year classes is of the utmost importance for rebuilding the striped bass stock. The 2015-year class is the strongest year class observed since 2003 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 slot limit is maintained, the 2015 year class may be subject to high recreational harvest for the next several years, 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 slot, and again once the surviving fish have grown larger than the upper bound of the slot.

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 effort which makes it difficult to control overall fishing mortality. While the acceptable proportion of 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 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[1] through conservation

[1] FMP standard refers to a management measure specified in the FMP.

equivalency (CE). 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 to address release mortality and protect strong year classes 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 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/slot 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. Additional gear restrictions, such as requiring barbless hooks or banning treble hooks, could also impact tackle manufacturers and bait and tackle shops by disrupting the supply/demand chain.

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.x 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 4). Total fishing mortality in 2017 was estimated at 0.31, which is above the fishing mortality threshold of 0.24 (Figure 5). 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. 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.

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 17-19). 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 15-16). 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 21-22). 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 (Table 20). 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 23). 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 16).

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 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 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/slot 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/slot 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/slot 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 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.

[2] See https://deq.nc.gov/about/divisions/marine-fisheries/public-information-and-education/habitat-information/chpp for more information.

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 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.

[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.

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 (A-R) 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 A-R 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 commercial fisheries, and coastal and producer area sectors; and 5) excessively frequent changes to the management program.

[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 ninth such report was recently provided to Congress (Shepherd et al. 2017).

[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.

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 Fmsy 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 A-R. The Chesapeake Bay and A-R 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.

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

[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.

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 Fmsy 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 13-14).

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 F back to F 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 within 10 years (by 2029). 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. Besides these four issues, all other management measures are consistent with Amendment 6 and its Addenda; however, other issues can be addressed in a separate management document(s) following approval of the final amendment (see *Section 4.6 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

[7] This guidance on incidental catch could not be implemented as a compliance criterion since incidental catch was not originally part of Addendum VI.

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-Roanoke 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-Roanoke stock is currently assessed and managed as a non-coastal migratory stock by the state of North Carolina[8] under the auspices of ASMFC. 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 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).

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.

[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).

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).

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 6-7). 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.

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 is based on the sexually mature females in the striped bass population. The 1995 estimate of female SSB is currently used as the SSB threshold because many stock characteristics, such as an expanded age structure, were reached by this year, and this is also the year the stock was declared recovered. The female SSB target is equal to 125% female SSB threshold. 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 spawning stock biomass falls below the threshold spawning stock biomass 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 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 will be updated with future stock assessments because they are estimated based on the best available data.

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

[9] F target is 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 may be calculated based on recruitment values from a low recruitment time period only, as specified in *Section 4.1*.

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 Roanoke River/Albemarle Sound. 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 index values for the Hudson River, Delaware River, Chesapeake Bay and its tributaries serve as input to the assessment model. Juvenile indices can also serve as another indicator of the status, and future status, of the striped bass population.

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 Roanoke River/Albemarle Sound.

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.

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. Should a new tagging study be 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 currently 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 currently 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 currently used as the SSB threshold because many stock characteristics, such as an expanded age structure, were reached

by this year, and this is also the year the stock was declared recovered. The female SSB target is equal to 125% female SSB threshold.

3.5.4 Assessment of Fishing Mortality

The fishing mortality rate is currently 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

There is currently no stocking program in place 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.

<u>Commercial Fisheries</u>

- 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.

<u>Recreational Fisheries</u>

- 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.

<u>For-Hire Fisheries</u>

- 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

This section includes four issues with options for Board consideration and public comment: *Section 4.1 Management Triggers; Section 4.2.2 Ocean Recreational Fishery: Measures to Protect the 2015 Year Class; Section 4.2.3 Measures to Address Recreational Release Mortality; and Section 4.5.2 Management Program Equivalency.*

As defined in Addendum VI, 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. However, Addendum IV specifies the Chesapeake Bay spring trophy fishery is part of the coastal fishery for management purposes.

Note: The Board should decide how to categorize the Chesapeake Bay trophy fishery for Draft Amendment 7.

The Albemarle Sound-Roanoke River stock is managed separately by the State of North Carolina.

Draft Amendment 7 continues to use bag and size limits to manage recreational striped bass fisheries, and quotas and minimum 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 to 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 introduces an inherent level of uncertainty in decision making. 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.

The following options consider how to set the management triggers in Amendment 7. Upon reaching any (or all) of the specified management triggers, the Management Board is required to alter the management program to ensure the objectives of Amendment 7 are achieved.

The Status Quo option is defined by the management triggers as specified in Amendment 6 to the Atlantic Striped 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:

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.

- **Sub-option A3:** Reduce F to a level that is at or below the target within three 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 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.

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 two consecutive years and female SSB is below the SSB target in both 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 C3:** 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 C4:** If the five-year average F exceeds the F target, 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 C5:** 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 a 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 C5 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 two consecutive years and the three-year average fishing mortality rate exceeds the target, 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:** 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 C4:** If female SSB is below the target and stock projections indicate female SSB has at least a 50% probability of falling below the SSB threshold within three years, the striped bass management program must be adjusted to rebuild biomass to a level that is at or above the target within an established timeframe [not to exceed 10-years].

- **Sub-option C5:** 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 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 previous period of high recruitment seen in the late 1990s and early 2000s. As requested by the Board, these trigger alternatives are more sensitive than the status quo trigger in order to alert the Board to periods of low recruitment. The alternative trigger options are designed to be an early warning sign of 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. Sub-options A2 and A3 would change the reference period to exclude those years of very low recruitment which results in more sensitive trigger options. 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 JAI. This period spans the time of high recruitment seen in the late 1990s and through the early 2000s. The Maryland JAI was used as the basis for this analysis because the Maryland JAI is closely correlated to the coastwide age-1 estimates from the stock assessment model and it 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 assessments to evaluate whether definition of the high recruitment period for the trigger has changed with new years of data.

- **Sub-option A1 (status quo):** Any JAI (ME, NY, NJ, MD, VA, NC) shows 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).

- **Sub-option A2:** Any of the four JAIs used in the stock assessment model[10] to estimate recruitment (NY, NJ, MD, VA) shows an index value that is below 75% of all values (i.e., below the 25th percentile) from 1992-2006, which represents a period of high recruitment, for three consecutive years. This trigger alternative has a moderate sensitivity; it is more sensitive than the status quo but less sensitive than sub-option A3 (Table 2).
    - This trigger alternative would have tripped three times since 2003: NY in 2006; MD in 2010; MD in 2014 (Table 2).
    - Three consecutive year classes that are below the 25th percentile of high recruitment period would signal to the Board that the productivity of the stock may decline. While the stock has not quite reached recruitment failure if this trigger is tripped, the stock would be in a period of very low recruitment.

- **Sub-option A3:** 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 from 1992-2006, which represents a period of high recruitment for three consecutive years. This trigger alternative has a higher sensitivity than both the status quo trigger and sub-option A2.

[10] The NC JAI for the Albemarle Sound-Roanoke River (A-R) is not used in the stock assessment because the A-R stock is managed and assessed separately by the state of North Carolina; the ME JAI for the Kennebec River is not used in the stock assessment because that stock is small and assumed to only contribute a small amount to the coastwide stock.

- 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).
- Three consecutive year classes that are below the median of the high recruitment period would signal to the Board that the productivity of the stock may decline.

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		Sub-option A2	Sub-option A3
		Ref. period = Established through Addendum II		Ref. period = High recruitment (1992-2006)	
		One or more JAI below 25th Percentile for 3 consecutive years		One or more of the "core" JAIs below 25th Percentile for 3 consecutive years	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

Option B: Management Response to Recruitment Trigger

The following sub-options are alternatives for the management response that would be paired with the recruitment trigger definition selected under Option A. Sub-options B2 and B3, which would require reducing F target, 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, given the weak stock-recruit relationship for striped bass.

Juvenile abundance indices and model recruitment estimates provide information on the near-term productivity of the stock. Several years of poor recruitment results in fewer fish entering the exploitable population and the spawning stock biomass, 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 or the rebuilding framework 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. That F target is calculated by drawing recruitment from the values observed from 1990 to 2017; this time period does not include the very low values in the 1980s, but it does include both high and low values from later in the time series. 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.

Sub-option B1 (status quo): If the 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.

- **Sub-option B2:** If the trigger is tripped, the Board would manage the stock under a lower, interim *F* target calculated for the low recruitment regime, including reducing *F* to the interim *F* target if *F* was above the interim *F* target in the terminal year of the most recent stock assessment[11]. The interim F target would remain in place at least until the next stock assessment update or benchmark assessment is approved for management use. The Board would determine which F target to move forward with by considering factors such as stock status as determined by the assessment, recent JAI data and TC input.

[11] For example, the current *F* target is 0.20 based on recruitment from 1990-2017. When recruitment is drawn from the low recruitment regime identified by the change point analysis (2008-2017 for age-1 model estimates), the *F* target is 0.18.

- This option would require the Board to react to a period of low recruitment and higher F, regardless of SSB status, by taking actions to reduce F immediately in the short term.
- Sub-options B2 and B3 could be selected separately or together.

- **Sub-option B3:** If the trigger is tripped and SSB is below the SSB target, the Board would adjust F to rebuild the stock to the SSB target within 10 years using the low recruitment regime assumption[12]. The interim F target would remain in place at least until the next stock assessment update or benchmark assessment is approved for management use. The Board would determine which F target to move forward with by considering factors such as stock status as determined by the assessment, recent JAI data, and TC input.
  - This option would require the Board to react to a period of low recruitment and lower SSB, regardless of F status, by taking actions to reduce F to rebuild SSB over a longer period.
  - Sub-options B2 and B3 could be selected separately or together.

Identifying Recruitment Regimes: Based on a change point analysis of the MD JAI with data through 2020, the TC has 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 new F targets for sub-options B2 and B3. If B2 and/or B3 is selected, the TC will update the change point analysis during benchmark assessments to evaluate whether definition of the high recruitment period for the trigger has changed with new years of data.

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 C5 (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

[12] For example, under a low recruitment regime, total removals of 5.60 million fish per year will rebuild stock to the current SSB target in 10 years, compared to the total removals of 7.49 million fish per year that would be allowed under the high recruitment regime.

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 can 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: 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, management action may be deferred until the next assessment.

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: If the F target management trigger is tripped and there is at least a 50% probability of SSB remaining above the SSB threshold over the next three years, management action may be deferred until the next assessment.

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 50% 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 1a. Summary of management trigger options Tiers 1-2: fishing mortality (F) and female spawning stock biomass (SSB) triggers.

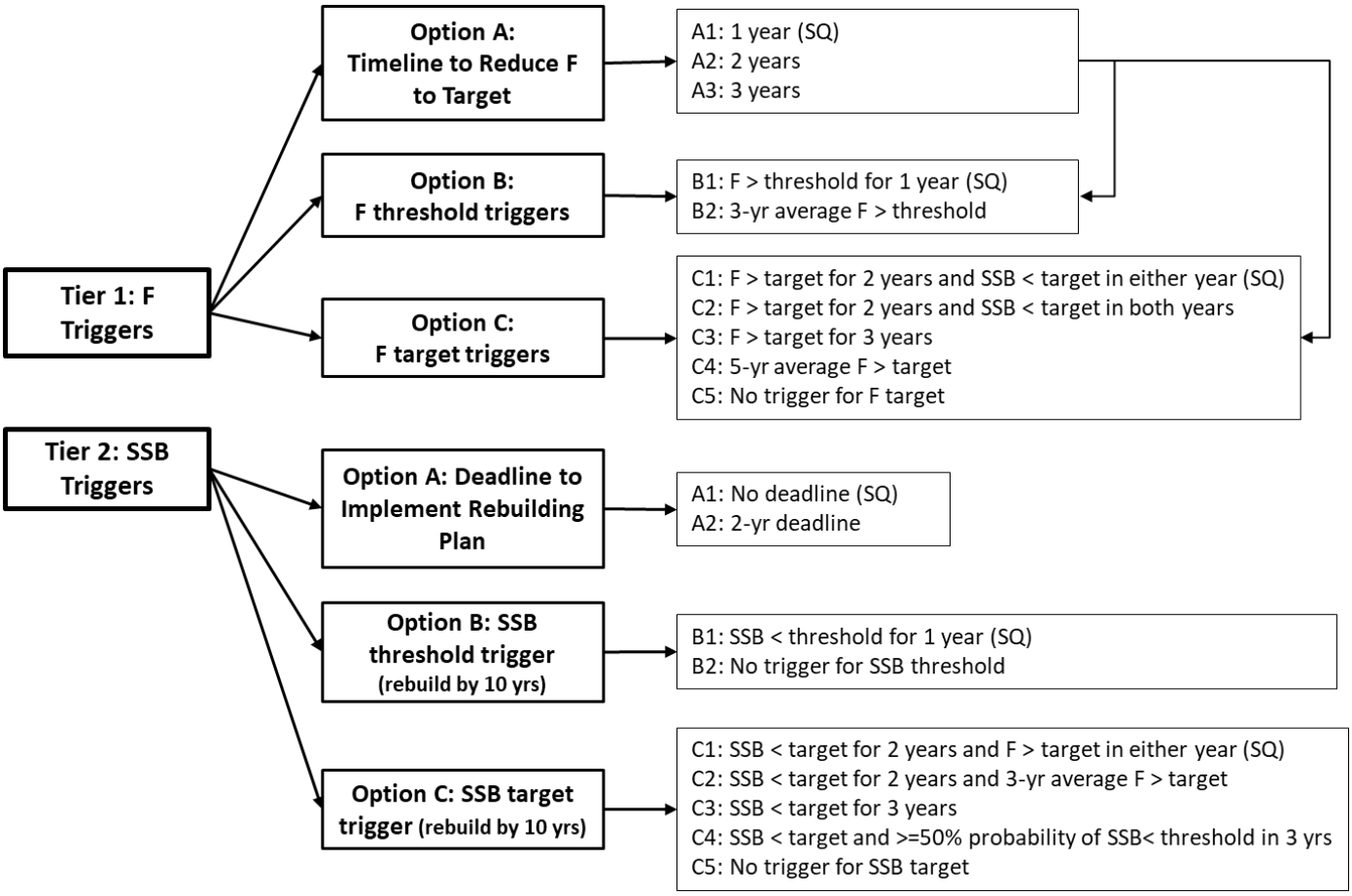
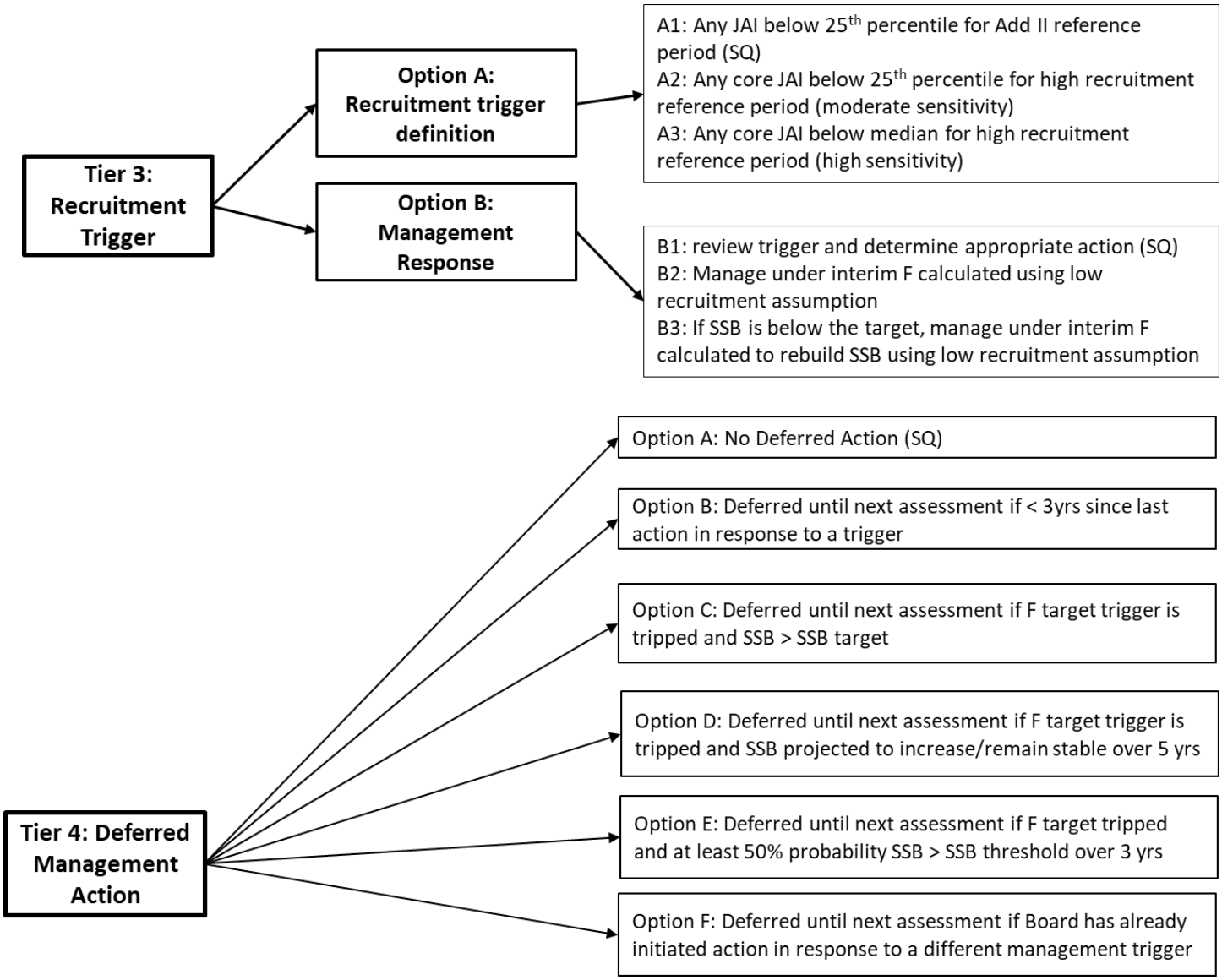


Figure 1b. Summary of management trigger options Tiers 3-4: recruitment-based triggers and deferred management action.



4.2 RECREATIONAL FISHERY MANAGEMENT MEASURES

All bag limits are per person per day. All minimum size and slot size limits are in total length. States are required to maintain the same seasons that were in place in 2017[13].

4.2.1 Chesapeake Bay Recreational Fishery

All recreational fisheries operating in the Chesapeake Bay are constrained by a one fish bag limit and an 18 inches minimum size limit.

4.2.2 Ocean Recreational Fishery: Measures to Protect the 2015 Year Class

It has been raised by stakeholders and the Board that protection of emerging, strong year classes is of the utmost importance for rebuilding the striped bass stock. The 2015-year class is the strongest year class observed since 2003 and will soon be entering the recreational ocean region slot limit of 28" to less than 35" adopted by the majority of Atlantic coast states under Addendum VI in 2020. If this slot limit is maintained, the 2015 year class may be subject to high recreational harvest mortality for the next several years, 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 slot, and again once the surviving fish have grown larger than the upper bound of the slot. In addition to the 2015 year class, the Striped Bass Technical Committee (TC) 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 following options consider whether to alter the ocean recreational fishery measures to enhance protection of emerging strong year classes. These options to protect strong year classes are directed at the ocean recreational fishery because the relatively strong 2015 year class is approaching the ocean fishery's status quo slot limit.

The status quo 28" to <35" slot limit (Option A) was adopted under Addendum VI to achieve the 18% reduction in total recreational removals from 2017 needed to reduce F to the target in 2020. In addition to the status quo option, the options in this section include two options from Draft Addendum VI that were projected to achieve a similar level of reduction (Option B's 35" minimum size limit and Option C's 32" to <40" slot limit); a narrower slot limit (Option D's 28" to <32" slot limit) that is projected to result in a greater level of reduction from the 2017 recreational removals (Table 3); and a complete harvest moratorium (Option E).

Each of these options is analyzed in terms of the level of protection it would afford a year class as it ages through the population; i.e., the percent of each year class that is outside the size/slot

[13] Some states have implemented alternative seasons through conservation equivalency for Addendum VI.

limit over time based on length-at-age estimates developed by the TC (Tables 4-5, Figure 2). For example, Option B's 35" minimum size limit would provide the 2015 year class with more protection from harvest in 2023 (when those fish are age-8) compared to the status quo slot limit (Option A); however, the 2015 year class's protection from the 35" minimum size limit will decrease over time as fish reach that minimum size, as compared to having increased protection over time under the slot limit.

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 also need to be considered. Accordingly, stock projections were conducted to compare the alternative options to the status quo. For the size/slot Options B-D, projections were developed using the same level of fishing mortality, but different selectivity patterns, based on what proportion of each age was vulnerable to the fishery for each option. This assumes that effort will remain constant regardless of which set of regulations are implemented. However, Option E (harvest moratorium) is intended to change the level of fishing mortality and effort overall, not the selectivity pattern. Because of the difficulty in predicting the effect of a harvest moratorium on effort and removals, Option E was not included in the projections, as it would not be comparable to the results for the other options.

Figure 3 shows the change in total female SSB for all year classes for Options B–D compared to the status quo (Option A), assuming the stock is fished at the target rate under each scenario. The projections indicate that for all options, the 2015 year class would have a higher contribution to stock productivity than the 2017 and 2018 year classes. The projections also indicate that the stock recovery timeline (i.e., the year SSB exceeds the threshold and the year SSB exceeds the target) is the same for all four options. For all options, there is uncertainty around how angler behavior and effort would change in response to a change in size/slot limit[14]. Additionally, slot limits are associated with more recreational releases and a large minimum size limit could also result in more releases.

Table 3. Estimated percent change in harvest, recreational release mortality, and total recreational removals relative to 2017 for ocean size/slot options A-D.

Option (with 1 fish bag limit)	**% change from 2017**		
	Harvest	Release Mortality	Total Removals
Option A: 28" to <35" slot	-46%	+3%	-19%
Option B: 35" minimum	-43%	+3%	-18%
Option C: 32" to <40" slot	-49%	+4%	-21%
Option D: 28" to <32" slot	-62%	+4%	-26%

Note: Because of the difficulty in predicting the effect of the harvest moratorium on effort and removals, Option E is not included in this table.

[14] While release mortality is included in the projections through the selectivity patterns, the projections assume that total effort is the same across all scenarios.

Table 4. 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: 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**	**2016 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	

Table 5. Percent of fish protected from harvest (outside the size/slot limit) for each age. The ages of the 2015, 2017, and 2018 year classes in 2023 are in bold. Note: 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

Figure 2. Percent of fish in the 2015, 2017, and 2018 year classes that is protected from harvest over time starting in 2023, under each option. Note: The percent protected for ages 15 and above is the percent of all fish age 15+ combined.

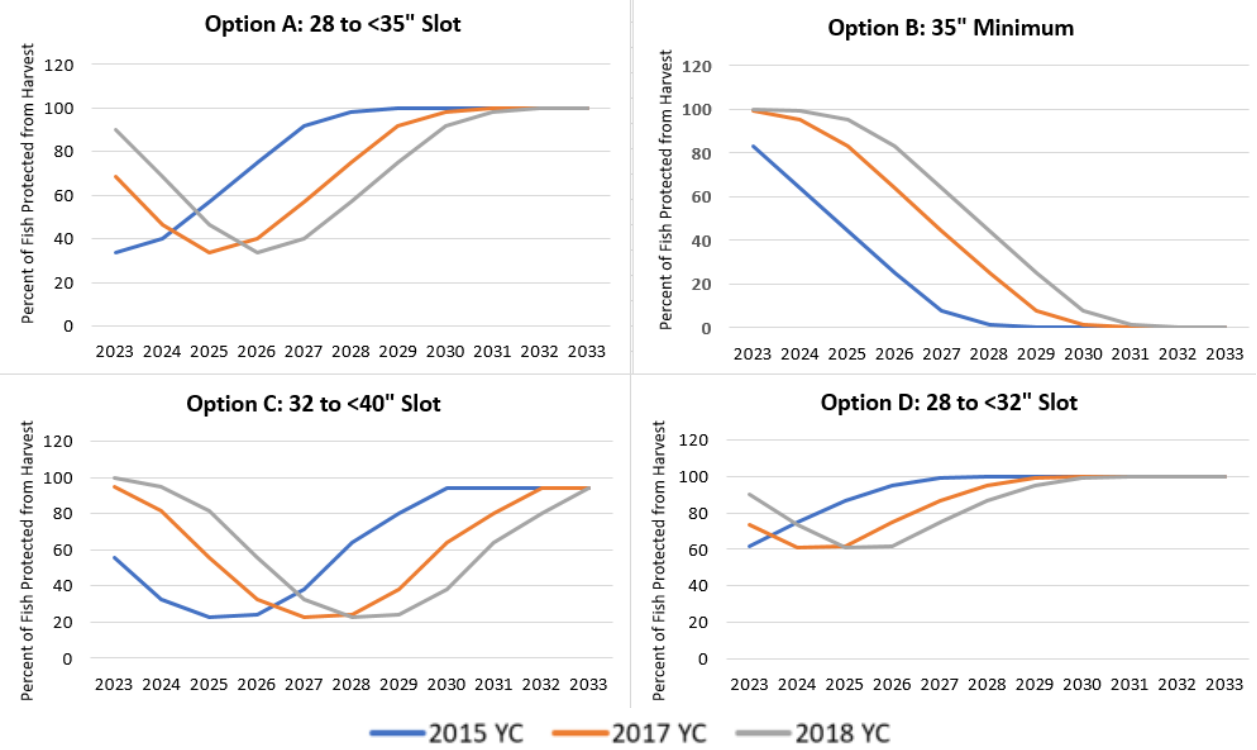
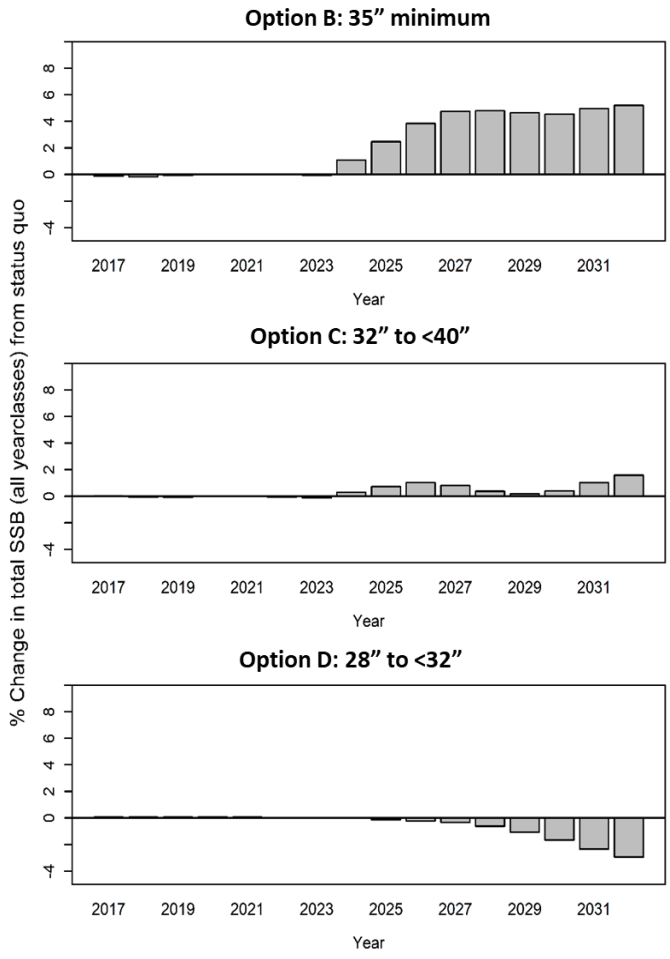


Figure 3. Change in total female SSB for all year classes for each size/slot option compared to the status quo. Note: Because of the difficulty in predicting the effect of the harvest moratorium on effort and removals, Option E was not included in the projections.



OPTIONS

Option A. (status quo): The current recreational slot limit for the ocean fishery of 28" to <35" and one fish bag limit would be maintained, along with all current (approved in 2020[15]) state implementation plans and CE programs with Addendum VI.

- In 2023, the 28" to less than 35" slot limit is estimated to protect 33.4%, 68.8%, and 90.0% of the surviving 2015, 2017, and 2018-year classes from harvest, respectively (Table 5). See Figure 2 for how this protection changes over time. Fish that are not subject to release mortality.

[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.

Option B. (minimum size): The recreational minimum size for the ocean fishery would be 35" and a one fish bag limit.

- In 2023, this option is projected to protect 82.9%, 99.4%, and 100% of the surviving 2015, 2017, and 2018 year-classes from harvest, respectively (Table 5). See Figure 2 for how this protection changes over time. Fish that are not subject to harvest are still subject to release mortality.
- Under this option, total SSB (all year classes in the population combined) is projected to increase over time relative to the status quo with a maximum increase of just over 4% at the terminal projection year of 2032 (Figure 3).
- If this option is selected, the Board must select an option under Tier 1 and Tier 2.

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.

- In 2023, this option is projected to protect 55.8%, 95.1%, and 99.5% of the surviving 2015, 2017, and 2018-year classes from harvest, respectively (Table 5). See Figure 2 for how this protection changes over time. Fish that are not subject to harvest are still subject to release mortality.
- Under this option, total SSB (all year classes in the population combined) is projected to slightly increase for a few years, followed by a slight decrease, and finally increasing again relative to the status quo with a maximum increase of less than 2% at the terminal projection year of 2032 (Figure 3).
- If this option is selected, the Board must select an option under Tier 1 and Tier 2.

Option D. (narrower slot): The recreational slot limit for the ocean fishery would be 28" to <32" and a one fish bag limit.

- In 2023, this option is estimated to protect 61.4%, 73.2%, and 90.5% of the surviving 2015, 2017, and 2018-year classes from harvest, respectively (Table 5). See Figure 2 for how this protection changes over time. Fish that are not subject to harvest are still subject to release mortality.
- Under this option, total SSB (all year classes in the population combined) is projected to slightly decrease over time relative to the status quo with a maximum decrease of about 3% at the terminal projection year of 2032 (Figure 3).
- If this option is selected, the Board must select an option under Tier 1 and Tier 2.

Option E. Harvest Moratorium: Implement a coastwide moratorium on the recreational harvest of striped bass. This harvest moratorium option is the most conservative approach to protect the 2015, 2017, and 2018-year classes. The Board would select a sunset date from sub-options E1-E4. In general, a harvest moratorium would expedite stock rebuilding by eliminating recreational harvest. Although some recreational harvest trips may shift to catch-and-release fishing, which could increase the number of releases, striped bass removals would likely decrease overall with the reduction in harvest, assuming total effort remains about the same. For all sub-options, the status quo 28" to <35" slot and 1-fish bag limit would be implemented when the moratorium ends. If this option is selected, CE would not be permitted.

- **Sub-option E1**: End on December 31, 2024. By 2025, the 2015 year class will be age-10. 100% of females are estimated to be mature by age-9 so all 2015 year class females would have had a chance to spawn. By 2025, 57% of the surviving 2015s (age-10) would be protected from harvest under the current slot (Table 5 above).
- **Sub-option E2**: End on December 31, 2025. By 2026, 75% of the surviving 2015s (age-11) would be protected from harvest under the current slot (Table 5 above).
- **Sub-option E3**: End on December 31, 2026. By 2027, 92% of the surviving 2015s (age-12) would be protected from harvest under the current slot (Table 5 above).
- **Sub-option E4**: End on December 31, 2027. By 2028, 98% of the surviving 2015s (age-13) would be protected from harvest under the current slot (Table 5 above).

Tier 1: Conservation Equivalency Consideration for Ocean Size/Slot Limits
The Board must select an option under Tier 1 if option B, C, or D (alternative size/slot limit) is selected.

- **Option A**: CE would be permitted if CE is allowed to be used based on any CE restrictions or requirements selected by the Board in *Section 4.5.2*.

- **Option B**: CE would not be permitted.

Tier 2: Addendum VI Conservation Equivalency Programs Splitting the Reduction between Sectors
The Board must select an option under Tier 2 if option B, C, D (alternative size/slot limit) is selected. Tier 2 considers how changing the ocean recreational size limit through Amendment 7 would impact those Addendum VI CE programs that combined recreational and commercial measures to achieve at least an 18% reduction statewide; specifically those CE programs that implemented a less than 18% reduction in commercial quota which was offset by a larger reduction in recreational removals. If the ocean recreational size/slot limit is changed through Amendment 7, the recreational measures implemented through 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 approved Addendum VI CE programs that split the Addendum VI reduction between sectors would no longer be valid, but the commercial quota levels implemented through those CE programs would carry forward (Table 6). Under this option, the commercial quota levels implemented through Addendum VI CE for those states would be continued forward into Amendment 7 resulting in some commercial quota levels that are 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 reduction between sectors would not be valid under Amendment 7. Under this option, those states would be subject to the quotas specified in *Section 4.3*.

Table 6. 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.

4.2.3 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% discard 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). Each year since 2017, more fish were estimated to have died from catch and release fishing than were harvested by the recreational fishery (2.76 million fish estimated to have died from catch and release fishing and 1.71 million fish harvested in 2020). Because 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 (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 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 will have to consider the impacts those actions will have on the fishery. For example, management measures focusing on reducing discards could discourage participation from anglers that value food fish and negatively impact the industry which caters to those anglers.

The current management program, which primarily uses bag limits and size limits to control harvest, 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 the status quo option, the circle hook requirement implemented through Addendum VI to Amendment 6 (Addendum VI Section 3.2) would remain in place as the only measure implemented 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…*

Option B. Effort Controls (Seasonal Closures)
Recreational release mortality could be addressed by reducing effort in the recreational fishery through seasonal closures, which are intended to reduce the number of live releases by reducing the number of fishing trips (effort) that interact with striped bass. The following options outline a variety of seasonal closures for consideration[16]. Some 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. 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.

[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.

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). Although there are enforceability concerns and uncertainty about angler compliance with no-targeting closures, the PDT assumes maximum reduction of effort, and thus reduction in number of releases, would be achieved with a no-targeting closure. While no-harvest closures would reduce harvest removals, angler behavior may shift to catch-and-release fishing trips, thereby increasing the number of releases, which is counter to the objective of reducing release mortality. 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 increased. The majority of options developed by the PDT are no-targeting options in order to address recreational releases resulting from both harvest trips and catch-and-release fishing trips. It is important to note that with any type of closure, there would still be fishing trips targeting other species that incidentally catch and release striped bass. For 2018-2019, for example, an average of 24% of all trips interacting with striped bass were non-targeted trips or trips where striped bass was the secondary target, and these trips would likely still occur during a striped bass no-targeting closure. Additionally, closures may result in shifting effort to targeting other species or shifting effort to other times of year when the fishery is open.

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 season closure depends on assumptions about changes in angler behavior, which is highly uncertain. The TC[17] has not established a standardized method for estimating the reduction in removals from a no-targeting season closure. Given the no-targeting closure options being considered in Draft Amendment 7 as well as the potential for other states to propose no-targeting closures in future CE proposals, the PDT recommends the TC discuss and establish such methods in advance of implementation of subsequent management actions. The TC may need guidance from the Board on this discussion.

[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."

The Board can select one seasonal closure option among sub-options B1, B2, and B3; if the Board selects one of these options, the Board must consider sub-option B4. The Board can select sub-option B5 (spawning closures) independent of or in addition to the other closure options.

- **Sub-option B1. Wave 4 Coastwide Closure:** All recreational targeting of striped bass would be prohibited coastwide for a time period during Wave 4 selected from sub-options B1-a through B1-d (at a minimum). A no-targeting closure during Wave 4 would reduce effort during a time when all states have an active fishery (Table 7). Additionally, a closure during Wave 4 would reduce effort during a time when there are environmental stressors, including peak air and water temperatures[18], associated with higher post-release mortality rates. The Board should consider seasonal peaks in air and water temperatures and relevant water quality data (dissolved oxygen, salinity, etc.) when considering these sub-options. If this option is selected, the use of CE would not be permitted.
    - **B1-a. July 1-15**
    - **B1-b. July 16-31**
    - **B1-c. August 1-15**
    - **B1-d. August 16-31**

- **Sub-option B2. Wave 4 State-Specific Closures:** All recreational targeting of striped bass would be prohibited for a minimum two-week or minimum three-week period during Wave 4, as specified in sub-options B2-a through B2-c. No-targeting closures during Wave 4 would reduce effort during a time when all states have an active fishery (Table 7). Additionally, closures during Wave 4 would reduce effort during a time when there are environmental stressors, including peak air and water temperatures, associated with higher post-release mortality rates. State implementation plans should consider seasonal peaks in air and water temperatures and relevant water quality data (dissolved oxygen, salinity, etc.). If this option is selected, CE would not be permitted.

    - **B2-a. State-Specific 2-Week Closures in Wave 4:** Each state would select a two-week period (at minimum) during Wave 4 during which all recreational targeting of striped bass would be prohibited.

    - **B2-b. State-Specific 2- or 3-Week Closures in Wave 4:** Each state, except Maine and New Hampshire, would select a three-week period (at minimum) during

[18] The PDT reviewed climate normal data for one coastal city in each state and noted air temperatures tend to peak in late July for most states (https://www.ncei.noaa.gov/access/us-climate-normals/). The PDT reviewed NOAA buoy data for one station in/near each state's waters and water temperatures tend to peak in August (https://www.ndbc.noaa.gov/).

Wave 4 during which all recreational targeting of striped bass would be prohibited. Maine and New Hampshire would select a two-week period (at minimum) during Wave 4 during which all recreational targeting of striped bass would be prohibited.

- This option was developed to address the concern about the relatively large proportion of annual directed striped bass trips that occur during Wave 4 in some states and the shorter period of time that large striped bass are available in some areas.
- This option is based on MRIP striped bass directed trip (primary or secondary target) data from 2017-2019 (Table 7; Table 8). All states with a Wave 4 proportion of annual directed trips greater than one standard deviation from the mean of Wave 4 proportions across all states would implement a two-week closure. The Wave 4 proportion of annual directed trips in ME and NH is greater than 36.5 (mean of 21.0 plus one standard deviation of 15.5).
- The Board could identify an alternative method to determine which states could require a shorter closure than other states.

- **B2-c. Region-Specific 2-Week Closures in Wave 4:** Each region (as defined below or defined otherwise by the Board) would select a two-week period (at minimum) during Wave 4 during which all recreational targeting of striped bass would be prohibited.
  - Gulf of Maine: ME, NH, MA
  - Long Island/Block Island Sound: RI, CT, NY
  - Mid-Atlantic: NJ, DE, MD ocean, VA ocean, NC ocean
  - Chesapeake Bay: MD Chesapeake Bay, VA Chesapeake Bay

  Note: The Board may re-define these regions before final approval of Draft Amendment 7.

- **Sub-option B3. State-Specific Closures Any Wave:** All recreational targeting of striped bass would be prohibited for a minimum two-week period, as specified in sub-options B3-a and B3-b, to reduce effort during times when the striped bass fishery is active (i.e., directed trips are occurring) as defined in the sub-options. In addition to the directed trips criteria outlined in the sub-options, state implementation plans should consider protection for spawning/pre-spawn fish, extreme air and water temperatures and relevant water quality data (dissolved oxygen, salinity, etc.), alongside socioeconomic considerations and regulatory consistency within shared waterbodies. If this options is selected, CE would not be permitted.

  - **B3-a. State-Specific 2-Week Closures (15% trips per wave):** Each state would select a two-week period (at minimum) during which all recreational targeting of striped bass would be prohibited. Each state's closure must occur during a Wave with at least 15% of the state's striped bass directed trips. At least two waves in each state/region meets this 15% minimum threshold (Table 7).

- This option was developed based on MRIP striped bass directed trip (primary or secondary target) data from 2017-2019.
- 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 7 most closely aligns with their distribution of effort.

- **B3-b. State-Specific 2-Week Closures (25% trips per wave):** Each state would select a two-week period (at minimum) during which all recreational targeting of striped bass would be prohibited. Each state's closure must occur during a Wave with at least 25% of the state's annual striped bass directed trips. At least one wave in each state/region meets this 25% minimum threshold (Table 7).
  - This option was developed based on MRIP striped bass directed trip (primary or secondary target) data from 2017-2019.
  - 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 7 most closely aligns with their distribution of effort.

Table 7. Proportion of each state's 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%

*During Wave 1, the Fishing Effort Survey (FES) is not administered in any state except NC. During Waves 2 and 6, the FES is not administered in ME.

Table 8. Percent of each state's annual striped bass directed trips (primary and secondary target) estimated to occur within a 2-, 3-, and 4-week period during Wave 4 based on 2017-2019 directed trips. Source: MRIP

	% State's Annual Directed Trips in 2-wk closure Wave 4	% State's Annual Directed Trips in 3-wk closure Wave 4	State's Annual Directed Trips in 4-wk closure Wave 4
MAINE	9.4%	14.1%	18.8%
NEW HAMPSHIRE	12.1%	18.2%	24.2%
MASSACHUSETTS	7.8%	11.7%	15.6%
RHODE ISLAND	4.6%	7.0%	9.3%
CONNECTICUT	4.2%	6.3%	8.5%
NEW YORK	3.0%	4.6%	6.1%
NEW JERSEY	0.9%	1.4%	1.8%
DELAWARE	1.8%	2.7%	3.7%
MD CHES BAY	6.0%	9.0%	12.1%
VA CHES BAY	0.4%	0.5%	0.7%
MD OCEAN	0.1%	0.1%	0.2%
VA OCEAN	7.1%	10.6%	14.2%
NC OCEAN	4.0%	6.0%	8.0%
COASTWIDE	**4.8%**	**7.2%**	**9.6%**

- **Sub-option B4. Applicability of Existing No-Targeting Closures:** If the Board selects sub-option B1, B2, or B3, the Board needs to consider whether existing no-targeting closures implemented in 2020, as part of a CE program to meet the Addendum VI reduction, would meet the seasonal closure requirements for the above closure options.
    - **B4-a.** The existing no-targeting closures implemented in 2020 would fulfill the requirements of sub-options B2 or B3. If sub-option B1 is selected, the closure dates would shift to match the selected coastwide closure dates.
    - **B4-b**. The existing no-targeting closures implemented in 2020 would not fulfill the requirements of sub-options B1, B2, or B3. States that implemented no-targeting closures in 2020 would need to choose between the following actions:
        - Implement additional closures to meet the new season closure requirements of the selected option (B1, B2, or B3); OR
        - Implement only the new seasonal closure requirement by the selected sub-option (B1, B2, or B3) and implement the FMP standard size limit for the Chesapeake Bay recreational fishery (*Section 4.2.1*).

- **Sub-option B5. Spawning Area Closures**: The Board can select either or both of the following options B5-a and B5-b. Existing spawning closures would be applied toward

meeting the requirements of the selected option(s)[19]. 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.

- **B5-a. No-Harvest Spawning Closure Required**: All recreational harvest of striped bass would be prohibited during Waves 1 and 2 in spawning areas (Chesapeake Bay, Delaware Bay/River, Hudson River, Kennebec watershed) in order to protect pre-spawn and spawning fish. 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).

- **B5-b. No-Targeting Closure Required**: All recreational targeting of striped bass would be prohibited for a two-week period (at minimum) 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, in order to protect spawning fish. 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 4).

[19] 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 3. 2021 seasonal closures in the **ocean region** by state.

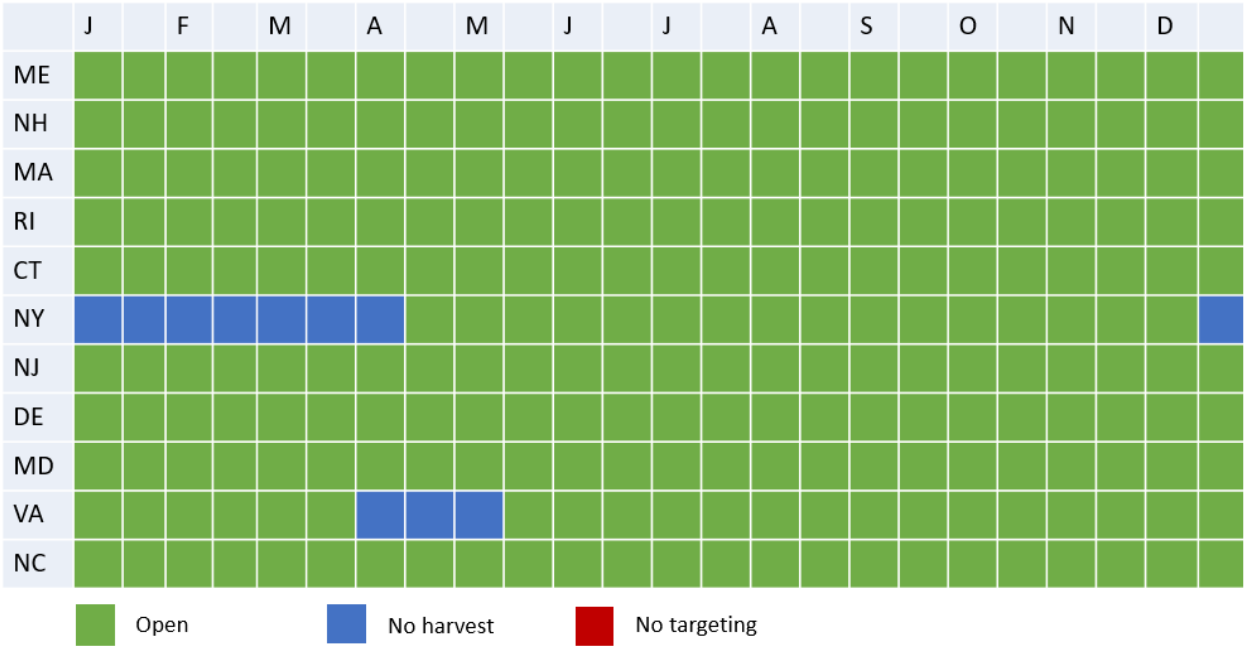
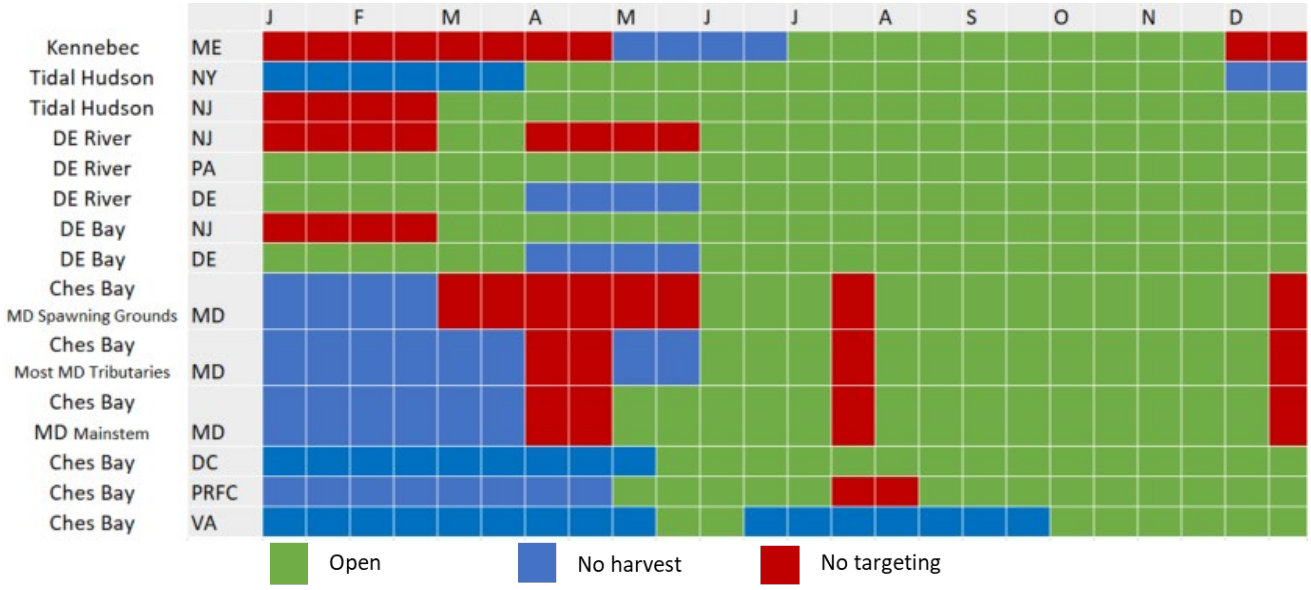


Figure 4. 2021 closures in **spawning areas** by state.



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 is difficult to quantify. It is unknown how many anglers already use these tactics and thus it is unknown how many anglers would change their fishing behavior to comply with new gear restrictions. This leads to uncertainty in how many additional fish could be saved if new gear restrictions are put in place.

There are also enforcement and compliance challenges. As evidenced by the implementation Addendum VI circle hook requirement, it is very difficult for enforcement officers to prove angler intent or target species (i.e., gear restrictions are difficult to enforce for one species if it is an acceptable gear to use when targeting a different species in the same place and time).

The Board may select one or more of the following sub-options[20].

- **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**: Recreational anglers would be prohibited from using treble hooks when fishing for striped bass. Treble hooks on artificial lures would be required to be replaced with single hooks. There are mixed results in studies that compare release mortality rates of fish caught on treble hooks on artificial lures compared to other hook types (Nuhfer and Alexander 1992, Nelson 1998, Diodati and Richards 1996). Using single hooks or limiting the number of hook points on artificial lures could lead to shorter dehooking times and increase the chance of survival of released striped bass.

- **Sub-option C3**: Recreational anglers would be required to use of barbless hooks when fishing for striped bass. Studies have shown that fish caught on barbed hooks had higher release mortality rates than fish caught on barbless hooks (Taylor and White 1992). Using barbless hooks can lead to shorter dehooking times and increase the chance of survival of released striped bass.

[20] These options were developed based on public comment received on Addendum VI and on the Draft Amendment 7 Public Information Document.

- **Sub-option C4**: Recreational anglers would be prohibited from trolling with wire when fishing for striped bass. Some stakeholders have noted concern about the exhaustion of a fish when it gets to the surface after chasing the hook and being dragged through the water for a period of time.

- **Sub-option C5**: Striped bass caught on any unapproved method of take would be returned to the water immediately without unnecessary injury[21].
    - Selecting this option would make this a requirement 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) and any other gear restrictions selected from sub-options C1-C4.

Option D: Outreach and Education

States have already implemented outreach and education campaigns related to circle hooks, as encouraged by Addendum VI, and related to best handling and fishing practices. These 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 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.

[21] The Board approved this language on incidental catch as guidance to Addendum VI in March 2021; this incidental catch guidance could not be a compliance criterion as part of Addendum VI since incidental catch was not originally part of Addendum VI.

States should provide updates on public education and outreach efforts in annual state compliance reports. Best practices 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[22].

4.3.2 Quota Allocation

The table below indicates the commercial quota in pounds for the ocean region and for Chesapeake Bay (Table 9).

Table 9. Ocean Region and Chesapeake Bay Commercial Quota

Region	Quota (Pounds of Fish)
Chesapeake Bay Total	2,588,603
Ocean Total	2,333,408

The Chesapeake Bay commercial quota is allocated to Maryland, Virginia, and the Potomac River Fisheries Commission per the state/jurisdiction's mutual agreement. Each state's commercial quota for the ocean region is detailed in the table below (Table 10).

Table 10. 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

* Commercial harvest/sale prohibited.
† Under Addendum IV, New Jersey and Connecticut reallocated its commercial quota to the recreational sector through conservation equivalency but must resubmit for conservation equivalency in order to maintain these recreational fishery bonus programs under Addendum VI. Accordingly, the quota presented herein is an 18% reduction from the quota as listed in Addendum IV.
^ Rhode Island (181,572 lbs Add IV CE-adjusted) and Maryland (90,727 lbs Add IV CE-adjusted) implemented reduced quotas through conservation equivalency under Addendum IV. An 18% reduction was calculated relative to these reduced quotas.

[22] Some states have implemented alternative commercial size limits through conservation equivalency.

All quotas represent an 18% reduction from the Addendum IV quotas. Quotas are allocated on a calendar year basis[23]. 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 4.2.2 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

Addendum IV to Amendment 6 specified that 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. If Draft Addendum VII is approved for public comment, public comment will be conducted through the separate Draft Addendum VII process. This section will be updated if Draft Addendum VII is approved.

4.4 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

[23] North Carolina's fishing year is December 1 – November 30.

dredging), and projects which could potentially jeopardize striped bass habitat quality or access.

4.4.1 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.

4.4.2 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.

4.4.3 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.

4.4.4 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).

4.5 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.

4.5.1 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 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.

4.5.2 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[24].

Option A (Status Quo): Board Discretion on CE 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;

[24] As of September 2021, the CE Guidance Document is under review for potential updates.

- 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) or eliminate the use of CE from the FMP (Option F). 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 CE at the front end of the CE process (i.e., considering when CE can be used and requirements for CE proposals)[25]. For each Option B–E, the Board may select one sub-option (or more, depending on the option); if a sub-option is not selected under an option, the Status Quo (Board discretion) remains in place on that issue.

Alternatively, the Board may select Option F to eliminate the use of CE from the FMP; if this occurs, Options B–E are not valid.

To inform consideration of these options, Table 11 outlines the CE programs implemented for Addendum VI[26].

[25] 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.

[26] 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 had to achieve 18% regardless. Also, a majority of states pursued CE and submitted a very large number of options for TC review, which raised questions for additional guidelines regarding the development of CE proposals.

Table 11. 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; established Bonus Program with commercial quota (24 to < 28”, 1 fish/day)	Decreased commercial quota reduction (to 0%) with surplus recreational fishery reduction and transferred commercial quota to recreational fishery
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 4 targeting closures, and shorter spring trophy season (May 1–15) to achieve 20.6% removals reduction; Ocean: FMP standard slot	Decreased Ocean and Chesapeake Bay commercial quota reduction (to -1.8%) with surplus 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 CE 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 assessment or assessment update reviewed by the Board). When the stock conditions are met, CE programs would not be approved. Previously existing CE programs would remain in place until Board action is taken on new FMP standards relevant to the specific fishery.

B1. Restrictions: CE programs would not be approved when *[sub-option B1 and B2 are mutually exclusive; sub-option B3 may be selected alone or in addition to sub-option B1 or B2]:*

> **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, Delaware Bay, and Chesapeake Bay spring trophy 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[27)] remain accountable to a CE-adjusted quota using census level harvest data, whereas non-quota managed fisheries have a CE-adjusted harvest target that may be exceeded as subsequently determined by survey-based harvest estimates. Commercial state-by-state quota management is also characterized by wide ranging 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

[27] 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.

directed at the existing commercial fishery CE programs[28]. Additionally, the public's concerns were seldom focused on the 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. While some public concern was expressed about the Chesapeake Bay spring trophy fishery[29] continuing to target adult migrant fish, the Management Board allowed the Chesapeake Bay states to maintain the trophy fishery regulations that were in place in 2017 without having to pursue CE when implementing Addendum VI, hence the fishery was exempted here again. However, the Board may choose to add to the default list of affected fisheries through Option B2.

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**: the Chesapeake Bay spring trophy fisheries
>
> **Sub-option B2-c**: quota-managed recreational fisheries (e.g., "bonus programs")
>
> **Sub-option B2-d**: commercial fisheries (all of which are quota managed)

Option C. Precision Standards for MRIP Estimates Used in CE 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."[30] 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

[28] 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.

[29] The Chesapeake Bay spring trophy fishery allows recreational fishermen in the Chesapeake Bay to take adult migrant fish during a limited seasonal fishery subject to a possession limit and minimum size separate from the rest of the Chesapeake Bay recreational fishery or Ocean recreational fishery. The fishery was originally controlled by a Board-approved harvest cap as well, but in 2008 the Board approved non-quota management until a stock assessment indicated that corrective action was necessary to reduce F on the coastal stock. Virginia closed its spring trophy fishery beginning in 2019, while Maryland and PRFC currently have a May 1–15 season during which 1 fish at 35" or greater may be taken. The recreational minimum size limit in the Bay during other open seasons is 19" or 20" depending on jurisdiction.

[30] 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"[31].

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

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. CE 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/removals target). Quota-managed CE fisheries have reactive accountability measures of in-season quota closures and quota overage paybacks in the subsequent year. The uncertainty buffer would provide a proactive accountability measure for non-quota managed CE fisheries 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 buffer applies to the percent reduction required or liberalization allowed for the non-quota managed fishery (after any potential transfer of reduction/liberalization between fisheries). For example, if a 20% reduction is required with a 10% uncertainty buffer, proposed CE programs would need to demonstrate a 22% reduction. Similarly, if a 20% liberalization is allowed with a 10% uncertainty buffer, proposed CE programs may liberalize up to 18%. The uncertainty buffer still applies when CE is requested separate from an implementation plan (e.g., a CE proposal

[31] See: www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-survey-and-data-standards

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., 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 12 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 12. *This table provides a hypothetical example to explain the difference between Option E's sub-options. Suppose an FMP standard is adopted that achieves 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 options vary in the amount of reduction required or liberalization allowed if each state requested 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%

Option F. Prohibition on the Use of CE
This option would remove the allowance for CE from the striped bass management program (with the exception of management program equivalencies that are written into the FMP) until reinstated by the Board in a future management action. Previously existing CE programs would remain in place until states are required to implement new FMP standards relevant to the specific fishery. If Amendment 7 alters any of the FMP standards for a specific fishery (i.e., Ocean recreational, Ocean commercial, Chesapeake Bay recreational, and Chesapeake Bay commercial), the relevant states must implement the FMP standard and CE would not be allowed. Note that if Amendment 7 changes the Ocean region's status quo recreational 28" to less than 35" slot limit, the new size limit(s) would apply to the Hudson River, Delaware River, and Delaware Bay recreational—unless the FMP establishes separate standards for these fisheries.

4.5.3 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).

4.5.3.1 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.

4.5.3.2 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.

4.6 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 4.6.2*. 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 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.

4.6.2 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

4.7 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 Amendment 7. Procedures for

implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2016).

4.8 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.

4.8.1 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.

4.8.2 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.

4.8.3. 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.

4.8.4 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.

4.8.5 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.

4.8.6 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.

4.8.7 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.

4.8.8 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.

4.8.9 Federal Agencies

4.8.9.1 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.

4.8.9.2 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.

4.9 RECOMMENDATION TO THE SECRETARY OF COMMERCE FOR COMPLEMENTARY MEASURES IN FEDERAL WATERS

The Board will discuss this during final approval of the Draft Amendment.

4.10 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 4.6*), 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 4.6*); 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 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 4.5: 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 4.6*.

- 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)[32] 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

[32] 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.

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.

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[33]. 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.

[33] North Carolina has reported zero offshore commercial harvest since 2013.

Endangered	
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*)
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[34]	*(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.

[34] 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.

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 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[35]

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear[36]. In 2008, several minke whales were observed dead in bottom 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[37]. 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

[35] 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.

[36] 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-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

[37] 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.

(*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 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.

Bottom Trawl and Gillnet

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[38], 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).

[38] 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.

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

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.

8.0 REFERENCES

Able, K. W., T. M. Grothues, J. T. Turnure, D. M. Byrne, P. Clerkin. 2012. Distribution, movements, and habitat use of small striped bass (*Morone saxatilis*) across multiple spatial scales. Fisheries Bulletin 110:176-192.

Albrecht, A. B. 1964. Some observations on factors associated with survival of striped bass eggs and larvae. California Fish and Game 50:100-113.

Atlantic States Marine Fisheries Commission (ASMFC). 1990. Source document for the supplement to the Striped Bass FMP - Amendment #4. Washington (DC): ASMFC. Fisheries Management Report No. 16. 244 p.

ASMFC. 1998. Amendment #5 to the Interstate Fishery Management Plan for Atlantic Striped Bass. Washington (DC): ASMFC. Fisheries Management Report No. 24. 31 p.

ASMFC. 2004. Summary of the USFWS Cooperative Tagging Program Results. Washington (DC): ASMFC. A Report by the Striped Bass Tag Working Group to the Striped Bass Technical Committee. 27 p.

ASMFC. 2011. Atlantic Menhaden Stock Assessment and Review Panel Reports. Stock Assessment Report No. 10-02 of the Atlantic States Marine Fisheries Commission. Arlington, VA. 326 pp.

ASMFC. 2007. Special report to the Atlantic Sturgeon Management Board: Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic. August 2007. 95 p.

ASMFC. 2017. 2017 Atlantic sturgeon benchmark stock assessment and peer review report. October 18, 2017. 456 pp.

ASMFC. 2018. Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management. ASMFC, Arlington, VA. 93pp. Available online at: http://www.asmfc.org/uploads/file/5b3bed98ResearchPriorities_April2018.pdf

ASMFC. 2019. Technical Support Group Guidance and Benchmark Stock Assessment Process. ASMFC, Arlington, Virginia. 61 pp. Available online at: http://www.asmfc.org/files/pub/TechnicalGuidanceDocument_Aug2019.pdf

ASSRT (Atlantic Sturgeon Status Review Team). 2007. Status review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 p.

Au, S. Y., C. M. Lee, J. E. Weistein, P. van der Hurk, and S. J. Klaine. 2017. Trophic transfer of microplastics in aquatic ecosystems: Identifying critical research needs. Integrated Environmental Assessment and Management 13:505-509. DOI: 10.1002/ieam.1907

Auld, A. H. and J. R. Schubel, 1978. Effects of suspended sediment on fish eggs and larvae: a laboratory assessment. Estuarine Coastal Marine Science 6(2):153-164.

Bailey, H. and D. H. Secor. 2016. Coastal evacuations by fish during extreme weather events. Scientific Reports 6:30280. DOI: 10.1038/srep30280.

Bain, M. B., and J. L. Bain. 1982. Habitat suitability index models: Coastal stocks of striped bass. U.S. Fish and Wildlife Service, Division of Biological Services, FWS/OBS-82/10.1.

Baker, W. D. 1968. A reconnaissance of anadromous fish runs into the inland fishing waters of North Carolina**.** Completion report for Project AFS-3. NC Wildlife Resources Commission. 33 pp.

Bayless, J. D. 1972. Artificial propagation and hybridization of striped bass*, Morone saxatillis (Walbaum).* SC Wildlife Marine Resources Department. 135 pp.

Beach, D. 2002. Coastal sprawl: the effects of urban design on aquatic ecosystems in the United States. Pew Oceans Commission, Arlington, Virginia.

Beal, R. April, 2000. Public information document for amendment 6 to the interstate fishery management plan for Atlantic striped bass. Atlantic States Marine Fisheries Commission.

Bellmund, S.A., J.A. Musick, R.C. Klinger, R.A. Byles, J.A. Keinath, and D.E. Barnard. 1987. Ecology of sea turtles in Virginia. Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia.

Benville, P. E., and S. Korn. 1977. The acute toxicity of six monocyclic aromatic crude oil components to striped bass, *Morone saxatilis,* and bay shrimp*, Crago franciscorum.* California Fish and Game 63:204-209.

Bergmann, M., L. Gutow, and M. Klages (eds.). 2015. Marine Anthropogenic Litter. DOI: 10.1007/978-3-319-16510-3_1

Bettoli, P. W. 2005. The fundamental thermal niche of adult landlocked striped bass. Transactions of the American Fisheries Society 134(2):305-314. DOI: 10.1577/T03-204.1

Bigelow HB, Schroeder WC. 1953. Fishes of the Gulf of Maine. US Fish and Wildl Serv Fish Bull 74(53):1-577.

Bjorndal, K. A. 1997. Foraging ecology and nutrition of sea turtles. Pages 199-231 in P. L. Lutz and J. A. Musick, editors. The biology of sea turtles. CRC Press, Boca Raton, Florida, USA.

Blazer, V. S., L. Iwanowicz, D. D. Iwanowicz, D. R. Smith, J. A. Young, J. D. Hedrick, S. W. Foster, and S. J. Reeser. 2007. Intersex (testicular oocytes) in smallmouth bass from the Potomac River and selected nearby drainages. Journal of Aquatic Animal Health 19:242-253.

Bour, A., J. Sturve, J. Höjesjö, and B. C. Almroth. 2020. Microplastic vector effects: Are fish at risk when exposed via the trophic chain? Frontiers in Environmental Science 8(90). DOI: 10.3389/fenvs.2020.00090

Breitburg, D. 2002. Effects of hypoxia, and the balance between hypoxia and enrichment, on coastal fishes and fisheries. Estuaries 25:767-781.

Brocksen, R. W. and H. T. Bailey. 1973. Respiratory response of juvenile chinook salmon and striped bass exposed to benzene, a water-soluble component of crude oil. Pages 783-791 in Proceedings of joint conference of prevention and control of oil spills. Am. Petroleum Inst., Environmental Protection Agency and U.S. Coast Guard, Washington, DC

Brush, G. S. 2009. Historical land use, nitrogen, and coastal eutrophication: A paleoecological perspective. Estuaries and Coasts 32: 18-28. DOI: 10.1007/s12237-008-9106-z

Buckler, D. R., P. M. Mehrle, L. Cleveland, and F. J. Dwyer. 1987. Influence of pH on the toxicity of aluminum and other inorganic contaminants to east coast striped bass. Water Air Soil Pollution. 35:97-106.

Callihan, J. L., C.H. Godwin, and J.A. Buckel. 2014. Effect of demography on spatial distribution: movement patterns of the Albemarle Sound–Roanoke River stock of Striped Bass (*Morone saxatilis*) in relation to their recovery. Fisheries Bulletin 112:131–143. DOI: 10.7755/FB.112.2-3.3

Callihan, J.L., J.E. Harris, and J.E. Hightower. 2015. Coastal Migration and Homing of Roanoke River Striped Bass. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science, 7(1): 301-315, DOI: 10.1080/19425120.2015.1057309 http://dx.doi.org/10.1080/19425120.2015.1057309

Cappiella, K. and K. Brown. 2001. Impervious cover and land use in the Chesapeake Bay watershed. Center for Watershed Protection, Ellicott City, Maryland.

Carr-Harris, A. and S. Steinback. 2020. Expected economic and biological impacts of recreational Atlantic striped bass fishing policy. Front. Mar. Sci. 6: 814, p.1-20.

Chesapeake Bay Foundation, 2021. Land use and pollution across the bay watershed. https://www.cbf.org/about-the-bay/land-use-and-pollution-across-the-bay-watershed.html Accessed 07/01/2021

Chesapeake Conservation Partnership. 2020. Chesapeake Conservation Atlas. https://natureserve.maps.arcgis.com/apps/Cascade/index.html?appid=4b1f324aab6842589315acdffa503ad6 Accessed 07/01/2021

Chittenden, M. E., Jr. 1971. Effects of handling and salinity on oxygen requirements of striped bass, *Morone saxatilis*. Journal of the Fisheries Research Board of Canada 28: 1823-1830.

Chavez-Rosales, S., M.C. Lyssikatos, and J. Hatch. 2017. Estimates of cetacean and pinniped bycatchin northeast and mid-Atlantic bottom trawl fisheries, 2011-2015. Northeast Fish Sci Cent Ref Doc. 17-16; 18 p.

Chow, M. I., J. I. Lundin, C. J. Mitchell, J. W. Davis, G. Young, N. L. Scholz, and J. K. McIntyre. 2019. An urban stormwater runoff mortality syndrome in juvenile coho salmon. Aquatic Toxicology 214(105231). DOI: 10.1016/j.aquatox.2019.105231.

Cimino, J., M. Fabrizio, K. Culzoni, D. Gauthier, J. Jacobs, M. Johnson, E. Martino, N. Meserve, S. Minkkinen, D. Secor, A. Sharov, J. Uphoff, W. Vogelbein, J. Gartland, R. Klauda, R. LaTour, and M. Topolski. 2009. Ecosystem-based fisheries management for Chesapeake Bay: Striped bass background and issue briefs (Publication Number UM,SG,TS,2009,07). Maryland Sea Grant. https://www.mdsg.umd.edu/sites/default/files/2019-12/EBFM-Striped-Bass-Briefs-1.pdf

Clapham, P.J., L.S. Baraff, C.A. Carlson, M.A. Christian, D.K. Mattila, C.A. Mayo, M.A. Murphy and S. Pittman. 1993. Seasonal occurrence and annual return of humpback whales, *Megaptera novaeangliae*, in the southern Gulf of Maine. *Canadian Journal of Zoology.* 71: 440-443.

Clark, J. R. 1967. Fish and man: Conflict in the Atlantic estuaries. American Littoral Society, Special Publication 5. 78pp.

Cole TVN and Henry AG. 2013. Serious injury determinations for baleen whale stocks alongthe Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2007-2011. Northeast Fish Sci Cent Ref Doc. 13-24; 14 p.

Collins, M. R. and T. I. J. Smith. 1997. Distribution of shortnose and Atlantic sturgeons in South Carolina. *North American Journal of Fisheries Management*. 17: 995-1000.

Costantini, M., S. A. Ludsin, D. M. Mason, X. Zhang, W. C. Boicourt, S. B. Brandt. 2008. Effect of hypoxia on habitat quality of striped bass (*Morone saxatilis*) in Chesapeake Bay. Canadian Journal of Fisheries and Aquatic Sciences 65:989-1002.

Coutant, C. C. 1990. Temperature–oxygen habitat for freshwater and coastal striped bass in a changing climate. Transactions of the American Fisheries Society 119:240–253.

Coutant, C. C. 2013. When is habitat limiting for striped bass? Three decades of testing the temperature-oxygen squeeze hypothesis. American Fisheries Society Symposium 80:65-91.

Coutant, C. C., and D. S. Carroll. 1980. Temperatures occupied by ten ultrasonic-tagged striped bass in freshwater lakes. Transactions of the American Fisheries Society 109:195–202.

Coutant, C. C., K. L. Zachmann, D. K. Cox, and B. L. Pearman. 1984. Temperature selection by juvenile striped bass in laboratory and field. Transactions of the American Fisheries Society 113:666–671.

Davis, J. P., Schultz, E. T., & Vokoun, J. C. 2012. Striped Bass consumption of Blueback Herring during vernal riverine migrations: does relaxing harvest restrictions on a predator help conserve a prey species of concern? Marine and Coastal Fisheries, 4(1), 239-251.

Davis, G.E., M.F. Baumgartner et al. 2017. Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (Eubalaena glacialis) from 2004 to 2014. Sci. Rep. 7:13460.

Davis, G. E., M. F. Baumgartner, et al. 2020. Exploring movement patterns and changing distributions of baleen whales in the western North Atlantic using a decade of passive acoustic data. Glob. Change. Biol. 26: 4812-4840.

Diodati, P.J. and R.A. Richards. 1996. Mortality of Striped Bass Hooked and Released in Salt Water. Transactions of the American Fisheries Society 125:300-307.

Dodge, K.L., B. Galuardi, T. J. Miller, and M. E. Lutcavage. 2014. Leatherback turtle movements, dive behavior, and habitat characteristics in ecoregions of the northwest Atlantic Ocean. *PLOS ONE*. 9 (3) e91726: 1-17.

Doroshev, S. I. 1970. Biological features of the eggs, larvae, and young of the striped bass (*Roccus saxatilis* (Walbaum) in connection with the problem of its acclimation in the U.S.S.R. J. Ichthyology 10(2): 235-278.

Dunton, K.J., A. Jordaan, K.A. McKown, D.O. Conover, and M.J. Frisk. 2010. Abundance and distribution of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) within the northwest Atlantic Ocean, determined from five fishery-independent surveys. *Fishery Bulletin*. 108:450-465.

Ecosystem Principles Advisory Panel. 1999. Ecosystem-based fishery management. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Springs, MD. 44 pp. + appendices.

Eckert, S.A., D. Bagley, S. Kubis, L. Ehrhart, C. Johnson, K. Stewart, and D. DeFreese. 2006. Internesting and post nesting movements of foraging habitats of leatherback sea turtles (*Dermochelys coriacea*) nesting in Florida. *Chelonian Conservation and Biology*. 5(2): 239-248.

Epperly, S.P., J. Braun, and A.J. Chester. 1995a. Aerial surveys for sea turtles in North Carolina inshore waters. *Fishery Bulletin*. 93: 254-261.

Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J.V. Merriner, and P.A. Tester. 1995b.Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery. *Bulletin of Marine Science*. 56(2): 547-568.

Erickson, D. L., A. Kahnle, M. J. Millard, E. A. Mora, M. Bryja, A. Higgs, J. Mohler, M. DuFour, G. Kenney, J. Sweka, and E. K. Pikitch. 2011. Use of pop-up satellite archival tags to identify oceanic-migratory patterns for adult Atlantic Sturgeon, *Acipenser oxyrinchus* Mitchell, 1815. *Journal of Applied Ichthyology*. 27: 356– 365.

Fabrizio MC. 1987. Contribution of Chesapeake Bay and Hudson River stocks of striped bass to Rhode Island coastal waters as estimated by isoelectric focusing of eye lens protein. Trans Amer Fish Soc 116:588-593.

Ferry, K. H., and M. E. Mather. 2012. Spatial and Temporal Diet Patterns of Subadult and Small Adult Striped Bass in Massachusetts Estuaries: Data, a Synthesis, and Trends Across Scales. Marine and Coastal Fisheries 4(1): 30–45.

Hartman, K.J. and S.B. Brandt. 1995. Predatory demand and impact of striped bass, bluefish, and weakfish in the Chesapeake Bay: applications of bioenergetics models. Canadian Journal of Fisheries and Aquatic Sciences 52:1667-1687.

Gauthier DT, Latour RJ, Heisey DM, Bonzek CF, Gartland J, Burge E, Volgelbein WK. 2008. Mycobacteriosis-associated mortality in wild striped bass (Morone saxatilis) from Chesapeake Bay, USA. Ecological Applications 18:1718-1727.

Gervasi, C. L., Lowerre-Barbieri, S. K., Vogelbein, W. K., Gartland, J., & Latour, R. J.2019. The reproductive biology of Chesapeake Bay striped bass with consideration of the effects of mycobacteriosis. Bull. Mar. Sci., 95(2):117-137.

Goodyear, C. P. 1984. Analysis of potential yield per recruit for striped bass produced in Chesapeake Bay. North Am. J. Fish. Manage., 4(4B):488-496.

Goodyear CP, Cohen JE, Christensen S. 1985. Maryland striped bass: recruitment declining below replacement. Trans Amer Fish Soc 114:146-151.

Griffin, D.B., S. R. Murphy, M. G. Frick, A. C. Broderick, J. W. Coker, M. S. Coyne, M. G. Dodd, M. H. Godfrey, B. J. Godley, L. A. Hawkes, T. M. Murphy, K. L. Williams, and M. J. Witt. 2013. Foraging habitats and migration corridors utilized by a recovering subpopulation of adult female loggerhead sea turtles: implications for conservation. *Marine Biology.* 160: 3071–3086.

Greene, K. E., J. L. Zimmerman, R. W. Laney, and J. C. Thomas-Blate. 2009. Atlantic coast diadromous fish habitat: A review of utilization, threats, recommendations for conservation, and research needs. Atlantic States Marine Fisheries Commission Habitat Management Series No. 9, Washington, DC.

Groner, M. L., J. M. Hoenig, R. Pradel, R. Choquet, W. K. Vogelbein, D. T. Gauthier, M. A. M. Friedrichs. 2018. Dermal mycobacteriosis and warming sea surface temperatures are associated with elevated mortality of striped bass in Chesapeake Bay. Ecology and Evolution. DOI: 10.1002/ece3.4462

Haab, T.C. and McConnell, K.E. 2003. Valuating Environmental and Natural Resources: The Econometrics of Non-Market Valuation, Edward Elgar Publishing.

Hager et al. 2021. Raised-Footrope Gill-Net Modification Significantly Reduces Subadult Atlantic Sturgeon Bycatch. North American Journal of Fisheries Management 41:19-25.

Hagy, J. D., W. R. Boynton, C. W. Keefe, and K. V. Wood. 2004. Hypoxia in Chesapeake Bay, 1950-2001: Long-term change in relation to nutrient loading and river flow. Estuaries 27(4):634-658.

Hall, L. W., Jr., D. T. Burton, and L. B. Richardson. 1981. Comparison of ozone and chlorine toxicity to the developmental stages of striped bass, *Morone saxatilis*. Canadian Journal of Fisheries and Aquatic Science 28: 752-757.

Hatch J, Orphanides C. 2014. Estimates of cetacean and pinniped bycatch in the 2012 New England sink and mid-Atlantic gillnet fisheries. Northeast Fish Sci Cent Ref Doc. 14-02; 20 p.

Hatch JM, Orphanides CM. 2015. Estimates of cetacean and pinniped bycatch in the 2013 New England sink and mid-Atlantic gillnet fisheries. Northeast Fish Sci Cent Ref Doc. 15-15; 26 p.

Hatch JM, Orphanides CM. 2016. Estimates of cetacean and pinniped bycatch in the 2014 New England sink and mid-Atlantic gillnet fisheries. Northeast Fish Sci Cent Ref Doc. 16-05; 22 p.

Hawkes, L.A., M.J. Witt, A.C. Broderick, J.W. Coker, M.S. Coyne, M. Dodd, M.G. Frick, M.H. Godfrey, D.B. Griffin, S.R. Murphy, T.M. Murphy, K.L. Williams, and B.J. Godley. 2011. Home on the range: spatial ecology of loggerhead turtles in Atlantic waters of the USA. *Diversity and Distributions*. 17: 624–640.

Hayes, S.A., E. Josephson, K. Maze-Foley, and P.E. Rosel 2017. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments 2016. NOAA Technical Memorandum NMFS-NE-241.

Hayes, S.A, E. Josephson, K. Maze-Foley, and P. Rosel. 2018. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessment-2017. NOAA Technical Memorandum NMFS-NE-245.

Hayes, S.A., E. Josephson, K. Maze-Foley, and P. E. Rosel. 2019. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2018. NOAA Technical Memorandum NMFS-NE-258.

Hayes, S.A., E. Josephson, K. Maze-Foley, and P. E. Rosel. 2020. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2019. NOAA Technical Memorandum NMFS-NE-264.

Henry AG, Cole TVN, Hall L, Ledwell W, Morin D, Reid A. 2015. Serious injury and mortality determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2009-2013. Northeast Fish Sci Cent Ref Doc. 15-10; 48 p. Online at: https://doi.org/10.7289/V5C53HTB

Henry AG, Cole TVN, Ha ll L, Ledwell W, Morin D, Reid A. 2016. Serious injury and mortality determinations for baleen whale stocks along the Gulf of Mexico, United States east coast, and Atlantic Canadian provinces, 2010-2014. Northeast Fish Sci Cent Ref Doc. 16-10; 51 p.

Henry, A.G., T.V.N. Cole, M. Garron, W. Ledwell, D. Morin, and A. Reid. 2017. Serious injury and mortality and determinations for baleen whale stocks along the Gulf of Mexico, United States east coast and Atlantic Canadian provinces, 2011-2015. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc. 17-19; 57 p.

Henry A, Garron M, Reid A, Morin D, Ledwell W, Cole TVN. 2019. Serious injury and mortality determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast, and Atlantic Canadian Provinces, 2012-2016. Northeast Fish Sci Cent Ref Doc. 19-13; 54 p.

Henry AG, Garron M, Morin D, Reid A, Ledwell W, Cole TVN. 2020. Serious injury and mortality determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast, and Atlantic Canadian provinces, 2013-2017. Northeast Fish Sci Cent Ref Doc. 20-06; 53 p.

Hill, J., J. W. Evans and M. J. van den Avyle. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) – striped bass. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, DC Biological Report 82(11.118). US Army Corps of Engineers, Waterways Experiment Station, Coastal Ecology Group, Vicksburg, MS. TR EL-82-4. 35 pp.

Hocutt, C. H., S. E. Seibold, R. M. Harrell, R. V. Jesien, and W. H. Bason. 1990. Behavioral observations of striped bass (*Morone saxatilis*) on the spawning grounds of the Choptank and Nanticoke Rivers, Maryland USA. Journal of Applied Ichthyology 6:211-222. DOI: 10.1111/j.1439-0426.1990.tb00581.x

Holland G. F. Yelverton. 1973. Distribution and biological studies of anadromous fishes offshore North Carolina. Division Commercial And Sport Fishing, NC Department of Natural and Economic Resources. Special Science Report 24. 132pp.

Hollema HM, Kneebone J, McCormick SD, Skomal GB, Danylchuk AJ. 2017. Movement Patterns of Striped Bass Morone saxatilis in a Tidal Coastal Embayment in New England. Fisheries Research 187, no. Journal Article 168–177.

Holzer, J. and McConnell, K.E. 2017. Risk Preferences and Compliance in Recreational Fisheries, Journal of the Association of Environmental and Resource Economists, 4(S1), p.1-35.

Hurst, T. & Conover, D. (1998). Winter Mortality of Young-of-the-Year Hudson River Striped Bass (*Morone saxatilis*): Size-Dependent Patterns and Effects on Recruitment. Canadian Journal of Fisheries and Aquatic Sciences. 55. 1122-1130. 10.1139/cjfas-55-5-1122.

Hurst, T. P., D. O. Conover. 2002. Effects of temperature and salinity on survival of young-of-the-year Hudson River striped bass (*Morone saxatilis*): Implications for optimal overwintering habitats. Canadian Journal of Fisheries and Aquatic Sciences. 59:787-795. DOI: 10.1139/f02-051

Itakura, H., M. H. P. O'Brien, and D. Secor. 2021. Tracking oxy-thermal habitat compression encountered by Chesapeake Bay striped bass through acoustic telemetry. ICES Journal of Marine Science. DOI:10.1093/icesjms/fsab009

Jackson HW, Tiller RE. 1952. Preliminary observations on spawning potential in the striped bass. Solomons (MD): Chesapeake Bay Laboratory. CBL Pub No. 93. 16 p.

Jacobs JM, Howard DW, Rhodes MR, Newman MW, May EB, Harrell RM. 2009a. Historical presence (1975 – 1985) of Mycobacteriosis in Chesapeake Bay striped bass Morone saxatilis. Diseases of Aquatic Organisms 85:181-186.

Jacobs JM, Stine CB, Baya AM, Kent ML. 2009b. A review of Mycobacteriosis in marine fish. Journal of Fish Diseases 32:119-130.

James, M.C., R.A. Myers, and C.A. Ottenmeyer. 2005. Behaviour of leatherback sea turtles, *Dermochelys coriacea*, during the migratory cycle. *Proceedings of the Royal Society B*. 272: 1547-1555.

James, M.C., S.A. Sherrill-Mix, K. Martin, and R. A. Myers. 2006. Canadian waters provide critical foraging habitat for leatherback sea turtles. *Biological Conservation*. 133: 347-357.

Jarvis, S. L. 2011. Stated Preference Methods and Models: Analyzing Recreational Angling in New England Groundisheries. PhD diss., Department of Agricultural and Resource Economics, University of Maryland.

Josephson, E., F.Wenzel, and M.C. Lyssikatos. 2017. Serious injury determinations for small cetaceans and pinnipeds caught in commercial fisheries off the Northeast US coast, 2011-2015. Northeast Fish Sci Cent Ref Doc. 17-15; 32 p.

Josephson, E., F. Wenzel, and M.C. Lyssikatos. 2019. Serious injury determinations for small cetaceans and pinnipeds caught in commercial fisheries off the Northeast US Coast, 2012-2016. Northeast Fish Sci Cent Ref Doc. 19-05; 27 p.

Kaattari IM, Rhodes MW, Kator H, Kaattari SL. 2005. Comparative analysis of mycobacterial infections in wild striped bass Morone saxatilis from Chesapeake Bay. Diseases of Aquatic Organisms 67:125-132.

Kaushal, S. S., K. L. Wood, J. G. Galella, A. M. Gion, S. Haq, P.J. Goodling, K. A. Haviland, J. E. Reimer, C. J. Morel, B. Wessel, W. Nguyen, J. W. Hollingsworth, K. Mei, J. Leal, J. Widmer, R. Sharif, P. M. Mayer, T. A. N. Johnson, K. D. Newcomb, E. Smith, and K. T. Belt. 2020. Making 'chemical cocktails' – Evolution of urban geochemical processes across the periodic table of elements. Applied Geochemistry 119(104632). DOI: 10.1016/j.apgeochem.2020.104632.

Keinath, J.A., J.A. Musick, and R.A. Byles. 1987. Aspects of the biology of Virginia sea turtles: 1979-1986. Virginia Journal of Science 38(2):81.

Kemp, W. M., W. R. Boynton, J. E. Adolf, D. F. Boesch, W. C. Boicourt, G. Brush, J. C. Cornwell, T. R. Fisher, P. M. Glibert, J. D. Hagy, L. W. Harding, E. D. Houde, D. G. Kimmel, W. D. Miller, R. I. E. Newell, M. R. Roman, E. M. Smith, and J. C. Stevenson. 2005. Eutrophication of Chesapeake Bay: Historical trends and ecological interactions. Marine Ecology Progress Series 303:1-29

Kennish, M. J. 2002. Environmental threats and environmental future of estuaries. Environmental Conservation, 29(01):78–107. DOI: 10.1017/S0376892902000061

Kneebone, J., W. S. Hoffman, M.J. Dean, and M. P. Armstrong. 2014. Movements of striped bass between the Exclusive Economic Zone and Massachusetts state waters. North American Journal of Fisheries Management 34: 524-534. DOI: 10.1080/02755947.2014.892550

Kohlenstein LC. 1980. Aspects of the dynamics of striped bass Morone saxatilis spawning in Maryland tributaries of the Chesapeake Bay. Doctoral dissertation, Johns Hopkins University, Baltimore MD, USA. Johns Hopkins University Applied Physics Laboratory publication PPSE T-14.

Kohlenstein, L. C. 1981. On the proportion of the Chesapeake stock of striped bass that migrates into the coastal fishery. Transactions of the American Fisheries Society 110: 168−179.

Korn, S., J. W. Struhsaker, and P. Benville, Jr. 1976. Effects of benzene on growth, fat content, and caloric content of striped bass. US National Marine Fisheries Service Fisheries Bulletin 74: 694-698.

Kosak-Channing, L., and G.G. Helz. 1979. Ozone reactivity with seawater components. Ozone Science and Engineering 1: 39-46.

Kraus, R. T., D. H. Secor, and R. L. Wingate, 2015. Testing the thermal-niche oxygen-squeeze hypothesis for estuarine striped bass. Environmental Biology of Fishes 98: 2083-2092. DOI: 10.1007/s10641-015-0431-3

Lee, M., S. Steinback, K. Wallmo. 2017. Applying a Bioeconomic Model to Recreational Fisheries Management: Groundfish in the Northeast United States. Marine Resource Economics 32(2), p.191-216.

Litwiler, T.L. 2001 .Conservation plan for sea turtles, marine mammals, and the shortnose sturgeon in Maryland. Maryland Department of Natural Resources. Technical Report FSSCOL-01-2. Oxford, Maryland. 134 pp.

Lutcavage, M. and J.A. Musick. 1985. Aspects of sea turtle biology in Virginia. Copeia 2:449-456.

Lyssikatos, M.C. 2015. Estimates of cetacean and pinniped bycatch in Northeast and mid-Atlantic bottom trawl fisheries, 2008-2013. Northeast Fisheries Science Center Reference Document 15-19; 20 p.

Lyssikatos, M.C., S. Chavez-Rosales, and J. Hatch. 2020. Estimates of cetacean and pinniped bycatch in Northeast and Mid-Atlantic bottom trawl fisheries, 2013-2017. Northeast Fish Sci Cent Ref Doc. 20-04; 11 p.

Mansueti, R. J. 1954. Mysterious movements of young striped bass studied. Maryland Tidewater News 11(1): 3-4.

Mansueti, R. J. 1958. Eggs, larvae and young of the striped bass, *Roccus saxatilis*. Chesapeake Biological Laboratory Contribution 112, 35 p.

Marine Research Incorporated. 1976. A report on possible alternatives to chlorination for controlling fouling in power station cooling water systems. Final report. Marine Research Inc. Falmouth, MA., 157pp.

Martino, E. J. and E. D. Houde, 2010. Recruitment of striped bass in Chesapeake Bay: spatial and temporal environmental variability and availability of zooplankton prey. Marine Ecology Progress Series 409: 213-228.

Martino, E.J. and E.D. Houde. 2012. Density-dependent regulation of year-class strength in age-0 juvenile striped bass (*Morone saxatilis*). Canadian Journal of Fisheries and Aquatic Sciences. 69(3): 430-446. https://doi.org/10.1139/f2011-149

Massoudieh A, Loboschefsky E, Sommer T, Ginn T, Rose K, Loge F. 2011. Spatio-Temporal Modeling of Striped-Bass Egg, Larval Movement, and Fate in the San Francisco Bay–Delta. Ecological Modelling 222:3513–3523.

Matsche, M.A., Overton, A., Jacobs, J., Rhodes, M.R. and Rosemary, K.M., 2010. Low prevalence of splenic mycobacteriosis in migratory striped bass *Morone saxatilis* from North Carolina and Chesapeake Bay, USA. Diseases of aquatic organisms, 90: 181-189.

McConnell, K.E. and Strand, I.E. and Blake-Hedges, L. 1995. Random Utility Models of Recreational Fishing: Catching Fish Using a Poisson Process. Marine Resource Economics 10, p.247-261.

McIntyre, J. K., J. I. Lundin, J. R. Cameron, M. I. Chow, J. W. Davis, J. P. Incardona, and N. L. Scholz. 2018. Interspecies variation in the susceptibility of adult Pacific salmon to toxic urban stormwater runoff. Environmental Pollution 238: 196-203. DOI: 10.1016/j.envpol.2018.03.012

Merriman, D. 1941. Studies on the striped bass (*Roccus saxatilis*) of the Atlantic Coast. U.S. Fish Wildlife Service Fish Bulletin 50(35): 1-17.

Mihursky, J. A. and Millsaps, Harold and Wiley, Martin. 1987. Fecundity estimates for Maryland Striped Bass. Solomons, MD, University of Maryland Center for Environmental Science, 26pp. UMCES CBL Reference Series, 87-127.

Miller, M.H. and C. Klimovich. 2017. Endangered Species Act Status Review Report: Giant Manta Ray (*Manta birostris*) and Reef Manta Ray (*Manta alfredi*). Report to National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD. September 2017. 128 pp.

Miller, T. and G. Shepard. 2011. Summary of discard estimates for Atlantic sturgeon. Northeast Fisheries Science Center, Population Dynamics Branch, August 2011.

Millette, N. C., J. J. Pierson, and E. W. North. 2019. Water temperature during winter may control striped bass recruitment during spring by affecting the development time of copepod nauplii. – ICES Journal of Marine Science, DOI:10.1093/icesjms/fsz203.

Morris, J. A., Jr., R. A. Rulifson, and L. H. Toburen. 2003. Genetics, demographics, and life history strategies of striped bass, *Morone saxatilis*, inferred from otolith microchemistry. Fisheries Research 62: 53-63.

Morreale, S.J. and E.A. Standora. 2005. Western North Atlantic waters: Crucial developmental habitat for Kemp's ridley and loggerhead sea turtles. *Chelonian Conservation Biology*. 4(4):872-882.

Morrison WE, Nelson MW, Howard JF, Teeters EJ, Hare JA, Griffis RB, Scott JD, and Alexander MA. 2015. Methodology for Assessing the Vulnerability of Marine Fish and Shellfish Species to a Changing Climate. NOAA Technical Memorandum. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Murphy, T.M., S.R. Murphy, D.B. Griffin, and C. P. Hope. 2006. Recent occurrence, spatial distribution and temporal variability of leatherback turtles (*Dermochelys coriacea*) in nearshore waters of South Carolina, USA. *Chelonian Conservation Biology*. 5(2): 216-224.

Murphy Jr., R., S. Scyphers, S. Gray, J.H. Grabowski. 2019. Angler attitudes explain disparate behavioral reactions to fishery regulations. Fisheries 44 (10): 475-487.

Murray, K.T., 2008. Estimated average annual bycatch of loggerhead sea turtles (*Caretta caretta*) in US Mid- Atlantic bottom otter trawl gear, 1996–2004, second ed. Northeast Fisheries Science Center Reference Document 08-20, p. 32.

Murray, K.T. 2015. The importance of location and operational fishing factors in estimating and reducing loggerhead turtle (*Caretta caretta*) interactions in U.S. bottom trawl gear. *Fisheries Research*. 172: 440–451.

Murray, K. 2020. Estimated magnitude of sea turtle interactions and mortality in US bottom trawl gear, 2014-2018. NOAA Tech Memo NMFS NE. 260; 19 p.

Musick, J. A., and C. J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pages 137-164 in P. L. Lutz and J. A. Musick, editors. The biology of sea turtles. CRC Press, Boca Raton, Florida, USA.

Musick, J. A., E. O. Murdy, and R. S. Birdsong. 1997. Striped bass, In Fishes of Chesapeake Bay. Smithsonian Institution, Washington, DC 218-220.

Nack, C. C., D. P. Swaney, and K. E. Limburg. 2019. Historical and projected changes in spawning phenologies of American shad and striped bass in the Hudson River estuary. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science 11: 271–284

National Marine Fisheries Service (NMFS). 1998. Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 104 pages.

Northeast Fisheries Science Center (NEFSC). 2019. 66th Northeast Regional Stock Assessment Workshop (66th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 19-08; 1170 p.

NMFS. 2011b. Bycatch Working Group Discussion Notes. NMFS Sturgeon Workshop, Alexandria, VA. February 11, 2011.

NMFS. 2013. Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the Northeast Multispecies, Monkfish, Spiny Dogfish, Atlantic Bluefish, Northeast Skate Complex, Mackerel/Squid/Butterfish, and Summer Flounder/Scup/Black Sea Bass Fisheries. NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1992. Recovery plan for leatherback turtles (*Dermochelys coriacea*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 65 p.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 2013. Leatherback sea turtle (*Dermochelys coriacea*) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 91 p.

Nelson, G.A., M.P. Armstrong, J.S. Thomson, and K.D. Friedland. 2010. Thermal habitat of striped bass (*Morone saxatilis*) in coastal waters of northern Massachusetts, USA, during summer. Fisheries Oceanography 19(5):370–381.

Nelson, K.L. 1998. Catch-and-Release Mortality of Striped Bass in the Roanoke River, North Carolina, North American Journal of Fisheries Management, 18:1, 25-30.

Nuhfer, A. J. and G. R. Alexander. 1992. Hooking mortality of trophy-sized wild brook trout caught on artificial lures. North American Journal of Fisheries Management 12:634–644.

Oberdörster, E. and A. Oliver. 2001. Gender benders at the beach: endocrine disruption in marine and estuarine organisms. Environmental Toxicology and Chemistry 20: 23-36.

Old Dominion University Center for Quantitative Fisheries Ecology (ODU CQFE). Striped Bass, Morone Saxatilis [Internet]. 2006 [cited 2007 June 6]. Available from: http://www.odu.edu/sci/cqfe/

Ottinger CA. 2006. Mycobacterial infections in striped bass Morone saxatilis from upper and lower Chesapeake Bay: 2002 and 2003 pound net studies In Ottinger CA, Jacobs JM, editors. USGS/NOAA Workshop on Mycobacteriosis in Striped Bass, May 7-10, 2006, Annapolis, Maryland. Reston (VA): USGS. p 15-16.

Ottinger, C.A., and J.M. Jacobs. 2006. USGS/NOAA Workshop on Mycobacteriosis in Striped Bass, May 7-10, 2006, Annapolis, Maryland. NOAA Technical Memorandum NOS NCCOS 41 and USGS Scientific Investigations Report 2006-5214. Reston, VA. 42 pp.

Ottinger, C. A., J. J. Brown, et al. (2006). Mycobacterial infections in striped bass (Morone saxatilis) from Delaware Bay. USGS/NOAA workshop on Mycobacteriosis in striped bass. C. A. Ottinger and J. M. Jacobs. Annapolis, MD, United States. SIR 2006-5214. Scientific Investigations Report: 23-24.

Osborne, J.H. 2018. Fish assemblage and habitat use in North Carolina and Virginia waters during the annual Cooperative Winter Tagging Cruise, 1988-2013. MS thesis, East Carolina University, Department of Biology, Greenville. 1059 pp.

Overton, A.S., F.J. Margraf, C. A. Weedon, L. H. Pieper, and E. B. May. 2003. The prevalence of mycobacterial infections in striped bass in Chesapeake Bay. Fisheries Management and Ecology 10: 301 – 308.

Overton AS, Jacobs JM, Stiller JW, May EB. 2006. Initial investigation of the overall health and presence of Mycobacteriosis in Roanoke River, NC, striped bass (Morone saxatilis). In: Ottinger CA, Jacobs JM, editors. USGS/NOAA Workshop on Mycobacteriosis in Striped Bass, May 7-10, 2006, Annapolis, Maryland. Reston (VA): USGS. p 15-16.

Overton AS, Margraf FJ, May EB. 2009. Spatial and temporal patterns in the diet of striped bass in Chesapeake Bay. Transactions of the American Fisheries Society 138: 915-926.

Overton, A.S., J.C. Griffin, F.J. Margraf, E.B. May and K.J. Hartman. 2015. Chronicling Long-Term Predator Responses to a Shifting Forage Base in Chesapeake Bay: An Energetics Approach. Transactions of the American Fisheries Society 144: 956-966.

Parker, B. W., B. A. Beckingham, B. C. Ingram, J. C. Ballenger, J. E. Weinstein, and G. Sancho. 2020. Microplastic and tire wear particle occurrence in fishes from an urban estuary: Influence of feeding characteristics on exposure risk. Marine Pollution Bulletin 160(111539). DOI: 10.1016/j.marpolbul.2020.111539

Pautzke, S.M., M.E. Mather, J.T. Finn, L.A. Deegan, and R.M. Muth. 2010. Seasonal use of a New England estuary by foraging contingents of migratory striped bass. Transactions of the American Fisheries Society 139:257–269. DOI: 10.1577/T08-222.1

Peer, A. C. and T. J. Miller. 2014. Climate change, migration phenology, and fisheries management interact with unanticipated consequences. North American Journal of Fisheries Management 34: 94-110.

Pieper L. 2006. Striped bass disease overview for the past ten year plus In Ottinger CA, Jacobs JM, editors. USGS/NOAA Workshop on Mycobacteriosis in Striped Bass, May 7-10, 2006, Annapolis, Maryland. Reston (VA): USGS. p 10-11.

Radtke, L. C., and J. L. Turner. 1967. High concentrations of total dissolved solids block spawning migration of striped bass, *Roccus saxatilis*, in the San Joaquin River, California. Transactions of the American Fisheries Society 96: 405-407.

Rago, P. J. 1992. Chesapeake Bay striped bass: The consequences of habitat degradation. Pages 105-116 in R. H. Stroud, editor. Stemming the tide of coastal fish habitat loss. National Coalition for Marine Conservation, Inc., Marine Recreational Fisheries No. 14, Savannah, Georgia.

Raney, E. C. 1952. The life history of the striped bass, *Roccus saxatilis* (Walbaum). Bulletin of the Bingham Oceanographic Collection, Yale University 14(1): 5-97.

Regan, D. M., T. L. Wellborn, Jr., and R. G. Bowker. 1968. Striped bass: Development of essential requirements for production. US Fish and Wildlife Service, Bureau of Sport Fisheries, Atlanta, Georgia.

Richards, A., Fogarty, M., and Teichberg, M. 2003. Density-dependent growth and reproduction of Chesapeake Bay striped bass. National Oceanic and Atmospheric Administration, Marine Fisheries Initiative Program, Final Report (Award NA96FD0076), Gloucester, Massachusetts.

Richkus, W. A. 1990. Source document for the supplement to the striped bass fisheries management plan – Amendment #4. Atlantic States Marine Fisheries Commission, Washington, DC Fisheries Management Report No. 16.

Rudershausen PJ, Tuomikoski JE, Buckel JA, Hightower JE. 2005. Prey Selectivity and Diet of Striped Bass in Western Albemarle Sound, North Carolina. Transactions of the American Fisheries Society 134:1059–1074.

Rulifson, R. A., J. E. Cooper, and G. Coloumbo. 1986. Development of fed and starved striped bass (*Morone saxatilis*) larvae from the Roanoke River, North Carolina. NC Department of Natural Resources Completion. Report for ECU Grant/Contract No. 5-2143, ICMR Tech Report 86-03.

Sadler, P. W., Hoenig, J. M., & Harris, R. E. (2006) Evaluation of Striped Bass Stocks in Virginia: Monitoring and Tagging Studies, 2004-2008, 1 September 2005 - 31 August 2006. Virginia Institute of Marine Science, William & Mary.

Schafer RH. 1970. Feeding habits of striped bass from surf waters of Long Island. NY Fish and Game Journal 17: 1-17.

Schubel, J. R., T. S. Y. Koo, and C. F. Smith. 1976. Thermal effects of power plant entrainment on survival of fish eggs and larvae: a laboratory assessment. Chesapeake Bay Inst., Ref. 76-5 Special Report 52, Johns Hopkins University. 37 pp.

Secor, D. H. 2000. Spawning in the nick of time? Effect of adult demographics on spawning behavior and recruitment of Chesapeake Bay striped bass. ICES Journal of Marine Science 57: 403-411.

Secor, DH, Gunderson TE, Karlsson, K. 2000. Effect of Temperature and Salinity on Growth Performance in Anadromous (Chesapeake Bay) and Nonanadromous (Santee-Cooper) Strains of Striped Bass *Morone saxatilis*. 2000:291–296.

Secor, D. H., E. D. Houde, and L. L. Kellogg. 2017. Estuarine retention and production of striped bass larvae: a mark-recapture experiment. ICES Journal of Marine Science, DOI:10.1093/icesjms/fsw245.

Secor, D. H., M. H. P. O'Brien, B. I. Gahagan, J. C. Watterson, and D. A. Fox. 2020. Differential migration in Chesapeake Bay striped bass. PLoS ONE 15(5): e0233103. DOI:10.1371/journal.pone.0233103

Setzler, E., W.R. Boynton, K.V. Wood, H. H. Zion, L. Lubbers, N. K. Mountford, P. Frere, L. Tucker, and J. A. Mihursky. 1980. Synopsis of biological data on striped bass, *Morone saxatilis* (Walbaum). NOAA Technical Report NMFS Circular 433, FAO Synopsis No. 121. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, US, Department of Commerce.

Shoop, C.R., and R.D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. *Herpetological Monographs*. 6:43-67.

Shortnose Sturgeon Status Review Team (SSSRT). 2010. A Biological Assessment of shortnose sturgeon (*Acipenser brevirostrum*). Report to National Marine Fisheries Service, Northeast Regional Office. November 1, 2010. 417 p.

Smith WG, Wells A. 1977. Biological and fisheries data on striped bass, Morone saxatilis. Highlands (NJ): NOAA Northeast Fisheries Science Center. Sandy Hook Lab Tech Ser Rep No. 4. 42 p.

Southwick Associates. 2019. The Economic Contributions of Recreational and Commercial Striped Bass Fishing. A report produced for: The McGraw Center for Conservation Leadership. Revised April 12, 2019. 69 pp.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004a. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. *Transactions of the American Fisheries Society*. 133: 527- 537.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004b. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States. *North American Journal of Fisheries Management*. 24: 171- 183.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan, and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. *Marine Mammal Science.* 9: 309-315.

Taylor, M.J. and White, K.R. 1992. A Meta-Analysis of Hooking Mortality of Nonanadromous Trout. North American Journal of Fisheries Management, 12: 760-767.

Tetra Tech. 2020. Developing a preliminary conceptual ecological risk assessment model and science strategy for microplastics in the Potomac River. US Environmental Protection Agency. https://www.chesapeakebay.net/documents/FINAL_ERA_02102021.pdf

Timoshkin, V. P. 1968. Atlantic sturgeon (*Acipenser sturio L*.) caught at sea. *Journal of Ichthyol.* 8(4): 598.

Trent L, Hassler WH. 1968. Gill net selection, migration, size and age composition, sex ratio, harvest efficiency, and management of striped bass in the Roanoke River, North Carolina. Chesapeake Science 9:217–232.

Tresselt EF. 1952. Spawning Grounds of the Striped Bass or Rock, *Roccus Saxatililis* (Walbaum), in Virginia. Bull Bingham Ocean Coll 14(1):98-110.

Turner, J. L. and T. C. Farley. 1971. Effects of temperature, salinity, and dissolved oxygen on the survival of striped bass eggs and larvae. California Fish and Game 57: 268-273.

Uphoff, J. H., M. McGinty, R. Lukacovic, J. Mowrer, and B. Pyle. 2011. Impervious surface, summer dissolved oxygen, and fish distribution in Chesapeake Bay subestuaries: Linking watershed development, habitat conditions, and fisheries management. North American Journal of Fisheries Management 31(3): 554-566. DOI:10.1080/02755947.2011.598384

Uphoff, J. H., Jr., M. McGinty, A. Park, C. Hoover, and S. Dawson. 2020. Marine and estuarine finfish ecological and habitat investigations. Performance Report for Federal Aid Grant F-63-R, Segment 10, 2019. Maryland Department of Natural Resources, Fishing and Boating Services, Annapolis, Maryland.

Uphoff, J. H. 2003. Predator–prey analysis of striped bass and Atlantic menhaden in upper Chesapeake Bay. Fisheries Management and Ecology 10: 313-322.

USGCRP. 2017. Climate science special report: Fourth national climate assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp, DOI: 10.7930/J0J964J6.

Vogelbein WK, Hoenig JM, Gauthier DT. 2006. Epizootic mycobacteriosis in Chesapeake Bay striped bass: What is the fate of infected fish? In Ottinger CA, Jacobs JM, editors.

USGS/NOAA Workshop on Mycobacteriosis in Striped Bass, May 7-10, 2006, Annapolis, Maryland. Reston (VA): USGS. p 26-27.

Vu, E., D. Risch, C. Clark, S. Gaylord, L. Hatch, M. Thompson, D. Wiley, and S. Van Parijs. 2012. Humpback whale song occurs extensively on feeding grounds in the western North Atlantic Ocean. *Aquatic Biology*.14(2):175–183.

Walter JF, Austin HM. 2003. Diet composition of large striped bass (*Morone saxatilis*) in Chesapeake Bay. Fishery Bulletin 101:414–423.

Walter JF, Overton AS, Ferry K, Mather ME. 2003. Atlantic coast feeding habits of striped bass: a synthesis supporting a coast-wide understanding of trophic biology. Fisheries Management and Ecology 10: 1–13.

Vanalderweireldt, L., P. Sirois, M. Mingelbier, and G. Winkler. 2019. Feeding ecology of early life stages of striped bass (*Morone saxatilis*) along an estuarine salinity-turbidity gradient, St. Lawrence Estuary, Canada. Journal of Plankton Research 41(4): 507-520. DOI:10.1093/plankt/fbz031

Warden, M.L. 2011a. Modeling loggerhead sea turtle (*Caretta caretta*) interactions with US Mid-Atlantic bottom trawl gear for fish and scallops, 2005–2008. *Biological Conservation*. 144: 2202–2212.

Warden, M.L. 2011b. Proration of loggerhead sea turtle (*Caretta caretta*) interactions in US Mid-Atlantic bottom otter trawls for fish and scallops, 2005-2008, by managed species landed. NEFSC Reference Document 11-04; 8 p.

Waring, G.T., E. Josephson, M.C. Lyssikatos, and F.W. Wenzel. 2015b. Serious injury determinations for small cetaceans and pinnipeds caught in commercial fisheries off the Northeast U.S. coast, 2012. Northeast Fish Sci Cent Ref Doc. 15-12; 19 p.

Waring, G.T. , E. Josephson , K. Maze-Foley , and P. E. Rosel. 2016. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments 2015. NOAA Technical Memorandum NMFS-NE-238.

Wippelhauser, G.S. 2012. A Regional Conservation Plan For Atlantic Sturgeon in the U. S. Gulf of Maine. Prepared on behalf of Maine Department of Marine Resources, Bureau of Science. NOAA Species of Concern Grant Program Award #NA06NMF4720249A.

Zlokovitz, E. R., D. H. Secor, and P. M. Piccoli. 2003. Patterns of migration in Hudson River striped bass as determined by otolith microchemistry. Fisheries Research 63: 245-259.

9.0 TABLES

Note: Tables 1-12 are in-text.

Table 13. 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 13 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 14. 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 – Feb 28 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 14 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 14 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 15. 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 16. 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	11.94%	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 17. 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 18. 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 19. 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 20. 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 21. 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 22. 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

Table 23. Results of 2020 commercial quota accounting in pounds. Source: 2021 state compliance reports. 2020 quota was based on Addendum VI and approved conservation equivalency programs.

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

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

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

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

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

10.0 FIGURES

Note: Figures 1-3 are in-text.

Figure 4. Atlantic striped bass female spawning stock biomass and recruitment, 1982-2017. Source: 2018 Benchmark Stock Assessment.

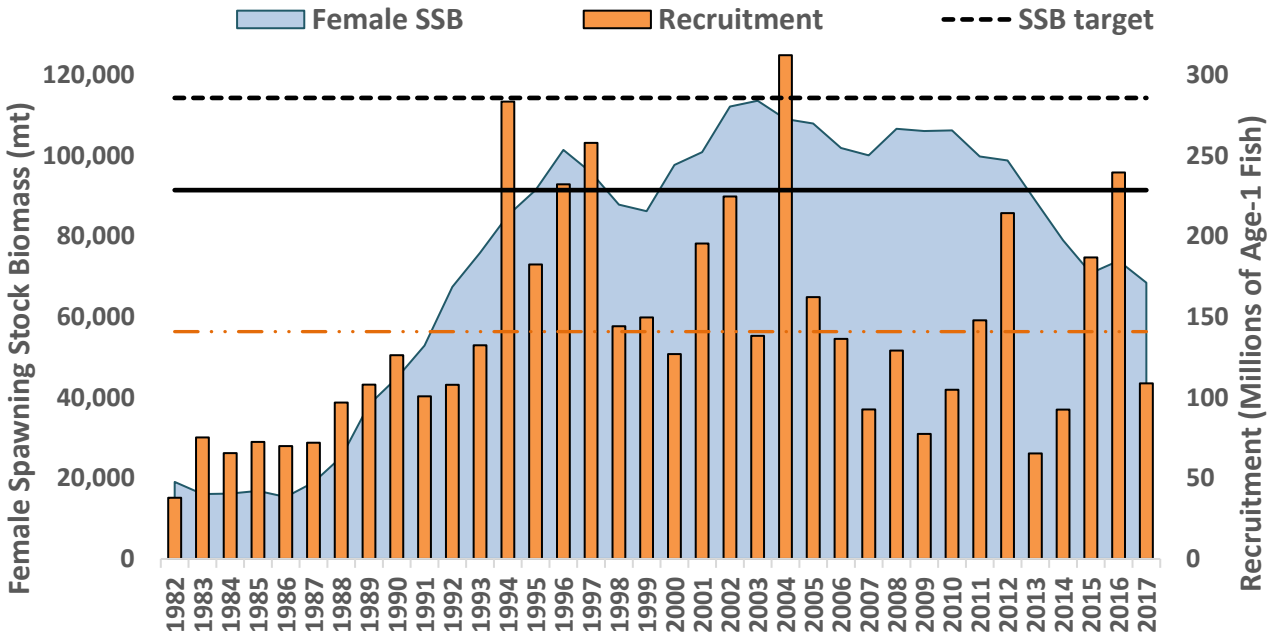


Figure 5. Atlantic striped bass fishing mortality, 1982-2017. Source: 2018 Benchmark Stock Assessment.

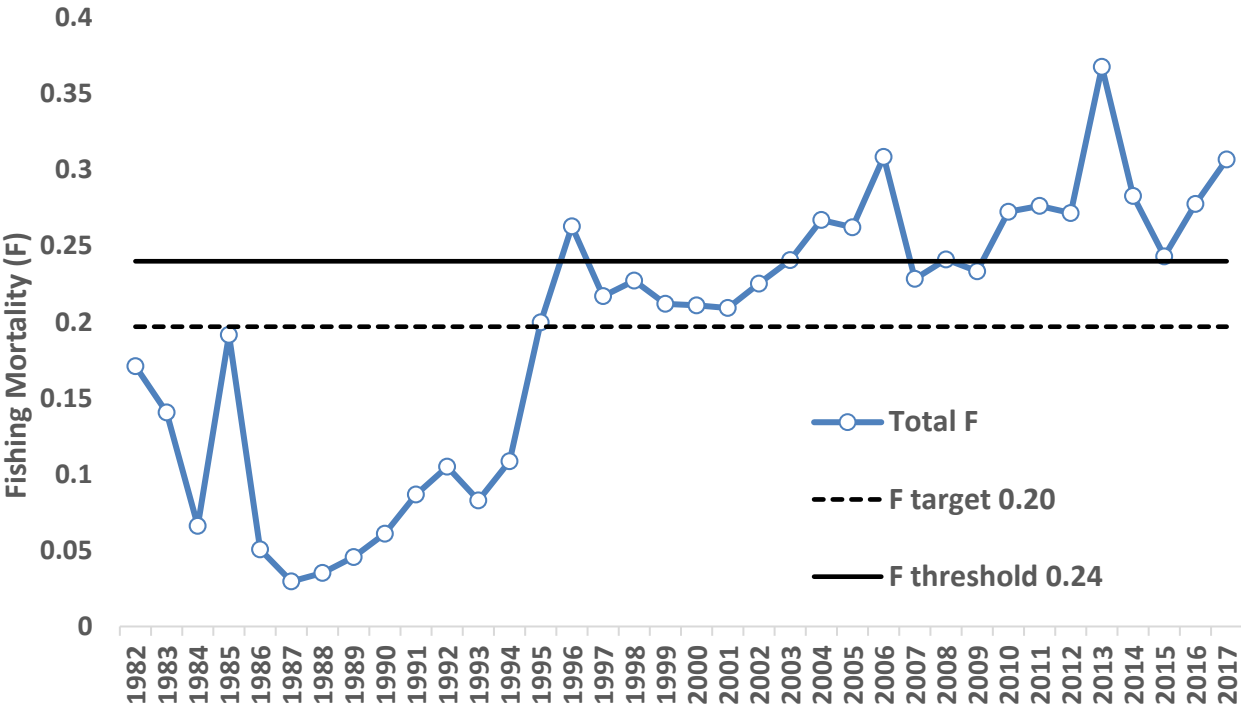


Figure 6. Albemarle Sound-Roanoke River striped bass female spawning stock biomass and recruitment (abundance of age-1), and biological reference points, 1991-2017. Source: 2020 A-R Stock Assessment (Lee et al. 2020).

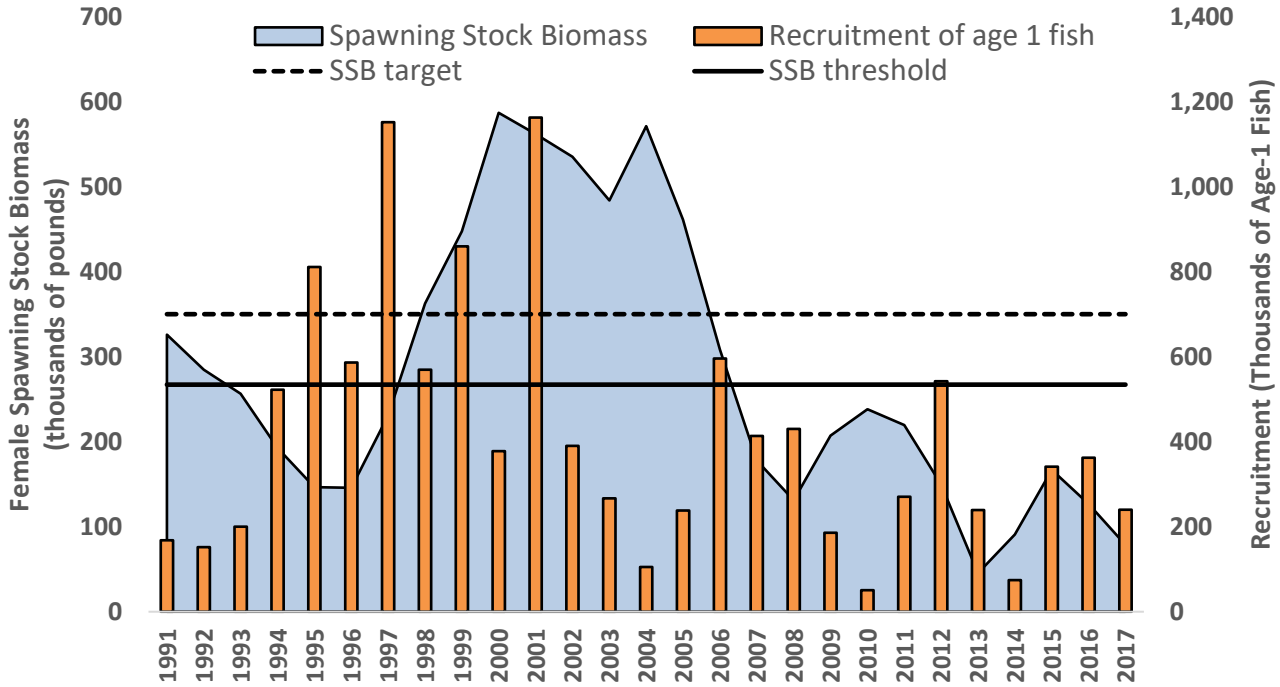


Figure 7. Albemarle Sounds-Roanoke River striped bass fishing mortality (F) estimates, and biological reference points, 1991-2017. Source: 2020 A-R Stock Assessment (Lee et al. 2020).

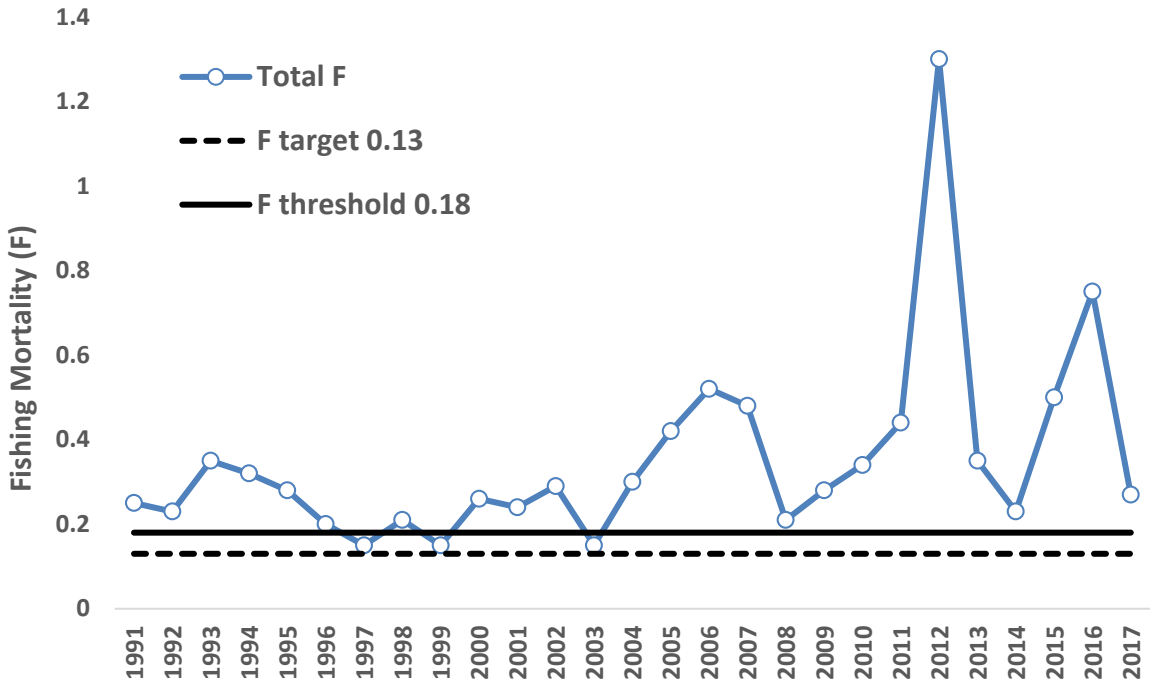


Figure 8. Total Atlantic striped bass removals by sector in numbers of fish, 1982-2020. Note: Harvest is from state compliance reports/MRIP, discards/release mortality is from ASMFC. Estimates exclude inshore harvest from A-R.

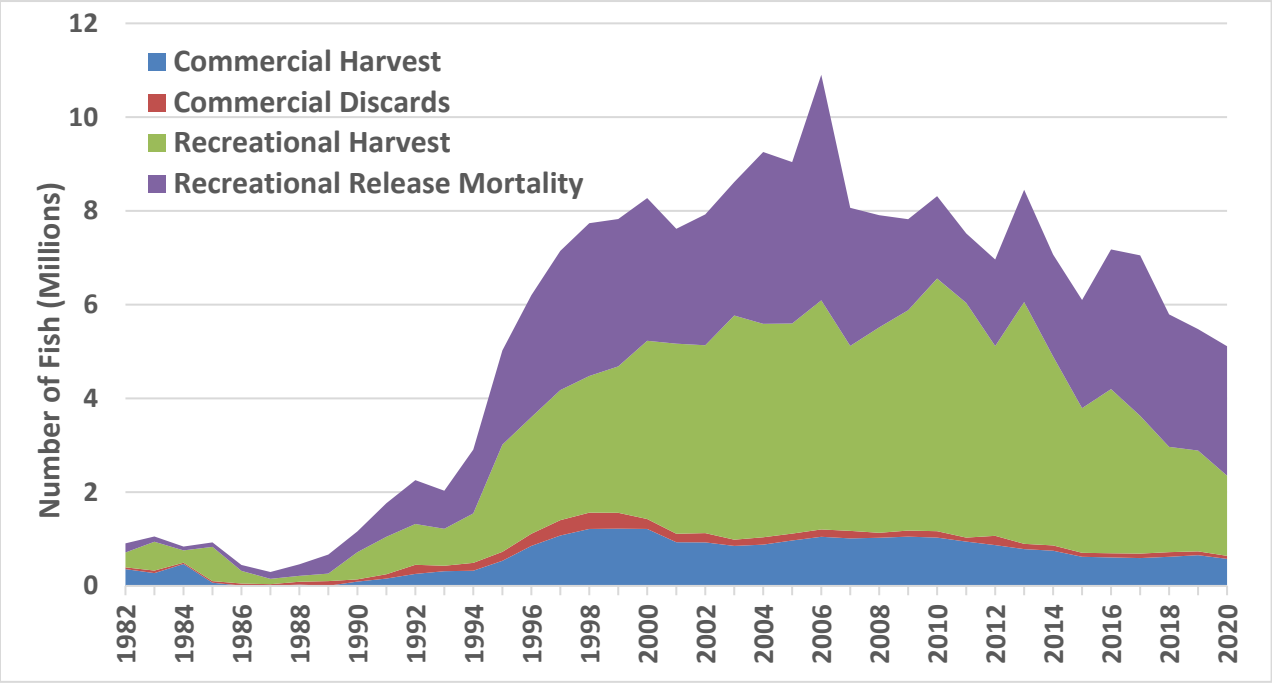


Figure 9. Commercial Atlantic striped bass landings by state in pounds, 1990-2020. Source: State compliance reports. Commercial harvest and sale prohibited in ME, NH, CT, and NJ. NC is ocean only.

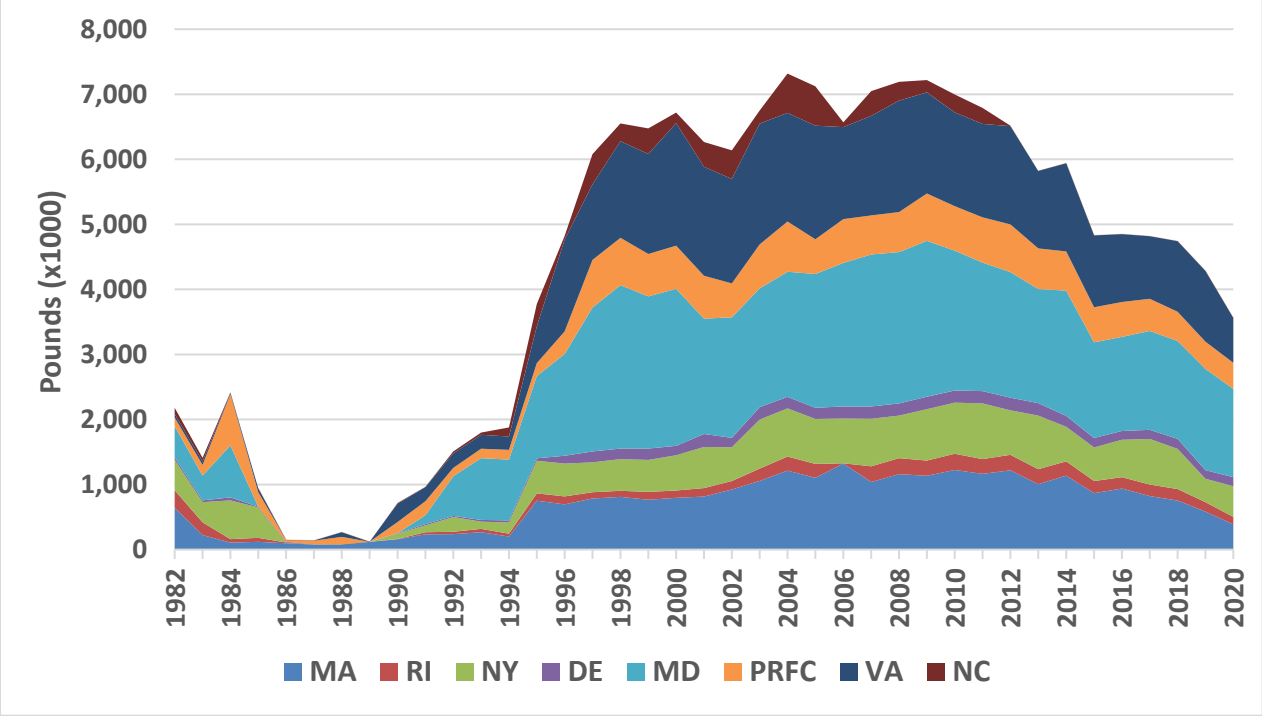
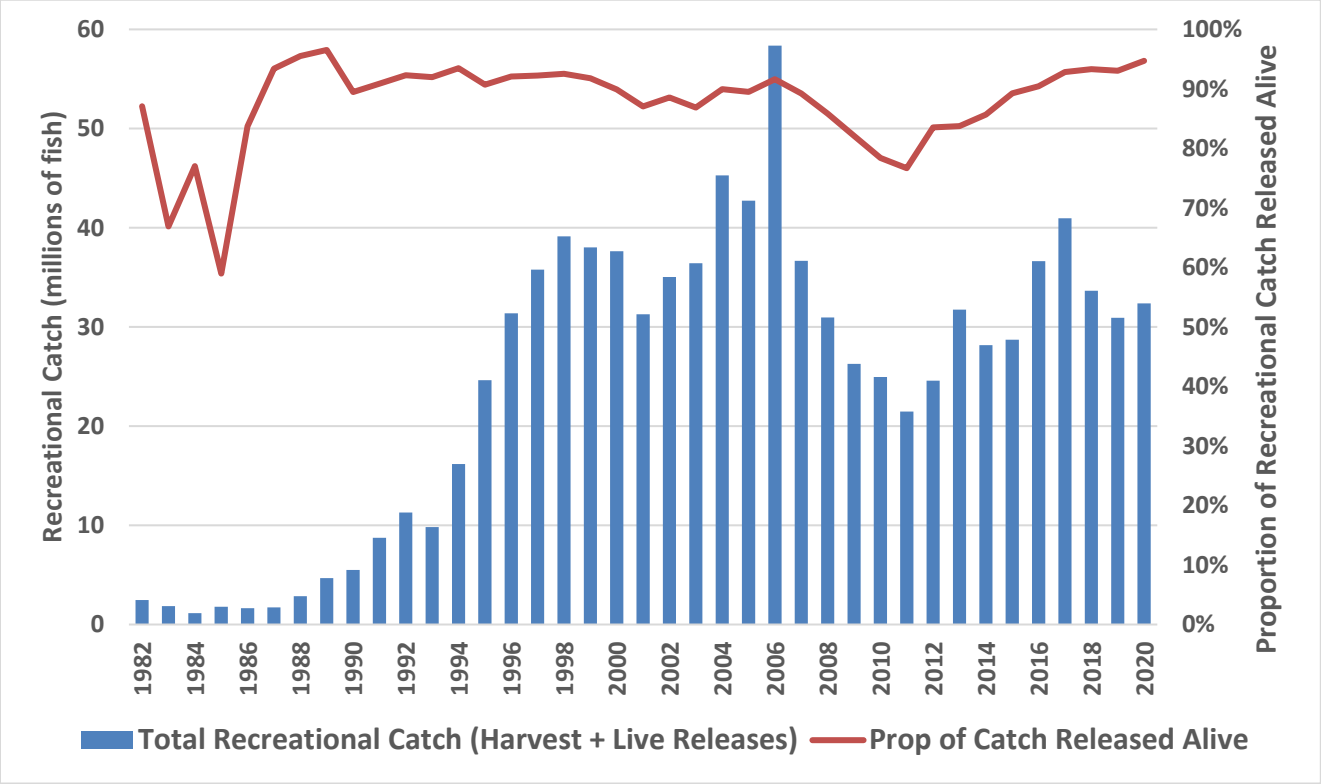


Figure 10. Total recreational catch and the proportion of fish released alive, 1982-2020. Source: MRIP/ASMFC. Estimates exclude inshore harvest from A-R.



Emilie Franke

From: Zach <zachsabri@gmail.com>
Sent: Tuesday, September 28, 2021 1:24 PM
To: Emilie Franke
Subject: [External] Striped Bass

Hi, please keep the strict slot limits for striped bass in place indefinitely. Dan Mckiernan the head of the Department of marine wildlife in Massachusetts allowed commercial fisherman to slaughter 735,000 pounds of any sized fish this year due to Covid financial burdens and that is unacceptable as those commercial fisherman were getting Covid unemployment check for a year. Please harden your stance on he slot limit, circle hooks and continue to heavily manage the primary food sources of striped bass. These fish need help and they need it bad. Please do not allow them to ever reach the 1985 population levels again. I think they should have the same protection as blue marlin if not more since they are far more vulnerable but I understand politics makes it hard to give them this protection but all we ask is you do your best in fighting for them to thrive in population.
Please also keep in mind poaching is far more prevalent than people in management positions understand, you have to be out there fishing 6 nights a week to see the extreme levels of poaching going on and you guys should consider that in data analysis and policy suggestions.

Thank you for your time.

Sent from my iPhone