Atlantic States Marine Fisheries Commission

Atlantic Striped Bass Management Board

August 8, 2018
4:45 – 5:30 p.m.
Arlington, Virginia

Agenda

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

1.	Welcome/Call to Order (*M. Armstrong*)	4:45 p.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from May 2018	4:45 p.m.
3.	Public Comment	4:50 p.m.
4.	Consider Approval of 2018 Fishery Management Plan Review and State Compliance Reports (*M. Appelman*) **Action**	5:00 p.m.
5.	2018 Benchmark Stock Assessment Progress Update (*K. Drew*)	5:25 p.m.
6.	Elect Vice-Chair **Action**	5:30 p.m.
7.	Other Business/Adjourn	5:30 p.m.

The meeting will be held at the Westin Crystal City, 1800 S. Eads Street, Arlington, Virginia; 703.486.1111

MEETING OVERVIEW
Atlantic Striped Bass Management Board Meeting

August 8, 2018
4:45 – 5:30 p.m.
Arlington, Virginia

Chair: Mike Armstrong (MA) Assumed Chairmanship: 02/18	Technical Committee Chair: Nicole Lengyel (RI)	Law Enforcement Committee Rep: Kurt Blanchard (RI)
Vice Chair: Vacant	Advisory Panel Chair: Louis Bassano (NJ)	Previous Board Meeting: May 1, 2018
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 May 2018

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

4. Consider Approval of the 2018 Fishery Management Plan Review and State Compliance Reports (5:00-5:25 p.m.) Action

Background

- Annual state compliance reports for Atlantic striped bass are due June 15
- The Plan Review Team reviewed state reports and drafted the 2018 FMP Review **(briefing materials).**
- The PRT noted inconsistent language between the regulations implemented by Maryland for its 2018 summer and fall recreational fishery in the Chesapeake Bay and the motion passed by the board at its February 2018 meeting. Additionally, regulations under Maine's Department of Inland Fisheries and Wildlife are inconstant with the FMP (regulations are consistent with the FMP under Maine's Department of Marine Resources). Maine is working to resolve this issue and will provide an update in supplemental materials, or during the August 2018 Board meeting.

Presentations

- M. Appelman to review the 2018 FMP Review Report

Board Actions for Consideration

- Consider approving the 2018 FMP Review

5. 2018 Benchmark Stock Assessment Progress Update (5:25-5:30 p.m.)
Background • A benchmark stock assessment is currently underway and schedule for peer review in November 2018 at the 66th SAW/SARC.
Presentations • Benchmark Stock Assessment Progress Update by K. Drew

6. Elect Vice-Chair

7. Other Business/Adjourn

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

- TC – June 15th: Annual compliance reports due
- TC/SASC/TSC – All Year: benchmark stock assessment
    - May 2018: Modeling Workshop I
    - May 2018: Updated data submission for Assessment through 2017
    - Sept. 2018: Modeling Workshop II
    - Sept. 2018: Final SASC call/webinar to approve stock status determination
    - End of Sept. 2018: All Draft Report components due to staff
    - Oct. 31, 2018: Assessment Report due to external peer-review panel
    - Nov. 27-30, 2018: Peer review (SAW/SARC 66)

TC Members: Nicole Lengyel (RI, TC Chair), Kevin Sullivan (NH, Vice Chair), Alex Aspinwall (VA), Alexei Sharov (MD), Carol Hoffman (NY), Charlton Godwin (NC), Edward Hale (DE), Ellen Cosby (PRFC), Gail Wippelhauser (ME), Gary Nelson (MA), Heather Corbett (NJ), Jeremy McCargo (NC), Kurt Gottschall (CT), Luke Lyon (DC), Michael Kaufmann (PA), Peter Schuhmann (UNCW), Winnie Ryan, Gary Shepherd (NMFS), Steve Minkkinen (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Max Appelman (ASMFC)

SAS Members: Edward Hale (DE, Chair), Gary Nelson (MA, Vice Chair), Alexei Sharov (MD), Hank Liao (ODU), Justin Davis (CT), Michael Celestino (NJ), John Sweka (USFWS), Gary Shepherd (NMFS), Katie Drew (ASMFC), Max Appelman (ASMFC)

Tagging Subcommittee (TSC) Members: Stuart Welsh (WVU, Chair), Heather Corbett (NJ, Vice Chair), Angela Giuliano (MD), Beth Versak (MD), Chris Bonzak (VIMS), Edward Hale (DE), Gary Nelson (MA), Ian Park (DE), Jessica Best (NY), Carol Hoffman (NY), Gary Shepherd (NMFS), Josh Newhard (USFWS), Wilson Laney (USFWS), Katie Drew (ASMFC), Max Appelman (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC STRIPED BASS MANAGEMENT

The Westin Crystal City
Arlington, Virginia
May 1, 2018

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.

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ATTENDANCE

Board Members

Patrick Keliher, ME (AA)
Steve Train, ME (GA)
G. Ritchie White, NH (GA)
Doug Grout, NH (AA)
Sen. David Watters, NH (LA)
Dennis Abbott, NH, Legislative proxy
Raymond Kane, MA (GA)
Mike Armstrong, MA, Chair
Rep. Sarah Peake, MA (LA)
David Borden, RI (GA)
Jay McNamee, RI (AA)
Matt Gates, CT, proxy for P. Aarrestad (AA)
Maureen Davidson, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Boyle (LA)
Heather Corbett, NJ, proxy for L. Herrighty (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Loren Lustig, PA (GA)
Andy Shiels, PA, proxy for J. Arway (AA)
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Russell Dize, MD (GA)
Mike Luisi, MD, proxy for D. Blazer (AA)
Steve Bowman, VA (AA)
Rob O'Reilly, VA, Administrative proxy
Chris Batsavage, NC, proxy for S. Murphey (AA)
Doug Brady, NC (GA)
Michael Blanton, NC, proxy for Rep. Steinburg (LA)
Bryan King, DC
Martin Gary, PRFC
Derek Orner, NMFS
Sherry White, USFWS

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

Ex-Officio Members

Staff

Robert Beal
Toni Kerns
Katie Drew
Max Appelman
Jessica Kuesel
Caitlin Starks

Guests

Rep. Thad Altman, FL (LA)
Joe Cimino, NJ DEP
Colleen Giannini, CT DEEP
Robert Newberry, DelMarVa Fishermen Assn.

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia; Tuesday, May 1, 2018, and was called to order at 1:15 o'clock p.m. by Chairman Michael Armstrong.

CALL TO ORDER

CHAIRMAN MICHAEL ARMSTRONG: Good afternoon everyone. I would like to call to order the Atlantic Striped Bass Management Board.

APPROVAL OF AGENDA

CHAIRMAN ARMSTRONG: First order of business, approval of agenda, does anybody have any changes to the agenda? We do have an item or two that we'll include in other business at the end, so approval of the agenda.

APPROVAL OF PROCEEDINGS

CHAIRMAN ARMSTRONG: You've all read the proceedings I'm sure, and do you have some changes? Yes, Colleen.

MS. COLLEEN GIANINI: I just wanted to make a note that on Page 24 of the February 18 meeting minutes, I did not represent the state of New Jersey in the final roll call.

CHAIRMAN ARMSTRONG: So noted.

PUBLIC COMMENT

CHAIRMAN ARMSTRONG: At this time there is an opportunity for public comment for items that are not on the agenda. We have no one signed up; is that correct, Max?

MR. MAX APPELMAN: We have one.

CHAIRMAN ARMSTRONG: Oh I'm sorry, we do; Captain Newberry, could you come on up to the microphone?

CAPTAIN ROBERT NEWBERRY: Mr. Chairman and members of the Committee, my name is Captain Robert Newberry; I'm Chairman of the DelMarVa Fisheries Association. First of all as a comment that I have, I would like to congratulate Mr. Russell Dize as the new appointee from our Governor of Maryland to sit on the ASMFC. It's good to have him on board, he's been here before and I think he'll be good to work with.

Number two, I would also like to thank this Panel for the unanimous vote in the conservation equivalence that our Department of Natural Resources worked hard on that is now going through the process in Maryland. I would like to thank you very much for that vote. It's going to be very helpful for what we're facing in Maryland; so I want to thank you very much for that.

Also, looking forward to possibly down the road of addressing – it's kind of a touchy issue – but the accountability for the recreational fishery, not only in the bay but coastwide for striped bass. I thank you very much for taking the time and letting me speak. Thank you very much.

PROVIDE GUIDANCE TO THE STOCK ASSESSMENT SUBCOMMITTEE REGARDING BIOLOGICAL REFERENCE POINTS FOR THE 2018 STOCK ASSESSMENT

CHAIRMAN ARMSTRONG: Are there any other public comments? Seeing none; we'll go to the first agenda item, Providing Guidance to the Stock Assessment Subcommittee Regarding Biological Reference Points. As you know, we formed a working committee last meeting and we met several times. We sent out a survey that most of you responded to; and Max is going to summarize the report from that group, and summarize the results of the survey.

MR. APPELMAN: Just to refresh everyone of how we got to where we are. Of course there is a benchmark assessment currently underway for striped bass. One of the terms of reference for that benchmark is to update or redefine biological reference points.

I think everyone is also aware that we've heard some concerns from members around this table that the current reference points may be too conservative and/or are restricting fishing unnecessarily; which has raised questions about whether the FMP objectives have changed since the implementation of Amendment 6, and maybe those acceptable risk levels have changed as well – an example being the balance between preserving biomass versus allowing fishing, and determining that best balance is ultimately a Board level decision.

With all of that in mind, the Technical Committee and the Stock Assessment Subcommittee came to the Board in October of last year requesting guidance regarding the Plan objectives, and the types of reference points that they should pursue in the upcoming benchmark.

Initially, the Board hoped to have a workshop but with budget and time constraints we couldn't really make that happen. Instead, the Board decided to establish a workgroup of Board, Advisory Panel and Stock Assessment Subcommittee members to develop guidance recommendations for the Board to consider today.

I want to just take a minute to clarify that the goal of this exercise is to give the Stock Assessment Team a starting point for developing reference points. There are a lot of different roads that the stock assessment could have gone down regarding reference points; and I think everyone would agree, no one is interested in exploring a set of reference points that this Board isn't interested in.

Again that was the goal of this exercise; and if any new management objectives did come to light from this, or if new reference points are identified at the end of the assessment process, the Board would still need to go through the adaptive management process to adopt those objectives or reference points into the management program. This is just helping the Stock Assessment Team develop reference points in the assessment.

Here is a snapshot at the benchmark timeline right now. September of last year was the data workshop; that is what sort of spawned this whole exercise. Then today, the Board will give some formal guidance to the stock assessment subcommittee regarding reference point development; which the Stock Assessment Team will take into the modeling workshop in a few weeks. Then as we heard yesterday the stock assessment is on the SAW/SARC schedule for this November. In February of 2019, the Board can anticipate reviewing those findings and consider a management response at that time.

BOARD GUIDANCE WORKGROUP REPORT

MR. APPELMAN: This is a glance at our membership of the Board Guidance Workgroup; so WG is going to denote Workgroup in my presentation. We tried our best to ensure all interests were represented on the Workgroup, but remember that membership was volunteer based. It was also limited to five Board members and five AP members; but you can see that we have a pretty good spread geographically amongst the Board and Advisory Panel. We also had our Stock Assessment Subcommittee Chair, our Technical Committee Chair, and two other stock assessment members.

Again, the Workgroup was tasked with developing reference point guidance recommendations. To do that as our Chair pointed out, the Workgroup developed a survey and sent that to all Board and AP members to solicit their input and facilitate that process. The survey asked 15 different questions, most of them were multiple choice, but some were fill in the blank or write-in questions, regarding what member's value most from the striped bass resource and fishery and regarding overall satisfaction with the state of the stock and management under Amendment 6. The results of that survey were then used to develop these recommendations; which I'll go over.

If you didn't take the survey or haven't seen it, there is a copy in your briefing materials along with a summary of those results, and an

appendix with all of the write-in responses that were received.
I'm just going to highlight some of the major take-home points from the survey results; but feel free to dig into your briefing materials for more details.

Okay, so respondent demographics starting with the Board. We had pretty good turnout; 27 Board members completed the survey, and we had representation across all jurisdictions except for the District of Colombia, and that's what this pie chart is showing you. There is no meaning behind the colors; it's just trying to spice up my presentation a little bit. It was pretty dull; just a visual representation. Then looking at the bar chart, this is showing you all the sector categories that you could check off in the survey; again, just showing you that we had representation across all those sectors. But that big bar on the right side that is your Administrative Commissioners, so predominately Administrative Commissioners.

Looking at our Advisory Panel respondent demographics, we had nine AP members complete the survey, which is somewhat a product of the size of the AP. It's a small group, and so that's on par really for AP participation. All sectors were represented, as you can see from the bar chart there; but the bigger bars, the top two, are representing the recreational sector; mostly recreational representation there. And then the pie chart showing you the major fishing areas that were represented from Chesapeake Bay, coastal Maryland, coastal Delaware, up Delaware Bay, Long Island Sound all the way up and around Cape Cod too; so a pretty good turnout.

Of course the ultimate goal of this survey was to hone in on some commonalities across different regions and sectors and user groups. However, and probably not surprising to many of you, the survey was unable to identify an overwhelming majority regarding general satisfaction with the management of striped bass, current management triggers, or with the current reference points. I'm showing these figures to give you another visual of what I mean by overwhelming majority. These three figures ask the three primary questions in the survey.

Left to right the questions are, are you satisfied with the state of the stock and management; Question 2 is, are you satisfied with the current management triggers, and the right figure Question 3, are you satisfied with the striped bass reference points? The left hand column on each figure is the yes column; the right is the no column. Then the blue is Board and the orange is AP. Again, the take home is that here is no overwhelming majority. There are some slight majorities on the second two charts, but overall it's pretty split.

If we hone in a little bit on respondents that are not satisfied with the current reference points, some of those responses show some commonalities there that the biomass target is too conservative and/or unachievable under current conditions; and that being not just environmental conditions, but also conditions of other predator and prey populations was cited in those responses.

Another commonality there is the development of stock specific reference points being very important to these respondents; also something we've heard around this table. Additionally, survey results indicated an interest in revisiting the pre Addendum IV reference points. We remember with Addendum IV, it implemented a new set of F reference points, fishing mortality reference points that were designed to achieve the respective biomass targets and thresholds over the long term. But in short, under Amendment 6, the F target and threshold were a bit higher; and it seems that that sort of situation was desirable among these respondents.

Then my last bullet here is that there didn't appear to be a strong preference for the type of reference point; whether that be an empirical or historical-based reference point, or a model-based reference point, as long as they met the management objectives.

When asked to rank the current management objectives from most important to least important, there was pretty high agreement between the Board and AP respondents. What I'm showing you here is the management objectives as they appear in the management plan. There are seven of them and they are listed as such on the X-axis there.

Then, the higher the bar, the more important that objective was to the survey respondents. Management Objective Number 2 stood out as the most important; that one is to manage F to maintain an age structure that provides adequate spawning potential. No matter how you slice and dice the results, this stood out as the most important objective.

The second, third and fourth most important differed a little bit, but pretty in line with each other, and then the other commonality here is 5, 6, and 7. Those also stood out as the least important objectives; no matter how you group the respondents together. Same concept with the figure here, there was less agreement between the Board and the Advisory Panel respondents when it came to ranking factors of a viable and quality fishery, although there was some overlap. This is showing you the Advisory Panel respondents. Their top three factors of a quality and viable fishery were pretty similar in nature. Broad age structure, high abundance of market size fish, high abundance of trophy size fish, so I guess the take home there is a broad age structure and a lot of each age, right? The overlap between the Board and the AP was that broad age structure factor; but they diverged with their second and third most important. High catch rates and stability and consistency in regulations ranked as important factors to the Board respondents.

A couple caveats to consider here, low sample size, which I think is more of a product of the size of the Board and the size of the Advisory Panel. Nonetheless, it's something to point out. You didn't see any robust statistical analyses around these results. It's pretty much taken at face value. Also the Workgroup brought this up a couple times, we try to get equal representation across all the different fishing sectors and user groups, but as far as our respondents, one sector in particular, the commercial sector, was really underrepresented in those responses.

Moving on to Workgroup recommendations, after reviewing all the results, having a couple conference calls, the Workgroup recommends that the Stock Assessment Subcommittee develop a range of F and SSB reference points, sort of reflecting that there was no overwhelming majority. But at least we can give some expectation to the Board by making this recommendation.

As part of this we would be tasking the Stock Assessment Team to revisit current target and threshold definitions; so as they're defined in Addendum IV. Also revisiting the pre-Addendum IV approach, as they were under Amendment 6. Also the Stock Assessment Team should continue to strive for development of stock-specific reference points where possible. That of course stood out amongst the survey results; and we've heard that around the Board table as well.

Then, an important part of this is for the SAS to clarify the various implications of the different reference point values that they bring forward. This would ultimately allow the Board to explore the tradeoffs of different management objectives and different characteristics of a quality fishery following the assessment.

ADVISORY PANEL REPORT

MR. APPELMAN: Mr. Chair, if I could add one thing while I still have the floor. The Advisory Panel also met via conference call to review the Working Group's recommendations and the survey results. This was the APs opportunity to develop its own recommendations if warranted.

Based on discussion, it was also clear that there was no overwhelming majority. It seemed, depending on where you're fishing and what time of year you're fishing, you're seeing very different things on the water. Some AP members wanted to stay the course with

management; others felt regulations could be relaxed a little bit. In the end the Advisory Panel supports the Workgroups recommendations to explore a range of fishing mortality and spawning stock biomass reference points that would allow the Board to explore tradeoffs of different management objectives. That is the end of my presentation. I'll take any questions.

CHAIRMAN ARMSTRONG: Any questions from the Board members? Rob O'Reilly.

MR. ROB O'REILLY: Thank you Max. A question is what exactly is the pre Addendum IV alluding to? For example, the SSB target certainly way before 2014 and implementation of Addendum IV in 2015. There were many thoughts that you showed in one slide talking about essentially the target being unreachable; that is my words there.

But those thoughts went back quite a way before pre Addendum IV. You know the 1.25 times the 1995 SSB target was a cause of concern for several members of the Board going back quite a bit. When you say pre-Addendum IV, how far back are you talking about?

MR. APPELMAN: I think those comments were really in relation to the F reference points. The 1995 value they we're referring to for biomass that has been the biomass reference point for a while now. But the change between Amendment 6 was really the period we were talking about here; and Addendum IV was a change in the F reference points, getting those in line with each other. It basically brought down that F value. I think those comments we we're hearing is to have a higher F, and I guess my words, allowing a little more fishing to happen.

CHAIRMAN ARMSTRONG: Follow up, Rob.

MR. O'REILLY: The slide we have up right now, and I'm going to agree with you, but at the same time the slide we have up now talks about based on historic SSB, which I assume goes all the way back to 1995 SSB. I don't know. But you did have a comment up there on one of the slides, which talked about and I'll paraphrase, dissatisfaction with the SSB reference point. I'm hoping that some others will also speak up about this. But I think that was definitely something that has been a concern for a number of years; not just the fishing mortality rate. I mean that's my perspective.

MR. APPELMAN: That specific bullet is really getting at the concept of, and you know that is why it says "and/or F levels." It's not just talking about spawning stock biomass. It's the notion that there was a time period that most people would think was a good condition of the stock. What happened under Amendment 6 is we took that biomass level. But perhaps looking at the F level instead and having our biomass reference points match that. That is what this is getting at. It's looking at basically the definition of what it was under Amendment 6 versus what it is now.

CHAIRMAN ARMSTRONG: John.

MR. JOHN G. McMURRAY: This slide that is up there now Max, recommend SAS develop a range of F and SSB alternatives. From a process perspective how would that work? Would that range of alternatives be part of the stock assessment; and how would we go about making a decision on which alternative the Board would prefer?

MR. APPELMAN: I'm going to give that to Katie; our stock assessment leader.

DR. KATIE DREW: Yes, I think it would be part of the assessment in that we would sort of select, I would say, a method to develop a reference point and then the actual level of the reference point would be chosen later after the Board has a chance to review the final outcome. We would probably pick say a range for example, let's keep the current definition. What would the reference point look like if we keep the current definitions? What would the value and therefore the associated SSB levels and the associated F and harvest levels be if we chose a higher F; maybe in line with what the pre

Addendum IV level of F was. Then we would go through peer review with those, and we would say, you know, make sure we've calculated these correctly and that they are biologically meaningful.

Then the Board would come and see these; and you would have as part of your sort of response to this assessment, you would select from there the reference points that you would like to establish with this fishery. I think that is where the discussion about tradeoffs and things like that would come into play.

MR. McMURRAY: Thank you for that explanation, but the actual decision making process, would that be done through an addendum, or would it be just a discussion amongst Board members in one meeting?

MR. APPELMAN: That would be through some management document. I think Reference Points is in your tool bag in the Management Plan. But if the Board felt that it was a big enough issue that they wanted to go through an amendment that is possible.

CHAIRMAN ARMSTRONG: Doug.

MR. DOUGLAS E. GROUT: One of the things that I would like to see with this is that the Stock Assessment Subcommittee tells us what the thresholds are; either via an empirical approach for both SSB and F, or more ideally I would rather have some kind of a model base for the SSB, if it can be done.

Then the Board would set the targets reference points based on our risk that we're willing to take with the fishery; because the way I understand thresholds is, this is a threshold for fishing mortality, is the point at which we're going to be overfishing. Then we can't stay above that level for very long without harming the stock.

The biomass, we want to make sure it does not go below the threshold; because that can harm the future sustainability of the stock. But then a target, which is sort of a buffer off of this, is sort of the risk that this Board, how close to the threshold we want to fish. Obviously if we wanted to fish closer to that threshold, have a fishing mortality rate that is closer to the threshold, we're willing to take more risk.

If we want to have something a little bit more conservative, then we would prefer to take less risk as we're dealing with this. That's the way I was hoping we would be making recommendations on ways to develop the targets; not so much the thresholds, which I hope will come out of our stock assessment scientists. Am I off on this?

MR. APPELMAN: No, I don't think you're off. I think this recommended tasking is to explore primarily the threshold, right. We have targets and thresholds in our plan, so that will be part of their exercise in the assessment.

CHAIRMAN ARMSTRONG: Jay.

MR. JASON McNAMEE: I think I will start by supporting what Mr. Grout just said. Reading through, well going through the survey and thinking through this. I think it's a mistake to develop reference points that are detached from the underlying model for all of the various reasons of it; interconnections, changing productivity, all sorts of reasons. I think I'm being supportive of what Doug just said about not having external reference points. It should be integrated with the model; just as a general comment.

But my question is the stock-specific reference points I think sound cool. I was just wondering, are you guys developing, so I know there was a stock-synthesis model in there which could accommodate some spatial information. My question is; is that where you would develop it? Are you doing standalone like statistical catch-at-age models for the different areas, or how would one develop stock-specific reference points?

DR. DREW: That's a good question. It's certainly something we're going to wrestle with at our next assessment meeting. But I think

that we are developing a statistical-catch-at-age model that does have some spatial structure within it; so that it allows us to model the Chesapeake Bay stock as a unit that also interacts then with the coastal fishery and in the Bay fishery. As well as then sort of either one or two additional other stocks that also then interact in the mixing zone of the coastal fishery. I think the goal, if we were able to develop stock-specific reference points, it would be on the basis of a spatial model such as that; where we have some kind of ability to parse out what's happening at the Chesapeake Bay level, and what's happening sort of with the other stocks.

MR. McNAMEE: I interpret that as you're working on something that's integrated.

DR. DREW: Yes.

MR. McNAMEE: Cool. Well, thank you.

CHAIRMAN ARMSTRONG: Other questions. Mike.

MR. MICHAEL LUISI: Max or Katie, can you just remind me. You mentioned Term of Reference Number 5 and what that led to; as far as coming up with the recommendations that this Workgroup put together. But it's been a while since we've mentioned an issue that we wanted to have explored having to do with the male and female ratio information. Can you just remind me so I'm sure that that is still included in those terms as something that the Stock Assessment Subcommittee will be working on?

DR. DREW: Yes it is still part of the terms of reference; although I think we softened it to if possible. I think it is, and that is also something we'll be evaluating at our next modeling workshop is whether the data are there to support, or to what level the data are available to support male and female information.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: Max, you mentioned as part of the survey there were folks who were dissatisfied with the reference points; because they do not believe that they were achievable, given current productivity and the number of average to below average year classes we've experienced since 2003. A few years ago we were over target, right? Am I misunderstanding that?

MR. APPELMAN: The biomass target? I believe 2003ish, 4ish was the last time we were at or above the target.

MR. McMURRAY: Okay. Well, if there is reason to believe that something has changed that's reducing productivity, I would argue that that is a reason to be even more cautious instead of less cautious. It also provides reason for maintaining a good age and size structure. But that was more of a comment than a question, sorry.

CHAIRMAN ARMSTRONG: Jay.

MR. McNAMEE: One other thing that kind of popped into my head as I was looking at this is none of this; this is all – understandably so – single species oriented. I was wondering if you thought, and I don't think there is, but if there is any nuance in these where one might incorporate multispecies considerations; or will there be flexibility moving forward?

I mean it's not something that is immediately available for the current assessment process; but hopefully not too far down the road. I guess I'm wondering, should we be thinking about that and leaving room, and if there is some management process that follows the assessment we should be leaving in some consideration for, I'll just be specific about it; you know where the striped bass population should be relative to some of the objectives for the menhaden fishery that sort of thing.

DR. DREW: Good question. I think how we exactly word the final management document is certainly still a little up in the air. But I think part of the range of reference points that we could produce would essentially be here is different levels of SSB and the F value that will

achieve that level. Therefore, here is the quota that comes out, and here is the age structure that would be associated with that, and how do you guys feel about that as a management Board?

But that does leave open then, the other question would be then, when we do have that multispecies model available to say, this is how. Plug those target and threshold values into that multispecies model and say okay, under this level of striped bass what is that going to do to the menhaden fishery, and what are the tradeoffs there so that we can evaluate sort of the tradeoffs between allowing fishing and preserving biomass?

Not just for striped bass, but then also bringing that when that multispecies model is ready for us to evaluate, bringing those different target and threshold striped bass levels into that model, to also have information on what would that do to the menhaden population as well? I think kind of the methodology could be there, and then how the Board chooses to sort of structure the reference points down the line I think is up to them.

CHAIRMAN ARMSTRONG: Ed, did I see your hand up?

MR. ED O'BRIEN: Yes thank you, Mr. Chairman, I just had a couple questions. First of all I'm sure you all are actively exploring getting somebody from commercial on this committee. We always had somebody on the Advisors Committee who was pretty commercially oriented; sometimes two or three.

MR. APPELMAN: We do have commercial advisory panel members who are representing the commercial sector; Arnold Leo at the back of the room is one of them. He was participating on our Guidance Workgroup. He also took the survey. But there is more recreational representation than there is commercial. It's also reflecting of states appoint their advisory panel members.

MR. O'BRIEN: Well Arnold is a great man. I think that's good representation; but it seems to me you ought to have a little bit more. Relative to the reference points, yes the male/female thing is important, and I know you all are looking at that. Developing that more and making it official, I think would be good for all of us.

Also, if you could explore when it comes to the nurseries, particularly the Chesapeake Bay, Potomac River, if you could get some more feel for everybody as to when those fish actually leave and go out into the ocean. We've all got our ideas on that. But it seems to be that could be defined a little bit better. Do you agree with that?

DR. DREW: It's not something that the assessment can do right now; but I think they are working on. I know we are working with Dave Secor on some telemetry studies; so that we can actually tag the fish and monitor where they go out. There has been some historical tagging work on that. I think that is something that needs more attention and research, and is getting some that we can hopefully fold those results back into the assessment and be more informed on that front.

MR. O'BRIEN: Yes, we used to have, I remember Tom O'Connell when he was here. He brought in some pictures of these huge schools of rockfish. But it seems like we could develop this a little bit more; as to when they vacate. Relative to the comment somebody made about how we really don't yet understand the recreational fisheries. Of course we've got MRIP and that's data, and very important. But I think there is really something to that comment.

It would be nice, I mean I've been around this a long time and I don't understand the recreational fishery, per se, as at just how strong it is, how economic it is. I think somewhere along the line past experience and whatever has been written could be reviewed, and that could be developed a little bit more; because you hear that from a lot of people. Thank you very much, Mr. Chairman, they were

the comments I wanted to make.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: This is a question, not a comment. I promise. Max, in the briefing material you mentioned the AP would have the opportunity to provide its own guidance at some point. Where in the process would that take place?

MR. APPELMAN: The AP did meet via conference call, and it was their opportunity to provide alternative recommendations if they so chose. After reviewing the results and after having some discussion, it turned out that they were in the same camp as the Workgroup; so that happened. Of course, during any management response they will be a part of that process as well.

PROVIDE GUIDANCE TO THE STOCK ASSESSMENT SUBCOMMITTEE

CHAIRMAN ARMSTRONG: Thank you for all those comments. I think an awful lot of the discussion will be better informed when we see what we get back from the Stock Assessment Subcommittee. In that interest, we need to formulate a charge to the Stock Assessment Subcommittee, and I think Mike you have a motion.

MR. LUISI: **I do, Mr. Chairman. I would move to task the Stock Assessment Subcommittee to develop a range of F and SSB reference points as part of the 2018 Benchmark Stock Assessment as recommended by the Board Guidance Workgroup.**

CHAIRMAN ARMSTRONG: Do we have a second? John Clark. Discussion, Doug.

MR. GROUT: Mike, are you talking about targets or thresholds or both?

MR. LUISI: My motion speaks to that last slide that was put up; as far as what those recommendations were. I got a little lost in that discussion over targets and thresholds, and wasn't exactly sure where that was going. I was waiting to hear something from staff. I wouldn't have any problem in the comments that were heard today. Not only would the Working Group's recommendations move forward, but thoughts from Board members today could also be part of that guidance; as to the work of the SAS in the coming months.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: I'll support the motion; but I want to be clear that the public is going to have a chance to comment on this. The public is going to have a chance to weigh in. I don't know if I got that answer when I asked. What is the mechanism going to be to choosing a reference point?

Is that process going to allow for a significant period for the public to comment on it; because this is a big decision? We're talking about changing the management objectives theoretically; that were well established in Amendment 6 after years of debate and public comment. I think it's only fair at this point that we make sure the public gets to weigh in.

MR. APPELMAN: Back to my first slide. I think we're getting a little bit into the weeds here. This is about giving the Stock Assessment Team a starting point when it comes to developing reference points. When they're done with this assessment and it goes through peer review, you're going to have, the management board is going to have a suite of reference points that they can weigh the pros and cons and decide what goes out to public comment in a management document. This is Step 1 of 50; just honing in on a range that they can work with, and take away the guess work from that Stock Assessment Team so they can confidently explore a number of different reference points as tasked by the Board.

CHAIRMAN ARMSTRONG: John, I see us having a very vigorous debate on the data that come out of that; and us having a recommendation, which will then go to perhaps an amendment, which will go to public hearing, et cetera.

MR. APPELMAN: I'll just add. I mean John, more directly to your question. There will be a public comment process to adopt any reference points, any new management objectives, or anything like that. We are not making changes to the management program, its objectives, regulations, reference points, at all right now. That will come later.

CHAIRMAN ARMSTRONG: One more follow up.

MR. McMURRAY: Thank you for that but I'm still not sure whether or not that range is going to be part of that amendment process. I mean are we going to pick one of those alternatives and then have status quo and the reference points and then have it go out to public; or is the public going to be able to weigh in on the range? I think it's important that they do weigh in on the range.

MR. APPELMAN: That is a Board decision. The reference points that go into that draft document are a Board decision.

CHAIRMAN ARMSTRONG: Mike then Ritchie.

MR. LUISI: I'll just make one more point. As a member of the Guidance Working Group, you know we took the survey, we developed the survey, Board members took the survey, and the AP. I think it was our goal would have been to provide more focused guidance to the SAS. But given what we got back as part of the survey. I mean it was clear that it was a split decision on most issues; and nothing really stood out as being what we would see as a more focused attempt at providing direction.

In conclusion, which is what is referenced on the board right now, and which is how I formulated that motion. It's to provide for that range; and that range of alternatives would be something in a future document. I'm just thinking back to menhaden. You know we had a range of different ways for which we could manage menhaden under reference points; so something similar to that John would be kind of how I would see it unfolding over the next year.

CHAIRMAN ARMSTRONG: Doug.

MR. GROUT: Mr. Chairman, I'm going to try and refine this motion with a substitute motion.

CHAIRMAN ARMSTRONG: Can I hold that thought for a second, and ask Katie; put you on the spot. When the SAS receives this will they say that's a darn good charge, or we've got enough meat on the bones here?

DR. DREW: Yes. I mean I don't know if we're going to say that's a darn good charge, but I think we can work with what has been presented here and the knowledge of kind of we have the survey results, we have the Working Group's discussions. We have had the Board discussion, so we kind of understand where we're coming from; and therefore I think this is more as Mike was saying.

I think the dream would have been like you guys came to a single conclusion and be like yes, this is a set of reference points that we want; and that would minimize our work. But I think you know hearing this discussion, we understand kind of what the Board is looking for roughly. This will help us move forward in an efficient manner.

I think the other thing to say is if we come back with a set of stuff that you guys absolutely hate everything on that page, we can have more of a back and forth I think, on some of these numbers and on some of these values after the assessment is done. But I think this does give us a starting point to move forward with in a way that is going to be efficient; and not slow down the assessment.

CHAIRMAN ARMSTRONG: Doug, I'm going to take Colleen first.

MS. GIANINI: I was just going to say that I can support the motion that Mike had put forward, and I appreciate the Working Group's recommendation to include remembering the Addendum IV approach; because I think it's important to remember where we've come

from, and I think it could help put in context the new reference points that come out of this exercise.

CHAIRMAN ARMSTRONG: Doug.

MR. GROUT: I would like to put forward a substitute motion that I think refines what the Working Group came up with; but more along the lines of what I made with the previous comment. I believe that I would like the Stock Assessment Subcommittee to come up with the best, most robust biologically-based reference points, both biomass and F at the threshold level.

Then to develop a range of target-based reference points for the Board to consider on this, so here is my motion. Okay, you ready? I should have described it beforehand. **Move to substitute to task the Stock Assessment Subcommittee to develop biologically-based-threshold reference points (F and biomass) to address the objectives of the FMP.**

That meets the objectives of the FMP, excuse me not address. **Furthermore, develop a range of target reference points, both biomass and F that would provide a range of risk that the Board would consider in achieving the objectives of the FMP.** If I get a second to this I'll speak to it a little bit more; but not much.

CHAIRMAN ARMSTRONG: Pat Keliher, are you seconding?

MR. GROUT: Okay as I said. My concern here was that the broad base of reference points. Based on my past role as a scientist, I think it's a role of our Technical Committee and Stock Assessment Committee to come up with the best biologically-based reference points they can at the threshold level. Tell us where overfishing is going to occur. Tell us when the stock would be overfished; and we would be in jeopardy of losing the existence of the stock, and that it is the Board's role to develop what kind of fishery they want to see, and develop your targets around those levels. That could be a range. As we said, we have very different opinions here on what type of a fishery this Board would like to have. That's where the debate would come at the policy level is what the target levels are.

CHAIRMAN ARMSTRONG: Discussion, Rob.

MR. O'REILLY: I think the substitute motion adds a little something more than perhaps the original motion did. But one thing I notice is that when Max made his presentation he really talked about seven different items that we're looking at in the objectives of the FMP. Perhaps the word should be to consider the objectives of the FMP, because unlikely to meet all seven. That would be sort of a friendly suggestion amendment for Doug. But otherwise I do like the substitute motion.

MR. GROUT: The first part it doesn't say consider. It's only the second part. I'm okay with that as a friendly.

CHAIRMAN ARMSTRONG: Jay.

MR. McNAMEE: I like the motion. I'll offer that the way I interpret the threshold aspect of the motion is you're talking about internally derived based on the parameter estimation of the model. That is where that information will come from; and I'm supportive of that. I also like the bringing risk, a discussion on risk into this.

I would offer that I think maybe as a subsequent motion we might want to get more specific there. That is our gig. As the Board we determine the risk that we're willing to take. Maybe there is a sequence to this. Maybe we don't have to do that today; and we can follow up with that. But I guess I just wanted to state for the record that the continuum and the range of risk are infinite. I think we need to get a little more specific with that and give them some specific guidance there at some point.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: If this motion were to pass and substitute for the original, the concern that I

have is that we lose all of the guidance from the Guidance Workgroup regarding the points that Max summarized for us in his presentation. Things like stock-specific reference points gets lost, it's no longer part of that recommendation for moving forward.

To me we lose the suggestion by the Workgroup members that we take a look at pre Addendum IV reference points, and perhaps reset some of the words that we were using on the call were kind of resetting the reference points prior to Addendum IV. All of that to me, if this is a substitute we lose all of that; all of that guidance from the Workgroup that met and worked over the last six months to provide these recommendations. I don't have a problem in developing something as to what Mr. Grout and Mr. Keliher have put up here; but not in lieu of all of the other guidance. That's where I'm struggling right now in the loss of the other elements to what we were all hoping as part of that Guidance Workgroup that the SAS was going to continue to work on. I'll leave it at that thank you.

CHAIRMAN ARMSTRONG: Good point. I've got John and Rob, but Doug do you want to address that?

MR. GROUT: Yes just to that. That was not my intent, and if we need to come up with some additional wording for the target part that would allow the Stock Assessment Subcommittee to also consider some of the recommendations that came out of the Working Group, I'm more than willing to have that included in there for their consideration within that range of targets. I just was trying to move out what I think was a science exercise from a policy exercise. I think what the Working Group came up with is very valid policy exercise suggestions.

CHAIRMAN ALEXANDER: John, okay Rob.

MR. O'REILLY: I offered a friendly amendment but it got skewed a little bit, so I would like to go back to the substitute motion and tell you what I had in mind. Originally it said to meet the objectives period, it didn't say to consider meeting. Now to say to consider meeting seems like avoidance to me.

All I meant was to replace the word meet with consider; and if you replace the word to before consider with that it would read that "consider the objectives of the FMP," because we certainly want to consider all those objectives. We just don't know the culmination of what we'll have there.

Then if I may since there has been information back to the original motion, to speak to that for a second. What was missing there for me is we don't really have a reference to what the range is going to be all about; what it's going to be doing. We went through an exercise all of us, and some thought the trophy fish, some thought that recreational fisheries, some thought the yield.

You can't say all that but I mean I think there was a little bit of that missing in the original motion. But again, on the substitute motion Line 3, if it said and with Doug and Pat's forbearance, if it said that "consider the objectives," and get rid of "to consider meeting." I mean that was my intent of my friendly amendment.

CHAIRMAN ARMSTRONG: Doug, are you okay with that?

MR. GROUT: Yes.

CHAIRMAN ARMSTRONG: And Pat, thank you. Emerson.

MR. EMERSON C. HASBROUCK: I agree completely with the issues that Mike raised on this, and I don't want to see anything lost relative to the issues that were brought forth by the Stock Assessment Subcommittee. For that reason I would be opposed to this substitute. Then I also have a question, Mr. Chairman. I'm a little confused here. Aren't we also through this process going to consider changes to the objectives in the FMP, or do I have that wrong?

DR. DREW: I would say we're not going to consider changes to the FMP right now; because we haven't done the full public comment process with that. I think as a SAS member when I read this, what I would interpret that as would be consider the current objectives of the FMP to develop these reference points, and then as part of the next management process the amendment or the addendum that would be the chance to revisit the objectives and possibly then adjust the reference points as well. But I think the objectives wouldn't be reconsidered without the full blown public process.

CHAIRMAN ARMSTRONG: Jay.

MR. McNAMEE: I appreciated Mr. Luisi's comments before. I guess I don't necessarily agree that I think the spatial discussion; I think that can be accommodated here. It's just that the threshold reference points would be in that case they would be generated on a sub-stock level. I think you're right on the second one might have gotten lost. But I don't feel like the spatial discussion has gotten lost with the substitute motion. I think whether it's the coastwide stock or split up into sub units, I think in either case you could retrofit this motion to accommodate either of those.

CHAIRMAN ARMSTRONG: John.

MR. McMURRAY: I'm just rereading the range of risk portion of this motion. I want to ask the question of the Technical Committee. Would the current reference points be at the bottom of that range, or would you consider a full range; because certainly there are some people who think our reference points are too risky now from geography or an expansion perspective? I would hope that you would consider a lower level of risk than what we're looking at with our reference points now, in addition to what I'm presuming will be a lot of alternatives that provide a higher level of risk.

DR. DREW: If that is the will of the Board we could certainly consider additional, more conservative reference points as well out of this.

CHAIRMAN ARMSTRONG: Okay, Adam.

MR. ADAM NOWALSKY: I interpret the substitute as asking the SAS to give us back one, threshold F and biomass, and a range of target F and biomass. That is how I read the substitute. Am I interpreting that correctly?

CHAIRMAN ARMSTRONG: Doug.

MR. GROUT: It's a range of F and a range of biomass thresholds. Excuse me, it is a single value that they think is the best threshold F, the best biologically-based threshold F and biomass, and a range of fishing mortality rate and biomass targets for us to consider based on some different risks. I do want to emphasize, if some of the Board members would feel more comfortable I could add a sentence that would expressly ask the Stock Assessment Subcommittee to consider some of the suggestions in the Working Group paper.

CHAIRMAN ARMSTRONG: Adam.

MR. NOWALSKY: Thank you for clarifying that. My hesitation with supporting the substitute motion is that we have seven objectives in the FMP. When I look at a motion that asks for a single F threshold number and a single F biomass number, I have a very hard time believing the SAS themselves can come back with something that considers the objectives plural of the FMP.

I think we would get a very good biological number, very sound, scientific based. But I think it's ultimately the charge of this Board to consider all of those objectives; and we're not going to be able to do that around this table with a single number for a threshold in my opinion.

CHAIRMAN ARMSTRONG: Rob.

MR. O'REILLY: I certainly am used to having just that; in terms that unless we're, and I hope Katie Drew will help on this, but unless we're

going to decide the model format, how are we really going to be able to choose a different threshold then another threshold then another threshold?

How exactly would that work; because everything I'm familiar with you do get a threshold value for both F and SSB in one way or the other. Unless the Board instructs the SAS that well, don't like that threshold. They may have to do another model; or how is that going to work? That's what I'm trying to figure out.

DR. DREW: I think well yes that's a good question. I think there are a number of different ways that we come to our various reference points, and it's true that if we do go with a model-based reference point, so an MSY type reference point or an SPR type reference point. There is a single value that comes out of that.

We would have a little more flexibility with the empirical reference points; that is to say maybe our threshold is not the 1995 spawning stock biomass, maybe it's half of that or maybe it's a level of where we saw recruitment at or above this level associated with this level of SSB. That definition does sort of; you do get a single answer for an SSB.

But there are certain levels of risk associated with each answer that you get out of that. I think there is room for us to develop multiple pairs of reference points; if that's the desire of the Board that reflect different levels of risk or different levels of, I think the point about there are multiple objectives and you can't get one that will address all of them.

There is a tradeoff there. We can give you pairs of reference points that address certain objectives over certain other objectives. But if it is the will of the Board that we focus on a reference point that minimizes the risk of a stock collapse for a certain level of risk; I think we can do that and then give you more range, in terms of what you want for a target, we can do that. But we can also give you matched pairs that address a certain balance of objectives.

CHAIRMAN ARMSTRONG: Doug, you have something so profound to say that it's going to solve our dilemma.

MR. GROUT: No, other than clarify that I think Adam and I have a difference of opinion that I do think we should allow the Stock Assessment Committee to come up with the best biologically-based threshold reference points. Yes, there are multiple objectives, but I think clearly when you're talking about biologically-based threshold reference points you're talking about maintaining the stock.

You're talking about a certain subset of the references, the objectives. With a policy, the target, I think that is where we consider all the objectives. I think it's a policy decision as to how close to that threshold we're going to fish, and how close to that threshold does this Board want to fish to meet our objectives?

CHAIRMAN ARMSTRONG: Emerson.

MR. HASBROUCK: Based on what I just heard Katie say, I would think that the output from the original motion would also include whatever the output might be from the substitute motion. I think with the original motion, we'll get what we're looking for in the substitute plus more. That's another reason why I would not support the substitute, but would support the original motion.

CHAIRMAN ARMSTRONG: Doug, you had mentioned you would be willing to add some of the broader language. I would ask Mike, is there anything he can add from your motion that would make the second one palatable?

MR. LUISI: Mr. Chair, I think it's too late to change now. But the way I've listened to the conversation between Adam, Doug and Emerson, I see this biologically-based threshold reference point as being just one alternative. Where yes, we might have a choice in making a policy decision on how close to that threshold we want to fish, based on a target we select.

But unless it states more clearly in this that there will be other empirical-type reference points being considered. That's where I have felt since the beginning, since the motion was made that we have now lost that opportunity. It would almost be like this motion should have amended the original to include another way of taking the original motion and amending it to include a biologically-based threshold reference point option would have been the way to go. But in hindsight I think we're too far along to modify that now.

CHAIRMAN ARMSTRONG: Okay, I think it's time to vote so I'll read the motion. **Move to substitute to task the Stock Assessment Subcommittee to develop biologically-based threshold reference points (F and biomass) that considers the objectives of the FMP. Furthermore, develop a range of target reference points F and Biomass that would provide a range of risk that the Board would consider in achieving the objectives of the FMP.** Do we need to caucus? We need to caucus for one minute. Are you ready? All hands for yes; no; null; abstain. **The motion fails 6 to 9.** We now move to the original motion. Yes votes on the, oops, Mike.

MR. LUISI: I think it's important that oh and that all just disappeared didn't it. There we go. I think it's important as a consideration; and the only reason we voted against it was because it limited us in what came out of the Working Group. With that said; I would like to see something develop as it was mentioned here, based on the biologically-based threshold reference points and a range of targets. I would move to amend to include just that as tasking to the SAS, to include a biologically-based reference point range, how was it worded up there before?

Move to amend to include a biologically-based threshold reference points that consider the objectives of the FMP. Furthermore, develop a range of target reference points that would provide a range of the risk that the Board would consider in achieving the objectives of the FMP. I think by amending that then we are as to Emerson Hasbrouck's comment, we're including all of the work of the Subcommittee and this new tasking on biologically-based reference points, and I'll leave it at that.

CHAIRMAN ARMSTRONG: Is that a second, Doug; second by Doug Grout, discussion, Ritchie?

MR. G. RITCHIE WHITE: Question for Katie. Does this create a lot more work? I mean is this something that is doable?

DR. DREW: I mean I would say number one, I think all of the reference points that we would put forward would have a basis in the biology of the species; regardless of whether you're talking about a model-based or an empirically-based. It would all be based on the biology of the species. I think my one hesitation with the idea of the threshold is that there is an assumption about risk levels when you're developing that threshold.

To task us to come up with a single threshold would be to require us to come to consensus on the appropriate level of risk when you're developing that biological threshold. Even if we use a model base like an SPR or an MSY based reference point, there is a certain amount of risk implicit in that.

I think if we have the ability to provide paired target and threshold values that gives us the ability to sort of dodge the risk question and put that more to the Board; in terms of the threshold, and explicitly lay out this is the biological consequences of this target and threshold. This is the biological risk level with this target and threshold. Whereas a single threshold would sort of require us to come to consensus, and I can't say right now how difficult that would be for that.

CHAIRMAN ARMSTRONG: Okay, we have a motion and a second to amend the first motion. If this passes we will simply lift that language and add it to the end of the original motion. Is everyone clear on that? I need to read this into the record. Move to amend to add "and

develop biologically based threshold reference points (F and biomass) that consider the objectives of the FMP. Furthermore, develop a range of target reference point (F and biomass) that would provide a range of risk that the Board would consider in achieving the objectives of the FMP." Adam.

MR. NOWALSKI: I appreciate the collegial effort here around the table to try to satisfy as many people as possible. For those who sat through lunch with me would understand where that comment came from. But I have a question about what we're achieving. Our SAS is not a contractor we're hiring off the street; that we don't know what to expect that we have to give very explicit instructions that I expect my 2x4 walls to be straight and plum and level.

Part of the Working Group document said the SAS should continue to strive for development of stock-specific reference points where possible; which I think encompasses that biology element here. I don't know what additional we're getting out of this. If there is specific direction that says you're going to get more by adding this, I'm all for it. I just don't know what that extra is that we're getting here; other than a lot of words.

CHAIRMAN ARMSTRONG: Time to vote. Okay, on the motion to amend yeses. Caucus, sorry.

MR. APPELMAN: I just want to make a comment to the Board. I'm confused a little bit, because if this passes, what I read is that we now have two pieces to the motion. One is to put forward multiple sets of reference points, thresholds and targets, and another part of the motion that says one threshold and multiple targets. I think it creates some confusion to the Stock Assessment Team. I'm just throwing that out there.

CHAIRMAN ARMSTRONG: We vote, all right we're going to vote; yeses; noes; null; abstention. The motion passes 12 to 3. It is now incorporated into the original motion. Can you take a picture of that or something? Let it be noted for the record that both pieces have been read in already and we will combine them. The Stock Assessment Committee has a question of the objective of this. Katie, could you state those concerns?

DR. DREW: Right now it says develop a range of reference points and develop a single threshold and multiple targets. It is "develop a range of reference points", period, and also "do one target and multiple thresholds." I just wanted to confirm that the intention from the Board with this motion if it passes is that we should develop one threshold and multiple targets while still taking into account the Workgroup's recommendations, or is it the intent that we should do multiple thresholds and multiple targets?

CHAIRMAN ARMSTRONG: That would be stunned silence. Emerson.

MR. HASBROUCK: If you're looking for a response to Katie's question, my response would be the latter of the suggestions that she made where we're looking for multiple thresholds and multiple targets. That is my opinion. That is where I wanted to go originally.

CHAIRMAN ARMSTRONG: I would interpret it that way also. But also further saying and one of those multiple will be biologically based. Do we have consensus on that? Yes.

DR. DREW: Okay thank you.

CHAIRMAN ARMSTRONG: What do we need to do? Do you need to caucus? We need to vote on this. I see no caucuses needed. All in favor raise your hand; opposed; null; abstention. Motion passes unanimously.

2018 BENCHMARK STOCK ASSESSMENT PROGRESS UPDATE

CHAIRMAN ARMSTRONG: Okay, Katie could you give us an update on the stock assessment progress?

DR. DREW: Yes, Mr. Chair. I touched on a lot of this briefly. We are having an

assessment/modeling workshop in May, so mid-May that our plan is to bring sort of some of our potential candidate models with different stock structure to the floor, and sort of evaluate what kind of data we have to support those different models. Evaluate the quality of our sex-specific data to see what kind of sex-specific information we can fold into these models, and decide on a final preferred model that addresses the objectives of the TORs and is most supported by the data at this workshop. As well as now considering the Board's additional guidance on the reference points, and start talking about potential candidate reference points that would address the recommendations of the Workgroup.

After this meeting in May, we will have a subsequent meeting in September that will be after the new MRIP estimates have come out so that we can run the model with the most recent and up-to-date MRIP estimates. That will include the changes to the effort survey and the APAIS Survey, and that complete calibration; so that when we go to peer review in November we will have data through 2017 that include the new MRIP numbers.

CHAIRMAN ARMSTRONG: John.

MR. JOHN CLARK: Yes, maybe this should have come up earlier when the stock-specific modeling came up Mr. Chair, but Katie could you just once again go over how these stock-specific parts of the model are going to work in the overall whole? Because we're hearing of course, we were very much in favor or getting Delaware-specific reference points.

But I think the thinking was when that was requested it was going to be the way it was under Amendment 5, where we almost had a specific set of reference points that just covered the Bay there. We've been hearing from our members on the Stock Assessment Team that there is a lack of data to really develop a model for that.

But I'm just curious as to whether we would be looking at it as it was in the past, where we would be looking at these specific stocks almost as independent units or are they all just part of a whole, and therefore anything that was more. Like if more was given to a single stock it would take away from the coastal whole, or how the whole thing will work.

DR. DREW: That's a good question and that's certainly something we're going to talk about at the modeling workshop. I think right now, and certainly the issue with the Delaware Bay data is something we're going to have to really hammer out at the May workshop. Right now the model that we're sort of putting forward as our preferred structure anyway, is the ability to have within a single model multiple stocks; so that we recognize that you know Chesapeake Bay is a producer area. It has its own fisheries that are fishing on its fish.

But then, those fish move out to the coast where they're fished on by a different fleet; and in that coast are also mixed-in fish from other producer areas. I think the model is going to try to manage those dynamics separately so that we can say okay, the size of the Chesapeake Bay stock is this. The size of either the Delaware Bay stock or the size of the alternate other stock, which would include some of the Hudson River as well, the size of that other stock is this and so therefore if we fish at this level on the Chesapeake Bay, you can take this much quota in the Bay and this much in the ocean.

I think the intention is to recognize that there is sort of a mixed zone where you have to control the fishing mortality; recognizing that it's made up of multiple stocks, but that there are separate fisheries that can have a different level of F that is going to impact the total stock, but is also taken directly at a different time.

In terms of how that then folds into management, I think there is still going to be a tradeoff at the Board level to say, you know you could say all of the fishing mortality on the stock happens in the Bay and there is no ocean fishery, or all of the fishing mortality happens in the ocean and there is no fishing mortality.

But ideally, there is going to be obviously something in the middle where the Bay is allowed to take this much out of the Bay, and the ocean is allowed to take this much out of the Bay stock. That kind of question I think is definitely going to be a management question that the Board is going to have to sort of figure out with some of the information that we can provide you; so we can say this is the effect of allowing this much fishing pressure in the ocean and this much in the Bay. Whether that Bay is Delaware Bay or the Chesapeake Bay or things like that.

But then also you know this is the effect of having this much fishing pressure in the Bay under these size regulations and things like that. But it is going to recognize that even though these are separate stocks they are mixing together; and there is a mixed ocean fishery that needs to be accounted for in the mortality process. I don't know if that helps or not.

MR. CLARK: Just a follow up on that. Then taking the situation that we have where we don't have the complete data, I assume this is the Stock Assessment Subcommittee has been discussing this quite a bit. Is the Committee planning to move ahead with the stock-specific models or only if there is enough data to do so? How will that be addressed for the future of the assessment?

DR. DREW: We are planning to, at this modeling workshop is really where we're going to review. I think the issue is with the Delaware Bay in particular the issue is the length of the time series; so that we are able to parse out this amount of Delaware and New Jersey catch that happened in the Bay, and this is the age structure of that catch, and this amount of Delaware and New Jersey catch happened in the ocean, and this is the age structure of that catch.

We can do that back to maybe 2000; but before that there really isn't enough commercial and MRIP sampling that happened in the [Delaware] Bay specifically for fish that were caught in the [Delaware] Bay versus fish that were caught on the coast. Going back in time is really the issue; so I think one of the things we're going to be talking about is do we go with sort of a 2-stock model where you have the Chesapeake Bay is a stock within that model. Then you have sort of a, oh they're a mixed stock, which would be the Hudson River and the Delaware Bay sort of as a single stock complex that is also contributing to the overall coastal catch.

Would we model the Delaware Bay and only start fitting to the data when it becomes available is something we're also going to talk about. I think those are kind of the two questions we have to deal with; are we going to go with a 2-stock model, or are we going to go with a 3-stock model essentially.

OTHER BUSINESS

CHAIRMAN ARMSTRONG: Okay, seeing no other questions we'll move to Other Business. We have a couple of quick items presented by Derek Orner.

MR. DEREK ORNER: A couple items that have come up recently with NOAA Fisheries I want to bring to the Board; just to get some initial reaction. Manna Fish Farm has recently submitted a permit application in the U.S. Army Corps of Engineer for some proposed offshore aquaculture off of Long Island and New York; looking at finfish, shellfish, and macro algae, but in particular steelhead trout and striped bass.

This is something that was brought up to the state directors probably about two years ago in a preliminary form; but the concern is there is really no mechanism for legal harvest, transport, possession of striped bass in the EEZ. Manna has recently submitted a letter to the Agency requesting our support in modifying the regulations.

In response to the letter we're working with our Office of Aquaculture, and committed to identifying a number of potential options for moving forward with potentially allowing farming in federal waters. [I'm] bringing it up here to the Board just to start the discussion

and get some initial feedback.

Obviously in preparing any regulation, changes in the regulation in the EEZ, we need to bring it before the Board, the Councils and the states. We've identified a couple different options that we would just like to get a little bit of feedback on, and whether we bring it for further discussion later on.

We could initiate some regulatory revisions to clarify the prohibition of the fishing in the EEZ, and that it does not apply to cultured fish; it only applies to wild stocks. We could provide some guidance to Manna Fish Farm, and maybe moving forward with an exempted fishing permit as a pilot or a feasibility study; maybe for an 18 month or two-year window. It could be based on the recommendations or feedback from the group that there is no action to be taken at all.

In addition, if you've read the 2018 Omnibus language that recently provided our funding, we are directed, or the Agency is directed to look at or review the federal moratorium for striped bass at the conclusion of the benchmark stock assessment that we've just been talking about.

I guess at that point I can stop with that brief intro. I don't want to take a whole lot of time and drag on. But just to get some initial reaction or feedback from the Board on aquaculture in the EEZ, specifically for striped bass.

CHAIRMAN ARMSTRONG: Feedback, Pat.

MR. PATRICK C. KELIHER: I'm not sure, Derek if the agencies have even finalized a process by which you would determine site locations. Have you, I mean from a leasing standpoint, and then the second question I have is genetic strains. We've learned a tremendous amount in the hatchery world about genetic strains and genetic interactions with wild stocks from domesticated stocks. Has that been thought through clearly, so we would understand that if there was a large escape that it's not going to be detrimental to the wild stock?

MR. ORNER: I don't have answers specifically to the questions. I know the location they're talking about is some lease property about eight miles off the coast of Long Island.

CHAIRMAN ARMSTRONG: David.

SENATOR DAVID H. WATTERS: Thank you, Senator Watters, New Hampshire. I'm familiar with aquaculture operations in our waters. But I just wanted to know what kind of discussion, kind of following on what Pat was asking about, about any potential disease or pollution issues; as it might affect the wild stock.

MR. ORNER: Again, I guess my response would be since we haven't had a full proposal submitted by Manna Fish Farms at this point, I don't know the specifics behind some of that.

MR. THOMAS P. FOTE: It was interesting, about a year and a half ago a fish farmer from California, who is actually raising striped bass from five genetic pools down in Mexico asked if he could import it into New Jersey; basically because we don't allow for the sale, our Legislation said of anything except hybrid striped bass that are documented.

I thought it was a good idea. Of course the comments I got was overwhelming objection to anything to do with farm-raised striped bass. They were worried that well; his business is in Mexico so there is no plan of interfering with your genetic pool. But there were just so many concerns of law enforcement and everything else to be bringing it in; they didn't want to deal with it, as I said over my objections.

I don't see a large support. There are a lot of reasons we kept the EEZ closed. The genetic pool, I have real concerns about this. I don't think you're going to find any support, especially in the recreational community. First of all they've been opposed to doing any kind of aquaculture in the EEZ, because they're worried about disease and they worry about the clouding of efforts, so anyway that is the feelings you're going to get from New Jersey on that.

CHAIRMAN ARMSTRONG: Ritchie.

MR. WHITE: What are the next steps in this process; and will the Commission be involved as this unfolds?

MR. ORNER: I can take a shot at that. Yes, very easily on the second part of your question, the Commission would be involved. We're bringing in now is very preliminary stages of it, and we would want a recommendation from the Commission as we go through with any modifications to the regulatory language, whether it's an EFP, exempted fishing permit, or what it may be. A potential recommendation, since we don't have a proposal in hand from the group, would be to perhaps invite Manna Fish Farm to an upcoming Board meeting in possibly August, and give them a 10-15 minute window on the agenda to present what their business plan would be.

CHAIRMAN ARMSTRONG: Roy.

MR. ROY W. MILLER: I just quickly wanted to remind the Board that this Commission worked on a document back in the late 1980s on stocking guidelines that dealt with genetic mixing, disease control and that kind of thing. That guidance probably would still have relevance today, with regard to an ocean aquaculture situation, where the likelihood of escapement is fairly high, or at least greater than zero.

CHAIRMAN ARMSTRONG: We will be running into the Herring Board shortly, so we need to move it along. Doug.

MR. GROUT: Just a quick comment. One of your questions, they potentially would like to change the regulations in the EEZ. I would suggest that we not do a wholesale change of it; but if there is a chance that this is going to be permitted that any striped bass that are going to come out and be sold from this need to be tagged at the pens.

They can be uniquely identified as aquacultured before they go into the market. That way you might be able to have some modification to, depending on where they came in, the size limit restrictions in New York may be different than Chesapeake Bay. Make sure they can be tagged at the pen.

CHAIRMAN ARMSTRONG: Mike.

MR. LUISI: Derek, this issue was raised at a recent meeting of the Mid-Atlantic Council, and there was a great deal of concern offered by members of the Council and of the public. We were in Montauk, New York, so there was even a higher level of interest; given that this application is for the area offshore in the EEZ off of Long Island.

I guess to your point about providing the Board and perhaps even the Council some further information. I think we would all benefit from a presentation or just more information about the details about what this application would have in it, and how it would be carried out. Your suggestion about following back up with the Board I think is a good one.

CHAIRMAN ARMSTRONG: Tom, and then Emerson you can give us the final word.

MR. FOTE: I think a quick question I have is I think red drum is the only one that is also not allowed to be harvested in the EEZ. If we're going to look at one, we should look at the other to see how both of them will be handled. If I'm not mistaken, I think red drum is the other species that is handled like striped bass.

CHAIRMAN ARMSTRONG: Emerson.

MR. HASBROUCK: Just a couple of quick things. I'm wondering if perhaps the Council might share with the Striped Bass Board the comments that were raised at the recent Council meeting that Mike had mentioned. The other is, is there any place in the United States where we allow an aquaculture enterprise to take place for a species that is prohibited in the EEZ anywhere?

MR. ORNER: Not that I am aware of.

CHAIRMAN ARMSTRONG: Okay I lied. John, you're from New York, you get to have the final word.

MR. McMURRAY: Okay. I have a lot of questions, but I'm just going to ask the basic ones. Just to be clear, Manna is talking about raising wild striped bass not hybrid striped bass, correct?

MR. ORNER: That is my understanding, yes. But again I have not seen an actual application.

MR. McMURRAY: Follow up if I may. Are they planning on catching schoolies and growing them out, or are they getting fry or eggs, or how are they getting them; because that is significant in the context of the wild fishery? My other question would be we need to see what the plans are to feed them, because we're looking at depletion of the forage resource also.

CHAIRMAN ARMSTRONG: You're the final word, Adam, and make a motion to adjourn right at the end.

MR. NOWALSKY: Well that's easy; once you see the agenda is having concluded the business of the Board we are adjourned. You don't even need a motion, so I can make those words.

But my point was that it's great that someone is talking about it. I agree we should be engaged in the process. But I think it might be premature to bring them here before the Board when you don't even have an application.

I think some of these questions would be answered in the application. We don't need to take up our time until they get to that point. My recommendation would be once we get an application, have the Service present it and potentially have the applicant on hand at that time to answer questions we may have.

CHAIRMAN ARMSTRONG: I think Derek, you were looking for the flavor of opinions, and I think you got them.

MR. ORNER: Yes, thank you so much.

ADJOURNMENT

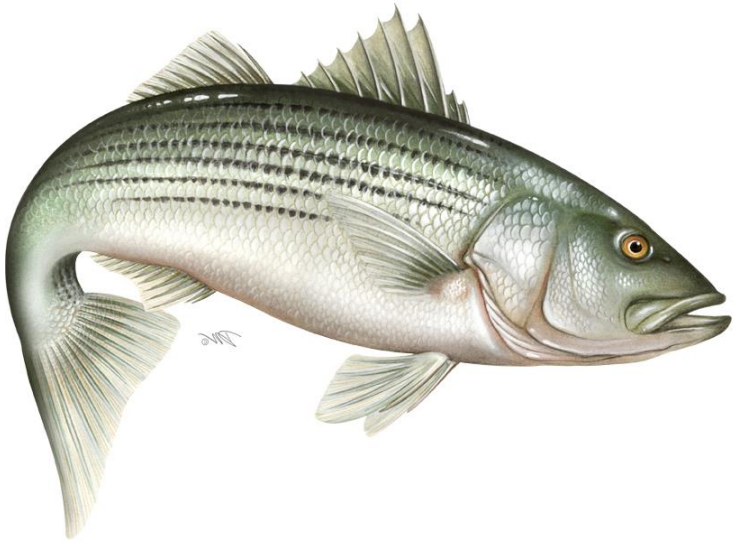
CHAIRMAN ARMSTRONG: All right with that we are adjourned.

(Whereupon the meeting adjourned at 3:45 o'clock p.m. on May 1, 2018)

2018 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN FOR

ATLANTIC STRIPED BASS
(Morone saxatilis)

2017 FISHING SEASON



Atlantic Striped Bass Plan Review Team
Max Appelman, Atlantic States Marine Fisheries Commission, Chair
Charlton Godwin, North Carolina Division of Marine Fisheries
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Derek Orner, National Marine Fisheries Service
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Drafted July 20, 2018

Executive Summary

Atlantic striped bass from Maine through North Carolina are managed under Amendment 6 and Addenda I-IV to the Interstate Fishery Management Plan.

A benchmark stock assessment was peer reviewed by the 57th Stock Assessment Review Committee and approved by the Board for management use in October 2013. Addendum IV to Amendment 6 was approved by the Board in October 2014, and implemented prior to the start of the 2015 fishing season. The addendum contained new fishing mortality reference points, and required coastal and Chesapeake Bay states/jurisdictions to reduce removals by 25 and 20.5%, respectively, in order to reduce F to a level at or below the new target. A 2016 stock assessment update indicated that Addendum IV successfully reduced F below the target in 2015. The Board initiated an addendum in 2017 to consider liberalizing regulations, but decided to not advance the addendum for public comment due to concerns that changing the management program could result in F exceeding the target.

In 2017, total Atlantic striped bass removals (i.e., commercial and recreational harvest and dead discards) was estimated at 3.33 million fish, which is a 7% decrease relative to 2016. Total striped bass harvest in 2017 is estimated at 1.72 million fish or 17.1 million pounds. The recreational fishery harvested 1.12 million fish (12.3 million pounds) in 2017, while the commercial fishery harvested 592,576 fish (4.80 million pounds). Dead discards from the recreational fishery are estimated at 1.08 million fish.

In 2017, all states implemented management and monitoring programs consistent with Amendment 6 and Addenda I-IV. Monitoring requirements vary by state, and may include monitoring commercial and recreational catch, effort, and catch composition; monitoring commercial tagging programs; and performing juvenile abundance surveys, spawning stock surveys, and research tagging programs. In 2017, the total coastal and Chesapeake Bay commercial quotas were not exceeded, however, Massachusetts exceeded its quota by 22,523 pounds which will be deducted from its 2018 quota. For the 2018 review of JAIs, the analysis evaluates the 2015, 2016, and 2017 JAI values. No state's JAI met the criteria for recruitment failure, nor was any states JAI value below its Q1 threshold in 2017.

The PRT noted inconsistent language between the regulations implemented by Maryland for its 2018 summer and fall recreational fishery in the Chesapeake Bay and the motion passed by the board at its February 2018 meeting. Additionally, regulations under Maine's Department of Inland Fisheries and Wildlife are inconstant with the FMP (regulations are consistent with the FMP under Maine's Department of Marine Resources). Maine is working to resolve this issue and will provide an update in supplemental materials, or during the August 2018 Board meeting.

Table of Contents

I. Status of the Fishery Management Plan

Date of FMP Approval:	Original FMP – 1981
Amendments:	Amendment 1 – 1984 Amendment 2 – 1984 Amendment 3 – 1985 Amendment 4 – 1989; Addendum I – 1991, Addendum II – 1992, Addendum III – 1993, Addendum IV – 1994 Amendment 5 – 1995; Addendum I – 1997, Addendum II – 1997, Addendum III – 1998, Addendum IV – 1999, Addendum V – 2000 Amendment 6 – 2003; Addendum I – 2007, Addendum II – 2010, Addendum III – 2012, Addendum IV – 2014
Management Unit:	Migratory stocks of Atlantic striped bass from Maine through North Carolina
States With Declared Interest:	Maine - North Carolina, including Pennsylvania
Additional Jurisdictions:	District of Columbia, Potomac River Fisheries Commission, National Marine Fisheries Service, United States Fish and Wildlife Service
Active Boards/Committees:	Atlantic Striped Bass Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Tagging Subcommittee, Plan Review Team, and Plan Development Team

The Atlantic States Marine Fisheries Commission (Commission) developed a fisheries management plan (FMP) for Atlantic Striped Bass in 1981 in response to declining juvenile recruitment and 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[1] 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 cohort to spawn at least once. Smaller size limits were permitted in producer areas than along

[1] 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).

the coast. Several states, beginning with Maryland in 1985, 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 – which was attained with the recruitment of the 1989 year class. 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 a target fishing morality (F) of 0.25, which was half the estimated F needed to achieve maximum sustainable yield (MSY). The amendment allowed an increase in the target F once spawning stock biomass (SSB) was restored to levels estimated during the late 1960s and early 1970s. The dual size limit concept was maintained, and a recreational trip limit and commercial season was implemented to reduce the harvest to 20% of that in the historic period of 1972-1979. A series of four addenda were implemented from 1990-1994 to maintain protection of the 1982 year class.

In 1990, to provide additional protection to striped bass and ensure the effectiveness of state regulations, NOAA Fisheries passed a final rule (55 Federal Register 40181-02) prohibiting possession, fishing, (i.e., 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. Atlantic striped bass may be possessed and 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.

In 1995, Chesapeake Bay, Delaware Bay and Hudson River striped bass were declared recovered by the Commission (the A-R stock was declared recovered in 1997), 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 F (which included measures aimed to restore commercial harvest to 70% of the average landings during the 1972-1979 historical period) and states were allowed to submit proposals for alternative regulations that were conservationally equivalent. From 1997-2000, a series of five addenda were implemented to respond to the latest stock status information and adjust the regulatory regime to achieve each change in target F.

In 2003, Amendment 6 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. Accordingly, Amendment 6 completely replaced all previous Commission plans for Atlantic striped bass.[2]

[2] While NOAA Fisheries 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,

The goal of Amendment 6 is to perpetuate, through cooperative interstate management, migratory stocks of striped bass; to allow commercial and recreational fisheries consistent with the long-term maintenance of a broad age structure, a self-sustaining spawning stock; and also to provide for the restoration and maintenance of their essential habitat. In support of this goal, the following objectives are included:

- 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.
- Manage fishing mortality to maintain an age structure that provides adequate spawning potential to sustain long-term abundance of striped bass populations.
- 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.
- Foster quality and economically viable recreational, for-hire, and commercial fisheries.
- Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.
- Adopt a long-term management regime that minimizes or eliminates the need to make annual changes or modifications to management measures.
- 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.

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 coastal commercial quotas for striped bass 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. In the recreational fisheries, all states were required to implement a two-fish bag limit with a minimum size limit of 28 inches, except for the Chesapeake Bay fisheries and fisheries that operate in the A-R (i.e., internal coastal waters of NC), and states with approved alternative regulations. The Chesapeake Bay and A-R regulatory programs were predicated on a more conservative F target than the coastal migratory stock, which allowed these jurisdictions to implement separate seasons, harvest caps, and size and bag limits as long as they remain under that F target. No minimum size limit can be less than 18 inches under Amendment 6. The same minimum size standards regulate the commercial fisheries as the recreational fisheries, except for a minimum 20 inch size limit in the Delaware Bay spring American shad gillnet fishery.

NOAA Fisheries 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, and due to the inability to immediately respond to an overfishing or overfished situation (e.g., the lag time in which a given year's data is available to management).

States are permitted the flexibility to deviate from these standards by submitting proposals for review to the Striped Bass Technical Committee (TC), Advisory Panel (AP), and Plan Review Team (PRT) and contingent upon the approval of the Atlantic Striped Bass Management (Board). A state may request a change only if it can demonstrate that the action is "conservationally equivalent" to the management standards or will not contribute to the overfishing of the resource. This practice has resulted in a variety of regulations among states (see Table 8 and Table 9).

In 2007, Addendum I was implemented to establish a bycatch monitoring and research program to increase the accuracy of data on striped bass discards and also recommend development of a web-based angler education program. Also in 2007, President George W. Bush issued an Executive Order (E.O. 13449) prohibiting the sale of striped bass (and red drum) caught within the EEZ. The order also requires the Secretary of Commerce to encourage management for conservation of resources, including State designation as gamefish where the state determines appropriate under applicable law, and to periodically review the status of the populations within US jurisdictional waters.

In 2010, Addendum II was approved. The addendum established a new definition of recruitment failure such that each index would have a fixed threshold indicating failure, rather than a threshold that changes annually with the addition of each year's data. The new definition of recruitment failure is "a value that is below 75% of all values in a fixed time series appropriate to each juvenile abundance index."

In 2012, Addendum III was approved. The addendum requires all states and jurisdictions with a commercial fishery 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.

In 2014, Addendum IV was approved. The addendum was initiated in response to the 2013 benchmark assessment which indicated a steady decline in SSB since the mid-2000s. The addendum established new F reference points (i.e., target and threshold), and a suite of regulatory measures to reduce F to a level at or below the new target by 2016. All coastal jurisdictions were required to implement regulations to achieve a 25% reduction from 2013 removals, and Chesapeake Bay fisheries implemented regulations to achieve a 20.5% reduction from 2012 removals. Addendum IV also formally defers management of the A-R stock to the state of North Carolina using A-R stock-specific BRPs approved by the Board (NCDMF 2013, 2014). Striped bass in the ocean waters of North Carolina continue to be managed under Amendment 6 and Addenda I-IV.

In February 2017, the Board initiated the 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 the Addendum IV measures successfully reduced F to a level below the target in 2015. The draft addendum proposed alternative measures aimed to increase total removals by 10% relative to 2015 in order to achieve the target F in 2017. However, the Board chose to not advance the draft addendum forward for public comment largely due to harvest estimates having increased in 2016

without changing regulations. Instead, the Board decided to wait until it reviews the results of the 2018 benchmark stock assessment before considering making changes to the management program.

Albemarle-Roanoke Striped Bass FMP

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 (NCDMF 2013, 2014). It is a joint plan between the North Carolina Marine Fisheries Commission (NCMFC) and the North Carolina Wildlife Resources Commission (NCWRC). Amendment 1, adopted in 2013, lays out separate management strategies for the Albemarle Sound-Roanoke Rive (A-R) stock and the estuarine (non-migratory) Central and Southern striped bass stocks in the Tar/Pamlico, Neuse, and Cape Fear rivers. Management programs in Amendment 1 utilize annual total allowable landings (TAL), daily possession limits, open and closed harvest seasons, gill net mesh size and yardage restrictions, seasonal attendance requirements, barbless hook requirements in some areas, minimum size limits, and slot limits to maintain a sustainable harvest and reduce regulatory discard mortality in all sectors. Amendment 1 also maintains the stocking regime in the central and southern systems and the harvest moratorium on striped bass in the Cape Fear River and its tributaries (NCDMF 2013). Striped bass fisheries in the Atlantic Ocean of North Carolina are managed under ASMFC's Amendment 6 and subsequent addenda to the Interstate FMP for Atlantic Striped Bass.

II. Status of the Stocks

Atlantic Striped Bass Stocks

The 2013 benchmark stock assessment for Atlantic striped bass was peer-reviewed at the 57th Stock Assessment Workshop (SAW)/Stock Assessment Review Committee (SARC). Based on recommendations by the 46th SAW/SARC in 2007, the statistical catch-at-age (SCA) model was generalized to allow specification of multiple fleets (an ocean fleet, a Chesapeake Bay fleet, and commercial discard fleet), different stock-recruitment relationships, and year- and age-specific natural mortality rates, among other changes (ASMFC 2013; NEFSC 2013a, 2013b). New F reference points were chosen to link the target and threshold F with the target and threshold female SSB. The 2013 assessment, and the new F reference points, were approved by the Board for management use at its October 2013 meeting.

The 2013 SCA model was updated in 2016 to estimate F, SSB, abundance, and recruitment of striped bass during 1982-2015 (ASMFC 2016). Based on results of the 2016 update, and in comparison to the biological reference points below, Atlantic striped bass are not overfished and are not experiencing overfishing.

	Female SSB	***Fully-Recruited F***
Threshold	SSB_{1995} = 57,626 metric tons	0.22
Target	$SSB_{threshold}$ x 1.25 = 72,032 metric tons	0.18

In 2015, female SSB was estimated at 58,853 metric tons (mt) (129.7 million pounds) which is above the SSB threshold but below the SSB target (Figure 1). The 2015 estimate is a decrease from the 2014 estimate of 63,918 mt (140.9 million pounds). In 2015, recruitment (age-1 abundance) was estimated

at 122.7 million fish which is above average for the most recent 20 years (98.0 million fish) and is the second highest value since 2005; the 2012 estimate (i.e., the 2011 year-class) was 123.9 million fish (Figure 1). In 2015, fully-recruited F was estimated at 0.16 which is below both the F threshold and F target (Figure 2).

Overall, the assessment results indicate that female SSB has declined steadily since the 2003 time series high and is approaching the SSB threshold. Although there appears to be an increasing trend in recreational catch over the last five years, the decline in SSB may be reflected in the coastwide harvest which has been decreasing from about 2007 to present (Figure 5). A new benchmark assessment is currently underway and scheduled for completion at the end of 2018. It's important to note that the 2018 benchmark will incorporate the newly calibrated recreational catch and harvest estimates based on the Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES). Accordingly, the results of the assessments (e.g., estimates of stock biomass and recruitment) will not be directly comparable to previous assessment results.

Albemarle Sound-Roanoke River Striped Bass Stocks

The most recent A-R benchmark stock-specific assessment (data through 2012) utilized the ASAP3 statistical catch-at-age model. The model was peer reviewed by an outside panel of experts and approved for management use by the Board in October 2014. The benchmark assessment produced new BRPs and annual harvest quota to prevent overfishing. The model was most recently updated in 2016 with catch and index data through 2014 (Flowers and Godwin 2016). Based on results of the 2016 update, and in comparison to the BRPs below, A-R Atlantic striped bass are not overfished and are not experiencing overfishing.

	F	***Female SSB***	***Total Allowable Landings (TAL)***
Threshold	0.41	772,588 lbs.	275,000 lb (split evenly between recreational and commercial sectors)
Target	0.33	965,735 lbs.	

In 2014, female SSB was estimated at 2,024,583 pounds which is above the peak in 2003 and the highest value in the time series (Figure 3). In 2014, F was estimated at 0.06 which is below both the F threshold and target (Figure 4). Caution should be used, however, when evaluating the estimates of SSB and F in the terminal year. The estimated SSB value in 2014 is likely an overestimate based on past years of retrospective bias exhibited by the model. Subsequent assessments, incorporating additional years of data, and possibly a revised stock-recruit relationship, will likely reduce the magnitude of the 2014 value (Flowers and Godwin 2016). A-R striped bass experienced a period of unusually strong recruitment (number of age-1 fish entering the population) from 1994-2001 followed by a period of lower recruitment from 2002-2014 (Figure 3).

Overall, the trends in the A-R stock abundance are quite similar to the Atlantic striped bass stocks described above, with a steady decline in female SSB since about 2003. Total stock abundance reached its peak in the early 2000s, declined gradually through about 2009 and increasing slightly beginning in 2011 through the terminal year. A new benchmark A-R stock assessment with data through 2016 is currently underway and scheduled to be completed in early 2019.

III. Status of the Fishery

Chesapeake Bay and Coastal Atlantic Striped Bass Fisheries

In 2017, total Atlantic striped bass removals (i.e., commercial and recreational harvest[3] plus dead discards) was estimated at 3.33 million fish[4], which is a 7% decrease relative to 2016. In 2017, total striped bass commercial and recreational harvest was estimated at 1.72 million fish or 17.06 million pounds, which is a 19% decrease by number and 31% decrease by weight relative to 2016 (Table 1 and Figure 5). In 2017, the commercial and recreational fisheries harvested 28 and 72% respectively by weight, and 39% of total harvest by weight came from within the Chesapeake Bay compared to 32% in 2016.

In 2017, the commercial fishery (coastal and Chesapeake Bay combined) harvested 4.80 million pounds or 592,576 fish, which is a 2% decrease relative to 2016 in number of fish but less than 0.5% decrease by weight (Table 2 and Table 3; Figure 6). The Chesapeake Bay jurisdictions accounted for 62% of 2017 commercial landings by weight; Maryland landed 32%, Virginia landed 20%, and PRFC landed 10%. Additional landings came from Massachusetts (17%), New York (15%), Rhode Island (4%), and Delaware (3%). Due to ongoing stock assessment efforts, the 2017 commercial dead discards estimate was not available at the time of this report. Accordingly, the PRT used the previous 10-year average of 535,377 fish (due to the high interannual variability of commercial discard estimates) as the 2017 commercial discard estimate in order to compare total removals in 2016 to 2017 (Table 6).

Total recreational catch (coastal and Chesapeake Bay combined, and as calculated by the Marine Recreational Information Program (MRIP) via the Coastal Household Telephone Survey effort estimates) increased slightly in 2017 relative to 2016, however total harvest decreased (Figure 7). The 2017 total recreational catch estimate (A + B1 + B2) is 13.1 million fish which is a 1% increase relative to 2016. Total recreational harvest (A + B1) in 2017 is estimated at 1.12 million fish (12.3 million pounds) which is a 26% decrease by number relative to 2016 (38% decrease by weight) (Table 4 and Table 5; Figure 7). Maryland landed the largest proportion of the recreational harvest in number of fish[5] (52%), followed by Massachusetts (16%), New York (10%), New Jersey (8%), and Virginia (5%) (Table 4 and Table 5). In the Chesapeake Bay, striped bass catch and harvest decreased in 2017 relative to 2016. The 2017 recreational catch (A + B1 + B2) estimate from the Chesapeake Bay is 4.05 million fish, a 32% decrease from 2016. 2017 Recreational harvest (A + B1) from the Chesapeake Bay is estimated at 632,043 fish (3.83 million pounds) which is an 11% decrease relative to 2016, and accounts for 56% of total recreational harvest in 2017.

In 2017, recreational anglers caught and released (B2) an estimated 12.0 million fish which is a 4% increase relative to 2016. Applying a 9% post-release mortality rate results in a dead discards estimate of 1.08 million fish (Table 6). Further analysis indicates that recreational releases increased by 38% along the coast relative to 2016, while anglers in the Chesapeake Bay experienced a 35% decrease in

[3] Recreational catch estimates are based on MRIP's Coastal Household Telephone Survey, not the new mail-based survey.
[4] The 2017 commercial dead discards estimate was not available at the time of this report, therefore the PRT used the previous 10-year (2007-2016) average of 535,377 fish in the interim.
[5] Maryland also landed the largest proportion of the total recreational harvest by weight (29%) in 2017, followed by Massachusetts (19%), New York (18%), New Jersey (14%), and Connecticut and Delaware each at 4%.

fish caught and released. This makes sense based on current understanding of the strong 2011 year class emigrating out of its natal bays and estuaries and becoming increasingly available to coastal fisheries. Furthermore, the PRT expects harvest along the coast to increase in the coming seasons as these fish continue to grow into the legal size range. The PRT also notes that the equally strong 2014 year class is expected to move through the fishery in the coming seasons.

Albemarle Sound and Roanoke River Atlantic Striped Bass Fisheries

In 2017, total commercial and recreational harvest in the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA) was 176,924 pounds (46,705 fish). Commercial harvest in the ASMA was 75,793 pounds (14,708 fish). Recreational harvest in the ASMA was 35,913 pounds (10,737 fish), and recreational harvest in the RRMA was 65,218 pounds (21,260 fish).

IV. Status of Research and Monitoring

Amendment 6 and its Addenda I-IV set the regulatory and monitoring measures for the coastwide striped bass fishery in 2017. Amendment 6 requires certain jurisdictions to implement fishery-dependent monitoring programs for striped bass. All jurisdictions with commercial fisheries or substantial recreational fisheries are required to define the catch and effort composition of these fisheries. Additionally, all states and jurisdictions with a commercial fishery must implement a commercial harvest tagging program pursuant to Addendum III to Amendment 6.

Amendment 6 also requires certain states to monitor the striped bass population independent of the fisheries. Juvenile abundance indices are required from Maine (Kennebec River), New York (Hudson River), New Jersey (Delaware River), Maryland (Chesapeake Bay tributaries), Virginia (Chesapeake Bay tributaries), and North Carolina (Albemarle Sound). Spawning stock sampling is mandatory for New York (Hudson River), Pennsylvania (Delaware River), Delaware (Delaware River), Maryland (Upper Chesapeake Bay and Potomac River), Virginia (Rappahannock River and James River), and North Carolina (Albemarle Sound-Roanoke River). Amendment 6 requires NOAA Fisheries, USFWS, Massachusetts, New York, New Jersey, Maryland, Virginia, and North Carolina to continue their tagging programs, which provide data used to determine survivorship and migration patterns.

V. Status of Management Measures and Issues

Coastal Commercial Quota

In 2017, the coastal commercial quota was 2,776,071 pounds and was not exceeded, however Massachusetts exceeded its allocation by 22,523 pounds which will be deducted from its 2018 quota. Table 7a contains state-specific quotas and harvest that occurred in 2017, as well as final 2018 quotas.

Chesapeake Bay Commercial Quota

In 2017, the Chesapeake Bay-wide quota was 3,120,247 pounds and was allocated to Maryland, the PRFC, and Virginia based on historical harvest. In 2017, the bay-wide quota was not exceeded and all bay-jurisdictions maintained harvest below its respective quota. Table 7b contains jurisdiction-specific quotas and harvest that occurred in 2017 for the Chesapeake Bay, as well as final 2018 quotas.

Commercial harvest from within the Chesapeake Bay accounted for 57% of total commercial landings by weight, compared to 59% in 2016 and 61% in 2015.

Chesapeake Bay Spring Trophy Fishery

Recreational fishermen in the Chesapeake Bay are permitted to take adult migrant fish during a limited seasonal fishery, commonly referred to as the Spring Trophy Fishery. From 1993 to 2007 the fishery operated under a quota. Beginning in 2008, the Board approved non-quota management until stock assessment indicates that corrective action is necessary to reduce F on the coastal stock. The Spring Trophy Fishery is managed via bag limits and size restrictions. The 2017 estimate of migrant fish harvested during the trophy season was 22,892 fish (22,853 fish in Maryland and 39 fish in Virginia) a decrease relative to 2016 (74,349 fish) and below the 2006-2017 average of 42,973 fish (Horne 2018).

Wave-1 Recreational Harvest Estimates

Evidence suggests that North Carolina, Virginia, and possibly other states have had sizeable wave-1 (January/February) recreational striped bass fisheries beginning in 1996 (NEFSC 2013b). MRIP, formerly the Marine Recreational Fisheries Statistics Survey (MRFSS), has sampled for striped bass in North Carolina during wave-1 since 2004 (other states are not currently covered during wave-1). For Virginia, harvest in wave-1 is estimated via the ratio of landings and tag returns in wave-6 and regression analysis (refer to the methods described in ASMFC 2016 for more detail).

However, based on fishery-independent data collected by NCDMF, ASMFC and USFWS, striped bass distributions on their overwintering grounds during December through February has changed significantly since the mid-2000s. The migratory portion of the stocks has been well offshore in the EEZ (>3 miles) effecting both Virginia's and North Carolina's striped bass winter ocean fisheries in recent years. Furthermore, North Carolina has reported zero striped bass landings during wave-1 in the ocean for 2012-2017. Similarly, its commercial fishery has reported zero striped bass landings from the ocean during that time.

Addendum II: Juvenile Abundance Index Analysis

The following states are required to conduct striped bass young-of-year juvenile abundance index (JAI) 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 Maryland Chesapeake Bay tributaries; Virginia for the Virginia Chesapeake Bay tributaries; and North Carolina for the A-R stock.

The PRT annually reviews trends in all required JAIs. Per Addendum II, recruitment failure is defined as a value that is below 75% (the first quartile, or Q1) of all values in a fixed time series appropriate to each JAI (see *Addendum II* for details). If any survey's JAI falls below their respective Q1 for three consecutive years, appropriate action should be recommended by the PRT to the Management Board.

For the 2018 review of JAIs, the analysis evaluates the 2015, 2016, and 2017 JAI values. No state's JAI met the criteria for recruitment failure (Figure 8). Furthermore, no state's JAI value in 2017 was below its respective Q1 threshold. Maine's JAI was below the Q1 threshold in 2015, and below average in 2016 and 2017. New York's 2016 JAI value was below the Q1 threshold, but the JAI was above average in 2015 and slightly below average in 2017. New Jersey's JAI was slightly above the Q1 threshold in

2015, above average in 2016 and slightly below average in 2017. Maryland's JAI was below the Q1 threshold in 2016, but above average in 2015 and 2017 (the 2015 value is the 7th highest in the time series). Virginia's JAI was slightly below average in 2016 and 2017, and slightly above average in 2015. North Carolina's JAI for the A-R stock has declined from well above average in 2015 to slightly below average in 2016, and is just above the Q1 threshold in 2017.

Addendum III: Commercial Fish Tagging Program

Addendum III to Amendment 6 includes compliance requirements for monitoring commercial fishery harvest tagging programs. In 2017, all states implemented commercial tagging programs consistent with the requirements of Addendum III. Table 10 describes commercial tagging programs by state.

Addendum IV: Performance Review

Addendum IV was implemented prior to the start of the 2015 fishing season, and required coastal and Chesapeake Bay jurisdictions to reduce removals by 25 and 20.5%, respectively, relative to the base period[6] in order to reduce F to a level at or below the new target. Overall, 2017 regulations achieved a 21% reduction relative to 2013 removals (harvest plus dead discards) or an 18% reduction relative to bass period removals[7]. The coastal commercial fishery achieved a 28% reduction in harvest relative to the base period and the Chesapeake Bay commercial fishery achieved a 30% reduction. The coastal recreational fishery achieved a 41% reduction in removals (harvest plus dead discards) relative to the base period, and the Chesapeake Bay recreational fishery saw a 75% increase.

Albemarle-Roanoke Striped Bass FMP

The Interstate FMP for Atlantic Striped Bass requires North Carolina to inform the Commission of changes to striped bass management in the Albemarle Sound/Roanoke River (A-R) System. North Carolina must adhere to the compliance criteria in Amendment 6. No changes were made to the A-R Striped Bass FMP in 2017.

Law Enforcement Reporting

States are asked to report and summarize law enforcement cases that occurred the previous season in annual compliance reports. In 2017, reported law enforcement cases (e.g., the number of warnings and citations) were similar to those reported in previous years. The most common violations were recreationally harvested fish under the legal size limit and possessing fish in excess of the bag limit.

VI. Annual State Compliance and Plan Review Team Recommendations

In 2017, and based on annual state compliance reports (ASMFC 2018), the PRT determined that each state and jurisdiction implemented a management program consistent with the requirements of

[6] All coastal jurisdictions were required to implement regulations to achieve a 25% reduction from 2013 removals, and Chesapeake Bay fisheries implemented regulations to achieve a 20.5% reduction from 2012 removals.

[7] Analysis uses 2012 removals as the base period for the Chesapeake Bay and 2013 removals as the base period for coastal fisheries, as specified in Addendum IV. Also, 2017 commercial discards are compared to 2013 commercial discards which are essentially equal to each other.

Amendment 6 and addenda I-IV (Table 11). Refer to Table 8 and Table 9 for a summary of 2017 striped bass fishing regulations by state.

Addendum III to Amendment 6 includes compliance requirements for monitoring commercial fishery harvest tagging programs. The PRT determined that all states and jurisdictions with commercial striped bass fisheries implemented a commercial harvest tagging program in 2017 consistent with the requirements of Addendum III. Table 10 describes each state's program requirements.

Amendment 6 includes compliance requirements for monitoring programs (summarized in *Section IV*). Compliance with these requirements is summarized in Table 11. The PRT determined that each state and jurisdiction carried out the required monitoring programs in the 2017 fishing year. No planned monitoring program changes were reported for 2018.

Reported regulatory changes for 2018:

- Regulations under Maine's Department of Marine Resources are consistent with the FMP, however, regulations under Maine's Department of Inland Fisheries and Wildlife are inconsistent with the FMP. Current inland regulations are no bag limit and no size limit. Maine is working to resolve this issue and will provide an update in supplemental materials or during the Board meeting.

- Maryland implemented a 19" minimum size limit in the Chesapeake Bay recreational fishery (2 fish bag limit where only one fish can be greater than 28"), May 16 – Dec 15. Anglers must use non-offset circle hooks when live-lining or chumming. Anglers must use non-offset circle hooks or "J" hooks when using fish, crabs or worms as bait or when using processed baits while not live-lining or chumming (treble hooks are prohibited). The PRT noted inconsistent language between the regulations implemented by Maryland for its 2018 summer and fall recreational fishery in the Chesapeake Bay and the motion (and discussion supporting that motion) passed by the board at its February 2018 meeting. Specifically, the board motion states "non-offset circle hooks required when fishing with bait, non-artificial lures."

VII. Research Recommendations

The following categorized and prioritized research recommendations were developed by the 2013 Benchmark Stock Assessment Subcommittee and the 57th SARC:

Fishery-Dependent Priorities

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.[1]

Moderate

- Develop studies to provide information on gear specific discard morality rates and to determine the magnitude of bycatch mortality.[2]

- Improve estimates of striped bass harvest removals in coastal areas during wave 1 and in inland waters of all jurisdictions year round.
- Evaluate the percentage of fishermen using circle hooks.[3]

Fishery-Independent Priorities

Moderate

- Develop a refined and cost-efficient, fisheries-independent coastal population index for striped bass stocks.
    - The PRT recommends the SBTC be tasked with exploring whether the Cooperative Winter Tagging Cruise, NEAMAP, and/or NMFS Trawl Survey datasets may prove useful in this respect.

Modeling / Quantitative Priorities

High

- Develop a method to integrate catch-at-age and tagging models to produce a single estimate of F and stock status.[4]
- Develop a spatially and temporally explicit catch-at-age model incorporating tag based movement information.[5]
    - The PRT recommends that the SAS be tasked with reviewing recent published literature examining tag-based movement information to see if they would contribute to the development of such a model (e.g., Callihan et al. 2014)
- Review model averaging approach to estimate annual fishing mortality with tag based models. Review validity and sensitivity to year groupings.[6]
- Develop methods for combining tag results from programs releasing fish from different areas on different dates.
- Examine potential biases associated with the number of tagged individuals, such as gear specific mortality (associated with trawls, pound nets, gill nets, and electrofishing), tag induced mortality, and tag loss.[7]
- Develop field or modeling studies to aid in estimation of natural mortality or other factors affecting the tag return rate.

Moderate

- Develop maturity ogives applicable to coastal migratory stocks.
- Examine methods to estimate annual variation in natural mortality.[8]
- Develop reliable estimates of poaching loss from striped bass fisheries.
- Improve methods for determining population sex ratio for use in estimates of SSB and biological reference points.
- Evaluate truncated matrices and covariate based tagging models.

Low

- Examine issues with time saturated tagging models for the 18 inch length group.
- Develop tag based reference points.

Life History, Biological, and Habitat Priorities

High

- Continue in-depth analysis of migrations, stock compositions, etc. using mark-recapture data.[9]
- Continue evaluation of striped bass dietary needs and relation to health condition.[10]
- 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.

Low

- Determine inherent viability of eggs and larvae.
- Conduct additional research to determine the pathogenicity of the IPN virus isolated from striped bass to other warm water marine species, such as flounder, menhaden, shad, and largemouth bass.

Management, Law Enforcement, and Socioeconomic Priorities

Moderate

- Examine the potential public health trade-offs between the continued reliance on the use of high minimum size limits (28 inches) on coastal recreational anglers and its long-term effects on enhanced PCB contamination among recreational stakeholders.[11, 13]
- Evaluate striped bass angler preferences for size of harvested fish and trade-offs with bag limits.

Habitat Recommendations

- Passage facilities should be designed specifically for passing striped bass for optimum efficiency at passing this species.
- Conduct studies to determine whether passing migrating adults upstream earlier in the year in some rivers would increase striped bass production and larval survival, and opening downstream bypass facilities sooner would reduce mortality of early emigrants (both adult and early-hatched juveniles).
- 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 shall ensure that those projects will have no or only minimal impact on local stocks, especially natal rivers of stocks considered depressed or undergoing restoration.[11]
- 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 human health or striped bass health.
- Every effort should be made to eliminate existing contaminants from striped bass habitats where a documented adverse impact occurs.

- Water quality criteria for striped bass spawning and nursery areas should be established, or existing criteria should be upgraded to levels that are sufficient to ensure successful striped bass reproduction.
- Each state should implement protection for the striped bass habitat within its jurisdiction to ensure the sustainability of that portion of the migratory stock. Such a program should include: inventory of historical habitats, identification of habitats presently used, specification of areas targeted for restoration, and imposition or encouragement of measures to retain or increase the quantity and quality of striped bass essential habitats.
- States in which striped bass spawning occurs should make every effort to declare striped bass spawning and nursery areas to be in need of special protection; such declaration should be accompanied by requirements of non-degradation of habitat quality, including minimization of non-point source runoff, prevention of significant increases in contaminant loadings, and prevention of the introduction of any new categories of contaminants into the area. For those agencies without water quality regulatory authority, protocols and schedules for providing input on water quality regulations to the responsible agency should be identified or created, to ensure that water quality needs of striped bass stocks are met.[12]
- ASMFC should designate important habitats for striped bass spawning and nursery areas as HAPC.
- 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.

Footnotes

- [1] The Fish and Wildlife Service has archived otolith samples from known-age (CWT-tagged), stocked fish, for which scale ages were derived as well. These fish were collected during past Cooperative Winter Tagging Cruises and the otoliths, once aged, will increase our sample size, and since these are known-age fish, will also allow an examination of extent that which reader error affects both otolith age, and scale age.
- [2] Literature search and some modeling work completed.
- [3] Work ongoing in New York through the Hudson River Angler Diary, Striped Bass Cooperative Angler Program, and ACCSP e-logbook.
- [4] Model developed, but the tagging data overwhelms the model. Issues remain with proper weighting.
- [5] Model developed with Chesapeake Bay and the rest of the coast as two fleets. However, no tagging data has been used in the model.
- [6] Work ongoing by Striped Bass Tagging Subcommittee to evaluate the best years to use for the IRCR and the periods to use for the MARK models.
- [7] Gear specific survival being examined in Hudson River.
- [8] Ongoing work by the Striped Bass Tagging Subcommittee
- [9] Ongoing through Cooperative Winter Tagging Cruise and striped bass charter boat tagging trips. See Cooperative Winter Tagging Cruise 25 Year Report, in preparation.
- [10] Plans for a stomach content collection program in the Chesapeake Bay by the Chesapeake Bay Ecological Foundation.
- [11] Ongoing in New York.
- [12] Significant habitat designations completed in the Hudson River and New York Marine Districts.
- [13] Samples collected from two size groups ($\geq$ 28 inches and 20-26 inches) in Pennsylvania and processed by the Department of Environmental Protection to compare contamination of the two size groups.

VIII. References

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IX. Tables

Tables 1 – 6 only report catch and harvest estimates back to 1990 due to space constraints.

Table 1. Total harvest of Atlantic striped bass, 1990-2017. Recreational data source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. Commercial data source: 2016 stock assessment update for 1990-2015; state compliance reports for 2016-2017. Estimates exclude inshore harvest from A-R.

Year	Commercial		Recreational (A+B1)		Total	
	Pounds	Numbers	Pounds	Numbers	Pounds	Number
1990	689,858	115,636	2,226,546	163,242	2,916,404	278,878
1991	1,471,703	153,798	3,644,788	262,469	5,116,491	416,267
1992	1,434,495	230,714	4,034,251	300,180	5,468,746	530,894
1993	1,749,628	312,860	5,652,412	428,719	7,402,040	741,579
1994	1,776,176	307,443	6,798,579	565,167	8,574,755	872,610
1995	3,390,937	534,914	12,509,985	1,089,182	15,900,922	1,624,096
1996	3,367,185	766,518	13,233,025	1,175,112	16,600,210	1,941,630
1997	5,882,643	1,108,612	16,020,370	1,515,297	21,903,013	2,623,909
1998	6,443,874	1,233,089	12,722,184	1,352,191	19,166,058	2,585,280
1999	6,545,069	1,103,812	13,767,366	1,319,794	20,312,435	2,423,606
2000	6,698,988	1,057,712	17,634,667	1,963,702	24,333,655	3,021,414
2001	6,235,788	952,820	19,468,334	2,012,403	25,704,122	2,965,223
2002	5,999,275	658,091	18,521,685	1,807,951	24,520,960	2,466,042
2003	7,072,686	874,817	22,585,868	2,411,972	29,658,554	3,286,789
2004	7,320,357	913,160	29,366,502	2,395,131	36,686,859	3,308,291
2005	7,134,538	973,572	30,097,085	2,406,630	37,231,623	3,380,202
2006	6,783,628	1,054,664	30,866,676	2,701,736	37,650,304	3,756,400
2007	7,050,692	1,023,358	27,035,889	2,407,929	34,086,581	3,431,287
2008	7,188,715	1,010,955	30,841,285	2,310,314	38,030,000	3,321,269
2009	7,215,818	1,043,512	22,935,130	1,939,703	30,150,948	2,983,215
2010	6,979,612	1,030,938	22,972,427	1,958,404	29,952,039	2,989,342
2011	6,783,239	931,490	27,234,776	2,205,892	34,018,015	3,137,382
2012	6,514,238	839,329	19,503,265	1,481,120	26,017,503	2,320,449
2013	5,816,204	765,101	27,445,234	2,174,891	33,261,438	2,939,992
2014	5,937,662	766,298	23,608,567	1,763,073	29,546,229	2,529,371
2015	4,820,489	620,034	16,857,432	1,235,902	21,677,921	1,855,936
2016	4,818,212	605,677	19,881,179	1,524,853	24,699,391	2,130,151
2017	4,796,395	592,576	12,266,638	1,122,848	17,063,033	1,715,424
prev 5 yr avg	**5,581,361**	**721,046**	**21,459,135**	**1,635,968**	**27,040,496**	**2,355,180**
prev 10 yr avg	**6,312,488**	**864,548**	**23,831,518**	**1,900,208**	**30,144,006**	**2,763,839**

Table 2. Commercial harvest (pounds) of Atlantic striped bass by state, 1990-2017. Source: 2016 stock assessment update for 1990-2015; state compliance reports for 2016-2017. ^Estimates exclude inshore harvest from A-R.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC^	Total
1990			148,000	4,000		81,870		6,509	2,887	169,060	267,735	9,797	689,858
1991			235,000	28,000		105,163		21,079	191,066	216,755	668,454	6,186	1,471,703
1992			239,200	39,000		226,611		17,795	552,451	127,398	204,338	27,702	1,434,495
1993			262,600	40,000		109,362		28,032	916,764	142,742	213,665	36,463	1,749,628
1994			199,600	39,810		171,279		33,897	884,970	149,891	204,124	92,605	1,776,176
1995			782,000	113,461		500,784		38,198	856,568	198,478	557,741	343,707	3,390,937
1996			696,815	122,562		504,350		117,560	1,523,293	346,834		55,771	3,367,185
1997			785,942	96,519		460,762		165,978	2,030,061	731,114	1,153,743	458,524	5,882,643
1998			822,000	94,663		484,900		163,169	2,368,393	726,179	1,476,502	308,068	6,443,874
1999			788,171	119,679		491,790		187,096	2,377,393	653,266	1,538,220	389,454	6,545,069
2000			779,736	111,812		542,659		140,634	2,411,554	666,001	1,883,856	162,736	6,698,988
2001			815,054	129,654		633,095		198,802	1,774,758	658,676	1,675,469	350,280	6,235,788
2002			924,870	129,172		518,573		160,560	1,852,634	521,048	1,592,910	299,508	5,999,275
2003			1,055,439	246,312		753,261		188,419	1,813,727	676,574	1,856,831	482,123	7,072,686
2004			1,206,305	245,204		741,668		181,974	1,899,539	772,333	1,668,307	604,824	7,320,154
2005			1,104,737	242,303		689,821		173,815	2,055,558	533,456	1,746,247	588,601	7,134,538
2006			1,312,168	238,797		688,446		185,987	2,207,350	673,508	1,413,914	63,458	6,783,628
2007			1,040,328	240,627		729,743		188,668	2,336,886	599,261	1,534,799	380,380	7,050,692
2008			1,160,122	245,988		653,100		188,719	2,326,023	611,789	1,714,564	288,410	7,188,715
2009			1,138,291	234,368		789,891		192,311	2,394,620	727,197	1,549,145	189,995	7,215,818
2010			1,224,356	249,520		782,402		185,410	2,150,577	680,496	1,434,219	272,632	6,979,612
2011			1,163,865	228,163		854,731		188,620	1,976,473	694,151	1,434,636	242,600	6,783,239
2012			1,219,665	239,913		681,399		194,324	1,928,982	733,789	1,509,940	6,226	6,514,238
2013			1,004,459	231,280		823,801		191,424	1,755,712	623,792	1,185,736	0	5,816,204
2014			1,138,507	217,037		531,456		167,902	1,926,612	603,068	1,353,080	0	5,937,622
2015			865,753	188,475		509,135		144,068	1,471,493	536,357	1,105,208	0	4,820,489
2016			938,740	174,701		560,803		136,536	1,465,317	500,602	1,041,513	0	4,817,695
2017			823,409	175,312		701,216		141,800	1,520,217	472,719	961,722	0	4,796,395

Table 3. Commercial harvest (numbers) of Atlantic striped bass by state and dead discards, 1990-2017. Source: 2016 stock assessment update for 1990-2015; state compliance reports for 2016-2017. ^Estimates exclude inshore harvest from A-R. * 2017 reported estimate is based on previous 10-year average (2007-2016).

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC^	Total	Commercial Discards
1990			5,927	784		11,784		698	534	38,884	56,222	803	115,636	510,011
1991			9,901	3,596		15,426		3,091	31,880	44,521	44,970	413	153,798	327,167
1992			11,532	9,095		20,150		2,703	119,286	23,291	42,912	1,745	230,714	186,601
1993			13,099	6,294		11,181		4,273	211,089	24,451	39,059	3,414	312,860	347,839
1994			11,066	4,512		15,212		4,886	208,914	25,196	32,382	5,275	307,443	359,518
1995			44,965	19,722		43,704		5,565	280,051	29,308	88,274	23,325	534,914	515,454
1996			38,354	18,570		39,707		20,660	415,272	46,309	184,495	3,151	766,518	394,824
1997			44,841	7,061		37,852		33,223	706,847	87,643	165,583	25,562	1,108,612	216,745
1998			43,315	8,835		45,149		31,386	790,154	93,299	204,911	16,040	1,233,089	326,032
1999			40,838	11,559		49,795		34,841	650,022	90,575	205,143	21,040	1,103,812	236,619
2000			40,256	9,418		54,894		25,188	627,777	91,471	202,227	6,480	1,057,712	666,997
2001			40,248	10,917		58,296		34,373	549,896	87,809	148,346	22,936	952,820	310,900
2002			48,926	11,653		47,142		30,440	296,635	80,300	127,211	15,784	658,091	168,201
2003			61,262	15,497		68,354		31,531	439,482	83,091	161,777	13,823	874,817	261,974
2004			66,556	15,867		70,367		28,406	461,064	91,888	147,998	31,014	913,160	465,642
2005			65,332	14,949		70,560		26,336	569,964	80,615	119,244	26,573	973,572	798,544
2006			75,062	15,429		73,528		30,212	655,951	92,288	109,396	2,799	1,054,664	194,524
2007			57,634	13,934		78,287		31,090	598,495	86,695	140,602	16,621	1,023,358	606,599
2008			65,330	16,616		73,263		31,866	594,655	81,720	134,603	12,903	1,010,955	308,715
2009			63,875	20,725		82,574		21,590	618,076	89,693	138,303	8,675	1,043,512	611,944
2010			65,277	17,256		81,896		19,830	584,554	90,258	159,197	12,670	1,030,938	254,841
2011			63,309	14,344		87,349		20,517	490,969	96,126	148,063	10,814	931,490	617,457
2012			66,394	14,953		66,897		15,738	472,517	90,616	111,891	323	839,329	792,861
2013			62,570	13,825		76,206		17,679	399,118	78,006	117,697	0	765,101	525,581
2014			60,619	10,468		52,903		14,894	370,661	81,429	175,324	0	766,298	931,391
2015			42,250	11,325		44,809		10,990	300,929	69,981	139,750	0	620,034	299,566
2016			48,044	11,693		50,780		8,792	286,092	70,737	129,539	0	605,677	404,815
2017			41,222	10,106		61,569		9,517	267,165	67,539	135,458	0	592,576	535,377*

Table 4. Recreational harvest (numbers) of Atlantic striped bass by state, 1990-2017. Source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. ^ North Carolina estimates are from the Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC^	Total
1990	2,912	617	20,515	4,677	6,082	24,799	44,878	2,009	736	56,017	0	163,242
1991	3,265	274	20,799	17,193	4,907	54,502	38,300	2,741	77,873	42,224	391	262,469
1992	6,357	2,213	57,084	14,945	9,154	45,162	41,426	2,400	99,354	21,118	967	300,180
1993	612	1,540	58,511	17,826	19,253	78,560	64,935	4,055	104,682	78,481	264	428,719
1994	3,771	3,023	74,538	5,915	16,929	87,225	34,877	4,140	199,378	127,945	7,426	565,167
1995	2,189	3,902	73,806	29,997	38,261	155,821	254,055	15,361	355,237	149,103	11,450	1,089,182
1996	1,893	6,461	68,300	60,074	62,840	225,428	127,952	22,867	337,415	244,746	17,136	1,175,112
1997	35,259	13,546	199,373	62,162	64,639	236,902	67,800	19,706	334,068	518,483	96,189	1,648,127
1998	38,094	5,929	207,952	44,890	64,215	166,868	88,973	18,758	391,824	383,786	45,773	1,457,062
1999	21,102	4,641	126,755	56,320	55,805	195,261	237,010	8,772	263,191	411,873	65,658	1,446,388
2000	62,186	4,262	181,295	95,496	53,191	270,798	402,302	39,543	506,462	389,126	20,452	2,025,113
2001	59,947	15,291	288,032	80,125	54,165	189,714	560,208	41,195	382,557	355,020	58,873	2,085,127
2002	71,907	12,857	308,749	78,190	51,060	202,075	416,455	29,149	282,429	411,248	109,052	1,973,171
2003	57,765	24,878	407,100	115,471	95,983	313,761	391,842	29,522	525,191	455,812	127,727	2,545,052
2004	48,816	8,386	445,745	83,990	102,844	263,096	424,208	25,429	368,682	548,768	230,783	2,550,747
2005	83,617	24,940	340,743	110,490	141,290	376,894	411,532	20,438	533,929	293,161	104,904	2,441,938
2006	75,347	13,521	314,987	75,811	115,214	367,835	509,606	20,159	669,140	547,482	79,023	2,788,125
2007	53,694	6,348	315,409	101,400	118,549	474,062	289,656	8,465	765,169	353,372	37,376	2,523,500
2008	59,152	5,308	377,959	51,191	108,166	685,589	309,411	26,934	415,403	401,155	25,750	2,466,018
2009	62,153	8,587	344,401	71,427	60,876	356,311	283,024	19,539	501,845	326,867	5,650	2,040,680
2010	17,396	5,948	341,045	70,108	92,806	538,374	320,413	16,244	457,898	102,405	23,778	1,986,415
2011	18,105	32,704	255,507	88,635	63,288	674,844	393,194	18,023	445,171	146,603	94,182	2,230,256
2012	11,624	14,498	377,931	61,537	64,573	424,522	168,629	25,399	262,143	134,758	0	1,545,614
2013	23,143	17,657	298,945	218,236	143,373	490,855	345,008	19,520	477,295	118,686	0	2,152,718
2014	20,750	6,415	277,138	103,516	86,763	409,342	225,910	8,774	583,028	67,486	0	1,789,122
2015	4,720	1,828	170,770	39,857	70,522	262,181	284,257	3,101	406,371	94,473	0	1,338,080
2016	10,557	4,325	131,793	58,247	48,830	290,423	271,451	2,442	595,902	110,504	0	1,524,474
2017	13,198	3,935	181,141	36,725	40,046	114,000	85,745	15,904	580,569	51,585	0	1,122,848

Table 5. Recreational harvest (pounds) of Atlantic striped bass by state, 1990-2017. Source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. ^ North Carolina estimates are from the Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ^	DE	MD	VA	NC^	Total
1990	60,483	11,363	319,092	73,349	193,011	505,440	588,974	18,115	12,967	443,751	0	2,226,545
1991	58,177	6,731	440,605	496,723	125,309	1,053,589	643,571	25,501	456,954	333,743	3,091	3,643,994
1992	107,693	44,612	972,116	203,109	196,278	921,201	746,343	25,677	613,174	187,852	8,602	4,026,657
1993	11,953	28,115	1,113,446	292,428	400,067	1,575,938	874,296	52,540	794,853	505,742	1,701	5,651,079
1994	66,451	66,017	1,686,049	109,817	355,829	1,974,759	438,080	63,832	1,096,409	870,140	50,503	6,777,886
1995	45,933	67,992	1,504,390	436,058	671,647	3,296,025	3,141,222	175,347	2,057,450	955,822	73,663	12,425,549
1996	44,802	102,271	1,291,706	950,973	915,418	4,809,381	1,736,508	281,481	1,560,389	1,340,414	89,989	13,123,332
1997	185,178	206,904	2,891,970	927,919	920,465	4,449,564	821,784	232,186	1,962,947	2,813,471	301,683	15,714,071
1998	178,584	114,342	2,973,456	671,841	989,923	2,318,291	1,333,329	236,926	1,908,344	1,581,560	150,626	12,457,222
1999	98,623	84,255	1,822,818	886,666	824,031	3,171,344	3,342,372	100,541	1,137,940	1,741,857	268,026	13,478,473
2000	269,325	71,370	2,618,216	1,160,304	515,962	4,050,569	4,286,040	346,905	2,100,854	2,005,721	72,946	17,498,212
2001	290,233	223,072	3,644,561	1,138,974	628,044	2,996,805	5,341,867	382,498	2,072,943	2,140,713	284,449	19,144,159
2002	383,270	152,342	4,304,883	1,192,295	600,482	2,813,596	4,133,678	299,561	1,423,515	2,648,115	267,406	18,219,143
2003	253,910	281,549	5,120,554	1,502,455	1,537,899	4,687,685	4,545,515	303,909	2,975,437	2,789,745	772,981	24,771,639
2004	226,200	98,995	6,112,746	1,386,138	1,617,561	3,727,105	5,548,167	330,623	2,347,752	2,956,310	4,833,112	29,184,709
2005	381,058	281,114	5,097,821	1,732,581	2,173,638	5,537,432	5,958,454	286,777	4,612,417	1,996,840	2,164,859	30,222,991
2006	323,355	179,181	4,832,355	999,300	2,030,878	6,028,409	7,067,533	260,134	3,868,944	3,694,529	1,759,796	31,044,414
2007	232,328	68,142	5,136,580	1,584,354	1,468,499	7,913,817	3,718,451	99,800	3,504,041	2,392,258	876,707	26,994,977
2008	271,768	73,807	5,763,763	751,507	1,868,335	10,925,408	4,696,090	333,149	2,728,048	2,657,976	525,891	30,595,742
2009	329,064	113,705	4,786,895	1,123,434	835,970	5,004,604	4,238,319	275,410	4,278,145	1,791,058	160,922	22,937,526
2010	104,117	67,409	4,270,401	1,096,369	1,259,008	6,997,089	5,382,743	251,853	2,630,802	481,147	453,844	22,994,782
2011	91,705	370,798	3,504,522	1,257,302	758,623	8,969,762	6,197,026	241,149	2,640,309	1,160,914	2,042,981	27,235,091
2012	57,509	163,804	5,489,928	851,460	815,545	6,540,024	2,376,866	360,106	1,260,490	1,353,351	0	19,269,083
2013	102,437	233,039	4,193,416	3,043,251	2,286,969	8,624,422	4,945,069	253,062	2,203,319	526,306	0	26,411,290
2014	100,213	78,310	4,397,183	2,161,265	1,783,224	7,552,788	4,133,460	107,421	3,251,151	497,152	0	24,062,167
2015	63,878	30,614	2,701,724	798,394	1,262,377	4,620,923	5,145,204	34,808	3,095,910	430,360	0	18,184,192
2016	128,324	45,719	2,048,238	1,001,147	799,458	5,188,892	5,476,495	40,602	4,312,637	838,218	0	19,879,730
2017	160,529	37,695	2,325,778	974,602	512,959	2,258,259	1,725,147	435,518	3,541,718	294,433	0	12,266,638

Table 6. Commercial Discards, Recreational Releases and Recreational Dead Discards (numbers) of Atlantic striped bass by state, 1990-2017. Recreational data source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. Commercial data source: 2016 stock assessment update. * 2017 reported estimate is based on previous 10-year average (2007-2016).

Year	Commercial Dead Discards	Recreational Releases (B2)	Recreational ^ Dead Discards	Total Dead Discards
1990	510,011	1,653,594	148,823	658,834
1991	327,167	3,061,047	275,494	602,661
1992	186,601	3,367,397	303,066	489,667
1993	347,839	4,344,569	391,011	738,850
1994	359,518	7,930,839	713,776	1,073,293
1995	515,454	9,743,862	876,948	1,392,401
1996	394,824	12,288,668	1,105,980	1,500,804
1997	216,745	15,718,341	1,414,651	1,631,396
1998	326,032	14,928,368	1,343,553	1,669,585
1999	236,619	12,514,721	1,126,325	1,362,944
2000	666,997	16,808,809	1,512,793	2,179,790
2001	310,900	13,444,497	1,210,005	1,520,905
2002	168,201	13,693,056	1,232,375	1,400,577
2003	261,974	14,611,333	1,315,020	1,576,994
2004	465,642	17,053,333	1,534,800	2,000,442
2005	798,544	18,078,899	1,627,101	2,425,645
2006	194,524	23,343,300	2,100,897	2,295,421
2007	606,599	16,110,023	1,449,902	2,056,501
2008	308,715	12,510,987	1,125,989	1,434,704
2009	611,944	7,970,813	717,373	1,329,317
2010	254,841	6,258,081	563,227	818,068
2011	617,457	5,932,479	533,923	1,151,380
2012	792,861	5,191,891	467,270	1,260,131
2013	525,581	8,503,024	765,272	1,290,853
2014	931,391	7,265,050	653,855	1,585,246
2015	299,566	8,424,186	758,177	1,057,743
2016	404,815	11,516,493	1,036,484	1,441,299
2017	535,377*	12,003,813	1,080,343	1,615,720

^ Dead discards are estimated by multiplying the number of released fish by a mortality rate of 9%.

Table 7a. Results of 2017 Atlantic Coastal Commercial Quota Accounting in pounds. Source: 2018 state compliance reports.

State	Add IV Quota†	2017 Quota	2017 harvest	overage	2018 Quota
Maine*	188	188	-		188
New Hampshire*	4,313	4,313	-		4,313
Massachusetts	869,813	800,886	823,409	22,523	847,290
Rhode Island	182,719	181,540	175,312		181,572
Connecticut**	17,813	17,813	-		17,813
New York	795,795	795,795	701,216		795,795
New Jersey**	241,313	241,313	-		241,313
Delaware	145,085	145,085	141,800		145,085
Maryland	98,670	90,727	80,457		90,727
Virginia	138,640	138,051	133,874		138,640
North Carolina	360,360	360,360			360,360
Coastal Total	**2,854,709**	**2,776,071**	**2,056,068**	**22,523**	**2,823,096**

* Commercial harvest/sale prohibited, with no re-allocation of quota.
** Commercial harvest/sale prohibited, with re-allocation of quota to the recreational fishery.
† 25% reduction from Amendment 6 quota allocations. Quota reduced through conservation equivalency for MD (90,727 lbs) and RI (181,572 lbs)

Table 7b. Results of 2017 Chesapeake Bay Commercial Quota Accounting in pounds. Source: 2018 state compliance reports.

Jurisdiction	Add IV Quota	2017 Quota	2017 harvest	overage	2018 Quota
Maryland	1,471,888	1,471,888	1,439,760		1,471,888
Virginia	1,064,997	1,064,997	827,848		1,064,997
PRFC	583,362	583,362	472,719		583,362
Chesapeake Bay Total	**3,120,247**	**3,120,247**	**2,740,327**		**3,120,247**

Table 8. Summary of Atlantic Striped bass commercial regulations in 2017. Source: 2018 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	SEASONAL QUOTA	OPEN SEASON
ME	Commercial fishing prohibited		
NH	Commercial fishing prohibited		
MA	34" minimum size	869,813 lbs. Hook & line only	6.23 until quota reached, Monday and Thursdays only; 15 fish/day with commercial boat permit; 2 fish/day with rod and reel permit (striped bass endorsement required for both permits)
RI	Floating fish trap (FFT): 26" minimum size General category (GC; mostly rod & reel): 34" min.	Total: 181,449 lbs., split 39:61 between the FFT and GC. Gill netting prohibited.	FFT: 4.1 – 12.31, or until quota reached; unlimited possession limit until 70% of quota projected to be harvested, then 500 lbs/day GC: 5.29-8.31, 9.8-12.31, or until quota reached. Closed Fridays and Saturdays during both seasons.
CT*	Commercial fishing prohibited; bonus program: 22 – <28" slot size limit, 5.1 – 12.31 (voucher required)		
NY	28-38" minimum size (Hudson River closed to commercial harvest)	795,795 lb. 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 – <28" slot size limit, 5.1 – 12.31 (permit required)		
PA	Commercial fishing prohibited		
DE	Gillnet: 28" minimum size, except 20" min in Del. Bay and River during spring season. Hook and Line: 28" min	Gillnet: 137,831 lbs. Hook and line: 14,509 lbs.	Gillnet: 2.15-5.31 (2.15-3.30 for Nanticoke River) & 11.15-12.31; drift nets only 2.15-2.28 & 5.1-5.31; no fixed nets in Del. River. No trip limit. Hook and Line: 4.1–12.31, 200 lbs/day trip limit

(Table 8 continued – Summary of commercial regulations in 2017)

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
MD	Ocean: 24" minimum CB and Rivers: 18–36"	Ocean: 90,727 lbs. CB and Rivers: 1,471,888 lbs. (part of Bay-wide quota).	Ocean: 1.1-5.31, 10.1-12.31, Mon- Fri Bay Pound Net: 6.1-12.30, Mon-Sat Bay Haul Seine: 6.1-12.29, Mon-Fri Bay Hook & Line: 6.1-12.28, Mon-Thu Bay Drift Gill Net: 1.2-2.28, 12.1-12.29, Mon-Thu
PRFC	18-36" slot size limit 2.15-3.25 and 18" minimum size all other seasons	583,362 lbs. (part of Bay-wide quota). Allocated by gear and season.	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, 11.13-12.31 Misc. Gear: 2.15-3.25, 6.1-12.15
DC	Commercial fishing prohibited		
VA	Bay and Rivers: 18" min size, and 18-28" slot size limit 3.26–6.15 Ocean: 28" min	Bay and Rivers: 1,064,997 lbs. (part of Bay-wide quota). Ocean: 136,141 lbs. ITQ-system for both areas.	Bay and Rivers: 1.16-12.31 Ocean: 1.16-12.31
NC	Ocean: 28"	360,360 lbs. (split between gear types). Number of fish allocated to each permit holder. Allocation varies by permit.	Seine fishery was open for 120 days, 150 fish/permit Gill net fisher was open for 45 days, 50 fish/permit Trawl fishery was open for 70 days, 100 fish/permit

Table 9. Summary of Atlantic Striped bass recreational regulations in 2017. Source: 2018 State Compliance Reports. Minimum sizes and slot size limits are in total length (TL).

STATE	SIZE LIMITS	BAG LIMIT	GEAR RESTRICTIONS	OPEN SEASONS
ME	≥ 28" minimum size	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 catch and release only 5.1 – 6.30
NH	≥ 28" minimum size	1 fish/day	Gaffing and culling prohibited	All year
MA	≥ 28" minimum size	1 fish/day	Hook & line only; no high-grading	All year
RI	≥ 28" minimum size	1 fish/day	None	All year
CT	≥ 28" minimum size	1 fish/day	Spearing and gaffing prohibited	All year
NY	Ocean and Delaware River: 28" minimum size Hudson River: 18-28" slot limit, or ≥40"	1 fish/day	Angling only. Spearing permitted in ocean waters. Catch and release only during closed season.	Ocean: 4.15 – 12.15 Hudson River: 4.1 – 11.30 Delaware River: All year
NJ	1 fish at 28 to < 43", and 1 fish ≥ 43"			Closed 1.1 – 2.28 in all waters except in the Atlantic Ocean, and 4.1 – 5.31 in the lower Delaware River and tributaries (spawning ground closure)
PA	Upstream from Calhoun St Bridge: 1 fish at ≥ 28" minimum size, year round Downstream from Calhoun St Bridge: 1 fish at ≥ 28" minimum size, 1.1 – 3.31 and 6.1 – 12.31 2 fish at 21-25" slot size limit, 4.1 – 5.31			
DE	28" minimum size, no harvest 38-43" (inclusive)	2 fish/day	Hook & line, spear (for divers) only. Circle hooks required in spawning season.	All year except 4.1-5.31 in spawning grounds (catch & release allowed). In Del. River, Bay & tributaries, may only harvest 20-25"slot from 7.1-8.31

(Table 9 continued – Summary of <u>recreational</u> regulations in 2017). SF = Susquehanna Flats; C&R = catch and release

STATE	SIZE LIMITS	BAG LIMIT	OTHER	OPEN SEASON
MD	Ocean: 28-38” slot limit or ≥44” CB Spring Trophy: 35” minimum size CB Summer/Fall^: 20” minimum size and only one fish can be >28”	Ocean: 2 fish/day CB Spring Trophy: 1 fish/day CB Summer/Fall^: 2 fish/day	See compliance report for specifics.	Ocean: All year CB: C&R only 1.1-4.14^ CB Spring Trophy: 4.15-5.15 Bay Summer/Fall: 5.16-12.20
PRFC	Spring Trophy: 35” minimum size Summer/Fall: 20” minimum size and only 1 fish can be >28”	Trophy: 1 fish/day Summer/Fall: 2 fish/day	No more than two hooks or sets of hooks for each rod or line	Spring Trophy: 4.15 -5.15 Summer/Fall: 5.16-12.31
DC	20” minimum size and only one fish can be >28”	2 fish/day	Hook & line only	5.16-12.31
VA	Ocean: 28” Ocean Trophy: 36” minimum size CB Trophy: 36” minimum size CB Spring: 20-28” (with 1 fish >36”) CB Fall: 20” minimum size and only one fish can be >28”	Ocean: 1 fish/day Ocean Trophy: 1 fish/day Bay Trophy: 1 fish/day Bay Spring: 2 fish/day Bay Fall: 2 fish/day	Hook & line, rod & reel, hand line only. Gaffing is illegal in Virginia marine waters. No possession in the spawning reaches of the Bay during trophy season	Ocean: 1.1-3.31, 5.16-12.31 Ocean Trophy: 5.1-5.15 Bay Trophy: 5.1-6.15 Bay Spring: 5.16-6.15 Bay Fall: 10.4-12.31
NC	Ocean: 28” min size	Ocean: 1 fish/day	No gaffing allowed.	Ocean: All year

^in Susquehanna Flats and Northeast River: C&R only from 1.1-5.3 and 1 fish/day at 20-26” slot size limit from 5.16-5.31

Table 10. Status of Commercial Tagging Programs by state for 2017.

State	Number of Participants	Number of Tags Issued	Number of Tags Used	Point of Tag (sale/harvest)	[1]Biological Metric (Y/N)	Year, State and Unique ID on Tag (Y/N)	Size Limit on Tag (Y/N)	Tag Colors	Annual Tag Color Change (Y/N)
MA	111	65,500	41,222	Sale	Y	Y	Y	one tag color	Y
RI	29	13,661	10,106	Sale	Y	Y	N	two tag colors by gear	Y
NY	434	74,759	61,569	Harvest	Y	Y	N	One tag color	Y
DE*	111 (gill net) 129 (H&L)	16,715 1,935	9,517	Both	Y	Y	N	Harvest: two tag colors by gear Sale: one color	Y
MD	917	472,120	309,867	Harvest	Y	Y	N	Three tag colors by gear and permit	Y
PRFC	348	78,545	67,539	Harvest	Y	Y	N	Five tag colors by gear	N
VA	409	151,200	135,458	Harvest	Y	Y	Y	two tag colors by area	Y
NC^	69	26,200	22,045	Sale	Y	Y	Y	Three tag colors by area	N

[1] States are required to allocate commercial tags to permit holders based on a biological metric. Most states used the average weight per fish from the previous year, or some variation thereof. Actual biological metric used is to be included in State Annual Commercial Tag Reports.

* The number of tags issued represent the combined total from tags used by harvesters and weigh stations, such that each fish has two tags

^ All commercial tags were used in the internal waters of North Carolina

Table 11. Status of compliance with monitoring and reporting requirements in 2017. JAI = juvenile abundance index survey, SSB = spawning stock biomass survey, tag = participation in coastwide tagging program, Y = compliance standards met, N = compliance standards not met, NA = not applicable, R = recreational, C = commercial

Jurisdiction	Fishery-independent monitoring		Fishery-dependent monitoring		Annual reporting
	Requirement(s)	Status	Requirement(s)	Status	Status
ME	JAI	Y	composition, catch and effort (R)	NA	Y
NH	NA	NA	composition, catch and effort (R)	NA	Y
MA	tag	Y	composition, catch & effort (C&R), tag program	Y	Y
RI	NA	NA	composition (C&R), catch & effort (R), tag program	Y	Y
CT	NA	NA	composition, catch & effort (R)	Y	Y
NY	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
NJ	JAI, tag	Y	composition, catch & effort (R)	Y	Y
PA	SSB	Y	composition, catch and effort (R)	NA	Y
DE	SSB, tag	Y	composition, catch & effort (C), tag program	Y	Y
MD	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
PRFC	NA	NA	composition, catch & effort (C&R), tag program	Y	Y
DC	NA	NA	composition, catch and effort (R)	NA	Y
VA	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
NC	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y

X. Figures

Figure 1. Atlantic striped bass spawning stock biomass (SSB) and recruitment estimates (age-1 fish), and biological reference points, 1982-2015. Source: 2016 Stock Assessment Update

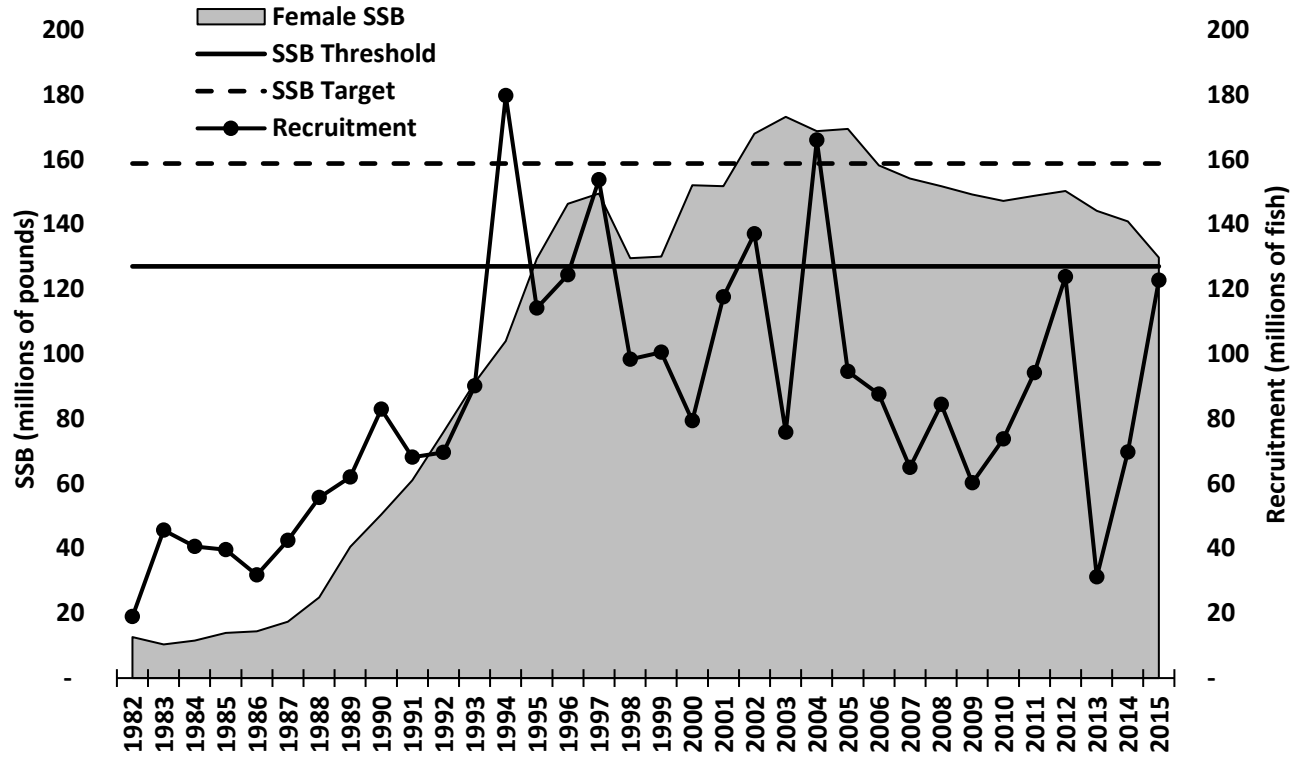

Figure 2. Atlantic striped bass fishing mortality rate (F) estimates, and biological reference points, 1983-2015. Source: 2016 Stock Assessment Update

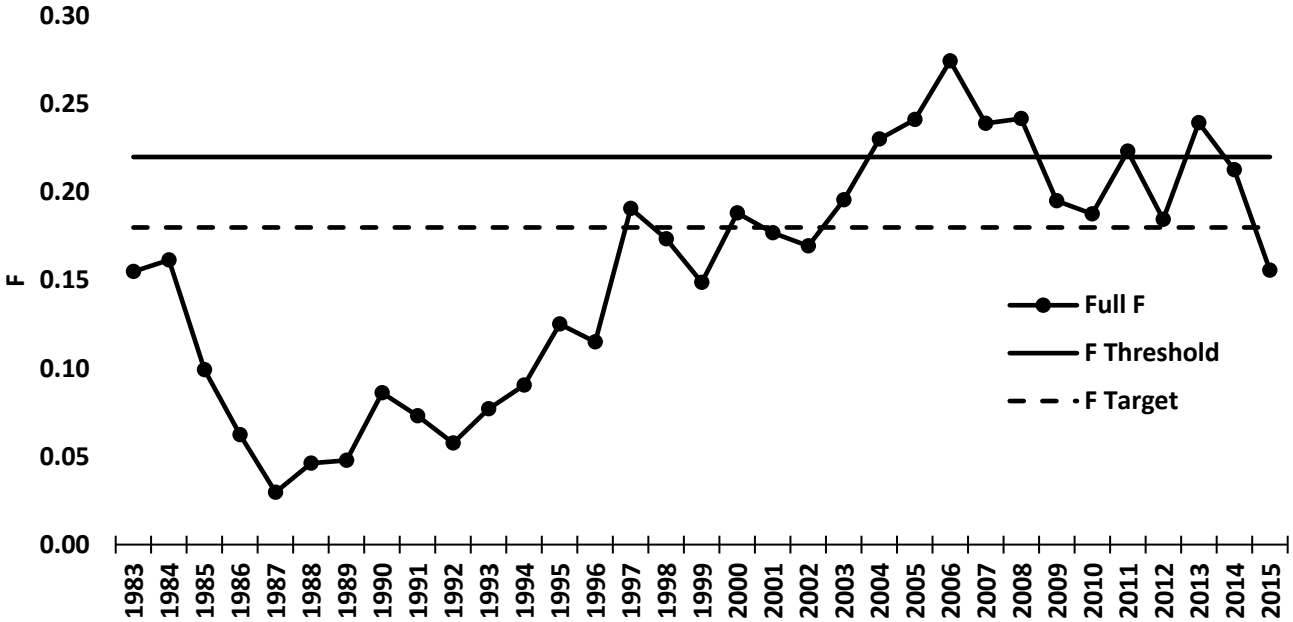

Figure 3. Albemarle/Roanoke striped bass female spawning stock biomass and recruitment (abundance of age-1), and biological reference points, 1982-2014. Source: Stock Status of Albemarle Sound-Roanoke River Striped bass, 2016

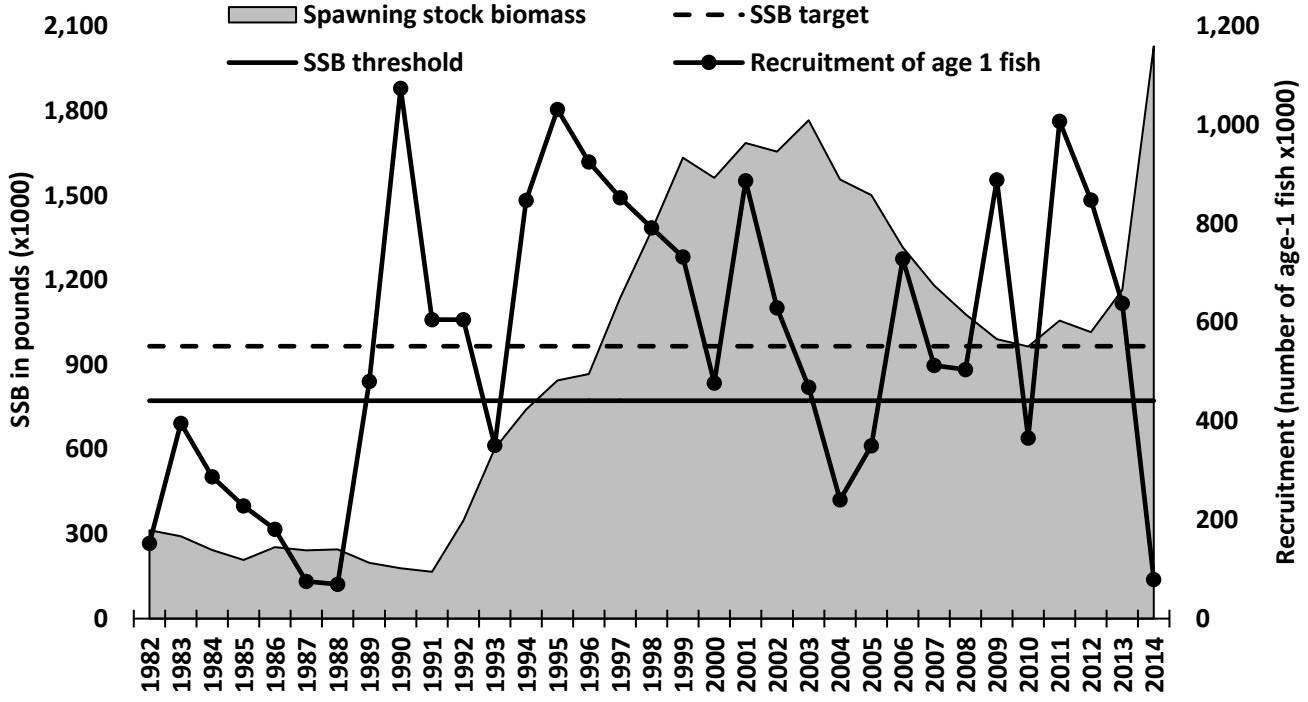

Figure 4. Albemarle-Roanoke striped bass fishing mortality (F) estimates, and biological reference points, 1982-2014. Source: Stock Status of Albemarle Sound-Roanoke River Striped bass, 2016.

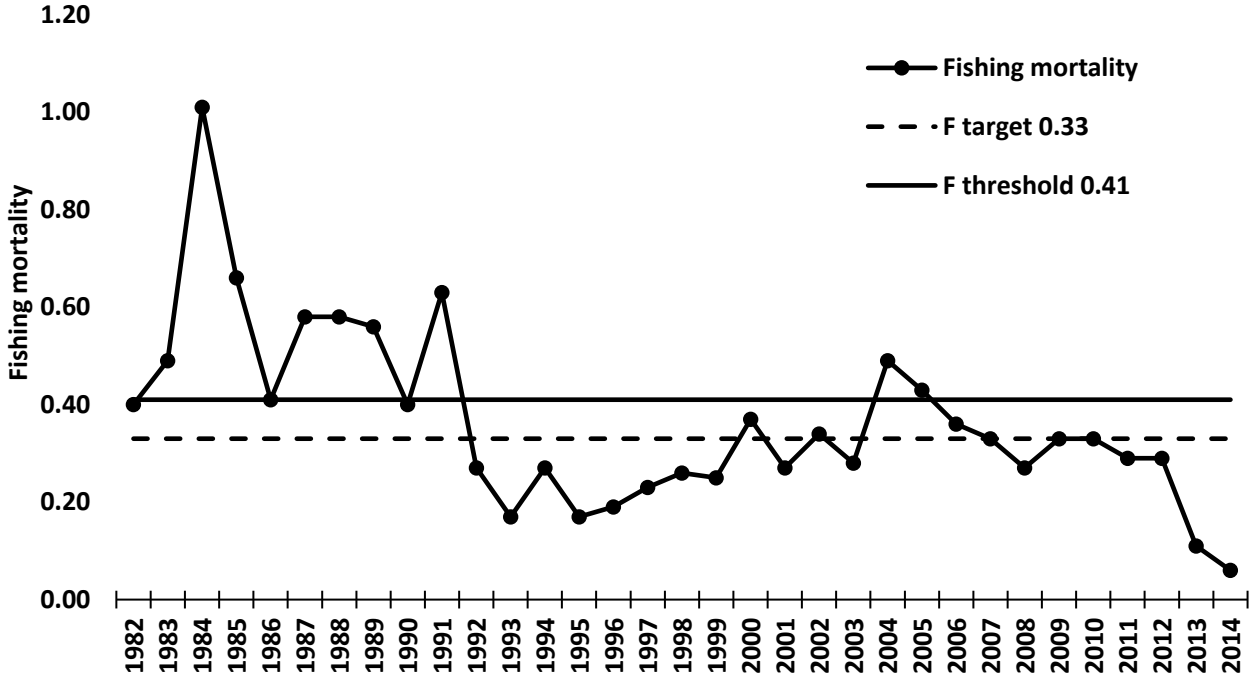

Figure 5. Total removals in millions of fish by sector, 1982-2017. Recreational data source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. Commercial data source: 2016 stock assessment update for 1990-2015; state compliance reports for 2016-2017. Estimates exclude inshore harvest from A-R.

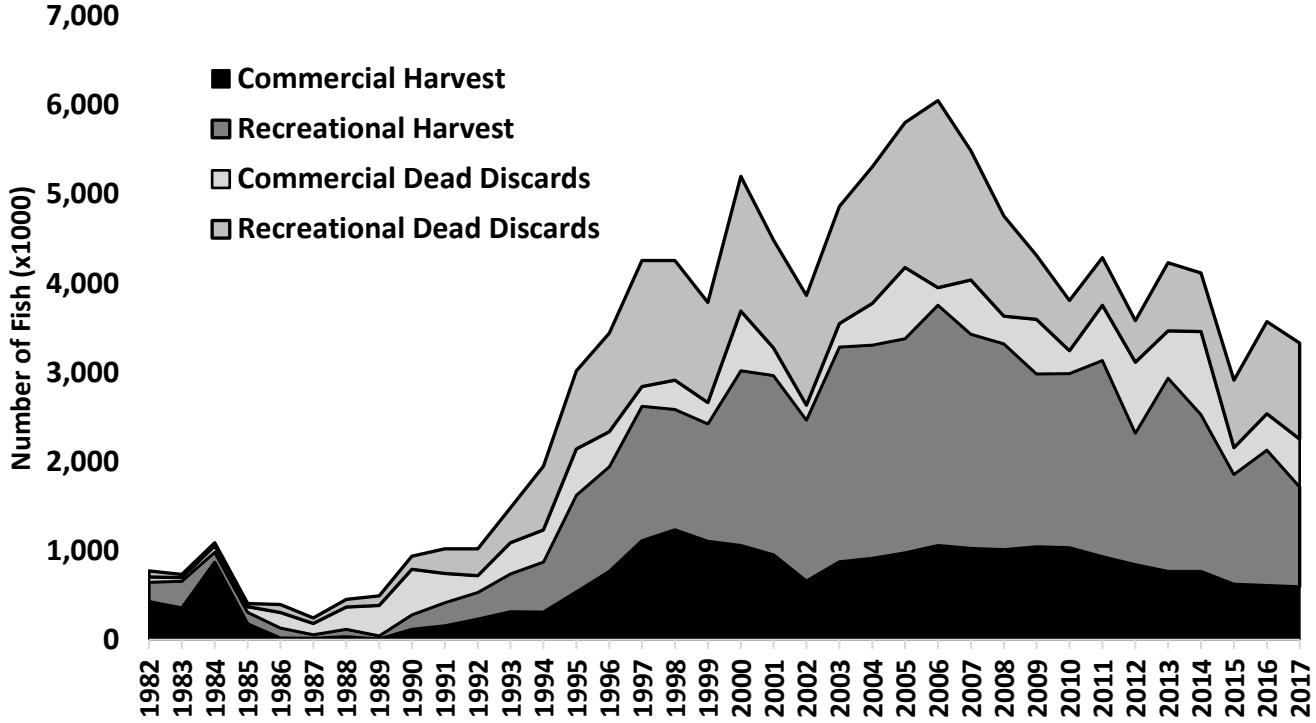

Figure 6. Commercial landings, in pounds, of migratory Striped bass, by state, 1990-2017.

Source: 2016 stock assessment update for 1990-2015; state compliance reports for 2016-2017. Commercial harvest and sale prohibited in ME, NH, CT, and NJ. NC is ocean only.

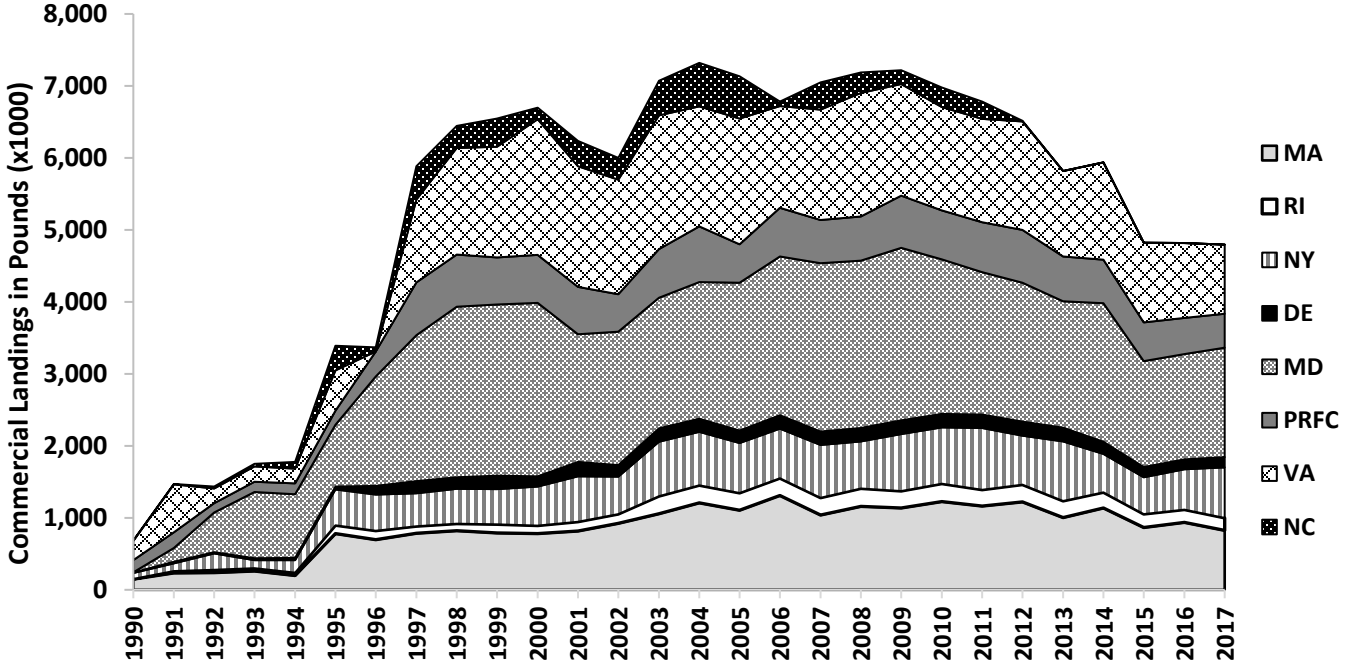

Figure 7. Recreational catch, harvest and the proportion of fish released, 1982-2017. Source: MRIP query on June 11, 2018; estimates based on MRIP's previous Coastal Household Telephone Survey. North Carolina estimates are from the Atlantic Ocean only.

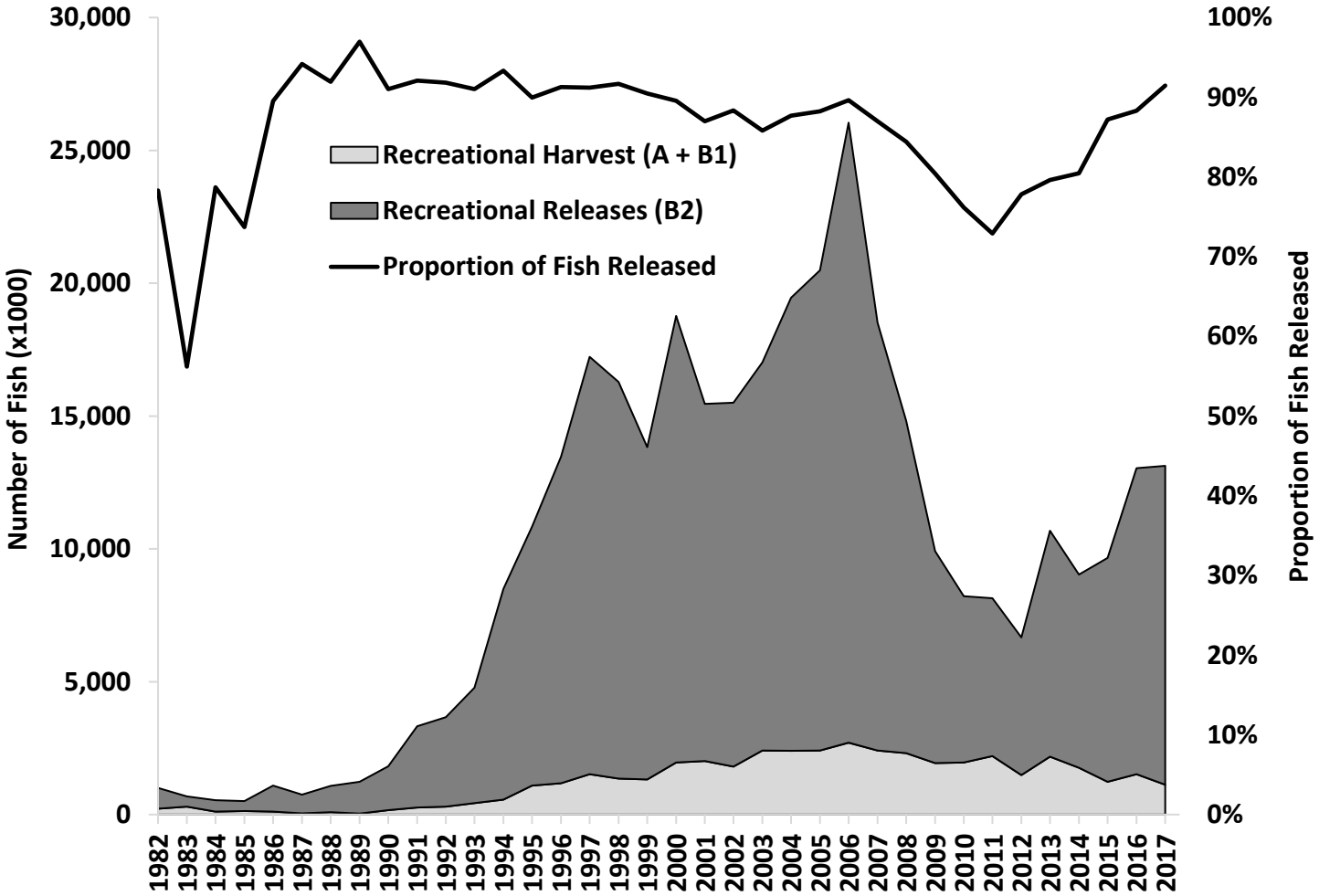

Figure 8. Juvenile abundance index analysis for Maine, New York, Jew Jersey, Maryland, Virginia, and North Carolina. Source: Annual State Compliance Reports. Q1 = first quartile, which is the value that is below 75% of all values in a specified time series. An open bar in the last three years indicates a value below the Q1 threshold.