Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

August 2, 2017 11:30 a.m. – 5:45 p.m. Alexandria, Virginia

Draft Agenda

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

1. Welcome/Call to Order (R. Ballou)	11:30 a.m.
 Board Consent Approval of Agenda Approval of Proceedings from May 2017 	11:30 a.m.
3. Public Comment	11:35 a.m.
4. Review the 2017 Atlantic Menhaden Stock Assessment Update (J. McName	ee) 11:45 a.m.
5. Lunch Break (not provided)	12:30 p.m.
 Biological Ecological Reference Point Workgroup Report (S. Madsen) Review of Hilborn, et al. (2017) Paper 	1:30 p.m.
 7. Consider Draft Amendment 3 for Public Comment Action Biological Ecological Reference Point Workgroup Report on Interim Reference Points (K. Drew) Review of Management Issues and Alternatives (M. Ware) Plan Development Team Report on NY Proposal to Recalibrate Landing Advisory Panel Report (J. Kaelin) 	2:00 p.m. s (<i>M. Ware</i>)
 8. Set 2018 Atlantic Menhaden Specifications Final Action Overview of Specification Process (M. Ware) Technical Committee Report (J. McNamee) Advisory Panel Report (J. Kaelin) 	4:45 p.m.
9. Update on 2017 Episodic Events Set Aside (M. Ware)	5:40 p.m.
10. Other Business/Adjourn	5:45 p.m.

The meeting will be held at the Westin Alexandria, 400 Courthouse Square, Alexandria, VA; 703.253.8600

MEETING OVERVIEW

Atlantic Menhaden Management Board Meeting Wednesday – August 2, 2017 11:30 a.m. – 5:45 p.m. Alexandria, Virginia

Chair: Robert Ballou (RI)	Technical Committee Chair:	Law Enforcement Committee	
Assumed Chairmanship: 05/16	Jason McNamee (RI)	Representative: Capt. Kersey (MD)	
Vice Chair:	Advisory Panel Chair:	Previous Board Meeting:	
Russ Allen (NJ)	Jeff Kaelin (NJ)	May 9, 2017	
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS,			
USFWS (18 votes)			

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2017
- **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. 2017 Stock Assessment Update (11:45 a.m. - 12:30 p.m.)

Background

- The 2017 Stock Assessment Update was completed in June 2017 (Briefing Materials).
- The TC met in Richmond, VA on June 15th to review a draft of the Stock Assessment Update and provide recommendations to the SASC.

Presentations

• Stock Assessment Update overview by J. McNamee

5. Lunch (12:30 – 1:30 p.m.)

6. BERP Workgroup Report on Hilborn et al., (2017) Paper (1:30-2:00 p.m.)

Background

- In April 2017, Hilborn et al. published a paper regarding harvest policies for forage fish.
- In May 2017, the Board tasked the BERP Workgroup with reviewing the Hilborn et al., (2017) paper given is potential application to the Amendment 3 process.
- The BERP Workgroup met via conference call on June 30th to discuss the Hilborn et al. (2017) paper and its application to menhaden management.

Presentations

BERP Workgroup report by S. Madsen (Briefing Materials)

7. Draft Amendment 3 (2:00 – 4:45 p.m.) Action

Background

- In February 2017, the Board tasked the PDT with developing Draft Amendment 3 in order to consider the adoption of ecological reference points and changes to the quota allocation method.
- Since the Spring Board meeting, the PDT met via conference call on May 22nd, June 12th, and July 12th.
- The Advisory Panel met via conference call on June 26th to provide feedback on the content of the Draft Amendment.
- The BERP Workgroup met via conference call on May 19th and June 2nd to calculate interim reference point values.

Presentations

- BERP Workgroup report on interim reference points by K. Drew (Briefing Materials)
- Review of management issues and alternatives by M. Ware (Briefing Materials)
- PDT report on NY proposal to recalibrate landings by M. Ware (Briefing Materials)
- Advisory Panel report by J. Kaelin (Briefing Materials)

Board actions for consideration at this meeting

• Approve Draft Amendment 3 for public comment.

8. 2018 Menhaden Specifications (4:45 - 5:40 p.m.) Final Action

Background

- The Board sets an annual or multi-year TAC using the best available science.
- The TC completed nine stock projection runs for the 2018 year based on recommendations from the Board. (Briefing Materials)

Presentations

Review of 2018 stock projections by J. McNamee

Board actions for consideration at this meeting

• Approve fishery specifications for 2018.

9. 2017 Episodic Events Set Aside Program (5:40 – 5:45 p.m.)

Background

- Roughly 4.4 million pounds were set aside for the episodic events program with the states of Maine, Rhode Island, and New York participating in the program.
- On July 5th, harvest under the episodic events set aside was closed.
- Total harvest under the program was roughly 4.6 million pounds, resulting in a 283,889 pound overage.

(Briefing Materials)

Presentations

• Summary of 2017 episodic events harvest by M. Ware

10. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC MENHADEN MANAGEMENT BOARD

The Westin Alexandria Alexandria, Virginia May 9, 2017

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Consider Approval of the 2017 FMP Review and State Compliance Reports	31
Other Business/Adjourn	33

INDEX OF MOTIONS

- 1. **Approval of Agenda** by Consent (Page 1).
- 2. **Approval of Proceedings of October 2016 by Consent** (Page 1).
- Move to implement a 1 million pound cap on New York's menhaden harvest under the episodic events program (Page 27). Motion by Terry Stockwell; second by Cheri Patterson . Motion carried (Page 28).
- Move to accept the 2017 Fishery Management Plan Review and state compliance reports, and approve de minimis status for New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida (Page 33). Motion by Steve Heins; second by Cheri Patterson. Motion carried (Page 33).
- 5. Motion to adjourn by Consent (Page 33).

ATTENDANCE

Board Members

Terry Stockwell, ME, proxy for P. Keliher (AA)

Steve Train, ME (GA)

Sen. Joyce Maker, ME, proxy for Sen. Langley (LA)

Cheri Patterson, NH, proxy for D. Grout (AA)

G. Ritchie White, NH (GA) Sen. David Watters, NH (LA)

Sarah Ferrara, MA, proxy for Rep. Peake (LA)

David Pierce, MA (AA) Raymond Kane, MA (GA)

Eric Reid, RI, proxy for Sen. Sosnowski (LA)

Robert Ballou, RI, proxy for J. Coit (AA), Chair

David Borden, RI (GA) Sen. Craig Miner, CT (LA)

Colleen Giannini, CT, proxy for M. Alexander (AA)

Steve Heins, NY, proxy for J. Gilmore (AA)

Emerson Hasbrouck, NY (GA)

John McMurray, NY, proxy for Sen. Boyle (LA)

Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)

Russ Allen, NJ, proxy for L. Herrighty (AA)

Loren Lustig, PA (GA)

Andy Shiels, PA, proxy for J. Arway (AA) John Clark, DE, proxy for D. Saveikis (AA) Craig Pugh, DE, proxy for Rep. Carson (LA)

Roy Miller, DE (GA) Rachel Dean, MD (GA)

Dave Blazer, MD (AA)

Allison Colden, MD, proxy for Del. Stein (LA) Rob O'Reilly, VA, proxy for J. Bull (AA) Michelle Duval, NC, proxy for B. Davis (AA) David Bush, NC, proxy for Rep. Steinburg (LA)

W. Douglas Brady, NC (GA) Malcolm Rhodes, SC (GA) Robert Boyles, Jr., SC (AA)

Patrick Geer, GA, proxy for Rep. Nimmer (LA)

Spud Woodward, GA (AA)

Jim Estes, FL, proxy for J. McCawley (AA)

Rep. Thad Altman, FL (LA) Martin Gary, PRFC

Derek Orner, NMFS Sherry White, USFWS

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

Ex-Officio Members

Jason McNamee, Technical Committee Chair

Staff

Bob Beal Toni Kerns Katie Drew Shanna Madsen Megan Ware

Guests

(Sign-In Not Distributed to Public)

Jeff Kaelin, Lunds Fisheries

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 9, 2017, and was called to order at 3:45 o'clock p.m. by Chairman Robert Ballou.

CALL TO ORDER

CHAIRMAN ROBERT BALLOU: I would like to call this meeting of the Menhaden Management Board to order. My name is Bob Ballou; I have the honor of serving as Board Chair. Before we launch into our agenda, I need to note that we have a firm 5:45 deadline for concluding our meeting; that is because the Commission is hosting an awards event that begins promptly at 6:30.

APPROVAL OF AGENDA

CHAIRMAN BALLOU: We need to be just as prompt with our agenda, so we can get through everything by 5:45. Thank you for your help with that. Item 2 on the agenda is the agenda itself. Does anyone on the Board have any recommended modifications to the agenda? Seeing none; is there any objection to approving the agenda as proposed? Seeing no objections the agenda as proposed stands approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN BALLOU: Item 2B are the meeting minutes from the Board's last meeting, which was held on February 1, 2017. Are there any recommended changes to the minutes? Seeing none; is there any objection to approving the minutes as proposed? Seeing none; the minutes stand approved by consent.

PUBLIC COMMENT

CHAIRMAN BALLOU: Item 3 is Public Comment.

This is an opportunity for anyone from the public who would like to comment on any issue that is not on today's agenda to do so. We rely upon a signup sheet; which I have here. There

is no one on it. Is there anyone who intended to speak but did not sign up? Now would be your opportunity; please raise your hand.

CONSIDERATION OF THE HILBORN ET AL. 2017 PAPER FOR TECHNICAL REVIEW

CHAIRMAN BALLOU: Seeing no hands; I am going to move on to the next agenda item; which is Item 4, Board Consideration of the Hilborn et al. 2017 Paper.

First, I will note that in addition to the Hilborn paper the Board has also received a May 1, 2017 response to that paper from the Lenfest Forage Fish Task Force; and both documents are included in your meeting materials. Second, I will note that we have just 15 minutes set aside for this agenda item; so we are not anticipating an in-depth discussion of the documents at this point in time.

Rather, our intent today is to bring these two recently released documents with particular emphasis on the Hilborn Paper before the Board; and look to the Board for guidance on how you would like to proceed regarding their review and the potential incorporation of that review in the Amendment 3 process. Given the relevancy of the papers to the Draft Amendment, and given that they have not yet been subject to technical review by the Board's Technical Committee or the BERP Working Group, one suggestion would be for the Board to initiate a technical review via a tasking motion undertaken today; and then circle back to the issue at our next meeting with that technical review in hand. I know that Megan, our FMP coordinator and Jason McNamee to her right, have been discussing this matter. I would like to now look to either or both of them to offer their thoughts on how the Board might want to proceed on this issue. Megan.

MS. MEGAN WARE: I'll be very brief. When we received the Lenfest Forage Fish Report that was sent to the BERP for a technical review, and then the BERP came back with their review of

that paper. One option for the Board is to pursue a similar avenue for the Hilborn paper, have the BERP read that over, provide their response and review of it at the August Board meeting.

CHAIRMAN BALLOU: With that; Board thoughts on this issue. Dr. Duval.

DR. MICHELLE DUVAL: I would actually like to go ahead and request that the BERP Work Group be tasked with the review of the Hilborn et al. Paper. You know in the same lens with which they reviewed the Lenfest Forage Fish Task Force Report for us a few years ago. I just don't think like it is going to be very productive for us to engage in much of a discussion today before we get that technical review. If that has to be in the form of a motion, I am willing to do that.

CHAIRMAN BALLOU: I don't think we need a motion; unless there are any objections. I will be looking for either concurrence on that or other thoughts on the matter. Robert, you had your hand up and then it went down.

MR. ROBERT H. BOYLES, JR.: Just to concur, Mr. Chairman, thank you.

CHAIRMAN BALLOU: Dr. Pierce.

DR. DAVID PIERCE: Yes I do concur, and I would like to highlight a couple of things relative to the paper that I suspect might come up whenever technical review is done by the BERP. For example, will this fishing forage species effect their predators? The authors of this paper, all seven of them, with Ray Hilborn being the first author; I assume, highlight that they're looking at rate of change.

That is significant when we're talking about rate of change, predator versus prey, and that needs to be looked at. In addition, it would be useful for there to be some reconciliation of what Ray Hilborn says in his recent text. He is the sole

author with his wife, I believe, "Overfishing, What Everyone Needs to Know."

I've got great respect for Ray Hilborn; I read just about everything that he puts out. He has a chapter in his book; they have a chapter in their book that is basically questions and answers. One of the questions is, do forage fish need special protection? Basically the answer is, yes. I read this and I hear what he says, not too long ago.

Now I see this paper with these other coauthors; and I'm left wondering, has he changed his point of view? Has he been influenced by the other authors? What did the data really suggest to him? Again, he talks about rate of change. Again, I would like to see this review. I think it will be very useful.

CHAIRMAN BALLOU: Yes, John.

MR. JOHN G. McMURRAY: I don't have a problem with putting this in front of the Technical Committee. I think they need to take a close look at it. But to a lot of us who spend time on the water, some of the conclusions that the paper came up with seem unbelievable; particularly the idea that predators only feed on younger prey, and it uses the example of menhaden. Anybody who has spent any time in that fishery understands that aggregations of menhaden drive time and area specific bites.

Striped bass really do focus on adult menhaden. That is really just one example. I would have the Technical Committee really take a close look at those datasets, because something is amiss; the whole idea that predator abundance is not related to prey abundance, just from an on-thewater perspective, defies commonsense. I would like to see a more in-depth analysis of that. I hope you guys keep the common sense factor in mind when you do review it.

DR. DUVAL: Just to clarify, with regard to Mr. McMurray's comments. The request was to

have the BERP Workgroup review it, rather than the TC. I just wanted to clarify that.

CHAIRMAN BALLOU: Anyone else on the Board wish to comment on this issue? Yes, Emerson.

MR. EMERSON C. HASBROUCK, JR.: Yes I concur that the paper should be reviewed, and that we should have that report back to us. But I would also request that during that review special attention be given to the last part of the paper; where the authors lay out what they conclude to be key factors that need to be included, when analyzing the impacts of fishing on forage fish. They lay out five or six key items that need to be addressed and included. Also, in terms of our review, I would like some comment about how will those key factors relate to where we're going with menhaden.

CHAIRMAN BALLOU: Good input; anyone else? Yes. Alison, you're new to the Board; welcome, thank you.

DR. ALLISON COLDEN: I heard in your opening statements that there are also public comments submitted in response to the Hilborn Paper. I am just wondering if the action that we are discussing also includes sending that response. I think the authors in that public comment indicated that there would be a peer reviewed response coming out following the public comment. I was just wondering if we were also considering sending the response to the paper to the BERP and or TC as well.

CHAIRMAN BALLOU: Yes, I believe you're referring to the Lenfest Task Force that did respond. That is in your meeting materials today; so we wanted to make sure it was before the Board, and that will be part of the review undertaken. It is essentially, they provided their response now we're looking to our own BERP Working Group to provide their response. Both will be essentially before the Board in August for your review and consideration. Next I have Rob O'Reilly.

MR. ROB O'REILLY: I guess my question is not to belabor the review, but in the paper there are several references besides Pikitch et al. in 2012, Curry is mentioned fairly frequently, Smith et al. I'm just wondering when this review takes place, and I don't know the answer here. Will you also look at some of these other papers? Is that part of the process?

CHAIRMAN BALLOU: I think the recommendation before the Board is to just review the Hilborn Paper. If you wish to expand on that you're welcome to, but I think right now that is the issue. Go ahead, Rob, follow.

MR. O'REILLY: I think this may be important to look at some of these other papers as well; the underpinnings for some of the premises that are here. I don't want to make it exhaustive, but maybe just to be able to look through them would be important. Get a sense of it.

CHAIRMAN BALLOU: That could be a pretty big lift, Rob. I mean, I very much respect your recommendation here.

MR. O'REILLY: I don't mind if they don't do it. I just was bringing it up. I mean that's fine; I'll stop.

CHAIRMAN BALLOU: Emerson, and then I would like to try to wrap this up.

MR. HASBROUCK: Thank you, Mr. Chairman for a second comment. In terms of review of the Lenfest response, if they're going to go forward with a peer review publication, relative to their response, I think it would be more appropriate to wait until that publication actually comes out; because what comes out of the peer review publication may be a little bit different than what they sent us as public comment.

CHAIRMAN BALLOU: That's an excellent point, and to clarify it I may have misspoken in response to Allison's question. The Lenfest response stands on its own. It's not going to be

subject to further review. What's going to be subject to review is the Hilborn Paper and Lenfest has already responded to that.

As you say, Emerson, they may well pursue that further via peer reviewed paper; and if so we'll bring that back before the Board as well. We definitely don't want to get into the business of trying to referee all these different scientific perspectives; but given the relevancy of this Hilborn Paper in particular and of course the Lenfest response.

We just simply want to make sure they're part of the mix. I think with the benefit of a technical review by our BERP Working Group delivered for our August meeting, we should have, I think, a decent handle on this issue; and be able to hopefully engage in a more thorough discussion on it. If there is no other hands up, and I don't see any; I am inclined to move on to the next agenda item, with the understanding and concurrence of the Board that this will be moved to the BERP Working Group for a technical review and report back for our August meeting.

Thank you for a good discussion on that. With that we'll move on to Item 5, which is the BERP Working Group Progress Report. This is just a quick five-minute update on the status of the working group's efforts to develop ecosystembased reference points for menhaden. I will turn to Shanna Madsen; our Commission's Fishery Science Coordinator for this review. Shanna, the floor is yours.

MS. SHANNA MADSEN: We're going to dive right in here to what should be a very familiar slide; because I show this to you guys every time I give you an update. Just looking at where we're at in 2017. Essentially, the BERP Work Group has a pretty full next few years coming up; to make sure that we are delivering our promise of ERPs by the 2019 timeframe.

In 2017, we've already completed one of these workshops, which I'll get into briefly on our next slide. We have two other in-person meetings scheduled; one to review another one of our modeling approaches, and we have various calls schedule throughout the rest of the year. We have a call coming up, actually in a few weeks.

We'll again be scheduling then a call to review the Hilborn Paper as the Board has just requested. Coming up in 2018, we will start our process of having our Data Workshop. Essentially we anticipate probably having two data workshops, due to the number of modeling approaches that we are considering; and the fact that these are multispecies models.

There is going to be a lot of data coming in. We're not just going to be vetting data for one species; we'll be vetting data for all of our predator species and all the other prey species that will be input into these models. Then in 2019, we will move into our assessment workshops. Again, we probably anticipate having about two assessment workshops.

That will have to take place prior to the 2019 peer review; where we anticipate all of our models going together as a package, along with a single species BAM model for review in 2019. We'll have those results for you, hopefully in 2020. Again, I just want to remind the Board that this is kind of the first time that we're attempting to do this level of modeling; to generate these ecosystem reference points.

It is a very ambitious timeline. We are cautiously confident in our ability to get these to you in 2019. We haven't experienced any hiccups yet; we are on track. But I will continue to keep the Board apprised of the situation as we move through the next few years. Our April modeling workshop that we just had a few weeks ago was focused on our multispecies statistical catch-at-age, you guys have all heard statistical catch-at-age modeling before.

This is the multispecies form of that. This catchat-age model is actually being developed by our very own Jason McNamee. The Committee provided Jason with some suggestions for some modifications, some comments that they had, and from those recommendations the group will be putting together a subcommittee of people who work closely with our old MSVPA model to kind of look at some of the data inputs that we want to put into that multispecies-statistical-catch-at-age model

We were also updated on some of the outside modeling approaches that are in development; as well as heard some updates from a few of the other models that we considered in 2016. We also just held a call on April 24, so just a short time ago, with the Lenfest Forage Fish Task Force. The reason that we held this call is we wanted to ensure that the reference points that are being looked at in Amendment 3 are actually calculated and are congruent with all of the recommendations that Lenfest has in their paper.

We developed a list of questions that we distributed to the task force prior to that call; just so they understood the modeling questions that we would be looking at moving forward. We wanted to have a discussion later based off of their responses. For our near future plans, as I mentioned we're going to have a call; that will be on May 19. The group is going to review the recommendations the Task Force provided us on the previous call; and again look at some of the calculations that a few of our committee members have already been working on, just to make sure that the whole committee is onboard with the way that we've decided to move forward with these calculations.

We do anticipate that these calculated reference points will be available for Megan to place into Draft Amendment 3 for further review by the AP, I believe, later in June. These will be ready for August meeting week for the Board to look at as well. As a heads up, as I said

earlier the BERP is also going to meet twice more in person this year. We're looking at a late summer in-person meeting to review a surplus production model that is in development outside of the work group.

At the end of the year the group is going to meet again in person; and that will sort of be our final decision workshop, I'm calling it, where we'll go through, we'll look at all of the modeling approaches that we've been considering over the past few years; and decide which of those will move forward into the peer review phase, as always, we will continue to keep you guys updated during our May and October meeting weeks. With that I will take any questions.

CHAIRMAN BALLOU: Questions for Shanna; Emerson.

MR. HASBROUCK: Thank you, Shanna for your presentation. I think it was your second or third slide that you had up there was relative to a recent conference call you had last week. Yes, I think it was that one, right. I'm just a little confused relative to the second bullet there.

Ensure control rules of Amendment 3 are congruent with the intention of the Lenfest Report, Pikitch et al. in 2012. Didn't either the Technical Committee or the Working Group determine that that paper was not relevant to what we are trying to do with menhaden management, menhaden ecosystem management?

MS. MADSEN: Yes, Emerson. From one of our earlier memos that we distributed to the Board after our review of the Lenfest Report, the BERP did find some issues with the paper. They did say that they believed that this would not be applicable to menhaden management. However, the Board did want to leave those reference points in Amendment 3 for consideration by the Board, as well as the public. That would be up to the Board to see

how to move forward. The BERP is still working to make sure that the calculations that are done with those reference points are correctly done.

CHAIRMAN BALLOU: Emerson, do you have a follow up?

MR. HASBROUCK: Yes, thank you. Are those the only reference points that are going to be brought back to the Board; or there are other reference points that are being developed as well?

CHAIRMAN BALLOU: I'm going to let Megan take that.

MS. WARE: Hey Emerson, there are other options; and I'll be going through Draft Amendment 3, just after Shanna's finished. I'll be talking about the options that are in the document.

CHAIRMAN BALLOU: Other questions for Shanna on her update regarding the BERP Working Group? Seeing no hands; thank you, Shanna again for a great update.

UPDATE ON DRAFT AMENDMENT 3

CHAIRMAN BALLOU: We'll move on to Item 6 on the agenda; which is as Megan just indicated, an update on the development of Draft Amendment 3. I'll just give a couple words of intro here, before turning things over to Megan.

As everyone is aware, the Board moved to initiate the development of the draft amendment at our last meeting in February, and the target date for bringing the document before the Board for final review and approval as a draft; before going out to public comment, will be at our next meeting in August.

As such, today's meeting constitutes an interim stage in the process of developing the document. This mid-stream status affords the Board an excellent opportunity to review the

progress made to date, consider some recommendations offered by the Board's Allocation Workgroup, and consider any other recommendations that anyone on the Board may wish to offer.

That is exactly what we plan to do over the next hour or so. As we engage, keep in mind that the draft amendment remains a work in progress, and no final decisions will be made on the issues and alternatives that will go out to public comment; until our August meeting. That said, the document is certainly taking shape; thanks to the excellent work being undertaken by Megan and the Plan Development Team.

As we engage in our discussion today and move into the final three-month phase of our draft plan development, I strongly encourage everyone on the Board to continue reviewing the issues and options set forth in the document; with a view to ensuring that they are presented and bounded in a way that gives the public a clear understanding of our current management program, and the alternatives being considered.

That clarity will really help to focus public comment; which no doubt will be significant, given the issues at hand. With that I am going to be turning things over to Megan for an update. Her update will wrap with a series of questions and Work Group recommendations; which will serve as the basis for our initial review and discussion today.

After we work through those issues, I will open the floor to any other comments or recommendations from the Board regarding the draft amendment, and if time allows, and I hope it does, I would also like to provide an opportunity for public comment. My goal today, with all of these issues is to seek consensus and call for motions and votes only if there are competing views among Board members. With that Megan, the floor is yours.

MS. WARE: I will be doing an update on Draft Amendment 3 today. I do just want to underline the disclaimer that this is a working document. I fully expect changes to continue to be made up until the August Board meeting. There are really two purposes of this review. The first is to provide an opportunity for the Board to kind of see progress thus far, and make any suggestions or modifications.

Then it's also an opportunity for the PDT to ask questions of the Board. As Bob alluded to. there are a series of questions that the PDT has for the Board; so we can get a bit more clarity moving forward. This is our timeline for Amendment 3. We are in the preparation of Draft Amendment 3 step, and we do expect that to take us to the August Board meeting. Hopefully at that point the Board will approve the document for public comment; which would make our public comment period likely from late August to potentially early October. Then the Board is scheduled to take final action in November. Just to kind of orient everyone to how Amendment 3 is organized, there are seven different chapters.

Chapter 1 is our introduction, so this states the problem that we're trying to address; and also provides a description of the resource fishery and habitat. The second chapter is our goals and objectives, so this outlines the purpose and need for action; as well as the reference points. Chapter 3 is our monitoring program.

This looks at things such as harvester reporting, as well as biological data collection. Chapter 4 is the management program. This is going to look at things such as allocation, episodic events, incidental catch, as well as any provisions that are under adaptive management. Chapter 5 is compliance, Chapter 6 is research needs, and then Chapter 7 is protected species.

Today I'm going to be focusing on Chapters 2, 3, and 4. However, if there are any comments or

questions on the other chapters, I'm happy to answer those. Starting off with reference points, those are in Section 2.6.4. There are currently five different reference point options in the amendment.

Option A is our single species reference points. Then Options B, C, and D are all looking towards the menhaden specific BERP ERPs. But those interim ERPs are what differ. In Option B, it is the interim use of our current single species reference points. In Option C, it is the interim use of the 75 percent rule of thumb.

In Option D it is interim use of the Pikitch et al. reference points, and then Option E is kind of our combo option; which is the fishing mortality target, consistent with achieving 75 percent unfished biomass, and our 40 percent threshold. As Shanna just talked about for Option C, D, and E, the BERP working group is still working on the calculations for those reference points.

But we do fully intend to have those ahead of the August Board meeting, and included in a subsequent draft of the amendment. Section 3.1 is Commercial Reporting; and I did want to highlight this section, because there are some differences that may occur, depending on the allocation method that is chosen.

We would still have reduction reporting through the Captain's Daily Fishermen reports, and if a jurisdictional quota is implemented then states could maintain at a minimum their current monitoring system. However, if jurisdictional quotas are not implemented, we need some way to monitor landings in season so that we could follow things such as a fleet quota, or a regional quota, or a sector quota.

As Amendment 3 currently reads, states would work to report through SAFIS. There are a couple of reasons why the PDT is recommending SAFIS. First it allows us to monitor landings in near-real time. This will be

particularly important if there are regional, fleet, sector or seasonal quotas.

Then it also is an established coast-wide program, which fulfills state and federal reporting requirements. If there are any concerns about SAFIS, now would definitely be a time to bring that up before the Board. If there are other suggestions on how to monitor quotas in season, the PDT is all ears. Section 4.3.1 is the TAC. We are using the same TAC setting method as Amendment 2, where the Board can set an annual or a multi-year TAC, and that can be done through the projection analysis or the ad hoc approach.

However, one of the new portions of this amendment is what we're calling the indecision clause. This is resulting from our healthy debate on the 2017 TAC. There are a couple reasons why we're putting this in. We need to specify what happens if the Board is unable to come to a decision on the TAC for a given year.

That is why we're putting this clause in. As it currently reads; if the Board is unable to approve a TAC for the subsequent fishing year by December 31, the TAC is set at one-half of the TAC from the previous year. I do want to note that this is definitely not a carrot approach; this is more of a stick approach, to getting the Board to a consensus.

The PDT did discuss keeping it at status quo, so if there is not a decision made, keeping the TAC from the previous year and moving it into the next year. However, there were a couple concerns that that might actually provide incentive to avoid a majority vote. For example, if the TAC is low and projections suggest that it could be increased; there may be some incentive to not have a majority vote to keep it low.

On the other end of the spectrum, if the TAC is high and projections suggest that there needs to be a decrease, there may be incentive to keep that TAC high, to not have to take that cut. That is how we ended up at one-half of the TAC. The PDT is all ears if you have another suggestion for what is a more appropriate level.

Moving on to Section 4.3.2, which is quota allocation. Just to orient everyone to how this is set up. There are three different tiers in this section. This is to try and accommodate the different combinations of allocation methods and timeframes that could be used. In Tier 1 we have our disposition quota, which is the bait versus reduction quota.

We also have fleet capacity quotas, seasonal quotas, allocation based on TAC level quotas, or none of the above. In Tier 2 we have our coastwide quota, our jurisdictional quotas, a fixed minimum quota, and then regional quotas. Then in Tier 3, we have our timeframes. Just to provide an example of how this would work.

For the Board to kind of choose the current management approach, the Board would choose none of the above in Tier 1. They would choose jurisdictional quota in Tier 2, and they would choose 2009 to 2011 in Tier 3. You have to choose an option in each tier to kind of create an allocation package.

Diving into these tiers a bit more, just to provide a bit of information on these different allocation methods, so the first one is our bait versus reduction, and there are two sub-options for how you split the quota between the two sectors. Sub-option 1 is 70 percent goes to the reduction fishery, and 30 percent goes to the bait fishery.

Sub-option 2 is that the split is based on historic landings, and preliminary allocation percentages for this option can be found in Table 1 of the amendment. Next is our fleet capacity quota. We have again two sub-options here; either a two-fleet or a three-fleet approach. Then there are also sub-options

which look at whether that small capacity fleet can be managed under a soft quota. Just to provide a bit more context on that soft quota approach. The small capacity fleet is still allocated a portion of the quota; however their fishery would not close if that quota is met.

The intent of this is kind of to reflect the ebb and flow of bait landings. Where in some years they might be a little bit above that quota, in some years they might be a little bit below; but in the end it all kind of evens out. We also have seasonal quotas here, and I'm going to talk about this a little bit more; but kind of previewing a question I have for the Board is, if the Board is still interested in this option.

One of the things to consider is states have not submitted monthly landings. My sense is from some states that might be hard to get going back to 1985. If the Board would like to pursue this option, I probably will have to use ACCSP data to calculate those percentages. Then we have allocation based on a TAC level.

Under this option we have a baseline TAC of 212,500 metric tons. If the TAC is below this then we keep our current allocation method; if it is above it, then that difference is allocated to the reduction and the state bait fisheries in different percentages, where you have different sub-options there.

Next on to Tier 2, the first option is our coastwide quota. Our second option is jurisdictional quotas and percentages for those can be found in Table 7 of Amendment 3. Next we have our fixed minimum quota. In this case each state gets a fixed minimum amount of quota. We have sub-options for either 1 percent or half a percent, and again those allocation percentages can be found in Tables 8 and 9.

Then we have regional quotas, so we have three sub-options there. We have a two-region split between the Chesapeake Bay and everyone else, a three-region split between New England, the Mid-Atlantic states and the South Atlantic states, and then a four-region split between New England, the Mid-Atlantic states, the Chesapeake Bay states, and the South Atlantic.

Then finally Tier 3, these are our allocation timeframes. Just a reminder, they are 2009 - 2011, 2012-2016, 1985-2016, 1985-1995, and then a weighted allocation between 1985-1995, and 2012-2016. One thing I do want to note is that Florida did not collect gear-specific data prior to 1993.

What this means is for some of the older timeframes we're going to have to use data from 1993 and 1994 to kind of back calculate what those gear landings are for something like a fleet capacity allocation method. Then a question that's been brought up is do historic reduction landings from states which no longer have a reduction facility count towards the allocation percentages?

This will be one of the questions that I'm hoping to get an answer from the Board today. This is what the allocation section looks like, and I'm hoping people can't actually read this; because the point is that there may be too many options in this document. What we have here is our different tiers, we have different options, we have the sub-options and then we have the subsub-options. I think the concern of the PDT is that this number of options may hinder effective public comment; and it may also hinder resulting board action in November. Kind of one of the themes I'm hoping to get across today is how can we hone in on the number of management alternatives in this section? Section 4.3.3 is quota transfers. Quota transfers only apply if a regional or statebased quota is chosen.

The PDT did not feel it was appropriate for transfers between either the bait and reduction sector, or different fleets. There was a request

at the February Board meeting that some guidance be provided on what happens if a state receives multiple requests at the same time. Amendment 3 recommends that if a state or a region receives multiple transfer requests, their transfers are considered in the order in which they were received.

We have four management alternatives here. Option A is kind of our status quo, so quota transfers would continue as they do now. Option B is our status quo, but it tries to build in some accountability measures, so that states aren't perpetually exceeding their quota; and then using transfers to try and address that issue.

This says if a state or region exceeds its quota by more than 5 percent in two years, it cannot receive a quota transfer in the third year. Option C is quota reconciliation; just a reminder of how this works. If the TAC is not exceeded then any state or region overages are forgiven. However, if the TAC is exceeded then any unused quota is pooled; and that is distributed to states or regions that had an overage.

Option D here again tries to build in some accountability measures. Under this option the amount of overages that is either forgiven or the amount that's distributed to states, is dependent on the number of previous years of overages. The more overages a state has had in consecutive years, the less amount of overage will be forgiven.

Section 4.3.4 is quota rollovers. The PDT has tried to tailor this so that quota rollovers will work under each allocation method. However, it is important to note that quota rollovers are not permitted if quota reconciliation from the previous slide is implemented. There are five different options for quota rollovers.

Option A is no quota rollovers, Option B is that 100 percent of unused quota can be rollover. Option C is 10 percent of total quota can be

rollover. For an example, if I am a state and I have one million pounds, I could roll over 100,000 pounds of unused quota. Option D is obviously quite similar to that except 5 percent.

Then Option E is rollover of 50 percent unused quota. Another example, if I have 500,000 pounds of unused quota, I could roll over 250,000 pounds. Section 4.3.5 is incidental catch. The first thing that this section does is define a small-scale gear from a non-directed gear from a stationary multi-species gear.

I think one of the challenges with Amendment 2 has been that it is kind of unclear who can participate in the bycatch fishery. The PDT has tried to define these different gear categories, so that we can develop options that pertain to each of these categories. They are not exclusive, so some gear types do occur in multiple categories. We now have six options for incidental catch. To kind of separate them, Options A, B, and C do not include bycatch in the TAC. Options D, E, and F do include bycatch in the TAC. One of the pieces of feedback we had received from the Board was to develop options that do include bycatch in that TAC. Option A is a trip limit for non-directed gears. This would be kind of your true bycatch definition, where something like a pound net would be able to harvest menhaden after the directed fishery has been closed through a trip limit. Option B is probably closes to status quo; it is a trip limit for non-directed gears and smallscale gears: so here both pound nets and cast nets would be able to harvest.

Option C built on this by adding a cap and trigger. It sets the cap at 2 percent of the TAC, and if this cap is either exceeded by 10 percent in a given year or if it is exceeded two years in a row, then that would trigger management action. The Board would be triggered to consider ways to reduce bycatch in the menhaden fishery.

Option D is an incidental fishery set aside, so 2 percent of the TAC would be set aside for incidental catch; which occurs after the quota is met. Option E is a small-scale-fishery set aside, so this sets aside 1 percent of the TAC for small-scale gears; and these gears would harvest from this set aside throughout the year.

Then Option F is all catch is included in the TAC. Once the quota is met the fishery would close. Then 4.3.6 is episodic events. Currently as Amendment 3 is written, eligibility is for the states of Maine through New York. It is the same mandatory provisions as under Amendment 2, so harvest is restricted to state waters.

There is a trip limit, daily trip level reporting. However, the PDT has tried to provide greater guidance on ways for states to prove a high abundance of menhaden. Things such as surveys or landings reports, fish kills, we've tried to provide a bit more guidance to states in the application process.

There are three options here, 1 percent of the TAC is set aside for the episodic events program. Option B is an increase, so 3 percent of the TAC is set aside, and Option C is 0 percent of the TAC is set aside; so that would eliminate the episodic events program. Then 4.3.7 is the Chesapeake Bay cap.

Under Option A, this is our status quo, where the cap is set at roughly 87,000 metric tons. Then we have sub-options that allow for either a portion of rollover of that cap or no rollover. Option B would set the cap at 51,000 metric tons, which is roughly the five-year average. Again, we have options that allow for a rollover of a portion of that if it is unused, or no rollover.

Then Option C would remove the cap. That is Chapters 2 through 4 of Amendment 3. Kind of getting back to one of the messages or themes of this presentation, how can we hone in on the number of allocation methods?

REVIEW ALLOCATION WORKGROUP RECOMMENDATIONS

MS. WARE: The Allocation Workgroup met to review Amendment 3, and also to provide some recommendations to the Board on how we can try and hone in on some of these options.

There were four questions that were asked of the Allocation Workgroup, and I'm going to provide their responses. The first question is there any benefits or concerns for either the two-fleet or three-fleet allocation method. The recommendation of the Allocation Workgroup is that the Board maintains the two-fleet quota option, but removes the three-fleet option. The Allocation Workgroup felt that the two-fleet option is less complex, and still achieves the goals of the allocation method; which is to provide equitable access to the fishery for all gears, and also reduce the administrative burden on states. The second question asked of the Allocation Workgroup is should soft quotas be included as a management alternative. The Allocation Workgroup recommends that soft quotas be maintained as a management alternative for small-capacity fleets, but that the PDT further develops clear and up-front controls on this fleet.

The PDT has started to work on that. But this is something that we would continue to work on if the Board agrees with this recommendation. The third question is; is there a regionalallocation method which best reflects the menhaden fishery? The Allocation Workgroup recommends that the current regional allocation options be removed from Amendment 3, and that they be replaced with an option that establishes a regional quota for the New England states; but maintains jurisdictional quotas for the Mid-Atlantic and South Atlantic states.

Some of the members of the workgroup expressed concern that regional quotas could result in states being shut out of the fishery, due to the timing and the movement of

menhaden. However, they did note the episodic nature of the New England fishery, and that may warrant a regional management approach.

Finally, the fourth question asked of the group was should historic reduction harvest from states which no longer have a reduction fishery be included in the landings used to calculate allocation percentages? The recommendation of the workgroup is that landings data prior to 2017 is not used in this amendment; 2007, my apologies. They pointed to a couple of things. They pointed to inconsistent reporting for several states prior to this date. They noted that this timeframe only includes one active reduction plan.

Many pointed to some of the management challenges that are occurring with summer flounder. As a result, they are recommending that the current allocation timeframes be replaced with the following; 2009-2011, which is our status quo, 2013-2016, which is four years under Amendment 2, 2007-2012, which is the six years before Amendment 2, 2012 -2016, which is the five most recent years of data, and 2007-2016, which is the most recent decade of data.

One of the last slides here, this is just kind of an FYI for the Board. New York did submit a proposal to recalibrate the menhaden landings, due to inconsistent or non-existing reporting. In the proposal they compare landings for 2013-2016 to 2009-2012; to scale their historic landings. The PDT is in the process of reviewing this proposal, and they will provide a recommendation to the Board in August.

PROVIDE GUIDANCE/ADDITIONAL INPUT TO THE PLAN DEVELOPMENT TEAM REGARDING MANAGEMENT OPTIONS

MS. WARE: Just to leave the Board off with some questions from the PDT. Again, how can we hone in on the number of management alternatives in this document? Should the

three-fleet option be removed? Should soft quotas be included as an alternative? Is the Board still interested in seasonal quotas? Should the regional allocation options be replaced with an option that creates a New England regional quota, but maintain state quotas elsewhere, and what timeframe should be used for allocation?

CHAIRMAN BALLOU: Really excellent presentation. Here is what I would like to suggest. Instead of an open question period, as we typically do after a presentation like that. Let's work through the issues that were teed up by Megan's presentation; at least initially address any and all questions along the way. Once we get through those issues, we'll open the floor to any other suggestions, any other recommendations pertaining to anything in the document. But I just want to kind of manage the discussion here by staying as focused as we can. Issue Number 1, just drawing from this slide that Megan has left up, is the recommendation that the two-fleet option be maintained in the draft amendment, but the three-fleet option be removed. Are there any questions regarding this recommendation? Are there any thoughts regarding the working group's recommendation, which I just indicated? Dr. Pierce.

DR. PIERCE: Very well done presentation and the questions have been very succinctly listed for us. Should the three-fleet option be removed? I'm going to believe you in your presentation noted the benefits of going with the two-fleet instead of the three-fleet; but what I missed was the drawbacks. Did the group highlight any of the potential drawbacks if we go to two-fleet as opposed to three-fleet? I'm leaning towards the two-fleet, but again what are the specific drawbacks, if any?

MS. WARE: I don't think any drawbacks were discussed on the call, however you're just kind of outlining how the two-fleet versus three-fleet works. Two fleet is small versus large, so

it's basically all gears separated from purse seines and pair trawls. The three-fleet option there is smaller gear, so things like cast nets, bait nets versus a medium fleet, which is something like pound nets versus the purse seines. I think it is more that the division between those different gear types.

DR. PIERCE: By going with the two-fleet as opposed to the three-fleet, we put in the mix the pound nets and cast nets. I am wrestling with that one. What is a gear that is capable of taking a "large amount of menhaden" versus a much smaller amount that one would expect to get with a cast net? I haven't yet been able to wrestle with that answer to that question. To what extent would we disadvantage the cast net fishermen as opposed to maybe not doing that?

CHAIRMAN BALLOU: I'll leave that as a comment. Good question and I think it was answered; any other questions, comments, Terry Stockwell.

MR. TERRY STOCKWELL: I am on the same thread. Megan, can you explain to me the difference between the two and the three-fleet, where cutoff would be. In a particular issue we discussed at the last meeting it was a difference in the size of the purse seiners; and the fact that actually the fish traps, at least in Maine, could have a fairly high catch. I'm not opposed to simplifying the document by going into a two-fleet component; I just want to make sure that the fishing effort is appropriately divided.

MS. WARE: In the two-fleet option it is basically purse seiners and pair trawls versus everything else; so your Maine purse seiners would be included in that large fleet. For the three-fleet option, the split for that large fleet is for purse seiners which have a capacity over the 120,000 pounds; so your Maine purse seiners would be in the medium fleet.

MR. STOCKWELL: To that point, thank you. In that case I am strongly in support of the three-fleet approach.

CHAIRMAN BALLOU: Okay, so we have a recommendation to just go with the two-fleet and not include the three as well, but we have at least one Board member, Terry Stockwell urging that it be kept in; that three-fleet option, so discussion on the issue, Rob O'Reilly.

MR. O'REILLY: Just a question. The fleet, whether two or three is part of that whether some of the gear types in the fleet, the small-based fleet would be soft caps and some would be soft quotas and some would be hard quotas. Is that part of what is also being asked?

MS. WARE: Yes, so those two issues are very much related. A sub-option of the fleet option is that that small capacity fleet be under a soft quota; so there is an option for it not to be under the soft quota, and an option for it to be under the soft quota. What you define as a small fleet will impact which gears might be subject to a soft quota.

CHAIRMAN BALLOU: I was hoping to reach consensus, and if we don't we can take a vote or we can just roll with what we've got. Again, the idea here is to try and give the PDT as much guidance as possible as they continue their work on this document; which will come back before the Board in August.

These issues could very well be brought back in August for further discussion, but at this point it is sort of an interim check; and this is one issue, and I'm looking for further guidance from the Board on how you would like to proceed on this. Emerson, did you have your hand up?

MR. HASBROUCK: Yes, thank you, Mr. Chairman and thank you, Megan for your excellent presentation. You were able to synthesize all those various options quite well. In looking in the document, under Table 2,

which is the two-fleet option, there are different percentages there that are based on historical catch for different time periods.

Then for the three-fleet option it is allocations yet to be calculated. There is no direct comparison there currently, and even if there were, I know these percentages are based on reported landings; but is that subject to change by the Board in August, or even further down the road in October? If we want to change what those percentages are?

MS. WARE: The percentages in Table 2 are based on historic landings. Unless there is a change in historic landings, those percentages would not change, or unless the allocation timeframes are changed. They presumably would not change. But there is not an option in here yet that says 5 percent goes to small-fleet and 95 goes to large, and that not be based on an allocation timeframe. Did that answer your question?

MR. HASBROUCK: Yes it does, but what if we wanted to include a discussion about that; you know about having the distribution between fleets, whether it be two-fleets or three-fleets, be based on something other than historic landings over whatever time period we want to choose? Make it not based on historic landings.

MS. WARE: Yes, if the Board is interested in that that is important information for the PDT to know.

CHAIRMAN BALLOU: Let me just pick up on Emerson, your comment, because I think it's relevant to Terry's perspective; and that is right now in the document under Table 2, is a break out of what a two-capacity fleet allocation might look like; depending on the timeframe, and indeed there is a sort of hold under that for Table 3, allocations not yet calculated.

I think the challenge here is that it would be indeed a challenge to try to calculate allocations

on a three-fleet basis; because now you're parsing the purse seine fleet. You're taking historically those purse seines able to harvest up to, I forget what the cut off is, 125,000 pounds; affording them an allocation in accordance with that middle fleet, mediumfleet category.

Then trying to go back and figure out how many purse seines that was capable of harvesting more than 125,000 pounds, putting them in the large fleet. I think if I'm not mistaken, and certainly anyone from the Working Group can speak up on this. That sense of trying to parse out the purse seine fleet into two different categories; based on historical timeframes, was going to be a huge challenge.

Why do it? Wouldn't it make more sense, and again I'm trying to paraphrase the Working Group recommendation, to just have the purse seine fleet in one category; purse seine and pair trawls, and all other gear types in the other? Terry, did you want to follow on that?

MR. STOCKWELL: Yes, thank you, Mr. Chairman. We entered into the development of this amendment with the understanding we were going to completely look at the reallocation from soup to nuts. By eliminating the medium capacity fleet, you are disenfranchising a complete gear type and region to start with.

I just don't think it is right at this point. We may find further down the road that it makes sense to merge the two, but right now the large purse seine effort and the small purse seine, they're two different fisheries; as different as between a medium vessel and a haul seine. They are two different fisheries.

Putting them in the same category, particularly as we go down soft quotas, time periods, I know it is a bucket load of work, and I appreciate all the hard work that the TCs and the Working Group is doing to develop this. But you lack the

perspective of a historic fishery in this Working Group, to advocate for what last year in Maine was a significant fishery. I hate to see us go through the efforts to develop an action right now, and at the very beginning exclude a fishery. I am strongly in favor, at least at this point, of maintaining the three-fleet option.

CHAIRMAN BALLOU: Thank you, fair enough. What I'm going to pose to the Board is that there is now on the floor a strong recommendation for keeping both the two-fleet and three-fleet options in the document. I would like to have anyone speak to that in opposition. Is there anyone in opposition to keeping both in the document? Please raise your hand and speak to that. David.

MR. BORDEN: I'm not in opposition, I'm just trying to get my head around the issue, and that I understand Terry's point here. What is, if I can ask Megan a question? What portion, almost 95 percent of the allocation goes to a large capacity fleet, the way I understand it. Under the three-fleet option, what portion of the allocation goes to the medium-sized vessels?

MS. WARE: I don't know, because I haven't calculated it yet.

MR. BORDEN: Okay. As I said, I recognize the point that Terry is making, and I understand the logic. But I also, looking at this, I think it's going to pretty much complicate the document significantly if we have. One of the options would be to, instead of having a 25,000 pound trip limit per day on the small-capacity fleet to simply raise that to 125,000 pounds, so we would have two fleets, one would be a large capacity fleet, and the other would be a small capacity fleet. The small capacity fleet would have a higher trip limit. That should meet Terry's needs, and also simplify the document.

CHAIRMAN BALLOU: Duly noted. Are there other thoughts or suggestions on this issue? Emerson.

MR. HASBROUCK: Megan, I think it might be helpful sometime after this meeting, if you could send out to the Board members the summary slide that you had with the different actions under the various tiers. Because the question I have here relative to two fleets or three fleets is if we choose to just split the total allocation between the reduction fishery and the bait fishery, do we even get into a discussion about fleets? I can't recall from your summary.

CHAIRMAN BALLOU: The answer is no. Those are two different options under Tier 1. You would only be able to pick one. The Board would only be asked to pick one.

MR. HASBROUCK: Right, so if we chose the option of splitting the quota between the reduction fishery and the bait fishery, then we don't need to worry about two fleets or three fleets or four fleets or whatever.

CHAIRMAN BALLOU: Correct. I see no other hands, so I'm going to suggest, based on the discussion that has taken place today that both, two-fleet and three-fleet remain in the document for further development by the Plan Development Team. Is there any objection to that guidance moving forward?

Seeing none; we'll move on to the next issue, which is the recommendation that soft quotas be maintained as a management alternative as applied to the small-capacity fleet option. Are there questions on this issue, thoughts on the Working Group's recommendation that soft quotas be maintained? David Borden.

MR. BORDEN: Maybe two questions. One question is do all soft quotas count towards the overall TAC?

CHAIRMAN BALLOU: The answer is yes.

MR. BORDEN: Okay, so I'll pass on the second one.

CHAIRMAN BALLOU: Questions, thoughts on this issue, in particular the recommendation to keep soft quotas in the document; and again as applied to the small-capacity fleet option. Is the Board comfortable with that? Dr. Pierce.

DR. PIERCE: Yes, I'm very comfortable with that. I think it's a good concept and in light of the guidance you just provided, Mr. Chairman regarding the two-fleet and three-fleet option, it will provide for more, I wouldn't say a challenge, but it will be more informative for all of us; because the small-capacity fleet is defined in different ways, depending upon two or three fleets. That might influence our eventual decision about whether to go with the soft quota for the small-capacity fleet. I make that point, because I look at the two-fleet option and I see you know the drift gillnets and the weirs and the pound nets and the floating fish traps; and I'm thinking wouldn't that possibly result in a rather large amount of menhaden being landed? How do you justify a soft quota for those particular gear types? If it is only 5 percent of the total landings of the commercial fishery, then I suppose it is not a big deal. Again, I support the soft cap.

CHAIRMAN BALLOU: Any further thoughts on this issue? If not, since we have concurrence on keeping it in and moving forward, and as such we will now take on Issue 3, which is the question of whether the Board remains interested in including a set of alternatives pertaining to seasonal allocation. If I'm not mistaken, the Working Group's recommendation was to strike that set of options from the document.

We're looking for questions and/or comments on that recommendation. The issue is seasonal allocations. This would be a Tier 1 option, so it would be in lieu of that reduction bait breakout, in lieu of a fleet capacity, it would be just breaking out the entire fishery into seasons; and managing it accordingly. The Working Group's thoughts on that were no, it was

essentially that it does not warrant remaining in the document, so thoughts on that. Rob O'Reilly.

MR. O'REILLY: I think that Megan outlined the problem that could exist with seasonal allocation when she gave her presentation. It could be haves and have not's, depending on the movement of the fish. I think it should be removed.

CHAIRMAN BALLOU: Thank you for that, Rob, is there anyone else on the Board wish to comment on this? Is the Board comfortable with this recommendation to remove it? It would certainly help pare down the options. It would be in keeping with the intent of this discussion. David Borden.

MR. BORDEN: I agree with Rob. I think it should be removed. I think it simplifies the document.

CHAIRMAN BALLOU: Any other thoughts? Seeing none; I think we have good guidance on this one, and we'll move on to the next issue; which is the recommendation that the current regional allocation options be removed from the amendment, and replaced with an option that considers a regional quota for the New England states, Maine through New York, and jurisdictional quotas for the Mid-Atlantic and South Atlantic states. Questions on this? Discussion? All right, Eric Reid.

MR. ERIC REID: I will be opposed to a regional quota in New England. Where we are in Rhode Island, typically we would have the last shot at any fishery. The perfect example is this year where there was no episodic event available to us, unless the quota was high enough that we all had a nice piece of the pie; but I would be opposed to a regional quota in New England.

CHAIRMAN BALLOU: Would you be opposed if that were the only region that had a quota, as a

way of preserving access to the fishery for the New England region?

MR. REID: I'm opposed to a regional quota in New England.

CHAIRMAN BALLOU: Other thoughts on this. Dr. Pierce.

DR. PIERCE: I'll echo it, I'll echo Eric's perspective. I definitely do not want to see regional allocation options replaced. What we're doing right now in our individual states in New England, I can speak specific to Massachusetts. We've done quite a bit to figure out how to manage our individual quota.

We may eventually have to go in a completely different direction; depending upon what the final results are, relative to this addendum. But the regional allocation definitely would put my state in particular at a great disadvantage; relative to who gets what first, depending upon the movement of the fish and the seasonality of that movement. I would not support that regional allocation option.

CHAIRMAN BALLOU: We really have two issues that are sort of getting conflated here. One is right now the Draft Amendment under Option D, regional allocation has three sub-options. The first is a two-region split, Chesapeake Bay being one, and the rest of the coast being the other. Sub-Option 2 is a three-region split.

The first region is a New England region, the second is essentially a Mid-Atlantic and the third is a South Atlantic. The third sub-option is a four-region split; New England one, Mid-Atlantic, New York through Delaware being the second, Chesapeake Bay, Maryland through Virginia being the third, and South Atlantic being the fourth.

The question for the Board is; do you want to keep those regional allocation options, including all three sub-options in the document or not? If not, do you want to replace it with something else? I'm sort of hearing two different things. I'm hearing opposition to the regional allocation approach. I'm hearing particular opposition to a New England regional approach. I'm not sure. I'm just trying to get a clear read from the Board on how they want to proceed on this issue. Rob O'Reilly.

MR. O'REILLY: I'll just mention what the Allocation Work Group talked about concerning regions that it would break down to states within the region, trying to make sure that they didn't go over a quota; and that could be somewhat of a complication. I know that was stated on the Allocation Working Group.

CHAIRMAN BALLOU: Let me pose the question this way. Is there any opposition on the part of the Board to removing regional allocation in its entirety? I'll just stop there. Is there any opposition to that? Does the Board support removing regional allocation as a component of this amendment? Let me go to Steve Train first.

MR. STEPHEN R.TRAIN: While I can see the merit to removing it, no knowing what we're going to get for a choice in the end makes me wish we could keep it in there a little bit longer. I mean with what we landed in Maine last year, and the way things are changing; having an allocation that is greater than having Terry and Pat begging and borrowing from the other states to get quota, would be better for us now. Can we do away with regional, yes? But not knowing what we're going to get instead of it, makes me want to be able to keep the option in it for now.

CHAIRMAN BALLOU: Understood. Cheri.

MS. CHERI PATTERSON: I agree. I think we need to maintain the regional option, because these fish are moving. We are seeing more and more episodic events further north; and those need to be considered if the population continues to expand.

CHAIRMAN BALLOU: Yes, Senator Watters.

SENATOR DAVID H. WATTERS: Just a follow up on what Cheri said. It is hard to separate this from the next issue of the timeframes, kind of a question to Megan. If we are seeing a shift of the biomass towards the north because of climate, do those timeframes really adequately reflect what might be projected there from, so that whatever we do in the regions, if we have timeframes that are based on historic landings that really don't reflect where the fish are going? I think that would be difficult.

MS. WARE: Yes it's a tough question. I'm going to throw it back to the Board. I mean I think it is up to the Board to make a policy decision on the timeframes, and whether the Board is interested in using historic timeframes or pursuing the allocation workgroup's recommendation to go from 2007 forward. I mean that is the next discussion we're going to have.

CHAIRMAN BALLOU: Dr. Pierce.

DR. PIERCE: Yes, I'm very much influenced by Option C in the list of options. Jurisdiction allocation with minimum based allocations, I suspect that that option and one of those suboptions, one or two, would actually be of benefit to the state of Maine and to other states. I know it will be to the state of Maine that is the last in line, so to speak, with menhaden.

With the regional allocation that would include, what is it Connecticut through Maine that potentially would put Maine at a disadvantage; regional allocation in the interest of shortening the document and making it easy to understand, and certainly supportable by me.

Regional allocation Option D, I still think we could delete that and go with Options A, B, and C. That should do the trick, but again I'll defer to the state of Maine. If Maine's

representatives really feel that Option D needs to be kept in there then I'll support that. But I really do think it's unnecessary.

CHAIRMAN BALLOU: Then again, just to remind the Board. We will be coming back to this for really a final review as a draft for public comment in August. We will have another chance at this issue. It's just to try to aid in the further development of the document, particularly with regard to the analysis of these options that we're really trying to address today. David Borden.

MR. BORDEN: Yes, Mr. Chairman, a question for you. Does this require more? If we leave it in until the next meeting, when we review more details, does it require any more work on the part of staff?

MS. WARE: It depends if we change the timeframes or not.

MR. BORDEN: It may make some sense just to leave it in and then take this up at the next meeting, and make a formal decision on it. People can think on it and so forth.

CHAIRMAN BALLOU: I think that is a really good fallback suggestion on these kinds, given the discussion we've just had. Just as a reminder, this is a Tier 2 issues, and I think as the Board becomes more fluent in the development and the nature of the amendment, the notion of first you don't even get to this issue of regional allocation until you've gone through a Tier 1 selection process.

I think what I'm urging everyone to do is sort of go back home, really try to digest this document as best you can. Think through the sequencing, if you will, of the decision making process that is going to unfold. Think about the public, in terms of trying to make sure they can be guided through the process of assessing the options in a way that is clear and straightforward.

Perhaps when we return in August there will be some clear thinking on what combinations we want to keep in, and which we might want to remove. I get the sense that maybe for many of you, you're just getting more and more familiar, but aren't at the point yet where you're ready to strike a wholesale some of these options.

That's the sense I'm getting, but if I'm wrong correct me. If there is certainly any specific recommendations to for example take out any of the specific sub-options under regional allocation. Now is the time to speak, otherwise maybe we'll just keep things together. David Blazer.

MR. DAVID BLAZER: In the spirit of cooperation, trying to trim down a little bit of the document. I think we could eliminate Sub-option 1, which divides the regional allocation for Chesapeake Bay and everybody else. I think we're supportive of eliminating that option.

CHAIRMAN BALLOU: Is there any objection to removing that so that we would be left with two sub-options, one would be a three-region split, the other would be a four-region split. We would remove, as Commissioner Blazer just suggested, the two-region split separating out Chesapeake Bay. Is there any objection to trimming the document just a bit in that way? Seeing no objection; thank you for that suggestion and we'll convey that to the PDT, other thoughts on this issue; Rob O'Reilly.

MR. O'REILLY: Not on the region, but we had also delved into the timeframe.

CHAIRMAN BALLOU: That's next.

MR. O'REILLY: Okay. Too early to comment?

CHAIRMAN BALLOU: You might be only five seconds early, but let me just make sure we've wrapped on that. Have we wrapped on the issue of regional allocation; or does anyone have anything else? Dr. Rhodes.

DR. MALCOLM RHODES: Just one quick question. We would remove Chesapeake Bay, but we would still have the catch cap in the earlier part of the document.

CHAIRMAN BALLOU: Correct.

DR. RHODES: All right, perfect, thank you.

CHAIRMAN BALLOU: Good question, I was thinking the same thing, so if the Chesapeake Bay cap portion remains, this just has to do with this sub-option; any other discussion on this issue? Seeing none; and Rob, I'll give you first crack at this. We're up to Issue, actually the last issue if you will on the list of issues to be considered; at least from the Working Group's perspective and that is the issue of Allocation Timeframes.

The issue has two components. One is the question of whether reduction landings from states which no longer have a reduction fishery, should be included in the calculations. The other is the question of which set of timeframe options should be included in the amendment, and used to flesh out the allocation percentages for every alternative that involves jurisdictional allocations. I just want to make sure the Board is clear.

These timeframes would be used in multiple ways throughout the document, on each and every occasion where there needs to be an allocation based on historical timeframes. You can see right now in the document in the tables that have been developed that were presented and are in your meeting materials, how things would play out with regard to the current four alternatives that are in the document.

In addition to status quo there are four alternatives in the document. You also have a Working Group recommendation to replace those with four different alternatives. I know Megan had put that slide up, but there it is right there. Right at the bottom of the slide is the

focus of the discussion I would now like to undertake, and that is current timeframes versus proposed new timeframes; questions, discussion on this, I'll go to Rob O'Reilly first.

MR. O'REILLY: I'm well aware that Robert Boyles and you have hosted about maybe nine, it seems like nine Allocation Workgroup conference calls, and so we have discussed this. I think in the document that has been prepared, the Draft Amendment 3. It is pretty clear that there are some problems with the historic information; not only the lack of data back in time, but also the fact that the last factory or reduction facility other than Omega Protein, was around until about 2007. We talked about that.

We talked about the data deficiencies, and I think one of the recommendations and there are other folks on the Working Group, so if I get anything wrong let me know. But one of the ideas was there was a comment that 2013-2016, the second option was actually going to be almost a continuation of what had happened; even though it followed Amendment 2.

Certainly that was born out that the proportion of harvest after Amendment 2 is there. The 2012, the fourth item was because with Amendment 2, the Board was just short of having any final data, and it seemed like that could be included. Then of course the 2007 goes back to the fact that that is where there is only one reduction facility; and that is Omega Protein.

I would recommend, and other Working Group members can chime in, with the proposed timeframes are really more suitable. I know that it would be a struggle to try and recreate the past data. That is one reason. The second reason owes to the reduction class.

CHAIRMAN BALLOU: Just to help ensure that the discussion that ensues now is well

informed. At the end of the Working Group memo, which is just a short, two-page memo in your meeting materials, is a third page, essentially. That is Table 1, and it shows the state-by-state allocation percentages for the time periods recommended by the Allocation Working Group. That would be the set of allocation timeframes on the right, on the slide that's up there now. In your Draft Amendment, I think its Table 7. Does that sound right? Table 7 in the Draft Amendment is the percentages that correspond to the current timeframes on the left side.

You can do your compare and contrast, or however you want to look at it, by comparing those two tables that are in your meeting materials. I just want to make sure that this discussion is focused on those tables; because they bear the fruit, if you will, of how things would play out regarding the Board's decision on how to move forward. David.

MR. DAVID BUSH: Just a quick question. Just to kind of get a sense of how the regulatory process has impacted the fisheries, now understanding that these things change from state-to-state, year-to-year a lot of changes. But I guess what I'm wondering is, and the reason why I'm asking, over the past few years with a couple of huge cuts, there are some significant cuts.

Is there any sense that that has caused any shift in any of the other fisheries, certain smaller fisheries, maybe no longer found it practical to fish during those years, and if so, we've sort of set it up to almost shape the plan and determine who's going to get the fish afterwards.

CHAIRMAN BALLOU: Is that a question or a comment? If it's a comment –

MR. BUSH: It's a question. I guess I'm looking for a sense of whether or not the recent regulatory changes have had any impacts in where these fish are landed, or if it is completely and totally just up to where the fish are?

CHAIRMAN BALLOU: I think the best way to answer that is to call your attention to Table 1, at the end of the Working Group document. That shows the percentages that would be applicable for each of the timeframes, one being the status quo timeframe, the other being that period of time since the adoption of Amendment 2, which for the first time put menhaden under quota management. Then you have some other combinations there.

I think really the best way to answer your question, David, is to just point to that table; and you can see whether there are any impacts that you can discern or not. I think that is the best way to answer that question, so I'll leave it there. Megan, did you have anything else on it? Okay. I'm trying to do my best to answer questions, and I keep forgetting I've got my expert right here to my right. Cheri.

MS. PATTERSON: Some states actually had decent fisheries or decent landing back in the late eighties early nineties, New Hampshire being one of them. I would of course be more leaning towards the current timeframe; so that we actually can show that we did have viable landings that can be attributed, because if we go with the proposed timeframes, we have 0 percent.

CHAIRMAN BALLOU: Understood, additional thoughts on this. David Borden.

MR. BORDEN: I'm actually opposed to the proposed timeframes of the Working Group. I just remind everybody that the state of Rhode Island, under the existing allocation got 66,000 pounds. If you went back over the timeframe of 1985-2015, there are periods there when I worked for the state of Rhode Island that we landed 25 million pounds. There is an enormous difference. Part of the reason we're

doing this whole addendum is because when the allocations were made, they simply excluded those long term timeframes. I would also remind everybody that when we went to public hearing, at least at two of the hearings there was almost unanimous agreement on the part of the public to include a longer timeframe. I'm opposed to taking out the long timeframe. I think it should be included for the public process.

CHAIRMAN BALLOU: Let me remind the Board that this is a two-part question. One is whether we keep the timeframes or not, and David and Cheri have just spoken in favor of supporting the current timeframes that do stretch back. The other is should reduction landings from states that no longer have reduction fisheries be included in those timeframes; those calculations or not? Again, a two-part question there, and I think we are looking for Board guidance on both issues. Dr. Pierce.

DR. PIERCE: I will reflect on your suggestion earlier on, Mr. Chairman that it is a tiered approach, and we need to focus on that as we get ready for the next meeting. With that said. I do favor the current timeframes, if for no other reason then again; it does include a longer time period.

I'll specifically reference Table 2 in the document; where consistent with what you said these timeframes will be carried through the entire document, all the different options, and that Table 2 reference is large-capacity versus small-capacity fleets. Depending upon the years you pick, the small-capacity fleet does get maybe twice what it otherwise would get. I'm influenced by Table 2, and as a consequence of that I would prefer to leave in the longer time span that includes the 1984 and later.

CHAIRMAN BALLOU: If you don't mind, I'm going to now challenge everyone on the Part 2 of that and that is which approach do you favor; a time series that includes reduction landings

from states that no longer have reduction fisheries or a timeframe that essentially cuts them out? There is good historical information, as I understand it, on the purse seine fisheries. This would be for states like North Carolina and others that once had reduction fisheries, but no longer do; should those landings be included in the long time series that you're supporting, or not?

DR. PIERCE: I would not include them.

CHAIRMAN BALLOU: Thank you. I appreciate that and I would like to again ask every Board member as you comment to speak to that second part of the issue as well. Thoughts on the issue, there seems to be more support for keeping the current timeframes than replacing them, and I'm still waiting for more input on the question of whether historical reduction landings from states that no longer have reduction fisheries should be retained or not. Emerson.

MR. HASBROUCK: I have a question, and then I guess a comment or two comments. In terms of what timeframe should be used for allocation, we have current and proposed. Is that for all references in this document to timeframe? That would include again, going back to a Tier 1 choice; the allocation between the bait fishery and the reduction fishery. Okay.

In terms then of what timeframes to use, I'm not opposed to keeping the current timeframes, except that I would like to include 2013 through 2016. I don't know what the easiest way to do that is if we just change 2009 to 2012? But then that doesn't reflect, I'm going to say status quo or what the current allocation is based on. Then, in terms of your question about do we include states that used to have a reduction fishery? I would say yes, if we're going to go back to the 1950s and look at historic landings back to the 1950s when New York had a reduction fishery.

CHAIRMAN BALLOU: We're not going that far back, at least as proposed. We're only going back as 1985.

MR. HASBROUCK: I said that somewhat tongue in cheek.

CHAIRMAN BALLOU: I'm sorry; I didn't pick up on that. Robert Boyles.

MR. BOYLES: Looking for wisdom here on how to split the baby. Many of you who I have spoken to over the years about allocation, know that I favor kind of a weighted approach, because we all want what we want. I make a note that South Carolina has a history of a reduction fishery; and yet we made a policy decision many, many years ago to effectively abandon that fishery.

It is why I like the weighted allocation. There are some of us who like more contemporary timeframes, and yet some of us like a longer time series. What I look at in terms of a weighted allocation, and why I favor it, is that you weight it both equally and you split the baby that way. I'm not quite sure where we're going to go.

I'm interested in final disposition of this, of course; I hope in November, and hope we can come to some consensus on how to best address it, but it's why I think I like the weighted allocation. You look at a long time series and you give that half, and you look at a more contemporary time series, and you give that half and you split the baby that way.

CHAIRMAN BALLOU: Robert, I'm not going to let you off the hook. Do you, in supporting that weighted allocation, which would in part rely upon the '85-'95 period, during which there were reduction fisheries in some states that no longer exist. Would you support keeping those landings in, or removing them?

MR. BOYLES: I would remove them.

CHAIRMAN BALLOU: Dr. Duval.

DR. DUVAL: Well I am going to agree and disagree with my neighbor to the south here. I also like keeping the weighted allocation in there; because I think it helps to bracket what the capacity was in different areas of the coast at different times. I think just because some states like North Carolina no longer have a reduction fishery.

Due to legislative action, it is highly unlikely that we will probably ever have a reduction fishery again. That doesn't mean that there is not the capacity there to harvest more. That is one of the reasons why I like the weighted allocation, and I would probably favor keeping those reduction landings in there. But you know that's me.

CHAIRMAN BALLOU: Terry Stockwell.

MR. STOCKWELL: I think we're all going to cherry pick what our favorite allocation is, I mean depending upon where we live and when we had our fisheries. Certainly there is from the northern perspective there is some wisdom for me to be in favor of a longer time series. I could also say a weighted allocation if they looked at this last year.

I am personally hoping we don't use timeframes at all as we move forward for the final decision. But I mean, tongue in cheek, Mr. Chairman. If we're going to go back and looking at old rendering plants, my hometown had three of them back in the 1800s.

CHAIRMAN BALLOU: Wisdom of the Board on this one. I am trying to discern and think about all the comments that have been offered, and is there a common thread here? I would really like to get maybe another comment or two from folks who have been thinking about this; and have a recommendation for a way forward.

Again, thinking about the fact that we have status quo in four alternatives under current timeframes; which we can keep. It seems like there are more board members in support of keeping that. I frankly don't know if I've heard too many if anyone suggest replacing. Then I definitely sense a mixed feeling on the issue of whether historic reduction landings from states that no longer have reduction fisheries should be kept in or not.

Maybe a little bit more discussion on that second point in particular, with my sense anyway from my perch here that the consensus that seems to be emerging is to stay with the current timeframes on the left of that slide; but again, looking for more clarity on that second part of the question. Roy Miller.

MR. ROY W. MILLER: Speaking from the perspective of a state that once had a reduction fishery, and like Emerson, I would have to go back to the '50s and '60s. I don't feel like it's appropriate for us to consider the landings from those old reduction fisheries. That infrastructure that supported those fisheries no longer exists; the dock space, the fleets, everything. All of that is ancient history. I think it would be prudent to just eliminate these reduction fisheries that occurred before '85, and subsequent to '85.

CHAIRMAN BALLOU: Understood, thank you, Roy, I appreciate that. Robert.

MR. BOYLES: You know we made this decision to pursue ecosystem reference points, recognizing it was going to be very difficult for us to move forward. We are diligently working in that direction, and at the same time trying to grasp this apple with this question of allocation. I think it just strikes me, I'll follow up on Roy's comment and Terry's somewhat tongue in cheek comment; but it's a true statement.

I mean we have had capacity in these communities for generations. You've heard me

say before, the communities are important. But I look at the same time that we are trying to move this ecosystem, this fishery forward. I think it's important that we recognize the capacity that we have now; with respect to reduction, and recognize that we've got terrific demands on bait. I would say for the purpose of keeping the orders of the day, Mr. Chairman that we keep the current timeframes but not include those historical capacities in the reduction fishery.

CHAIRMAN BALLOU: Here is my suggested way forward, because I do think that we do need to move on. If we keep the current timeframes, as I think there is pretty good consensus to do. By and large the work's already been done on the two ways of looking at those. You can go into your document after you get home and see more of what I'm referring to; if you don't know what I mean. Each option has sort of with reduction included, without reduction included.

My sense from what I'm hearing, and I think the direction that I'm inclined to offer the PDT, based on this Board discussion, is that the Board's preference is to use the current timeframes without including the reduction landings from states that no longer have reduction fisheries; but we'll keep that dataset sort of in our back pocket or off to the side, however you might want to refer to it, to be potentially brought back at our August meeting. If anyone felt so strongly that it needed to be.

But at least for the purposes of further refining the document, we would focus on just that one approach. Is there any objection to doing that from the standpoint of furthering the development of this document? No final decisions are being made right now; but it is more about giving the PDT the guidance they need, and Megan of course in her lead role here, to really further work on this. Is the Board comfortable with that approach? Is there any objection to that approach? Steve Train.

MR. TRAIN: The only thing that makes me uncomfortable is the fish were harvested; someone in the state landed the fish, and then because they chose to sell it to a reduction plant that is no longer there, we're not going to count it anymore. That doesn't make sense to me. It would have been sold somewhere else if the reduction plant wasn't there. It was landings that belong to the history of that state, and I have trouble pulling it out.

CHAIRMAN BALLOU: Do you have an objection to the approach I recommended, which is sort of well, let's put it this way, Steve. We can keep the document just as it is right now, and each option has two alternatives; one with reduction landings in, one with reduction landings out. I hear you saying that is your preference; to keep it that way. Is that what I hear?

MR. TRAIN: Yes, and the reason I spoke up is you said you were going to work forward in one direction; but keep the records of the other. I had a problem with that.

CHAIRMAN BALLOU: I'm going to try and broker this by just suggesting, because I really think it's important to kind of keep everything together as much as possible; even though I saw some heads nodding as I was trying to offer a way forward that was a more refined way. In fairness to Commissioner Train, and others who have spoken on this issue, let's keep everything in.

But let's vow to really roll up our sleeves and look at this document between now and August; in the sense of coming back at our meeting in August with a clear sense as to how you think this should go out for public comment. I think we've come a long way today in this discussion and our understanding of the issues and the options.

August is only three months away, it's not that far. I would just suggest that might be the best way forward. I sort of feel like on the one hand

I should offer some leadership here, and perhaps make some calls; but on the other hand I don't want to make a call that might disadvantage or be perceived as disadvantaging certain states and certain interests. Does that sound like a better way forward, to keep it together with both options, both approaches in? I don't see too many heads nodding, I see one affirmative. This is a tough issue. I am really looking for consensus here. I don't want to put this to a vote.

In August we might put it to a vote, in fact we will. In August we're going to be voting on these issues. Maybe that's the way to really think about it. We need to really come to a resolution on these issues at our August meeting. We're kicking the can down the road a little bit here today, which is okay; because we're in mid-stream.

We don't need to make a final call on what goes out for public comment. But in August we will. Fair enough, I think we've had a good robust discussion on these issues. I'm not planning to further it anymore, unless anybody wants to. Megan, do you have any? No reactions, I didn't get any elbows or anything on that one.

I guess I'm okay with that suggestion. I think it is the best way to kind of keep this process together. Just know that August is going to be a good meeting. It's going to be a good meeting in August. We are going to really try to and get this thing; come to terms with it. All right with that the clock is ticking. Dr. Pierce.

DR. PIERCE: Yes, before you go on to the next agenda item. I would suggest that we could actually remove 4.3.1.2 the indecision clause. I know it is a stick. Last time around, we had a problem setting the quota for the year; but that I think was kind of a unique situation. The nature of the motions that were made, we boxed ourselves in. But then at the next meeting through your leadership skills, we

ended up coming to agreement; and we set ourselves a TAC. I don't think that's needed.

CHAIRMAN BALLOU: Thoughts on that indecision clause and whether or not it needs to be kept in or not. By the way, I wasn't planning to move on to the next agenda item, I was planning to open the floor to additional comments; as Dr. Pierce took full advantage of, on other items that we haven't yet discussed. On this issue of the indecision clause, and the carrot/stick approach if you will, more of a stick I think, to get the Board to make a decision. Is that needed? Should that be kept in the document? David Borden.

MR. BORDEN: Question then, if we take it out then what happens if we don't make a decision?

MS. WARE: That's a great question. That's why we put it in. We need to specify what happens if the Board does not provide, or is not able to come to a consensus; because we were pretty close to that.

MR. BORDEN: I was going to suggest that with all due respect to the PDT, I thought as Megan characterized it carrot and stick. I was going to suggest that we use the Danvers half-long that's a carrot, a very short carrot, approach. Maybe we should pick a range of percentages there. Leave it in, but have a different range. Instead of having it be 50 percent, maybe have it be 75 percent or 90 percent. It wouldn't trouble me at all to say that the quota stays the same, or it gets reduced, and have some different percentages there.

CHAIRMAN BALLOU: Does that sound like a fair approach? David.

MR. BUSH: I certainly agree, and as a military guy I am all for accountability measures. I am uncomfortable with putting those accountability measures on the stakeholders though.

CHAIRMAN BALLOU: Further comments on this issue? We've had a suggestion to keep it in, but perhaps not make it quite so onerous with that half-cut; maybe something a little bit less onerous. I see a few heads nodding, so why don't we take that as the guidance we'll offer back to the PDT to keep this in; but not make that stick quite so heavy and dangerous. Okay, other comments or other recommendations on any other issues that Megan addressed, having to do with the draft amendment? Emerson.

MR. HASBROUCK: Megan, in your presentation a couple of times you referenced 212,500 metric tons as a trigger, I think, for different things to occur. What does that 212,500 metric tons derive from?

MS. WARE: Those are the average coastwide landings from 2009-2011.

CHAIRMAN BALLOU: I believe it was the first TAC established, wasn't it?

MS. WARE: That was what the Amendment 2 was based on, and then we took a 20 percent reduction from that.

CHAIRMAN BALLOU: I saw Dr. Duval next.

DR. DUVAL: I was actually going to go back and Megan had brought up an allocation, so if an eventual allocation method is implemented that does not have a jurisdictional component, the requirement to report landings via SAFIS. I understand that the intent is to try to provide real time monitoring; but I have concerns about this, based on North Carolina's statutory requirements that our dealers report to us.

Right now we use federal, so in order to track our quota monitored species, which we do on a daily basis for summer flounder and black sea bass. We have a dealer permit, it requires submission of a quota monitoring report; not trip ticket reports to us daily, which we can't require daily submission of trip tickets by statute.

You know we're looking to try to modify that. I think my point is that if the amendment specifies the frequency and required data elements, in terms of real-time reporting that the states ought to be allowed to submit those data and to meet those requirements; I guess is what I'm saying, and not necessarily dictate that you have to be reporting directly to SAFIS, because we're going to run into some problems with that in North Carolina.

MS. WARE: Michelle, maybe in response, where would you be submitting those reports to? What I'm trying to avoid is have the FMP Coordinator be kind of a receiver of states landings on a weekly basis. I think that that is kind of an onerous position to put the Coordinator in, so I'm just trying to put it all in some place where people could check it; and all the states could be submitting to one place.

DR. DUVAL: You know perhaps that's something that we're going to have to discuss offline. But again I raised the statutory issues that we have in North Carolina that data be submitted to us first. If we can perhaps work to try to develop an alternative that would both meet our statutory requirements, as well as not having dealers submitting information directly to the FMP Coordinator; you know we might have to find some work-around for the division submitting data to SAFIS on behalf of those dealers. That might be an alternative.

CHAIRMAN BALLOU: Rob O'Reilly.

MR. O'REILLY: Pretty much the same situation in Virginia, and so we all will have to have a conversation about how to accomplish this if it doesn't go jurisdictional. We've had mandatory reporting on the harvester basis since 1993. As with Michelle, the data comes to VMRC, so we would definitely have to work something out if it ends up that we don't go jurisdictional.

CHAIRMAN BALLOU: Any other comments or thoughts from the Board? Eric, on any issue, the floor is open right now.

MR. REID: The 212,500 tons that Emerson referenced earlier are those percentages of allocation at that amount fixed? I'm looking at 4.3.2 Tier 1, Option E, Sub-options 1 and 2. If the 212,500 tons is subject to a reallocation that is one thing; but if our current allotments are fixed in at that number, I would like to see that entire section removed.

CHAIRMAN BALLOU: We had this discussion at the last meeting. There were some recommendations to remove that and the consensus was to keep it in. I know Rob has been a strong proponent of that option, and I'll let Rob speak to it.

MR. O'REILLY: It used to be Option H, now it's Option E. This was proposed in Maine, and the idea is that again we came relatively close to having a 10 percent increase; and then everyone knows the story of how we came back with the increase that we had. We are relatively close still, to 212,500 metric tons.

The only idea there is that there would not be fixed percentages associated, once that 212,500 is reached or is attained. They would variable, and I think in the document it has two different percentages where the bait would receive a larger share; you know up to 70 percent, I think is what the document has.

That was the basis for that back in Maine. It remains the same. I think that last time around Nichola asked it to be removed, based on the public comment; and I had a few things to say about that which I won't say today again. But really, the public comment at that time was really not looking at our process to the direct way. That is why that option is in there, Eric, and I don't know whether that helps you or not.

MR. REID: Yes, it absolutely helps me, Rob. It tells me that I don't like it and you do, so it is going to stay in the document for now; that's what it tells me. Okay, can I keep going?

CHAIRMAN BALLOU: Please.

MR. REID: Are you good with that Rob? I'm looking in the draft document on Pages 53 and 54. It is minimum quota plus additional quota. I don't know how much work it is. Right now the numbers that I see are 0.5 percent and 1 percent. Just for reference, I would be fine if 0.5 percent were dropped out of the document. But I would like to see some analysis at least 2 percent, and if it is not too much of a pain in the neck, 1.5 as well.

That would be my request. If we have the capability at some point to say, okay we have the analysis at 1 percent and we have the analysis at 2 percent; can we do something in the middle, or can we just extrapolate the numbers? The numbers don't extrapolate very well in my mind; but at least they're close enough for me to make a decision. I guess that's my request. Can we do a table at 2 percent without too much trouble?

CHAIRMAN BALLOU: The answer is yes, it can be done. If there is no opposition on the part of the Board to add another sub-option, having to do with minimum jurisdictional quotas, and that would be in addition to the 0.5 percent; although I know you recommended taking it out. But one thought is to keep that in, keep the 1 percent, and then add a new 2 percent option. Does that sound fair?

MR. REID: Yes, I'm fine with that. Like I said, I can't extrapolate 0.5 to 1. You can't just multiply them times 2. I would like to see what 2 percent looks like plus the addition, 2 plus X for lack of a better term; and if I could have that I would appreciate it.

CHAIRMAN BALLOU: Eric, a follow up?

CHAIRMAN BALLOU: Okay, duly noted, other suggestions? We are running late. We've got a couple more agenda items here, but this is obviously a very important issue. David Borden.

MR. BORDEN: Just for my own edification, on the quota rollover and specifically the option to roll over 100 percent of the quota and 50 percent. I'm struggling with that a little bit, because I can't think of another example of where the system, the management system in any area has allowed the rollover of up to 100 percent of the quota.

I mean I've listened to a lot of different discussions at council meetings and commission meetings about rollovers. Generally the scientist's voice a lot of concerns, because you're a whole year later, you've had natural mortality on the stock and a whole bunch of other variables that can't be calculated. What is the scientific advice on 100 percent rollovers?

MS. WARE: The TC has not reviewed this document, so I can't really provide scientific advice from them. But we got those five options from Board input; based on the PID. If the Board would like to reconsider the options that are in there that would be useful information.

MR. BORDEN: Yes, my preference here would be to have the technical people specifically review that issue of the rollover, and whether or not it creates problems from a technical perspective.

CHAIRMAN BALLOU: Duly noted. Are there any other, suggestions, comments, recommendations from the Board on this issue? Seeing none; I had hoped to get some public input, but we're really running late. We've got a couple of other, three other actually, important issues. I don't think we'll take too much time. But we're well aware of the clock and the need to break in either four minutes or at some point soon thereafter. We're going to

move on, is there any objection to moving on? Seeing none; we'll move on to Item 7 on the agenda, which is New York Participation in Episodic Event Program. This issue was addressed in part by the Board last year, but may need to be readdressed this year to lend clarification to the issue. I'll let Megan summarize it, and set the stage for the Board's consideration.

NEW YORK PARTICIPATION IN EPISODIC EVENTS PROGRAM

MS. WARE: Just to briefly review the Episodic Events Program and what it would look like in 2017. In May of 2016 the Board passed the motion to extend the Episodic Events Program until Amendment 3 is implemented. We do have the Episodic Events Program for this year. The set-aside is roughly 4.4 million pounds; and that reflects the 200,000 metric ton TAC that has been specified for this year.

In May of 2016, the Board also approved New York as an eligible state to harvest under the Episodic Events Program, so as a result for 2017, the states of Maine through New York can harvest from the set-aside; pending they meet the mandatory provisions. The Board also capped New York at one million pounds for 2016. There is currently no cap on New York's harvest for 2017.

CHAIRMAN BALLOU: That's where things stand. If the Board were to take no further action, New York is eligible to participate in the program; that may be a signal, in 2017, and is not subject to a cap. If the Board wanted to change that scenario in any way, action would be needed today. Does anyone have any recommendations or thoughts? Terry.

MR. STOCKWELL: Déjà vu from a year ago. I'll keep this quick. I am going to move that New York harvest is capped at one million pounds for 2017.

CHAIRMAN BALLOU: Under the Episodic Event Program.

MR. STOCKWELL: Under the Episodic Event Program.

CHAIRMAN BALLOU: Is there a second to that; seconded by Cheri? Moved by Terry Stockwell, seconded by Cheri, to re-impose the one million pound cap on New York's participation in the Episodic Even Program for 2017 is there discussion on the motion, Steve Heins.

MR. STEVE HEINS: Probably that's a wise move on the part of the Board, because as of today our directed fisheries closed and you can walk across the water on the backs of the menhaden; they're so thick in New York. We need this Episodic Events just to try to at least forestall fish kills. We're going to have them. It's just maybe we can put them off for a few weeks.

CHAIRMAN BALLOU: Further discussion on the motion, Eric Reid.

MR. REID: I just have a question. How much tonnage or poundage did New York harvest last year?

CHAIRMAN BALLOU: Megan is looking into that and while she's looking into it, any other questions or comments on the motion? Seeing none; we'll wait for the answer to that and then we'll take a vote. Steve.

MR. HEINS: If you don't need an exact number, I think we were around (struck from the record due to confidentiality) of the Episodic.

MS. WARE: I don't have your episodic number actually, because I believe it is confidential; but total state landings were roughly 1.4 million, so that is bycatch, episodic, directed.

CHAIRMAN BALLOU: Do you want to just let your comment stand, Steve?

MR. HEINS: Well, I know that we didn't hit the one million mark; but that was because we had reached a point where we believed we had gotten out of the woods. Then in November we had (struck from the record due to confidentiality). I can't really judge this anymore.

MR. REID: I would like you to give a million pounds to Rhode Island of Episodic Event, but I don't think that's going to happen. No, I'm fine. If Rhode Island is going to be out of the fishery because Episodic Event gets used up again; that would be unfortunate for the state of Rhode Island. That's all I'm going to say.

CHAIRMAN BALLOU: Other comments? Robert Boyles.

MR. BOYLES: Mr. Chairman, parliamentary inquiry. I would like unanimous consent to strike Mr. Heins comments from the record; on the basis of information from staff.

CHAIRMAN BALLOU: Given the potential confidentiality?

MR. BOYLES: Yes.

CHAIRMAN BALLOU: Is there any objection to striking those comments from the record to protect any potential violation of confidentiality? Seeing no objections those comments will be struck. Thank you for that suggestion. Other comments on the motion, seeing none; is the Board ready for the question? If so, all in favor of the motion, I'm sorry, 15 second caucus.

Okay I'm going to call the question. All in favor please raise your hand, 18 in favor, opposed, null votes, and abstentions. The motion passes 18 to 0.

PROVIDE GUIDANCE TO THE TECHNICAL COMMITTEE REGARDING STOCK PROJECTIONS

CHAIRMAN BALLOU: And we're on to Item 8; which is to Provide Guidance to the Technical Committee Regarding Stock Projections. This is a prelude to setting the TAC for 2018; which will be on our agenda for our next meeting in August. I believe our TC Chair, Jason McNamee has a presentation, so at this point I will turn it over to Jason.

MR. JASON McNAMEE: We at the Technical Committee were sitting around chatting, and we said do you know what the Board hasn't heard from us in about three months, projection methodology. Let's do that again. I've got a quick presentation. This will help support the addendum. Kristen, if you want to jump right to Slide 4, we can skip some of that early stuff.

REVIEW STOCK PROJECTION METHODOLOGY

MR. McNAMEE: I'm just going to give you a whirlwind tour. The projection methodology has not changed the past several times that you've seen it. Monte Carlo bootstrap runs of 2015, the approved assessment, the base run of that approved assessment was used for the basis of the projections. They were run under various scenarios for a total of five years since that terminal year. Starting conditions include numbers-at-age, which were the estimated numbers-at-age for Year 2014 from BAM, for each of the Monte Carlo bootstrap runs. Monte Carlo bootstrap runs, it's just an iteration of the model. Certain elements of the model have a little perturbation to their starting values, and you end up with about a thousand different versions of the world. They're all very close but slightly different, and that's where you kind of determine your variability in your estimates. The numbers-at-age after that initial year, a fancy equation to look at here, the important element there is that Z parameter up in the air there. What that is is age and year specific total mortality.

What that consists of is it's the addition of the natural mortality for each age for that year, plus

the fishing mortality that takes into account the selectivity by age. The natural mortality for each of the projections was a vector from each of the Monte Carlo bootstraps; the selectivity again also a vector from each of the Monte Carlo bootstraps.

In this case the northern and the southern fishery selectivities, they're the values from the last time period; so there are a couple of blocks in the BAM model, and we're just grabbing the last blocks of the estimate from the last period of time. Then fishing mortality is estimated to match the annual landings that are estimated.

These landings, where do those come from? Those are calculated using the Baranov Catch Equation and the weight of the landings. There is recruitment in there. This is an important one to think about. Recruitment is projected without an underlying stock recruitment function, so there is no Beverton Holt or Ricker model in here.

What we're doing is taking median recruitment level, and that's the median from each of the 1,000 bootstrap runs. Then the way we get variability in there is there is a deviation vector in there; and so there is this vector, it's the length and it is the number of years that you're looking at. We have a median recruitment level, and then each year is a deviation away from that median. That is where your uncertainty comes from.

Those are selected randomly with replacement from each of the runs. All right, so we do all that stuff and we get some outputs. These are relevant outputs for you folks. They include fecundity, so remember that that is what we use as the biomass metric for menhaden. It produces fishing mortality, recruitment and landings.

Those are the model outputs that you get from the projections. Fecundity is calculated as the number of fish in each age times the reproductive vector at that age. We know a little bit about, or a lot about the fecundity of menhaden. That's all taken into account here. We use a 50/50 sex ratio, the maturity as we understand it for menhaden, mash that up all together and that's how we come up with the fecundity estimate. A couple of caveats for you, we did not include structural uncertainty in the projections.

This is model uncertainty is another way that people characterize it. There are lots of uncertainties that are accounted for; but this is not one of them. The projections are conditional on a set of functional forms. These are things like the selectivity function, which is a curve and recruitment as I've described.

The fisheries were assumed to continue at the current proportions of allocation; meaning bait and reduction using the current selectivities. The selectivity aspect of that is the important part. New management regulations that alter the proportions or the selectivities, would likely affect the projection results. Just be aware of that. If future recruitment is characterized by long periods of large or small year classes that is also going to impact the projections. You know when we end up at Year 5, and the answer is different than what we projected. There are a number of reasons why that is.

Additionally, because we're using the Baranov Catch Equation, it is assuming mortality occurs throughout the year. Again, if seasonal closures and things like that go in that is going to affect the outcomes of reality versus the projections. All right, just a couple of slides here, we can think back. This is what you had asked us for last time we did projections for you.

Current TAC is not the current TAC now, it is the current TAC back when we did these; but that was like a status quo projection you asked for. Then we did a series that were fairly simple, they were just increases from that TAC and then that was projected forward. Then you did a

series where you were thinking more about risk; and you asked for three different levels of these risk probabilities of being at or below the F target.

In summary, we are performing, and by "we" I mean Amy Schuler who's in the back there. We're performing new projections based on previous guidance from the Board; and as outlined in the presentation. We added in some new scenarios that include interim ecological reference points as requested.

As Shanna already noted, we conferred with the folks at Lenfest to make sure that we were interpreting their intent, so we're all on the same page there and we don't bring something forward that then someone might come back and say no that's not what we meant by that. We've done that homework. We are on track, I have completion in August. That's right, right? Yes. We're on track with the work. That's it; any questions?

CHAIRMAN BALLOU: Questions for Jason? Adam.

MR. ADAM NOWALSKY: Did I understand correctly that you're going to apply those same projections, the 5 percent increase, the 10 percent increase, the 50 percent probability, the 55 percent probability. Was that what I heard or did I mishear that?

MR. McNAMEE: That is not what I showed. I just wanted to show you the types of things that we have done for projections in the past as an example. I'm not actually entirely sure the exact ones that we're doing, and so Megan or Bob, if you have a better idea.

CHAIRMAN BALLOU: The issue I think for the Board, is the Board comfortable asking that those same projections be run again? Yes, it would be repeating the same, whatever it was seven runs I think, there is more actually when you add in some of the additional ERP type

approaches. But is that what the Board would like to see again?

In the same way you saw it last year and use that as the basis for your deliberations on setting the TAC for 2018, or would you recommend doing something different, either reducing those options or changing them that is the issue before the Board today. I guess the if we don't have auestion is recommendations to change anything, we'll run the same projections in the same way that they were run last year; and you'll get a report on those at your August meeting. This is the time to recommend any changes. If you don't have any recommended changes, you will see those same projections done in the same way. It must be getting late, because I don't see any movement, anybody shifting; except I see one hand up in the back. Rob.

MR. O'REILLY: Yes, I support moving ahead with those same runs. The second thing is, I will ask one question and I know it's late. What really determines the risk against the target F, and is there any uncertainty there in the risk? Bog you down, kind of curious.

MR. McNAMEE: What determines that is, so I had mentioned we do these Monte Carlo bootstraps, so you end up with these variations of the universe as you move forward; and they're different from each other. What you do in the end is you kind of bound all of the different projections.

That's what determines that envelop of uncertainty around some median value or something like that. If you picked it to be right at the median it would be 50 percent probability, and then you move up and down from there. It is all of the uncertainties coming out of the bootstrap on the elements in the projections that we put those perturbations on.

CHAIRMAN BALLOU: Any other question, comments, is there any opposition to tasking

the TC with running the same projections that they ran last year in the ways just described? Seeing none; I'll take that as Board support for a repeat, and we'll look forward to the results that we'll see in August. Is there anything else on this issue?

CONSIDER APPROVAL OF THE 2017 FMP REVIEW AND STATE COMPLIANCE REPORTS

CHAIRMAN BALLOU: Okay so on to our final issue. Consider Approval of the 2017 FMP Review and State Compliance Reports. States were required to submit their compliance plans by April 1, the PRT reviewed those plans and reported out via the FMP Review, which is in your meeting materials; so Megan, I think has a brief summary report. Megan.

MS. WARE: We're going to go right to Slide 4 to just kind of get to the meat of the FMP Review. For 2016 our TAC was 414.2 million pounds. Overall I would say landings were down from 2015. Our directed harvest, which excludes bycatch, was 396.15 million pounds; so that's 4.4 percent under the TAC and a 3.6 percent decrease from 2015.

Bycatch was 2.18 million pounds, which is a 63 percent decrease from 2015; but it's important to note that those landings do not count towards the TAC. Total harvest including bycatch, directed harvest, and the Episodic Events Program was 398 million pounds, which is a 4.5 percent decrease from 2015.

We can also look at the landings by the different sectors. Looking at bait harvest it is roughly 95.4 million pounds, which is a 5.6 percent decrease from 2015, and a 10.1 percent decrease from the previous five-year average. The states of New Jersey, Virginia, Maryland, Maine and Massachusetts landed the largest shares.

Reduction harvest was 302.9 million pounds, which is a 4.2 percent decrease from 2015, and a 6 percent decrease from the previous five-

year average. In terms of the Chesapeake Bay reduction fishery cap, landings were less than 45.000 metric tons: which is well below the cap. This means for 2017 our cap will be the full 87,000 metric tons plus the almost 11,000 metric ton rollover. This is one of the figures in the FMP review, which shows reduction landings in blue and bait landings in red. It is important to note that there are two different Y axes here, so reduction landings are still higher than bait landings. But overall we've seen a slight decline in reduction landings over the years, while we've seen a slight increase in bait landings. This is Table 1 in the FMP review; and I recommend looking at it in the printed document, because it is much easier to see.

But it shows average bycatch landings by state and gear type from 2013-2016. The predominant gears include pound nets and anchored or staked gillnets; and the states of Maryland and Virginia contribute the most to total bycatch landings. We can also look at the number of bycatch trips that were taken in 2016.

There were a total of 1,908 bycatch trips taken in 2016. This is significantly lower from the 4,668 trips taken in 2015. The majority of these trips did land less than 1,000 pounds. In terms of the Episodic Events Set-Aside Program, the states of Maine, Rhode Island and New York participated in the program; 3.8 million pounds were harvested in 2016, which is a much greater value than has ever been harvested under the program.

Ninety-two percent of the set-aside was used, but the remaining unused set-aside was reallocated to the states on November 1st. Table 3, this is quota performance, and I definitely recommend looking at this in the FMP review. But what it shows here is on a state-by-state basis the transfers that took place, what the total quota was, in terms of what a state was allocated, plus or minus transfers and then the redistribution of unused set-aside.

Then it shows what total landings were and if there were any overages. We had one state with an overage; that was Florida. It is only 4,000 pounds though. Then the final column there is 2017 quotas. This is based on the 200,000 metric ton TAC, as well as any overages that took place in 2016.

Non de minimis states are required to conduct biological monitoring based on their landings, as well as the geographic region. This is Table 6 in the FMP Review; it shows the number of ten fish samples that were required, and then the ones that were carried out by each state. All states did meet the biological sampling requirements.

In terms of de minimis, the states of New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida have requested de minimis status for 2017. All states qualified, because they do not have a reduction fishery and the bait landings in the two most recent years of data did not exceed 1 percent of coastwide bait landings.

The PRT recommends that the Board accept the 2017 FMP Review, de minimis status for the five states there, and then also notes that jurisdictions which repeatedly or grossly exceed their quota, should consider implementing more frequent reporting to avoid these overages.

CHAIRMAN BALLOU: Questions for Megan on her report? Dr. Duval.

DR. DUVAL: Not a question, just a comment. Megan, I believe you received information last week correcting North Carolina's 2016 landings. They are roughly about half of the 800,000 pounds that was shown up on the screen. We had a coding error with landings from a particular dealer, so that has since been corrected.

CHAIRMAN BALLOU: Any other questions? If not I would entertain a motion to accept the 2017 Fishery Management Plan Review, and approve de minimis request for the states of New Hampshire, Pennsylvania, South Carolina, Georgia and Florida. Moved by Steve Heins, do we have a second? Seconded by Cheri Patterson, is there any discussion on the motion?

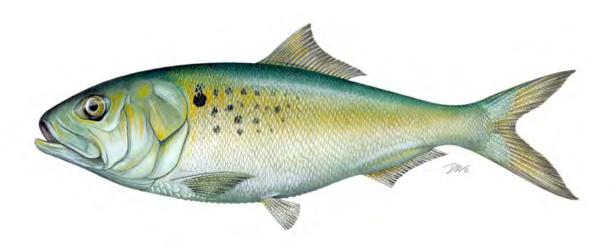
Is there a need to caucus? Seeing no indication, is the Board ready for the vote? If so, all in favor raise your hand, 18 in favor and that's unanimous, so I think we are at the last item; which is Other Business.

Other Business/Adjourn

CHAIRMAN BALLOU: Is there any other business to come before the Board? Seeing none; is there any opposition to adjourning? Seeing none; we are adjourned. Thank you very much.

(Whereupon, the meeting was adjourned at 6:05 o'clock p.m., May 9, 2017.)

Atlantic Menhaden Stock Assessment Update



August 2017



Vision: Sustainably Managing Atlantic Coastal Fisheries

Atlantic States Marine Fisheries Commission

2017 Atlantic Menhaden Stock Assessment Update

Prepared by the ASMFC Atlantic Menhaden Stock Assessment Subcommittee

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A publication of the Atlantic States Marine Fisheries Commission pursuant to National Oceanic and Atmospheric Administration Award No. NA10NMF4740016



Acknowledgements

The Atlantic States Marine Fisheries Commission (ASMFC or Commission) thanks all of the individuals who contributed to the development of the Atlantic menhaden stock assessment. The Commission specifically thanks the ASMFC Atlantic Menhaden Technical Committee (TC) and Stock Assessment Subcommittee (SAS) members who developed the consensus stock assessment report as well as Commission staff Megan Ware and Kristen Anstead for helping prepare the report.

Executive Summary

The purpose of this assessment was to update the 2015 Atlantic menhaden benchmark stock assessment (SEDAR 2015) with recent data from 2014-2016. No changes in structure or parameterization were made to the base model run. Additional sensitivity analyses were conducted.

Landings

The Atlantic menhaden commercial fishery has two major components, a purse-seine reduction sector that harvests fish for fish meal and oil and a bait sector that supplies bait to other commercial and recreational fisheries. The first coastwide total allowable catch (TAC) on Atlantic menhaden was implemented in 2013 and since then reduction landings have ranged from 131,000 mt in 2013 to 143,500 mt in 2015. In 2016, reduction landings were 137,400 mt and accounted for approximately 76% of coastwide landings. Landings in the reduction fishery are currently at their lowest levels in the time series because only one plant remains in operation along the coast. In contrast, bait landings have increased in recent years as demand has grown because of recent limitations in other species used as bait (e.g., Atlantic herring), peaking in 2012 at 63,700 mt. In 2016, bait landings were 43,100 mt and comprised 24% of coastwide landings.

Indices of Relative Abundance

Young of the Year (YOY) Index

The YOY index developed from 16 fishery-independent surveys shows the largest recruitments occurred during the 1970s and 1980s. Recruitment has since been lower with notable year classes in 2005, 2010, and 2016.

Age-1+ Indices

Two coastwide indices of adult abundance were developed from nine fishery independent survey data sets spanning the coast from New England to Georgia. In the most recent years, the northern adult index indicated an increase in abundance for ages-2+, while the southern adult index for the assessment indicated a slightly decreasing abundance for age-1.

Fishing Mortality

Highly variable fishing mortalities were noted throughout the entire time series. Fishing mortality rate was reported as the geometric mean fishing mortality rate of ages-2 to -4. In the most recent decade, the geometric mean fishing mortality rate has ranged between 0.31 and 0.58. The geometric mean fishing mortality rate for 2016 was 0.51. Adding data from 2014-2016 to the assessment model resulted in higher fishing mortality rates for the entire time series compared to the 2015 benchmark assessment, although the trend remained largely the same. These changes also affected the reference points, which are calculated as the median (target) and maximum (threshold) for the 1960-2012 time series.

Biomass

Biomass has fluctuated with time from an estimated high of over 2,288,000 mt in 1958 to a low of 567,000 mt in 2000. Biomass was estimated to have been largest during the late-1950s, with lows occurring during the mid-1990s to mid-2000s. Biomass was estimated to have been relatively stable through much of the 1970s and 1980s. The oldest age classes comprise the smallest proportion of the population, but that proportion has increased in recent years. Biomass is likely increasing at a faster rate than abundance because of the increase in the number of older fish at age and an increase in weight at age.

Fecundity

Population fecundity (i.e., Total Egg Production) was the measure of reproductive output used. Population fecundity (*FEC*, number of maturing ova) was highest in the early 1960s, early 1970s, and during the present decade and has generally been higher with older age classes making up a larger proportion of the *FEC*.

Stock Status

The current benchmarks for Atlantic menhaden are $F_{36\%}$, $F_{21\%}$, $FEC_{36\%}$, and $FEC_{21\%}$, which were calculated using the methods from the 2015 benchmark stock assessment. The benchmarks are calculated through spawner-per-recruit analysis using the mean values of any time-varying components (i.e., growth, maturity). Based on the current adopted benchmarks, **the Atlantic menhaden stock status is not overfished and overfishing is not occurring**. In addition, the stock is currently below the current fishing mortality target and below the current FEC target. The 2015 benchmark reference points for Atlantic menhaden were $F_{38\%}$, $F_{57\%}$, $FEC_{38\%}$, and $FEC_{57\%}$. Because this stock assessment update resulted in higher fishing mortality values throughout the time series due to the additional three years of data, the maximum and median F values were estimated higher compared to the 2015 benchmark.

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Introduction

The purpose of this assessment was to update the 2015 Atlantic menhaden (*Brevoortia tyrannus*) benchmark stock assessment (SEDAR 2015) with recent data from 2014-2016. No changes in structure or parameterization were made to the base model run. Corrections made to data inputs were minor and are described in the body of this report. The 2015 benchmark stock assessment for Atlantic menhaden was initiated by the Atlantic States Marine Fisheries Commission (ASMFC or Commission) Atlantic Menhaden Management Board (Board), prepared by the ASMFC Atlantic Menhaden Stock Assessment Subcommittee (SAS), and reviewed and approved by the ASMFC Atlantic Menhaden Technical Committee (TC) as part of the interstate fisheries management process.

1.0 Regulatory History

The first coastwide fishery management plan (FMP) for Atlantic menhaden was passed in 1981 (ASMFC 1981). The 1981 FMP did not recommend or require specific management actions, but provided a suite of options should they be needed. After the FMP was approved, a combination of additional state restrictions, establishment of local land use rules, and changing economic conditions resulted in the closure of most reduction plants north of Virginia (ASMFC 1992). In 1988, ASMFC concluded that the 1981 FMP had become obsolete and initiated a revision to the plan.

The 1992 Plan Revision included a suite of objectives to improve data collection and promote awareness of the fishery and its research needs (ASMFC 1992). Under this revision, the menhaden program was directed by the Board, which at the time was composed of up to five state directors, up to five industry representatives, one representative from the National Marine Fisheries Service, and one representative from the National Fish Meal and Oil Association.

Representation on the Board was revised in 2001 to include three representatives from each state in the management unit, including the state fisheries director, a legislator, and a governor's appointee. The reformatted Board has passed two amendments and six addenda to the 1992 FMP revision.

Amendment 1, passed in 2001, provided specific biological, social/economic, ecological, and management objectives for Atlantic menhaden. No recreational or commercial management measures were implemented as a result of Amendment 1.

Addendum I (2004) addressed biological reference points for menhaden, specified the frequency of stock assessments to be every three years, and updated the habitat section of the FMP.

Addendum II (2005) instituted a harvest cap on the reduction fishery in the Chesapeake Bay. This cap, based on average landings from 2000-2004 (see technical Addendum I), was established for the 2006 through 2010 fishing seasons. Addendum II also outlined a series of

research priorities to examine the possibility of localized depletion of Atlantic menhaden in the Chesapeake Bay. They included: determining menhaden abundance in Chesapeake Bay; determining estimates of removal of menhaden by predators; exchanging of menhaden between bay and coastal systems; and conducting larval studies.

Addendum III (2006) revised the Chesapeake Bay Reduction Fishery Cap to 109,020 metric tons, which is an average of landings from 2001-2005. Implementation of the cap remained for the 2006 through 2010 fishing seasons. Addendum III also allowed a harvest underage in one year to be added to the next year's quota. As a result, the maximum cap in a given year was extended to 122,740 metric tons.

Addendum IV (2009) extended the Chesapeake Bay harvest cap three additional years (2011-2013) at the same levels as established in Addendum III.

Addendum V (2011) established a new F threshold and target rate based on maximum spawning potential (MSP) with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species.

Amendment 2, approved in December 2012, established a 170,800 metric ton (mt) total allowable catch (TAC) for the commercial fishery beginning in 2013. This TAC represented a 20% reduction from average landings between 2009 and 2011. The 2009-2011 time period was also used to allocate the TAC among the jurisdictions. The Amendment also established requirements for timely reporting and required states to be accountable for their respective quotas by paying back any overages the following year. The amendment included provisions that allow for the transfer of quota between jurisdictions and a bycatch allowance of 6,000 pounds per trip for non-directed fisheries that operate after a jurisdiction's quota has been landed. Further, it reduced the Chesapeake Bay reduction fishery harvest cap by 20% to 87,216 metric tons.

At its May 2015 meeting, the Board established an 187,880 mt TAC for the 2015 and 2016 fishing years. This represented a 10% increase from the 2013 and 2014 TAC. In October 2016, the Board approved a TAC of 200,000 mt for the 2017 fishing year, representing a 6.45% increase from the 2015 and 2016 fishing years.

In August 2016, the Board approved Addendum I which added flexibility to the current bycatch provision by allowing two licensed individuals to harvest up to 12,000 pounds of menhaden bycatch when working together from the same vessel using stationary multi-species gear. The intent of this Addendum was to accommodate cooperative fishing practices which traditionally take place in the Chesapeake Bay.

Amendment 3 to the Atlantic Menhaden FMP is currently under development, initiated in 2015 to address several concerns in the fishery including the adoption of ecological reference points (ERPs) and a new quota allocation scheme. The ERPs are meant to account for changes in the

abundance of prey and predator species when setting overfished and overfishing thresholds for menhaden. The Board reviewed public input in February 2017 and provided guidance on management options to include in Amendment 3. Under the current timeline, the Board will consider final action on Draft Amendment 3 at the end of 2017.

In May 2013, the Board approved Technical Addendum I which established an episodic events set aside program. This program set aside 1% of the coastwide TAC for the New England States (ME, NH, MA, RI, CT) to harvest Atlantic menhaden when they occur in higher abundance than normal. In order to participate in the program, a state must reach its individual quota prior to September 1 before harvesting from the set aside. At its October 2013 meeting, the Board extended the episodic event set aside program through 2015, adding a re-allocation provision that re-allocated unused set aside as of October 31 to the coastwide states based on the same allocation percentages included in Amendment 2. At its May 2016 meeting, the Board again extended the episodic events program until final action on Amendment 3 and added New York as an eligible state to harvest under the program.

2.0 Life History

2.1 Stock Definition

Atlantic menhaden are considered a single stock. Historically there was considerable debate relative to stock structure of Atlantic menhaden on the US East Coast, with a northern and southern stock hypothesized based on meristics and morphometrics (Sutherland 1963; June 1965). Based on size-frequency information and tagging studies (Nicholson 1972 and 1978; Dryfoos et al. 1973), the Atlantic menhaden resource is believed to consist of a single unit stock or population. Recent genetic studies (Anderson 2007; Lynch et al. 2010) support the single stock hypothesis.

2.2 Age

In 1955, the NOAA Laboratory at Beaufort, NC, began monitoring the Atlantic menhaden purse-seine fishery for size and age composition of the catch (June and Reintjes 1959). From the outset, scales were selected as the ageing tool of choice for Atlantic menhaden due to ease of processing and reading and an age validation study confirming reliable age marks on scales (June and Roithmayer 1960). During the early decades of the Menhaden Program at the Beaufort Laboratory, scales from individual menhaden specimens were read multiple times by several readers. Since the early 1970s, only a single reader was retained on staff to age menhaden scales.

To address future plans for states to age Atlantic menhaden scales and the research recommendation to conduct an ageing workshop, the ASMFC organized and held a workshop in 2015 (ASMFC 2015). An exchange of scale samples took place and was followed with an inperson workshop to discuss the results. Depsite the fact that most participating agers were new to ageing Atlantic menhaden or had never aged the species, agreement between readers was on average 73% and increased to 95% within one year. False annuli, poor storage of samples, and damaged scales were common issues identified at the workshop. Atlantic menhaden scales

were also examined at ASMFC's 2017 Quality Assurance/Quality Control Fish Ageing Workshop (ASMFC 2017). Average percent error between agers along the Atlantic coast was 15%, although many readers had no previous experiencing ageing Atlantic menhaden. When considering readers with experience ageing this species, average exact agreement was 43%, although it increased to 88% within one year.

2.3 Growth

Catch in numbers by year, season, and fishing area was developed for weighting corresponding sampled weights of Atlantic menhaden. This was then used to calculate the mean weight at age for fish from 1955-2016, which was used in the stock assessment for matching to landings. These "weighted" mean weights increased during the 1960s, declined dramatically during the 1970s, and remained low during most of the 1980s. Increasing mean weights were estimated during the 1990s followed by declines in mean weight to the present. Weighting by catch in numbers by year, season, and fishing area was also applied to calculate average fork lengths (mm) by age and year.

An overall regression of weight (W in g) on fork length (FL in mm) for port samples of Atlantic menhaden was fit based on the natural logarithm transformation:

$$ln W = a + b ln FL$$

and was corrected for transformation bias (root MSE) when retransformed back to the form:

$$W = a(FL)^b$$
.

As in previous menhaden assessments, regressions of fork length (mm) on age (yr) were based on the von Bertalanffy growth curve:

$$FL = L_{\infty}(1 - \exp(-K(age - t_0))).$$

Von Bertalanffy fits were made with the size at age data aligned by cohort (year class). Because of concerns that density-dependent growth is a characteristic of the cohort, cohort-based analyses were thought to be a better approach.

Annual estimates of length at age for the population were bias-corrected using methods in Schueller et al. (2014). Specifically, the methods correct for the absence of samples at the youngest, smallest and largest, oldest sizes and ages. The correction was done on the cohort-based annually estimated growth curves with a minimum size of 100 mm FL (unless samples had a larger minimum size) and the maximum size was set at the 99.95% size for encountered fish rounded to the nearest whole number ending in 0 or 5. In a few cases, t_0 was fixed at the uncorrected value. The reference age selected was age-2 as that age reflects the full distribution of sizes at the age. The corrected values of L_{∞} and K were within the observed range of uncorrected values (Table 2.3.1). The growth curve parameters vary year to year and

are influenced by both density dependent processes and the fact that each cohort experiences a different set of conditions leading to differing growth.

Annual estimates of fork length-at-age were interpolated from the annual, cohort-based von Bertalanffy growth fits with a bias correction in order to represent the population or start of the fishing year (March 1) for use in estimating population fecundity (Table 2.3.2). Annual estimates of length-at-age were interpolated based on the non-biased corrected von Bertalanffy estimates to represent the fishery or middle of the fishing year (September 1), and converted to weight-at-age (Eq. 2) for use in the statistical catch-at-age models when comparing model estimated catch to observed catch (Table 2.3.3).

2.4 Maturity

For the 2015 benchmark stock assessment, data from the NEAMAP Southern New England/Mid-Atlantic Neashore Trawl Survey were analyzed to evaluate maturity at age. Based on the analysis and discussions among the SAS during the 2015 SEDAR benchmark assessment, it was determined that maturity is a length-based process as opposed to an age-based process. A logistic regression was fit to the maturity and length data from the commercial reduction fishery database. Fish were coded as immature or mature, as in the analysis completed on the NEAMAP data. Because the growth of Atlantic menhaden varies greatly among years, the SAS determined that maturity must also vary among years. Thus, the time-varying lengths at age for the population were used along with the logistic regression to provide time-varying maturity at age for 1955-2016 for the assessment update. Because the commercial reduction fishery had more years of data and a larger sample size, the maturity based on those data were used in the final base run model.

2.5 Fecundity

Often reproductive capacity of a stock is modeled using female weight-at-age, primarily because of lack of fecundity data. To the extent that egg production is not linearly related to female weight, indices of egg production (fecundity) are considered better measures of reproductive output of a stock of a given size and age structure. Additionally, fecundity better emphasizes the important contribution of older and larger individuals to population egg production. Thus, in the 2015 benchmark stock assessment and this update, modeling increases in egg production with size is preferable to female biomass as a measure of reproductive ability of the stock.

Atlantic menhaden are relatively prolific spawners. Predicted fecundities are:

number of maturing ova = 2563*e 0.015*FL

according to the equation derived by Lewis et al. (1987). Annual fecundity at age was calculated using the Lewis et al. (1987) equation as well as the bias corrected, cohort based estimates of length at age for the population at the beginning of the fishing year (March 1; Table 2.5.1).

2.6 Natural Mortality

Atlantic menhaden are vulnerable to multiple sources of natural mortality (*M*) throughout their range including, but not limited to, predation, pollution, habitat degradation, toxic algal blooms, and hypoxia. Estimating the relative contribution and magnitude of these mortality sources continues to be a challenge for stock assessments especially for a short-lived forage fish like Atlantic menhaden. For the 2015 benchmark assessment, the SAS explored several methods for estimating *M* and endorsed the use of an age-varying but time-invariant approach using the methods of Lorenzen (1996) scaled to tagging estimates of natural mortality for ages 4-6. Refer to the 2015 SEDAR benchmark stock assessment report for a more detailed discussion of methods the SAS evaluated and reasoning for rejecting or accepting various methods.

2.7 Migration

There have been several studies examining Atlantic menhaden migration patterns (Roithmayr 1963; Dryfoos et al. 1973; Nicholson 1978; ASMFC 2004b). Adults begin migrating inshore and north in early spring following the end of the major spawning season off the Carolinas during December-February. The oldest and largest fish migrate farthest, reaching southern New England by May and the Gulf of Maine by June. Fish begin migrating south from northern areas to the Carolinas in late fall. Adults that remain in the south Atlantic region for spring and summer migrate south later in the year, reaching northern Florida by fall. During November and December, most of the adult population that summered north of Chesapeake Bay moves south of the Virginia and North Carolina capes. After winter dispersal along the south Atlantic coast, adults again begin migrating north in early spring.

3.0 Fishery-Dependent Data Sources

3.1 Commercial Reduction Fishery

SEDAR 2015 provides a description of the history of the reduction fishery for Atlantic menhaden. Briefly, coastwide participation and landings for this fishery have expanded and contracted over the years, but only one reduction factory on the US East Coast exists today – Omega Protein Inc. in Reedville, VA, which fishes with approximately seven vessels. Most of their fishing activity takes place in the Virginia portion of the Chesapeake Bay and Virginia's ocean waters, although fleets travel along the US East Coast seasonally.

3.1.1 Selectivity Time Blocks or Breaks in the BAM Model

When addressing selectivity in the reduction fishery and potential time blocks or breaks, the SAS considered residual patterns in the age composition data and major changes within the fishery. With regard to the latter, the SAS adopted three time blocks for the reduction fishery in the northern region (defined as waters north of Machipongo Inlet, VA): 1955-1969, 1970-1993, and 1994-2016. The SAS also adopted three time blocks for the reduction fishery in the southern region (defined as waters south of Machipongo Inlet, VA, including Chesapeake Bay): 1955-1971, 1972-2004, and 2005-2016. These time blocks are related to changes in the reduction fishery and are decribed in detail in SEDAR 2015. In both regions, the introduction of

selectivity time blocks noticeably improved the residual pattern apparent in the age composition data.

3.1.2 Data Collection and Survey Methods

Fishery-dependent data for the Atlantic menhaden purse-seine reduction fishery have been maintained by the Beaufort Laboratory of the National Marine Fisheries Service since 1955 and they consist of three major data sets: 1) fishery landings or catch records, 2) port samples for age and size composition of the catch, and 3) daily logbooks, or Captains Daily Fishing Reports (CDFRs). Detailed landings data for the reduction purse-seine fishery are available 1940-2016. The biostatistical data, or port samples, for length and weight at age are available from 1955 through 2016, and represent one of the longest and most complete time series of fishery data sets in the nation. The CDFRs itemize purse-seine set locations and estimated at-sea catches; vessel compliance is 100%. CDFR data for the Atlantic menhaden fleet are available for 1985-2016. Biological sampling for the menhaden purse-seine fishery is conducted over its entire range of the fishery, both temporally and geographically (Chester 1984; Chester and Waters 1985).

Historically, daily vessel unloads were reported weekly or monthly during the fishing year. In recent years (since about 2005) individual vessel unloads are available daily via email from the clerical staff at the fish factory. Landings are provided in thousands of standard fish (1,000 standard fish = 670 lbs), which are converted to kilograms.

3.1.3 Commercial Reduction Landings

Landings and nominal fishing effort (vessel-weeks, measured as number of weeks a vessel unloaded at least one time during the fishing year) are available since 1940 (Table 3.1.3.1). Landings rose during the 1940s, peaked during the late 1950s (>600,000 mt for five of six years; record landings of 715,200 mt in 1956), and then declined to low levels during the 1960s (from 578,600 mt in 1961 to 162,300 mt in 1969). During the 1970s the stock rebuilt (landings rose from 250,300 mt in 1971 to 375,700 mt in 1979) and then maintained intermediate levels during the 1980s. Landings during the 1990s declined from 401,100 mt in 1990 to 171,200 mt in 1999.

By 1998, the fishery had contracted to only two factories, one in Virginia and one in North Carolina. Landings dipped to 167,300 mt in 2000, rose to 233,600 mt in 2001, and then stabilized until the North Carolina reduction plant closed in 2005, leaving the sole plant along the Atlantic coast in Virginia. Between 2006 and 2012, reduction landings averaged 162,100 mt. The first coastwide TAC on Atlantic menhaden was implemented in 2013 and since that time, reduction landings have ranged from 131,000 mt in 2013 to 143,500 mt in 2015. In 2016, reduction landings were 137,400 mt and accounted for approximately 76% of coastwide landings.

3.1.4 Commercial Reduction Catch at Age - Methods and Intensity

Detailed sampling of the reduction fishery allows landings in biomass to be converted to landings in numbers at age. For each port/week/area caught, biostatistical sampling provides

an estimate of mean weight and the age distribution of fish caught. Hence, dividing landings for that port/week/area caught by the mean weight of fish allows the numbers of fish landed to be estimated. The age proportion then allows for estimation of fish landed. Developing the catch matrix at the port/week/area caught level of stratification provides for considerably greater precision than is typical for most assessments.

Catch At Age in Recent Years

Since 2012, approximately 1,190 10-fish samples have been collected from the reduction fishery. Over the past three years, age-2 Atlantic menhaden have comprised on average 51% of the total numbers of fish landed in the north and 55% of the total numbers of fish landed in the south.

Landings, Removals by Areas, and the Beaufort Assessment Model (BAM) In the SEDAR 2015 benchmark assessment, the Atlantic menhaden fishery is addressed in terms of a northern and a southern fishery versus solely as a reduction and a bait fishery as in the 2010 assessement (ASMFC 2010). To this end, this benchmark assessment incorporates "fleetsas-areas" components where both the bait and reduction fisheries are divided into northern and southern regions (Tables 3.1.4.1 - 3.1.4.2). By consensus, the SAS divided the northern and southern fisheries using a line that runs due east from Great Machipongo Inlet on the Eastern Shore of Virginia. Historically and for statistical reporting purposes, this has been the dividing line for the Mid-Atlantic and Chesapeake Bay areas for the Menhaden Program at the Beaufort Laboratory (June and Reintjes 1959). Nicholson (1971) noted that "Similarities in age and size composition of the catches, time and duration of fishing, and range of vessels from home port tended to set each area apart." Through about the 1970s, reduction vessels from menhaden plants in New Jersey and Delaware rarely fished below this line; conversely, reduction vessels from Chesapeake Bay rarely fished north of this line. Thus, it is a convenient line of demarcation to sort port samples and landings data for the fleet-as-areas model. Moreover, empirical data for mean lengths of port sampled fish indicated appreciable size differences between areas north and south of this line.

Landings for the bait fleets were uncomplicated as these vessels typically operate over a much smaller geographic range than the reduction fleet; therefore, it was assumed that bait removals came from the state in which the fish were landed.

3.1.5 Potential Biases, Uncertainty, and Measures of Precision

The topics and data derivations for this section are unchanged and assumed the same as in the benchmark stock assessment (SEDAR 2015).

3.2 Commercial Bait Fishery

3.2.1 Data Collection Methods

Atlantic menhaden are harvested for bait in almost all Atlantic Coast states and are used for bait in commercial (e.g., American lobster and blue crab) and sport fisheries (e.g., striped bass and bluefish). Bait harvest comes from directed bait fisheries, primarily small purse seines,

pound nets, gill nets, and cast nets. Menhaden are also landed as bycatch in various food-fish fisheries, such as pound nets, haul seines, and trawls. Systems for reporting bait landings have historically been incomplete because of the nature of the fishery and its unregulated marketing. Data limitations also exist because menhaden taken as bycatch in other commercial fisheries are often reported as "bait" together with other fish species. Additionally, menhaden harvested for personal bait use or sold "over-the-side" likely go unreported. As a result, the TC has determined that even though bait landing records date back to 1955, the most reliable bait landings are available since 1985 because of recent improvements made to harvester and dealer reporting programs.

Despite problems associated with estimating menhaden bait landings, data collection has improved in many areas. Some states license directed bait fisheries and require detailed landings records. More recently, harvest data reporting requirements changed through the implementation of Amendment 2 to the Atlantic Menhaden FMP because of the need for states to monitor in-season harvest relative to their newly implemented state specific quotas. Beginning in 2013, several states went from monthly reporting to weekly or daily reporting to avoid exceeding their allocated quota.

Bait landings from 1985-2016 were compiled using state-specific landing records by gear type and represent the most accurate dataset (Table 3.2.1.1). Bait landings from 1955-1984 were compiled using the Atlantic Coastal Cooperative Statistics Program's (ACCSP) data warehouse, which houses historical data but is admittedly incomplete. More specifically, purse seine bait landings from 1955-1984 were not included because bait/reduction disposition is not available prior to 1985 so all the purse seine landings during this time period were included in the reduction landings even though a fraction of those landings may have been for bait purposes. Therefore, bait landings data from 1955-1984 are only from pound nets and "other" gears.

3.2.2 Commercial Bait Landings

Coastwide bait landings of Atlantic menhaden have generally increased from 1985 through 2016 (Figure 3.2.2.1). During 1985 to 1997 bait landings averaged 28,000 mt, with a high of 43,800 mt landed in 1988 and a low of 21,600 mt landed in 1986. Between 1998 and 2005, bait landings were fairly stable around 35,500 mt and then generally increased through 2016, peaking in 2012 at 63,700 mt. In 2016, bait landings were 43,100 mt and comprised 24% of coastwide landings.

Changes from the 2015 SEDAR Benchmark Assessment

Historic bait landings for several states have been updated from the 2015 SEDAR benchmark assessment to reflect the best available data. Prompted by incomplete or non-existent reporting in the past, several states, such as New York, have sought out historic landing reports to fill data gaps and better reflect the historic bait fishery. In addition, Florida reduction landings from 1985-1987 and Maine internal water processing landings through 1993 have been removed from the bait landings to avoid double counting in both the bait and reduction fleets. Florida reduction landings and Maine internal water processing landings are included in

the reduction fleet. As a part of Amendment 3, all states have reviewed and approved their menhaden landings from 1985-2016.

3.2.3 Commercial Bait Catch-at-Age

Because of the limited age composition data, characterizing the age distribution of the removals by the bait fishery has been done at the region/year level, rather than port/week/area fished used for the reduction fishery. Four regions are defined as follows: (1) New England (Connecticut and north); (2) Mid-Atlantic (coastal Maryland, and Delaware through New York); (3) Chesapeake Bay (including coastal waters of Virginia); and (4) South Atlantic (North Carolina to Florida). Separate catch-at-age matrices were constructed for the northern and southern bait fisheries where the northern region included (1) and (2), while the southern region included (3) and (4). When the number of samples for a given region and year was less than 50, data were pooled across the years available and substituted for that year as described in SEDAR 2015. The resultant northern and southern catch-at-age matrices for the bait fishery are shown in Tables 3.2.3.1 and 3.2.3.2.

3.2.4 Potential biases, Uncertainty, and Measures of Precision

The topics and data derivations for this section are unchanged and assumed the same as in the benchmark stock assessment (SEDAR 2015).

3.3 Recreational Fishery

3.3.1 Data Collection Methods

The Marine Recreational Fisheries Statistics Survey (MRFSS, 1981-2003) and the Marine Recreational Information Program (MRIP, 2004-2016) data sets were used to derive a time series of recreational landings of Atlantic menhaden. Estimated recreational catches are reported as number/weight of fish harvested (Type A+B1) and number of fish released alive (Type B2).

3.3.2 Recreational Landings

The recreational landings estimates of Atlantic menhaden for the two assessment regions were combined with the bait landings and are shown in Tables 3.2.3.1 and 3.2.3.2. These estimates include an assumed 50% mortality of released fish (A+B1+0.5*B2), the same value used in the 2010 and 2015 benchmark assessments. The average recreational landings in the past ten years was estimated at 130 mt in the north and 380 mt in the south, representing less than 1% of total (combined bait and reduction) landings. Landings were highly variable with an increasing trend in recent years in both regions.

3.3.3 Recreational Discards/Bycatch

To determine total harvest, an estimate of release mortality to apply to the B2 caught fish is necessary. Under the assumption that many of these recreationally caught fish were caught by cast net, the judgment of the data workshop participants was that a 50% release mortality rate was a reasonable value.

3.3.4 Recreational Catch-at-Age

Insufficient biological samples were available to develop a recreational catch-at-age matrix. As in the 2010 and 2015 benchmarks, recreational landings were combined with bait landings, and the bait catch-at-age matrix was expanded to reflect these additional landings in numbers applied regionally and then combined.

3.3.5 Potential biases, Uncertainty, and Measures of Precision

The MRFSS/MRIP provides estimates of PSE (proportional standard error) as a measure of precision. The PSE values associated with MRFSS/MRIP estimates for Atlantic menhaden were substantial (>50%) in most years. Potential biases are unknown.

4.0 Indices of Abundance

4.1 Fishery-Dependent Indices

For the 2015 benchmark stock assessment, four fishery-dependent datasets (MA pound net, NJ gillnet, MD pound net, and PRFC pound net) were used to create state-specific indices of relative abundance. The fishery-dependent (FD) datasets revealed that FD indices had significant positive correlations with fishery-independent (FI) indices, within their respective regions. The FD data sets lacked both age and length data and because the FI datasets had longer time series and were generally of a higher quality (i.e., fewer issues of concern; e.g., one data set was one permit holder), all FD indices were removed from consideration in assessment models and were not updated for this report.

4.2 Fishery-Independent Indices

For more information on criteria used to determine which FI data sets should be developed into indices of abundance, see SEDAR 2015. For this update report, the SAS added the most recent years' data to the indices developed previously. All surveys were standardized using a generalized linear model (GLM) and the same methods as SEDAR 2015. Information on the surveys used in index development and differences in the GLM standardization from the benchmark can be found in Appendix A.

4.2.1 Coastwide Indices

YOY Index (1959-2016)

Sixteen fishery-independent young-of-the-year (YOY) survey data sets were used to create a coastwide index of recruitment for use in the base run of the Atlantic menhaden assessment model. The individual indices were combined using hierarchical modeling as described in Conn (2010). The resultant YOY index shows the largest recruitments occurring during the 1970s and 1980s (Figure 6.1.13; Table 4.2.1.1). Recruitment has since been lower but with increases in recruitment in the last three years. The CV for the index ranged from 0.37 to 1.04. This index was used to inform annual recruitment deviations in the model along with the catch at age data.

Age-1+ Indices

Two coastwide indices of adult abundance were developed from nine FI surveys. A northern adult index (NAD) was created using the method of Conn (2010) that included VIMS, CHESMAP, CHESFIMS, NJ, CT, and DE 16- and 30-ft trawls for the years 1980-2016 (Figure 6.1.14). A southern adult index (SAD) was created using the method of Conn (2010) that included the SEAMAP trawl survey and the GA trawl survey for the years 1990-2016 (Figure 6.1.15).

The NAD adult index for the assessment indicates an increase in abundance in the most recent years, while the SAD adult index for the assessment indicates a slightly decreasing abundance in the most recent years (Table 4.2.1.1). The CV associated with the SAD index ranged from 0.40 to 0.71, and the CV associated with the NAD index ranged from 0.29 to 0.88.

The length compositions for each of the adult indices were combined across surveys. Raw lengths in 10-mm bins from each survey by year were summed and then divided by the total number of length samples for that year. Length compositions with sample sizes over 100 (number of sets, trawls, etc.) were available continuously for 1990-2016 for the SAD and for 1988-2016 for the NAD and were used to determine selectivity of the respective indices.

5.0 Assessment Model

The base run from the 2015 benchmark assessment was updated. A statistical catch-at-age approach was used based on the Beaufort Assessment Model (BAM). A thorough description of the BAM model was provided in SEDAR 2015.

5.1 Beaufort Assessment Model (BAM)

BAM is a forward-projecting statistical catch-at-age model. The essence of such a model is to simulate a population that is projected forward in time like the population being assessed. Aspects of the fishing process (e.g., gear selectivity) are also simulated. Quantities to be estimated are systematically varied from starting values until the simulated population's characteristics match available data on the real population as closely as possible. Such data include total catch by year, observed age composition by year, observed indices of abundance, and observed length composition by year. The BAM was the forward-projecting age-structured model used in the previous Atlantic menhaden benchmark assessment (SEDAR 2015) and is being updated here.

Treatment of Indices

The two adult indices, SAD and NAD, were included in the base run of the BAM along with length compositions because they were deemed as accurate representations of the population over time and best available science. Age-specific selectivity schedules were estimated for each of these indices by fitting to length composition data sampled during the surveys. The SAD index selectivity was estimated as a double logistic because large fish were absent from the length samples. The NAD index selectivity was estimated as logistic because many of these surveys captured some of the largest individuals sampled by either FI or FD gears. The level of error in each index was based on the precision surrounding the annual values produced by the hierarchical method used to standardize and combine the component indices. In the BAM model, the estimates of the product of total numbers of fish at the appropriate time of the year

(May 15 for SAD and September 1 for NAD), a single catchability parameter, and the selectivity schedule were fit to the index value in that same year for each respective index. The error in both of these abundance indices was assumed to follow a lognormal distribution.

In the model the recruitment, or juvenile abundance index (JAI), was treated as an age-0 CPUE recruitment index, by fitting the product of the model estimated annual age-0 numbers part way through the year (June 1) and a constant catchability parameter to the computed index values. The catchability parameter for this index was blocked in order to accommodate data streams contributing to the index. Therefore, two constant catchability parameters were estimated for this index, one for 1959-1986 and one for 1987-2016. This allowed for changing spatial coverage in the index (the spatial coverage changes as survey time series were added) as well as changes due to habitat with increasing spatial coverage of the index. The error in the JAI index was assumed to follow a lognormal distribution.

Parameterization

The major characteristics of the model formulation were as follows:

- Start year and terminal year: The start year of the model was 1955, and the terminal year of the model was 2016.
- Ages: The model included ages 0 to 6 with age-6 being treated as a plus group.
- Natural mortality: The age-specific natural mortality rate was assumed constant. A
 Lorenzen curve was scaled such that the mortality of the older ages was that estimated
 in a tagging study.
- Stock dynamics: The standard Baranov catch equation was applied. This assumes exponential decay in cohort size because of fishing and natural mortality processes.
- Sex ratio: The ratio of males to females was fixed in the model at 1:1 because of the 251,330 fish sampled from the reduction fishery from 1955-1970, 49% were male and 51% were female.
- Maturity and Fecundity: The percent of females mature and fecundity were age and time varying, but fixed in the model. Both fecundity and maturity were based on length at age for the population at the start of the fishing year. Annual, cohort-based von Bertalanffy growth parameters (L∞, K, and t₀) were estimated with a bias correction using the fishery data. These annual growth parameters were then used to estimate mean lengths at age over time. Female fecundity at age for each year was fixed in the model and was based on a function of mean length by age for the population (Lewis and Roithmayr 1981). Lengths were also used in an estimated logistic regression function for determining maturity each year, which was fixed in the model.
- Weights at age: The weight-at-age during spawning and during the middle of the fishery were input into the model and were based on the overall estimates of the parameters for the weight-length equation.
- Recruitment: Spawning was assumed to occur on March 1 in the model; hence the spawning time in months was 0.0, as March 1 was the start date for the model.
 Recruitment to age-0 was estimated in the assessment model for each year with a set of annual deviation parameters, conditioned about a median recruitment, which was

- estimated in log-space. The steepness value was fixed at 0.99, which allowed for the estimation of a median recruitment and estimated deviations with time. Estimated deviations were informed by age composition data and a recruitment index.
- Fishing: Four fisheries were explicitly modeled. Southern and northern fleets of both the reduction fishery and the bait fishery were explicitly modeled to account for differences in selectivity due to size and age based migratory patterns. Being such a small proportion of the landings in each year, recreational landings were combined with the bait fishery landings. Fishing mortality rates were estimated for each year for each fishery by estimating a mean log fishing mortality rate and annual deviations.
- Selectivity functions indices: Selectivity for the recruitment index was 1.0 for age-0 and 0.0 for all other ages. Selectivities for the NAD and SAD indices were age-varying, but constant with time. The NAD index selectivity was estimated as a flat-topped logistic function, while the SAD index selectivity was estimated as a double logistic or domeshaped function.
- Selectivity functions fishery: Selectivity for each of the fishery fleets was estimated using a functional form of dome-shaped selectivity. Specifically, the selectivity for each fleet was estimated as a four parameter double logistic. Selectivity was dome-shaped for each fishery for all years 1955-2016. Selectivity for both the northern and southern commercial reduction fisheries was time-varying using time blocks. For the southern fleet, selectivity was blocked as follows 1955-1971, 1972-2004, and 2005-2016. For the northern fleet, selectivity was blocked as follows 1955-1969, 1970-1993, and 1994-2016. Time blocks were based on the contraction and changes in the fishery over time. Selectivity for the bait fishery was constant throughout the time series.
- *Discards*: Discards of Atlantic menhaden were believed to be negligible and were therefore ignored in the assessment model.
- Abundance indices: The model used three indices of abundance that were each modeled separately: a recruitment (age-0) index series (1959-2016; JAI), a southern adult index series (1990-2016; SAD), and a northern adult index series (1980-2016; NAD). Each index represents a composite of multiple survey datasets that were standardized/combined using the hierarchical method of Conn (2010).
- Ageing uncertainty: Ageing uncertainty was not included in the base run of the assessment.
- Fitting criterion: The fitting criterion was a total likelihood approach in which catch, the observed age compositions from each fishery, the observed length compositions from each index, and the patterns of the abundance indices were fit based on the assumed statistical error distribution and the level of assumed or measured error.
- Biological benchmarks: Current interim benchmarks adopted for Atlantic menhaden are SPR based benchmarks and were calculated as they were in the 2015 benchmark stock assessment.

Weighting of Likelihoods

The likelihood components in the BAM model include northern and southern reduction landings, northern and southern bait landings, northern and southern reduction catch-at-age,

northern and southern bait catch-at-age, the NAD index, the SAD index, a recruitment index, NAD length compositions, and SAD length compositions. For each of these components, a statistical error distribution was assumed as follows:

Likelihood Component	Error Distribution	Error Levels
N & S reduction landings	Lognormal	Constant CV = 0.03
N & S bait landings	Lognormal	Constant CV = 0.15 (1955-1984) and
		Constant CV = 0.05 (1985-2016)
N & S reduction catch at age	Multinomial	Annual number of trips sampled
N & S bait catch at age	Multinomial	Annual number of trips sampled
NAD length compositions	Multinomial	Annual number of sampling events
SAD length compositions	Multinomial	Annual number of sampling events
NAD index	Lognormal	Annual CV values from 0.29 to 0.88
SAD index	Lognormal	Annual CV values from 0.40 to 0.71
Recruitment index (JAI)	Lognormal	Annual CV values from 0.37 to 1.04

In addition to these components, the likelihood also contained some penalty terms and prior probability distributions. The penalties were on recruitment deviations and the deviations in the initial age structure from equilibrium. The priors were on the two parameters of the descending limb of the double logistic selectivity for the SAD index and the A_{50} of the descending limb of the southern commercial reduction fishery selectivity.

Iterative reweighting was used to weight the data components as they were weighted in SEDAR 40 (Francis 2011). Iterative reweighting was completed such that the standard deviation of the normalized residuals for each data component was near the value from the benchmark assessment (SEDAR 2015).

Estimating Precision

The BAM model was implemented using the AD Model Builder software, which allowed for easy calculation of the inverse Hessian matrix, which provides approximate precision of estimated parameters. However, in this case where some key values were fixed (e.g., natural mortality), it is believed that precision measures from the inverse Hessian matrix are underestimates of the true precision. Instead, the BAM model employed a parametric Monte Carlo bootstrap (MCB) procedure in which the input data sources were re-sampled using the measured or assumed statistical distribution and error levels provided, as described in SEDAR 2015.

Sensitivity Analyses

A total of 15 sensitivity runs were completed with the BAM model. These sensitivity runs represent those involving input data, those involving changes to the model configuration, and those included as part of the retrospective analyses. Some of these runs were completed in order to explore the differences between the benchmark and update assessments.

Sensitivity to Input Data

Four sensitivity runs were conducted to examine various effects to changes in the input data. These runs are related to uncertainty in index choice or life history values. The following is a list of these sensitivity runs:

Run Number	Sensitivity Examined
am-090	Excluded the NAD index and NAD length compositions
am-091	Upper CI from Lorenzen for M
am-092	Lower CI from Lorenzen for M
am-100	Uncorrected bait landings, as used in the 2015 benchmark stock assessment

Sensitivity to Model Configuration

Five sensitivity runs were conducted to examine the effects of various model configurations. In particular, this set of runs was completed to try to assess the differences that occurred between the benchmark and update stock assessments. These runs are related to recruitment index catchability and catchability of the NAD index. The following is a list of these sensitivity runs:

Run Number	Sensitivity Examined
am-093	One estimated catchability for the recruitment index
am-076	Fixed catchability for the NAD index (fixed at benchmark assessment value)
am-101	Two catchabilities estimated for NAD index (1980-1989; 1990-2016)
am-102	Two catchabilities estimated for NAD index (1980-1995; 1996-2016)
am-103	Two catchabilities estimated for NAD index (1980-2006; 2007-2016)

Retrospective Analyses

Retrospective analyses were completed by running the BAM model in a series of runs sequentially omitting years 2016 to 2011, as indicated below:

Run Number	Sensitivity Examined
am-094	Retrospective analysis with modeling ending in 2015
am-095	Retrospective analysis with modeling ending in 2014
am-096	Retrospective analysis with modeling ending in 2013
am-097	Retrospective analysis with modeling ending in 2012
am-098	Retrospective analysis with modeling ending in 2011
am-099	Retrospective analysis with modeling ending in 2010

Uncertainty analyses

Uncertainty was examined in our results in two distinct ways: sensitivity runs and by using a Monte Carlo boostrap (MCB) procedure. This parametric bootstrap procedure was run for 1,500 iterations. For some iterations, the model did not converge; where this was true, then that

particular iteration was not included in the results. In addition, some iterations estimated fairly high values for R_0 or other parameters. Thus, some additional runs were excluded. In the end, about 13% of runs did not converge or were excluded for unrealistic parameter estimates.

Reference Point Estimation – Parameterization, Uncertainty, and Sensitivity Analysis Fishing mortality reference points for Atlantic menhaden were calculated using the same methods as the benchmark assessment (SEDAR 2015). The threshold and limit are the maximum and median geometric mean fishing mortality rates, respectively, during the years 1960-2012. The resultant reference points are $F_{36\%}$ (target) and $F_{21\%}$ (limit) based on SPR, which are a change from the 2015 benchmark stock assessment values of $F_{57\%}$ and $F_{38\%}$. These changes are due to adding additional years of data to the model. Population fecundity (FEC, number of maturing or ripe eggs) is the other reference point and is a measure of reproductive capacity. The reference points for reproductive output include FEC_{36%} (target) and FEC_{21%} (limit). All benchmark calculations were based upon landings weighted selectivity across all fleets and areas, M-at-age (which was constant), mean maturity at age, a 1:1 sex ratio, and mean fecundity-at-age from the model inputs. All means are across the time series of 1955 to 2013. Also included was the $F_{X\%}$ of the current fishing mortality rate and a plot of the biomass over time divided by the biomass at F = 0. Uncertainty in the benchmark estimates was provided by the bootstrap runs. For each run, the current reference points were calculated and a distribution of the benchmarks was provided.

6.0 Model Results

6.1 Goodness of Fit

Observed and model predicted removals for the northern and southern reduction and bait fisheries (1955–2016; Figures 6.1.1-6.1.4) were compared for the base model run. Reduction fishery removals, which are known fairly precisely, fit very well, as do bait fishery removals. Patterns in the annual comparisons of observed and predicted proportions of catch-at-age for the northern and southern reduction and bait fisheries (Figures 6.1.5-6.1.8) indicate a good overall model fit to the observed data. The bubble plots for the northern and southern reduction and bait fisheries (Figures 6.1.9-6.1.12) indicate that the model fit does fairly well at estimating catch-at-age during the time series. There is no patterning observed in the bubble plot that caused concern.

Observed and predicted coastwide recruitment indices were compared for the base model run (1959–2016; Figure 6.1.13). The residual pattern suggests that the recruitment index data did not fit well for relatively large year classes, especially those that occurred in the 1970s and 1980s. Visual examination of the fit suggests that the overall pattern fit reasonably well for the most recent time period with the BAM model capturing some of the lows and highs observed in the index values.

The observed and predicted NAD index (1980–2016; Figure 6.1.14) and SAD index (1990-2016; Figure 6.1.15) values fit well. The general patterns are captured. However, the model has a difficult time fitting estimates to the highest observed values in the 1980s and 2010s for the

NAD and in 1990, 2006, 2009, and 2011 for the SAD. Patterns in the annual comparisons of observed and predicted proportion NAD and SAD measurements at length for the NAD and SAD indices (Figures 6.1.16-6.1.17) indicate good fit to the observed data in some years, but problems in fitting to data in other years. Given the nature of these indices as a conglomeration of data from different state fishery-independent data sources, changing patterns in the data are expected, yet are difficult to discern with model specifications. Therefore, although the fits to the data could be better, the SAS only used the length data to get an idea of ages represented by each index, nothing more. Some of the problems include an accumulation of predicted values at larger lengths for the NAD index, a mismatch in size for given years for the SAD index, and bi-modality in the NAD index, all of which would be difficult to capture by addressing them with selectivity within the model. The bubble plots for the NAD and SAD index length compositions (Figures 6.1.18-6.1.19) show patterns, as would be expected from the annual length composition plots and are similar to the plots from the benchmark assessment.

6.2 Parameter Estimates

6.2.1 Selectivities and Catchability

Fishery removals were related to an overall level of fishing mortality and the selectivity (or availability) of Atlantic menhaden to the fishery. Model estimates of selectivity for the reduction and bait fisheries are shown graphically in Figures 6.2.1.1-6.2.1.8. Selectivity parameters were estimated for each fishery and time period as four-parameter, double-logistic models with the parameters being the ascending slope and A_{50} and the descending slope and A_{50} (Table 6.2.1.1).

Selectivity for the NAD index was estimated as a two-parameter logistic function as shown in Figure 6.2.1.9 and Table 6.2.1.1. Selectivity for the NAD index was used to fit the NAD length composition data and represents the ages of fish that were captured by the NAD index.

Selectivity for the SAD index was estimated as a four-parameter, double-logistic function as shown in Figure 6.2.1.10 and Table 6.2.1.1. Selectivity for the SAD index was used to fit the SAD length composition data and represents the ages of fish that were captured by the SAD index.

The base BAM model estimated a single, constant catchability parameter for the NAD and SAD abundance indices, reflecting the assumption that expected catchability for these indices is believed to be constant through time. This is a good assumption for the NAD and SAD fishery-independent indices since they are based on consistent, scientific survey collections, albeit the surveys are a mix of state surveys and do not target menhaden and because the indices used to create the NAD and SAD were standardized to account for catchability differences. Log-catchability was estimated as 0.81 (2.25 back transformed) for the NAD index with a 0.20 SE, while the log-catchability of the SAD index was -1.54 (0.21 back transformed) with a 0.08 SE. The addition of the 2014-2016 NAD index data points resulted in a large difference in the estimation of the NAD index catchability parameter when compared to the benchmark assessment. The three points had high leverage with the resultant catchability change resulting

in scale differences between this update assessment and the benchmark assessment. Some sensitivity runs were included to demonstrate the impact (see below).

The base BAM model estimated two constant catchability parameters for the recruitment index using two time blocks: 1959-1986 and 1987-2016. The time blocks represent a change in the combined spatial extent of the component seine surveys that comprise the index, with the addition of several state fishery-independent surveys after 1987. Log-catchability was estimated as -2.31 (0.10 back transformed) for the first time period with a SE of 0.06, while the log-catchability of the second time period was -2.79 (0.06 back transformed) with a SE of 0.04.

6.2.2 Fishing Mortality Rates

Highly variable fishing mortalities were noted throughout the entire time series and dependent upon the fishing. The highest fishing mortalities for the commercial reduction fishery in the north were in the 1950s (Figure 6.2.2.1), while the highest fishing mortality rates for the commercial reduction fishery in the south were during the 1970s to 2000s (Figure 6.2.2.2). The highest fishing mortalities for the commercial bait fishery in the north were in the 1950s and 1990s (Figure 6.2.2.3), while the highest fishing mortality rates for the commercial bait fishery in the south were during the late 1990s and 2000s (Figure 6.2.2.4).

Fishing mortality rate over time was reported as the geometric mean fishing mortality rate of ages-2 to -4 (Table 6.2.2.1; Figure 6.2.2.5). In the most recent decade, the geometric mean fishing mortality rate has ranged between 0.31 and 0.58. The geometric mean fishing mortality rate for 2016 is 0.51. The fishing mortality rate for this update assessment is higher than the fishing mortality rate from the benchmark assessment (Figure 7.2.1.3). The scale of the fishing mortality rate is different and the trend deviates in some years. To look at the difference in the scale and trend of the fishing mortality rate, the SAS and TC ran sensitivity runs (see below).

6.2.3 Abundance, Fecundity, Biomass, and Recruitment Estimates

The base BAM model estimated population numbers-at-age (ages 0-6+) for 1955–2016 (Figure 6.2.3.1 and Table 6.2.3.1). From these estimates, along with growth and reproductive data, different estimates of reproductive capacity were computed. Population fecundity (i.e., Total Egg Production) was the measure of reproductive output used as in the benchmark assessment. Population fecundity (*FEC*, number of maturing ova) was highest in the early 1960s, early 1970s, and during the more recent years and has generally been higher with older age classes making up a larger proportion of the *FEC* (Figure 6.2.3.2 and Table 6.2.3.2). Fecundity for this update assessment is lower than the fecundity from the benchmark assessment (Figure 7.2.1.4). The scale of the fecundity is different and the trend deviates in some years. To look at the difference in the scale and trend of the fecundity, the SAS and TC ran sensitivity runs (see below).

Biomass has fluctuated with time from an estimated high of over 2,288,000 mt in 1958 to a low of 567,000 mt in 2000 (Figures 6.2.3.3-6.2.3.4; Table 6.2.3.3). Biomass was estimated to have been largest during the late-1950s, with lows occurring during the 1960s and mid-1990s to mid-2000s, and was relatively stable through much of the 1970s, 1980s, and 2010s. Biomass is likely

increasing at a faster rate than abundance because of the increase in the number of older fish at age, which weigh more than younger individuals.

Age-0 recruits of Atlantic menhaden (Figure 6.2.3.5 and Table 6.2.3.1) were highest during the 1970s and 1980s. An extremely large year class was also predicted for 1958. More recently, larger year-classes have also been estimated in 2005, 2010, and 2016. The annual estimated recruitment values relative to the median are shown in Figure 6.2.3.6. The only recruitment parameter estimated in the model was log of R_0 , which was estimated at 2.62 with a standard deviation of 0.024. The log of R_0 was estimated at a lower value with the addition of the 2014-2016 data points when compared to the benchmark stock assessment. This seemed to be related to the leverage of the 2014-2016 NAD index points and increased estimate of catchability. To explore this, the SAS and TC ran additional sensitivity runs (see below).

6.3 Weighting of the Data Components

The likelihood components of NAD index, SAD index, recruitment index, SAD length compositions, NAD length compositions, northern commercial reduction fishery age compositions, southern commercial reduction fishery age compositions, northern bait fishery age compositions, and southern bait fishery age compositions were all weighted such that the weights for this update were similar to the weights from the benchmark assessment (Francis 2011; SEDAR 2015).

6.4 Sensitivity Analyses

6.4.1 Alternate model runs

The results of the sensitivity runs suggest that the base BAM model trends and stock status are somewhat robust to model choices made in the base run and data choices made by the SAS (Figures 6.4.1.1-6.4.1.11).

Sensitivity runs were completed to evaluate model robustness to decisions related to natural mortality, M. Fishing mortality rate varied overall for this series of runs with an increase and a decrease in M. Biomass and recruitment were greatly influenced by M with increased (upper) M values causing dramatically increased biomass and recruitment, which is to be expected. Only the scale of M was explored; time-varying M was not explored as a sensitivity run. Natural mortality likely varies with time given that Atlantic menhaden are a forage species and that the environment is dynamic.

Some sensitivity runs were completed to look at the effects of index choice and parameterization on model outcomes. The largest differences in model outcomes were for those runs that excluded the NAD index, had catchability fixed for the NAD index, or estimated two catchability parameters for the NAD index. When the NAD index was removed from the model, the biomass and fecundity from the 1990s forward increased dramatically and recruitment increased, while the *F* decreased. In short, the removal of the NAD index resulted in a larger population. With a loss of the NAD index, the model also lost its one logistic selectivity. The estimation of two catchabilities for the NAD index resulted in a much different

scale when the break years were 2006/2007. This suggests the potential for exploring the catchability of the NAD index in the next benchmark assessment. These runs provide insight into the changes that occurred between the benchmark and update assessment. Sensitivity runs and restrospective analysis (see below) suggested that the model is sensitive to the NAD index, and in particular to the addition of three most recent data points (2014-2016). This update leads to a change in the index catchability and higher fishing mortality for most of the time series. The 2015 benchmark assessment was also sensitive to the NAD index. Thus, the NAD index is critical to determining the scaling and trend in the stock assessment, as are the decisions surrounding the configuration of the NAD index within the stock assessment model. These runs suggest further exploration of the NAD index and its components during the next assessment.

Removal of time blocks on catchability for the recruitment index had very little influence on estimates of fishing mortality, especially in the most recent time period. With one constant catchability for the recruitment index, the biomass and fecundity in the 1970s was much higher than the base run. However, both the biomass and fecundity from 1990 to the present are similar to the base run. The fit to the recruitment index was different from the base run with a poorer fit for the sensitivity run. This was expected as the additional catchability parameter would allow for better fit to the recruitment index. Overall, the behaviors observed from the sensitivity run with one catchability were as expected.

In general, a common trend in the results from 1955-2016 were seen in many of the sensitivity runs. Some sensitivity runs resulted in differing year-to-year values depending upon the data sources used and modeling choices that were made, which was expected. Some sensitivity runs did change the overall scale of the assessment. For example, changes to natural mortality scaled other model components, which is a typical stock assessment result. Overall, the final stock status was the same across all sensitivity runs except the run with lower natural mortality.

The sensitivity runs when compared to the MCB runs discussed below are generally within the bounds of uncertainty explored for this assessment. Likelihood values, SDNRs, and some of the estimated parameters (Tables 6.4.1.1-6.4.1.3) can be compared below. The output distributions from the estimated parameters from the MCBs are fairly smooth distributions, which suggests that these runs are simply the bounds on the uncertainty of the assessment given the assumptions and data inputs.

6.4.2 Retrospective Analyses

The retrospective was run peeling off data back to 2010 (Figures 6.4.2.1-6.4.2.11; Tables 6. 4.2.1-6.4.2.3). The fits to the indices remained consistently good with the removal of years of data. The retrospective exhibits very little change for the first of the two years peel (2015-2014). For the years before 2014, geometric mean fishing mortality for ages-2 to -4 was under predicted. Biomass and fecundity exhibit similar behaviors for the retrospective analysis as the fishing mortality rate did. However, biomass and fecundity were over predicted in the years before 2014.

There are always trade-offs in fitting data components, and those tradeoffs change with time; these trade-offs have an impact on the appearance of retrospective analyses. For example, the second catchability parameter estimated for the JAI index is consistently estimated, but the catchability for the other indices and R_0 are changing with respect to the number of years of data included (Table 6.4.2.3). Patterns in retrospective analysis can emerge from data tradeoffs; the addition of data in a data space with no historical information can create patterns where parameter estimates are influenced and the fit to the indices is influenced.

The stock status outcome did not vary in this set of retrospective model runs. In particular, the ratio of geometric mean fishing mortality at ages-2 to -4 to the benchmarks in the terminal year showed no variation in stock status (Figures 6.4.2.8-6.4.2.9), nor did the ratio of *FEC* to the *FEC* benchmarks in the terminal year (Figures 6.4.2.10-6.4.2.11).

6.5 Uncertainty Analysis

Uncertainty was examined in our results in two distinct ways: sensitivity runs and by using a MCB procedure. This parametric bootstrap procedure was run for 1,500 iterations. For some iterations, the model did not converge; where this was true, then that particular iteration was not included in the results. In addition, some iterations estimated fairly high values for R_0 or other parameters. Thus, some additional runs were excluded. In the end, about 13% of runs did not converge or were excluded for unrealistic parameter estimates.

The resulting estimates from the MCB runs have been summarized in Figures 6.5.1-6.5.4, showing the 95% confidence region. In general, the MCB results are not symmetrical distributions about the base run results because some of the uncertainty specifications were not symmetrical. Uncertainty was large in some years, especially for biomass and fecundity. The uncertainty explored with the retrospective analysis was within the bounds of the uncertainty from the MCB runs.

7.0 Stock Status

7.1 Current Overfishing, Overfished/Depleted Definitions

The current overfishing definition is a fecundity-per-recruit threshold based on a historical performance reference point. The threshold and target were calculated, as in the benchmark assessment, as the maximum and median geometric mean fishing mortality rate for ages-2 to -4 during 1960-2012 (a period deemed sustainable). The resulting reference points for this update are a threshold of $F_{21\%}$ and a target of $F_{36\%}$. F-based reference points should be compared to the geometric mean fishing mortality rate for ages-2 to -4. The resultant fecundity-based overfished definition is a threshold of $FEC_{21\%}$ and a target of $FEC_{36\%}$.

The maximum spawning potential (MSP) or spawner per recruit (SPR) based reference points are intended to be interim reference points while the ASMFC's Multispecies Technical Committee develops ecological-based reference points (ERP). The ERPs will take time to develop because of the complexity of modeling the predator-prey relationships for marine species that rely on Atlantic menhaden for forage (e.g., striped bass, bluefish, and weakfish). In

either case (biological or ecological reference points), the intent is to manage Atlantic menhaden at sustainable levels to support fisheries and meet predator demands by maintaining sufficient reproductive capacity to prevent stock depletion and protect against recruitment failure.

7.2 Stock Status Determination

7.2.1 Overfished and Overfishing Status

Benchmarks for Atlantic menhaden are $F_{36\%}$, $F_{21\%}$, $FEC_{36\%}$, and $FEC_{21\%}$. The benchmarks are calculated through spawner-per-recruit analysis using the mean values of any time-varying components (i.e., growth, maturity) as in the benchmark assessment (SEDAR 2015) and geometric mean fishing mortality rate at ages-2 to -4 for each year (Figure 7.2.1.1). The base BAM model benchmark estimates and terminal year stock status are indicated in Table 7.2.1.1 Based on the current adopted benchmarks, **the Atlantic menhaden stock status is not overfished and overfishing is not occurring**. In addition, the current stock is below the current fishing mortality target and below the current *FEC* target (Figure 7.2.1.2).

The stock status for this update assessment is the same as the status from the benchmark assessment (Figures 7.2.1.3 and 7.1.2.4). Because the assessment update resulted in generally higher fishing mortality values throughout the time series, the maximum and median F values were estimated higher than the 2015 benchmark and the resulting reference points were different from the 2015 reference points of $F_{38\%}$, $F_{57\%}$, $FEC_{38\%}$, and $FEC_{57\%}$. While the scale is different and the trend deviates in some years, during the last decade the stock status for both fishing mortality rate and fecundity has been similar. Sensitivity runs indicate that the scale and trend differences are related to the NAD index and its model configuration. However, additional analyses should be undertaken during the next benchmark assessment to address this topic.

7.2.2 Uncertainty

The MCB runs and sensitivity runs support the stock status determination using the benchmarks. For each MCB run, the benchmarks were calculated. The entire time series of estimates of the geometric mean fishing mortality at ages-2 to -4 over F_{21%} and F_{36%} are shown in Figures 7.2.2.1 and 7.2.2.2, which include the 95% confidence intervals for the MCB runs. The entire time series of estimates of fecundity over FEC_{21%} and FEC_{36%} are shown in Figures 7.2.2.3 and 7.2.2.4, which also include the 95% confidence intervals for the MCB runs. In addition, the retrospective runs are within the bounds of the MCB runs in Figures 7.2.2.1 – 7.2.2.4. Phase plots of base run and each MCB run versus the threshold and target benchmarks are shown in Figures 7.2.2.5 and 7.2.2.6, respectively. Densities and cumulative probability densities for each of the benchmarks are shown in Figures 7.2.2.7 -7.2.2.8. In addition, each of the sensitivity and retrospective runs, as well as most of the MCB runs, indicated the same stock status as the base run, except the lower natural mortality run, and most of the MCB runs (Tables 7.2.2.1-7.2.2.2). The history of fishing mortality rates in these figures suggests that overfishing likely occurred in the 1950s, but generally, overfishing is unlikely to be occurring at present. The history of fecundity over the time series suggests that the population was overfished as recent as the late 1990s to mid 2000s, but is not currently overfished.

The uncertainty in the terminal year stock status indicators were expressed using the results of the bootstrap runs of the base BAM model and sensitivity runs. The results indicate that the fecundity estimates for the terminal year are generally above the threshold with 5% of runs falling below 1.0 for *FEC*_{21%}, while 61% of runs fell below 1.0 for *FEC*_{36%}. The results for the 2016 fishing mortality rate suggests that the base run estimate is below the target and threshold with none of the bootstrap runs exceeding the threshold values in the terminal year and 10% of the boostrap runs exceeding the target values in the terminal year.

7.3 Plan for Development of Ecological Reference Points

In the *Ecological Reference Points for Atlantic Menhaden* report, the Biological Ecological Reference Points (BERP) Workgroup (WG) presented a suite of preliminary ecological reference point (ERP) models and ecosystem monitoring approaches for feedback as part of the 2015 Benchmark Stock Assessment for Atlantic Menhaden (SEDAR 2015, Appendix E). The BERP WG recommended the use of facilitated workshops to develop specific ecosystem and fisheries objectives to drive further development of ERPs for Atlantic menhaden. This Ecosystem Management Objectives Workshop (EMOW) contained a broad range of representation including Commissioners, stakeholder representatives, and technical representatives to provide various perspectives on Atlantic menhaden management. The EMOW identified potential ecosystem goals and objectives that were reviewed and approved by the Board. The WG then assessed the ability of each preliminary ERP model to address EMOW-identified management objectives and performance measures, and selected models accordingly.

Currently, the WG is thoroughly evaluating this suite of novel multispecies models to ensure they are able to generate ERPs which meet as many management objectives as possible. Some of the models under consideration are a Bayesian surplus production model with time-varying population growth rate which estimates the trend in total Atlantic menhaden stock biomass and fishery exploitation rate by allowing the population growth rate to fluctuate annually in response to changing environmental conditions. This approach produces dynamic, maximum sustainable yield-based ecological reference points that implicitly account for the forage services menhaden provide. Another production model that is up for consideration is a Steele-Henderson model. This type of Steele-Henderson modeling permits non-fisheries (predation and environmental) effects to be quantified and incorporated into the single species stock assessments, allowing fixed and non-equilibrium (time-varying) ecological overfishing thresholds to be established. This approach is not intended to replace more complex multispecies ecosystem assessment models, but rather to expand the scope of the single species assessments to include the separate and joint effects of fishing, predation and environmental effects at the fish community level. Finally, a multispecies statistical catch-at-age modeling framework is being considered. This model uses standard statistical catch-at-age techniques and single species models are linked using trophic calculations to provide a predator-prey feedback between the population models. The statistical framework is believed to be an improvement from the existing MSVPA because using statistical techniques may help to estimate many of the model parameters while incorporating the inherent uncertainty in the data. An external model being considered is an Ecopath with Ecosystem model, however the

application of this model is for strategic planning (to explore tradeoffs) not tactical (e.g., quota setting) advice. The model is flexible and able to explore additional menhaden relevant scenarios, ERPs, and questions. This model could be used to evaluate the other models being developed.

Once these models are fully vetted, the WG will select which models will go to peer-review in 2019 along with the single-species BAM model, which has traditionally been used for menhaden management. This is an ambitious timeline, since all models will need to be evaluated in the same timeframe as a single species assessment. Additionally, the WG recommends conducting a Management Strategy Evaluation (MSE) for Atlantic menhaden during which single-species forage services reference points would be tested relative to traditional reference points and the management goals for the stock.

8.0 Research and Modeling Recommendations for Benchmark

Many of the research and modeling recommendations from the last benchmark stock assessment remain relevant for this update stock assessment. Research recommendations are broken down into two categories: data and modeling. While all recommendations are high priority, the first recommendation is the highest priority. Each category is further broken down into recommendations that can be completed in the short term and recommendations that will require long term commitment. Notes have been added for this report regarding work that has been addressed or initiated since SEDAR 2015.

Annual Data Collection

Short term (next 3-6 years):

1. Continue current level of sampling from bait fisheries, particularly in the Mid-Atlantic and New England. Analyze sampling adequacy of the reduction fishery and effectively sample areas outside of that fishery (e.g., work with industry and states to collect age structure data and biological data outside the range of the fishery). NOTE: Work to assess the sampling adequacy of the bait and reduction fisheries has been initiated by Genevieve Nesslage's research group at the University of Maryland Center for Environmental Science.

2. Ageing:

- a. Conduct ageing validation study (e.g., scale : otolith comparison), making sure to sample older age classes. Use archived scales to do radio isotope analysis.
- b. Ageing precision: conduct an ageing workshop to assess precision and error among readers (currently planned for January 2015). NOTE: A workshop was completed and described in ASMFC 2015 and Atlantic menhaden scales have been added to the annual ASMFC QA/QC Fish Ageing Workshop (ASMFC 2017) to address an ongoing need for information on ageing precision and error.
- 3. Conduct a comprehensive fecundity study. **NOTE**: This work has been initiated and is ongoing with Rob Latour's research group at Virginia Institute of Marine Science.
- 4. Place observers on boats to collect at-sea samples from purse-seine sets, or collect samples at dockside during vessel pump-out operations (as opposed to current top of hold sampling) to address sampling adequacy.

- 5. Investigate relationship between fish size and school size in order to address selectivity (specifically addressing fisher behavior related to harvest of specific school sizes).
- 6. Investigate relationship between fish size and distance from shore (addressing selectivity).
- 7. Evaluate alternative fleet configurations for the removal and catch-at-age data.

Long term (6+ years):

- 1. Develop a menhaden specific coastwide fishery-independent index of adult abundance at age. One possible methodology is an air spotter survey complemented with ground truthing for biological information (e.g., size and age composition). In all cases, a sound statistical design is essential (involving statisticians in the development and review of the design; some trial surveys may be necessary). [Highest Priority] NOTE: Design of a winter pelagic survey of adult Atlantic menhaden in the Mid-Atlantic has been initiated by Genevieve Nesslage's research group at the University of Maryland Center for Environmental Science.
- 2. Conduct studies on spatial and temporal dynamics of spawning (how often, how much of the year, batch spawning, etc.)
- Conduct studies on productivity of estuarine environments related to recruitment.
 NOTE: Anstead et al. 2016 and 2017 used otolith chemistry to evaluate the proportional contribution of each nursery area along the US Atlantic coast for recruits for 2010-2012.
- 4. Investigation of environmental covariates related to recruitment. **NOTE**: Buchheister et al. 2016 evaluated coast wide recruitment patters from 1959-2013 and found the Atlantic Multidecal Oscillation was the best predictor of regional recruitment. Simpson et al. 2016 evaluated several environmental covariates for an effect on larval survival and found temperature had the greatest effect on early life survival which was more related to recruitment than larval supply.

Assessment Methodology

Short term (3-6 year):

- 1. Conduct management strategy evaluation (MSE). [Highest Priority] NOTE: This work has been initiated and is ongoing with Amy Schueller's research group at the Southeast Fisheries Science Center in Beaufort, North Carolina.
- 2. Conduct multi-objective decision analysis (MODA). [Highest Priority] NOTE: This will be addressed through the ongoing BERP WG activities.
- 3. Continue to develop an integrated length and age based model (e.g., SS3).
- 4. Continue to improve methods for incorporation of natural mortality (e.g., multi-species statistical catch-at-age model). **NOTE**: This work will be addressed by McNamee's doctoral thesis (*in prep*) and through current BERP WG activities.
- 5. During the next benchmark stock assessment process (scheduled for 2019), the SAS recommends that the following items be considered during modeling workshops:
 - a. Re-examine the methodology and surveys used for the development of the NAD index.
 - b. Explore the likelihood component for the length composition data.

c. Examine the age composition of the bait fishery.

Long term (6+ years):

1. Develop a seasonal spatially-explicit model, once sufficient age-specific data on movement rates of menhaden are available.

9.0 Literature Cited

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10.0 Tables

Table 2.3.1 The estimated annual, cohort-based von Bertalanffy growth curves with the bias correction as detailed in Schueller et al. (2014). Those t_0 values with a * indicated values were fixed at the non-bias corrected values. 2012 and 2013 did not converge.

		Bias cor	rected va	lues
	n	L∞	K	t ₀
1947	28	380.7	0.23	0.00
1948	101	335.2	0.69	0.00
1949	355	322.8	0.75	-0.71
1950	1202	342.2	0.39	-0.25
1951	6574	344.7	0.42	0.00
1952	3596	354.8	0.34	-1.02*
1953	9362	356.5	0.39	-0.58
1954	9216	366.1	0.39	-0.43
1955	18271	544.9	0.15	-1.13
1956	20357	393.0	0.28	-0.68
1957	9581	487.3	0.17	-1.37
1958	34120	459.1	0.19	-0.85
1959	6880	443.7	0.21	-1.30*
1960	9016	374.6	0.33	-0.63
1961	8220	334.6	0.39	-0.74
1962	11242	349.6	0.35	-0.88
1963	9324	368.6	0.32	-0.95
1964	17597	469.8	0.23	-1.01*
1965	17274	627.4	0.14	-1.17*
1966	25575	440.1	0.29	-0.76*
1967	13397	675.2	0.12	-1.50*
1968	9459	620.2	0.13	-1.50*
1969	11442	503.3	0.25	-0.84*
1970	4373	392.2	0.45	-0.36*
1971	7721	539.8	0.15	-1.36
1972	6292	327.1	0.54	-0.11
1973	6366	401.5	0.27	-0.72*
1974	6796	562.3	0.13	-1.29
1975	8832	426.5	0.19	-0.95*
1976	6814	537.4	0.13	-1.06
1977	7168	592.9	0.12	-1.05
1978	5200	480.4	0.14	-1.34
1979	9437	565.5	0.10	-1.47*
1980	7302	393.7	0.22	-0.84
1981	13566	472.5	0.16	-1.10
1982	6564	429.1	0.22	-0.70*
1983	9446	541.3	0.12	-1.31
1984	10173	427.9	0.19	-0.98
1985	8361	544.8	0.13	-1.15
1986	6350	397.8	0.21	-0.92
1987	4215	420.2	0.21	-0.76*

		Bias cor	rected va	
	n	L∞	K	t ₀
1988	9608	384.6	0.29	-0.59
1989	3806	332.8	0.40	-0.56
1990	5668	393.6	0.26	-0.79*
1991	7743	461.4	0.20	-1.25
1992	5775	626.9	0.13	-1.01
1993	3567	417.4	0.27	-0.82*
1994	5693	405.2	0.35	-0.25
1995	3201	414.8	0.34	-0.16*
1996	3329	455.6	0.23	-0.46
1997	3364	396.3	0.30	-0.46*
1998	4574	426.3	0.24	-1.09*
1999	3797	392.5	0.41	-0.26*
2000	2182	325.7	0.62	0.00
2001	3377	295.2	0.59	-0.47
2002	4238	363.0	0.35	-0.63
2003	3326	376.3	0.30	-0.83*
2004	2293	367.3	0.36	-0.25*
2005	4356	296.1	0.60	-0.19
2006	4009	302.2	0.55	-0.38
2007	1875	296.3	0.57	-0.43
2008	3544	402.5	0.22	-1.46*
2009	3325	292.1	0.58	-0.46
2010	4171	302.7	0.48	-0.68
2011	3676	301.6	0.47	-0.72

Table 2.3.2 Fork length (mm) at age on March 1 (beginning of fishing year) estimated from year class von Bertalanffy growth parameters with a bias correction. Shaded cells are the average from the three preceding estimated years.

Year	1	2	3	4	5	6+
1955	155.1	226.3	263.8	280.2	298.5	320.7
1956	151.5	222.7	268.3	290.0	302.3	312.7
1957	147.3	207.3	268.6	296.8	308.6	316.8
1958	157.6	207.3	255.2	299.8	316.1	321.9
1959	138.7	207.7	252.7	296.3	321.1	329.2
1960	169.9	195.2	250.3	287.0	331.6	335.5
1961	156.4	221.8	241.8	286.3	312.9	361.8
1962	164.5	218.1	263.8	280.1	316.9	332.4
1963	169.1	219.5	262.3	297.9	311.7	342.8
1964	171.7	222.7	256.6	294.0	325.5	337.7
1965	171.0	225.8	260.3	281.8	316.8	347.9
1966	162.1	231.2	265.0	286.8	298.9	333.1
1967	175.4	222.0	279.3	293.4	305.4	310.4
1968	168.7	241.8	274.3	317.7	314.1	318.5
1969	174.3	223.7	291.6	319.8	348.3	329.0
1970	184.5	229.5	272.8	328.8	359.5	372.8
1971	179.4	254.5	277.8	316.5	356.8	394.0
1972	161.6	256.5	309.1	320.1	355.5	377.7
1973	147.3	214.6	305.7	351.8	357.2	390.2
1974	149.9	222.3	260.2	337.1	385.1	389.8
1975	141.0	209.8	266.1	299.4	357.0	411.0
1976	132.1	190.9	255.4	291.5	333.1	369.8
1977	127.7	183.1	234.9	290.2	306.4	362.1
1978	129.1	178.4	225.2	273.6	316.7	315.1
1979	134.4	181.5	222.8	260.0	307.8	336.9
1980	128.2	179.6	228.1	261.7	288.8	337.9
1981	131.0	171.4	218.9	269.3	295.8	312.6
1982	136.4	182.9	210.3	253.1	305.9	325.7
1983	132.1	186.6	224.5	245.4	282.8	338.4
1984	134.6	190.0	229.4	257.9	277.0	308.6
1985	131.4	182.0	236.6	265.7	284.7	305.5
1986	129.3	181.5	223.9	274.2	296.7	306.2
1987	133.8	178.5	223.1	260.9	304.4	323.0
1988	130.1	184.7	221.9	257.7	293.6	328.7
1989	140.4	185.0	225.7	260.1	286.4	322.5
1990	154.9	200.9	229.6	258.9	293.8	310.3
1991	147.9	213.8	246.5	265.7	285.6	323.5
1992	163.6	204.7	253.2	280.7	294.9	307.2
1993	143.2	216.4	248.4	279.6	306.5	318.7
1994	162.2	201.7	259.8	282.0	297.2	325.9
1995	142.8	222.6	253.2	295.5	307.8	309.0
1996	134.3	219.7	268.7	298.4	324.9	327.6
1997	131.9	214.7	274.1	303.9	338.2	349.1
1998	141.7	199.5	272.1	312.6	330.7	373.1

Year	1	2	3	4	5	6+
1999	169.9	208.2	252.9	313.0	339.7	351.2
2000	158.2	225.2	257.4	295.2	342.2	358.9
2001	150.1	237.0	268.6	293.7	328.6	363.1
2002	170.9	231.1	289.3	302.6	320.5	355.1
2003	156.7	226.2	274.7	324.0	329.3	340.3
2004	158.1	217.0	256.9	298.2	347.1	350.2
2005	134.0	214.3	259.7	273.9	310.9	362.3
2006	151.6	204.8	256.1	289.9	283.4	317.7
2007	160.5	216.9	254.2	287.1	311.3	288.6
2008	164.8	220.3	252.6	288.5	310.1	326.4
2009	165.5	221.9	254.8	272.3	312.4	327.1
2010	166.4	211.3	254.2	274.8	283.0	329.1
2011	168.1	221.4	248.3	272.5	286.4	288.9
2012	167.0	219.6	252.4	278.1	282.8	293.0
2013	167.2	217.4	251.3	269.8	302.2	288.7
2014	167.2	219.5	248.9	271.0	279.6	321.6
2015	167.2	219.5	250.9	268.6	283.1	285.1
2016	167.2	219.5	250.9	269.8	281.0	290.6

Table 2.3.3 Weight (g) at age on September 1 (middle of fishing year) estimated from overall weight-length parameters and annual lengths at age. Shaded cells are the average from the three preceding estimated years.

Year	0	1	2	3	4	5	6+
1955	36.7	126.2	279.1	397.5	459.9	533.3	622.6
1956	25.3	105.8	269.1	431.5	502.2	563.4	606.7
1957	43.2	94.0	232.5	410.6	545.5	586.4	634.6
1958	24.0	110.2	227.0	368.9	530.1	622.7	651.3
1959	62.8	77.5	230.6	367.0	494.1	622.4	672.2
1960	35.3	132.3	189.8	363.2	488.8	599.3	690.3
1961	51.6	118.9	254.9	328.0	489.7	585.0	683.1
1962	57.5	128.0	265.9	396.4	471.3	600.8	656.5
1963	62.0	140.9	248.2	407.2	542.2	606.4	693.4
1964	63.7	142.7	266.4	360.2	520.9	682.4	726.0
1965	52.8	143.7	270.0	377.5	450.9	604.4	810.9
1966	65.6	121.0	280.1	392.7	462.8	518.8	662.5
1967	63.8	158.4	251.0	426.5	496.4	523.7	567.4
1968	73.0	124.8	307.7	411.7	565.3	577.8	565.3
1969	75.6	138.4	243.6	452.7	587.6	687.3	638.9
1970	55.7	177.6	258.8	404.1	575.4	766.0	789.5
1971	48.4	167.4	344.6	411.4	603.0	671.5	937.8
1972	24.8	125.4	339.9	511.8	588.8	834.8	743.4
1973	40.5	118.0	263.8	486.2	658.5	783.1	1093.6
1974	28.6	104.0	266.0	414.5	591.5	777.6	986.9
1975	27.1	84.2	213.8	377.5	556.6	661.3	870.0
1976	18.0	67.4	186.2	328.0	445.9	679.7	705.5
1977	21.2	64.2	145.2	294.9	430.8	484.3	781.1
1978	28.9	68.1	157.4	240.2	393.5	516.1	504.9
1979	25.3	67.8	161.4	262.4	341.6	475.4	583.3
1980	22.1	55.7	141.2	269.1	361.0	441.2	539.7
1981	20.8	69.0	117.5	230.4	373.8	444.8	534.0
1982	24.9	71.9	159.3	202.1	325.7	466.2	511.8
1983	30.6	69.9	171.6	260.0	306.0	420.0	543.2
1984	23.8	67.7	157.8	279.9	354.8	425.0	508.6
1985	21.9	67.5	138.9	262.0	378.1	436.1	554.5
1986	25.5	65.9	150.3	228.9	367.8	458.8	502.1
1987	25.9	73.7	149.9	243.7	330.5	466.1	521.5
1988	27.3	69.0	160.6	243.7	333.8	437.1	552.5
1989	41.2	93.2	150.8	252.2	332.5	413.4	543.4
1990	37.5	114.7	207.7	246.0	334.3	409.3	479.9
1991	52.5	94.0	228.2	315.9	341.6	401.8	472.1
1992	30.1	128.3	192.9	327.1	401.2	429.6	454.3
1993	51.0	95.3	247.2	298.8	400.7	462.7	506.4
1994	25.2	122.8	218.5	358.6	397.3	451.5	504.8
1995	23.5	118.6	243.0	351.9	449.3	481.7	484.8
1996	18.2	98.5	286.6	366.4	473.6	517.7	550.5
1997	29.7	88.3	243.1	435.1	477.0	574.9	567.0
1998	61.1	94.7	227.0	388.4	541.6	568.5	654.4

Year	0	1	2	3	4	5	6+
1999	40.3	134.7	219.5	363.3	507.8	610.8	640.7
2000	28.2	136.2	261.3	357.0	471.4	596.4	653.6
2001	55.4	128.0	291.6	400.2	484.6	548.7	658.6
2002	37.8	145.9	289.3	426.1	535.1	592.5	600.9
2003	48.1	116.9	262.8	414.7	523.7	656.8	678.6
2004	24.8	114.4	242.1	345.9	494.5	588.5	761.4
2005	35.3	88.3	224.0	350.8	397.0	540.9	629.6
2006	43.6	114.2	199.2	334.7	430.7	426.2	566.7
2007	53.7	129.6	233.0	303.1	432.7	484.5	442.5
2008	59.7	134.8	252.5	328.1	384.1	512.8	519.3
2009	53.4	117.6	245.6	347.3	392.2	441.6	575.2
2010	57.7	134.6	215.1	331.7	409.4	432.1	480.5
2011	56.9	132.7	241.5	324.0	389.7	447.2	455.8
2012	56.9	128.1	239.1	320.4	433.7	426.1	469.2
2013	56.9	128.1	231.8	328.5	371.1	537.1	448.1
2014	56.9	128.1	231.8	324.3	394.4	401.3	630.4
2015	56.9	128.1	231.8	324.3	399.2	439.6	418.9
2016	56.9	128.1	231.8	324.3	399.2	457.1	469.5

Table 2.5.1 Fecundity (number of ova) at age on March 1 (beginning of fishing year) estimated from annual lengths.

		-				
Year	1	2	3	4	5	6+
1955	26267	76356	134072	171499	225574	314702
1956	24883	72366	143502	198473	238833	279006
1957	23368	57467	144117	219979	262471	296958
1958	27254	57476	117858	230192	293759	320304
1959	20527	57823	113474	218295	316474	357302
1960	32777	47911	109417	189742	370470	392930
1961	26775	71349	96300	187906	279836	583275
1962	30235	67500	134037	171141	297215	375348
1963	32403	68920	131049	223455	274818	438442
1964	33692	72330	120396	210941	338151	405941
1965	33326	75794	127224	175648	296815	473099
1966	29143	82221	136478	189256	226831	379233
1967	35572	71658	169108	209101	250238	269709
1968	32194	96373	156906	300776	284953	304553
1969	35028	73488	203311	310553	476360	356683
1970	40785	80098	153362	355629	562879	687690
1971	37767	116588	165349	295467	540609	944933
1972	28938	120135	264616	312075	530105	739806
1973	23352	64090	251253	501646	544506	892560
1974	24271	71970	126973	402194	826354	886857
1975	21245	59625	138682	228571	542898	1219898
1976	18604	44895	118252	203248	378919	657341
1977	17400	39935	86830	199236	253960	585202
1978	17768	37208	75112	155318	296465	289161
1979	19244	39023	72427	126644	259346	401304
1980	17524	37913	78409	129836	195075	407546
1981	18298	33502	68360	145595	216542	278839
1982	19817	39834	60076	114123	252076	339017
1983	18579	42124	74366	101690	178182	410168
1984	19306	44310	79989	122730	163410	262470
1985	18410	39323	89194	137999	183470	250572
1986	17838	39010	73718	156641	219434	253334
1987	19072	37306	72816	128431	246471	325540
1988	18035	40898	71494	122319	209725	354998
1989	21041	41123	75715	126859	188243	323439
1990	26177	52198	80213	124490	210324	269352
1991	23564	63325	103370	137864	185986	328444
1992	29834	55250	114350	172802	213846	257181
1993	21955	65819	106374	169801	254310	305240
1994	29190	52835	126214	176012	221209	340065
1995	21827	72214	114326	215661	259222	264026
1996	19204	69223	144185	225319	335133	349075
1997	18541	64206	156512	244434	409063	481664
1998	21465	51057	151852	278590	365730	690935
1999	32798	58256	113812	280572	418758	497451

Year	1	2	3	4	5	6+
2000	27487	75179	121790	214629	434711	558555
2001	24369	89659	144090	209972	354575	594044
2002	33274	82031	196498	240004	313961	527521
2003	26878	76273	157805	330756	358097	422592
2004	27465	66446	120859	224531	467296	490110
2005	19130	63834	126059	156028	271539	587754
2006	24912	55360	119383	198305	179784	300837
2007	28460	66301	116016	190006	273240	194493
2008	30382	69774	113395	194201	268277	342797
2009	30670	71500	117175	152188	277993	346570
2010	31077	61013	116070	158122	178830	356863
2011	31910	70991	106252	152698	188034	195368
2012	31398	69046	112949	166207	178345	207843
2013	31475	66874	111211	146641	238433	194730
2014	31475	68970	107228	149274	169818	318982
2015	31475	68970	110463	144125	179031	184421
2016	31475	68970	110463	146669	173416	200300

Table 3.1.3.1 Total menhaden reduction landings (1000s mt) 1940-2016, divided into northern and southern reduction landings.

Year	Landings (1000 t)	Northern landings (1000 t)	Southern landings (1000 t)
1940	217.7		
1941	277.9		
1942	167.2		
1943	237.2		
1944	257.9		
1945	295.9		
1946	362.4		
1947	378.3		
1948	346.5		
1949	363.8		
1950	297.2		
1951	361.4		
1952	409.9		
1953	593.2		
1954	608.1		
1955	644.5	402.7	241.7
1956	715.2	478.9	236.4
1957	605.6	389.8	215.8
1958	512.4	248.3	264.0
1959	662.2	318.4	343.7
1960	532.2	323.9	208.4
1961	578.6	334.8	243.9
1962	540.7	321.4	219.3
1963	348.4	147.5	200.9
1964	270.4	50.6	219.8
1965	274.6	58.0	216.6
1966	220.7	7.9	212.8
1967	194.4	17.2	177.2
1968	235.9	33.1	202.8
1969	162.3	15.4	146.9
1970	259.4	15.8	243.6
1971	250.3	33.4	216.9
1972	365.9	69.1	296.8
1973	346.9	90.7	256.2
1974	292.2	77.9	214.3
1975	250.2	48.4	201.8

Year	Landings (1000 t)	Northern landings (1000 t)	Southern landings (1000 t)
1976	340.5	86.8	253.7
1977	341.2	53.3	287.8
1978	344.1	63.5	280.5
1979	375.7	70.2	305.6
1980	401.5	83.0	318.5
1981	381.3	68.1	313.2
1982	382.5	35.1	347.4
1983	418.6	39.4	379.3
1984	326.3	35.0	291.3
1985	306.7	111.3	195.4
1986	238.0	42.6	195.4
1987	326.9	83.0	243.9
1988	309.3	73.6	235.6
1989	322.0	98.8	223.2
1990	401.1	144.1	257.1
1991	381.4	104.6	276.9
1992	297.6	99.1	198.5
1993	320.6	58.4	262.2
1994	260.0	33.4	226.6
1995	339.9	96.3	243.6
1996	292.9	61.6	231.4
1997	259.1	25.2	234.0
1998	245.9	12.3	233.6
1999	171.2	8.4	162.8
2000	167.3	43.2	124.1
2001	233.6	39.6	193.9
2002	174.1	27.2	146.9
2003	166.1	4.1	162.0
2004	178.5	25.9	152.6
2005	152.9	15.4	137.5
2006	157.4	60.1	97.2
2007	174.5	36.6	137.8
2008	141.1	39.3	101.8
2009	143.8	18.7	125.1
2010	183.1	28.7	154.4
2011	174.0	29.6	144.5
2012	160.6	23.9	136.7
2013	131.0	32.7	98.3
2014	131.1	29.9	101.2
2015	143.5	28.8	114.7
2016	137.4	45.0	92.4

Table 3.1.4.1 Catch-at-age for the northern commercial reduction fishery from 1955-2016.

Year 0 1 2 3 4 5 6+ 1955 0.000 0.015 0.471 0.217 0.253 0.032 0.012 1956 0.000 0.133 0.555 0.195 0.025 0.072 0.020 1957 0.000 0.225 0.908 0.042 0.010 0.008 0.009 1958 0.000 0.025 0.908 0.042 0.010 0.004 0.007 1960 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1961 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1962 0.000 0.015 0.248 0.095 0.068 0.080 0.023 1963 0.000 0.054 0.357 0.345 0.128 0.055 0.072 1965 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 <th>1 abie 3.1.</th> <th>4.1 Catti</th> <th>i-at-age it</th> <th>i the noi</th> <th>thern con</th> <th>illier clairi</th> <th>eduction</th> <th>History Hic</th>	1 abie 3.1.	4.1 Catti	i-at-age it	i the noi	thern con	illier clairi	eduction	History Hic
1956 0.000 0.133 0.555 0.195 0.025 0.072 0.020 1957 0.000 0.270 0.610 0.051 0.033 0.017 0.020 1958 0.000 0.025 0.908 0.042 0.010 0.008 0.009 1959 0.000 0.531 0.291 0.159 0.009 0.004 0.007 1960 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1962 0.000 0.296 0.438 0.095 0.668 0.080 0.023 1963 0.000 0.296 0.438 0.095 0.068 0.080 0.023 1964 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 0.055 0.296 0.567 0.025 0.000 0.055 0.296 0.567 0.072 0.009 0.001 1968 0.000 0.007 0.479 0.388 0.116 0.009 0.001 1968 0.000 0.001 0.251 0.594 0.149 0.005 0.000 1970 0.000 0.126 0.288 0.433 0.137 0.017 0.000 1971 0.000 0.126 0.288 0.452 0.085 0.008 0.000 1973 0.000 0.021 0.821 0.133 0.024 0.000 1974 0.000 0.028 0.844 0.117 0.006 0.000 0.001 1975 0.000 0.002 0.823 0.071 0.013 0.000 1977 0.000 0.022 0.823 0.071 0.013 0.000 0.001 1977 0.000 0.002 0.823 0.071 0.013 0.000 0.001 1978 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1977 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1977 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1978 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1978 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1978 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1980 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1980 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1980 0.000 0.002 0.823 0.071 0.013 0.000 0.000 1981 0.000 0.002 0.825 0.844 0.117 0.006 0.006 0.001 1985 0.000 0.002 0.825 0.462 0.243 0.051 0.004 1981 0.000 0.002 0.826 0.657 0.326 0.079 0.006 0.001 1985 0.000 0.002 0.826 0.657 0.210 0.007 0.005 0.005 1985 0.000 0.005 0.652 0.277 0.05	Year	0	1	2	3	4	5	6+
1957	1955	0.000	0.015	0.471	0.217	0.253	0.032	0.012
1958 0.000 0.025 0.908 0.042 0.010 0.008 0.009 1959 0.000 0.531 0.291 0.159 0.009 0.004 0.007 1960 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1962 0.000 0.025 0.245 0.218 0.457 0.033 0.032 1963 0.000 0.296 0.438 0.095 0.068 0.080 0.023 1964 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 0.201 0.467 0.212 0.100 0.009 0.012 1967 0.000 0.055 0.296 0.567 0.072 0.068 0.000 0.001 0.251 0.594 0.149 0.005 0.001 0.251 0.594 0.149 0.005 0.001 0.150 0.793 0.050 0.007 0.000 0.001 1970 0.000 0.126 0.288 0.433 0.137 0.017 0.000 0.001 1971 0.000 0.126 0.288 0.452 0.085 0.000 0.001 1972 0.000 0.021 0.821 0.133 0.024 0.001 0.000 1974 0.000 0.028 0.844 0.117 0.006 0.004 0.000 1975 0.000 0.022 0.567 0.326 0.055 0.004 0.000 1975 0.000 0.022 0.567 0.326 0.055 0.004 0.000 1975 0.000 0.022 0.567 0.326 0.055 0.008 0.000 1975 0.000 0.021 0.821 0.133 0.024 0.001 0.000 1975 0.000 0.022 0.567 0.326 0.055 0.008 0.000 1975 0.000 0.022 0.567 0.326 0.079 0.006 0.001 0.000 1975 0.000 0.002 0.579 0.332 0.076 0.006 0.001 1978 0.000 0.002 0.579 0.332 0.076 0.006 0.001 1985 0.000 0.002 0.237 0.462 0.243 0.051 0.000 1985 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1983 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1983 0.000 0.002 0.326 0.452 0.243 0.051 0.004 1985 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1985 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1986 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1985 0.000 0.005 0.652 0.277 0.058 0.006 0.002 1987 0.000 0.005 0.652 0.277 0.058 0.006 0.002 1.987 0.000 0.005 0.652 0.277 0.058 0.006 0.000 1	1956	0.000	0.133	0.555	0.195	0.025	0.072	0.020
1959 0.000 0.531 0.291 0.159 0.009 0.004 0.007 1960 0.000 0.009 0.892 0.037 0.049 0.009 0.004 1961 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1962 0.000 0.015 0.245 0.218 0.457 0.033 0.032 1963 0.000 0.296 0.438 0.095 0.068 0.080 0.023 1964 0.000 0.034 0.357 0.345 0.128 0.065 0.072 1965 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 0.055 0.296 0.567 0.072 0.009 0.001 1968 0.000 0.007 0.479 0.388 0.116 0.009 0.001 1969 0.000 0.001 0.251 0.594 0.149 0.005 0.000 1971 0.000 0.126 0.288 0.433 0.137 0.017 0.000 0.000 1972 0.000 0.169 0.286 0.452 0.085 0.008 0.000 1973 0.000 0.021 0.821 0.133 0.024 0.001 0.000 1975 0.000 0.022 0.823 0.071 0.013 0.000 1977 0.000 0.022 0.823 0.071 0.013 0.000 0.001 1975 0.000 0.092 0.823 0.071 0.013 0.000 0.001 1978 0.000 0.092 0.823 0.071 0.013 0.000 0.001 1978 0.000 0.092 0.823 0.071 0.013 0.000 0.001 1978 0.000 0.092 0.823 0.071 0.013 0.000 0.001 1980 0.000 0.002 0.2567 0.326 0.079 0.006 0.001 1980 0.000 0.002 0.237 0.462 0.243 0.051 0.000 1980 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1981 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1981 0.000 0.002 0.337 0.357 0.357 0.210 0.070 0.006 1988 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1986 0.000 0.004 0.343 0.566 0.097 0.025 0.001 1988 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1986 0.000 0.001 0.795 0.107 0.050 0.031 0.006 1988 0.000 0.000 0.759 0.332 0.076 0.006 0.000 1998 0.000 0.042 0.343 0.566 0.097 0.025 0.001 1998 0.000 0.005 0.652 0.277 0.058 0.006 0.002 1998 0.000 0.005 0.652 0.277 0.058 0.006 0.000 1999 0.000 0.05	1957	0.000	0.270	0.610	0.051	0.033	0.017	0.020
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1961 0.000 0.003 0.160 0.803 0.012 0.018 0.003 1962 0.000 0.015 0.245 0.218 0.457 0.033 0.032 1963 0.000 0.034 0.357 0.345 0.128 0.065 0.072 1965 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 0.201 0.467 0.212 0.100 0.009 0.012 1967 0.000 0.055 0.296 0.567 0.072 0.009 0.000 1968 0.000 0.001 0.479 0.388 0.116 0.009 0.001 1970 0.000 0.150 0.793 0.050 0.007 0.000 0.000 1971 0.000 0.126 0.288 0.433 0.137 0.017 0.000 1972 0.000 0.021 0.826 0.452 0.085 0.008 0.000 1973 0.000 0.021 0.821 0.133 0.024 0.001 0.000 1975 0.000 0.028 0.844 0.117 0.006 0.004 0.000 1975 0.000 0.028 0.844 0.117 0.006 0.004 0.000 1976 0.000 0.022 0.823 0.071 0.013 0.000 0.001 1977 0.000 0.022 0.823 0.071 0.013 0.000 0.000 1978 0.000 0.002 0.823 0.071 0.013 0.000 0.001 1979 0.000 0.002 0.287 0.326 0.079 0.006 0.001 1980 0.000 0.002 0.287 0.366 0.079 0.006 0.001 1981 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1983 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1984 0.000 0.024 0.343 0.506 0.097 0.025 0.001 1985 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1986 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1987 0.000 0.002 0.237 0.462 0.243 0.051 0.004 1988 0.000 0.002 0.760 0.089 0.111 0.017 0.003 1986 0.000 0.024 0.343 0.506 0.097 0.025 0.004 1987 0.000 0.024 0.343 0.506 0.097 0.025 0.004 1988 0.000 0.005 0.652 0.277 0.058 0.006 0.002 1988 0.000 0.005 0.652 0.277 0.058 0.006 0.002 1989 0.000 0.085 0.687 0.107 0.118 0.026 0.005 1990 0.000 0.058 0.687 0.107 0.118 0.026 0.005 1991 0.000 0.058 0.687	1959	0.000	0.531		0.159		0.004	0.007
1962 0.000 0.015 0.245 0.218 0.457 0.033 0.032 1963 0.000 0.296 0.438 0.095 0.068 0.080 0.023 1964 0.000 0.034 0.357 0.345 0.128 0.065 0.072 1965 0.000 0.160 0.370 0.373 0.071 0.013 0.014 1966 0.000 0.201 0.467 0.212 0.100 0.009 0.002 1967 0.000 0.055 0.296 0.567 0.072 0.009 0.000 1968 0.000 0.001 0.251 0.594 0.149 0.005 0.000 1970 0.000 0.0150 0.793 0.050 0.007 0.000 0.001 1971 0.000 0.169 0.286 0.452 0.085 0.008 0.000 1972 0.000 0.169 0.286 0.452 0.085 0.008 0.000 19	1960	0.000	0.009	0.892	0.037	0.049		0.004
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Year	0	1	2	3	4	5	6+
2001	0.000	0.000	0.150	0.796	0.055	0.000	0.000
2002	0.000	0.040	0.347	0.491	0.120	0.002	0.000
2003	0.000	0.000	0.474	0.378	0.139	0.010	0.000
2004	0.000	0.004	0.615	0.320	0.061	0.000	0.000
2005	0.000	0.000	0.219	0.605	0.174	0.002	0.000
2006	0.000	0.022	0.456	0.422	0.099	0.001	0.000
2007	0.000	0.022	0.761	0.174	0.041	0.002	0.000
2008	0.000	0.002	0.216	0.668	0.106	0.008	0.000
2009	0.000	0.123	0.299	0.463	0.102	0.013	0.000
2010	0.000	0.000	0.456	0.348	0.193	0.003	0.000
2011	0.000	0.058	0.726	0.190	0.023	0.003	0.000
2012	0.000	0.001	0.778	0.192	0.029	0.000	0.000
2013	0.000	0.028	0.724	0.233	0.015	0.000	0.000
2014	0.000	0.085	0.518	0.274	0.119	0.004	0.000
2015	0.000	0.006	0.593	0.362	0.038	0.000	0.000
2016	0.000	0.075	0.413	0.481	0.031	0.000	0.000

Table 3.1.4.2 Catch-at-age for the southern commercial reduction fishery from 1955-2016.

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Year	0	1	2	3	4	5	6+
1955	0.374	0.323	0.269	0.016	0.016	0.002	0.000
1956	0.017	0.885	0.049	0.018	0.004	0.022	0.004
1957	0.151	0.598	0.217	0.010	0.011	0.007	0.006
1958	0.059	0.466	0.443	0.018	0.005	0.005	0.004
1959	0.003	0.855	0.099	0.034	0.005	0.002	0.002
1960	0.052	0.192	0.701	0.018	0.025	0.008	0.004
1961	0.000	0.538	0.217	0.234	0.004	0.007	0.000
1962	0.040	0.387	0.491	0.033	0.044	0.003	0.002
1963	0.079	0.460	0.386	0.059	0.007	0.008	0.002
1964	0.187	0.433	0.349	0.028	0.002	0.000	0.000
1965	0.184	0.528	0.269	0.018	0.001	0.000	0.000
1966	0.265	0.414	0.299	0.020	0.001	0.000	0.000
1967	0.007	0.663	0.269	0.057	0.003	0.000	0.000
1968	0.143	0.349	0.468	0.037	0.003	0.000	0.000
1969	0.188	0.442	0.330	0.038	0.002	0.000	0.000
1970	0.016	0.650	0.309	0.022	0.003	0.000	0.000
1971	0.083	0.288	0.569	0.054	0.005	0.001	0.000
1972	0.033	0.618	0.285	0.061	0.003	0.000	0.000
1973	0.036	0.372	0.591	0.001	0.000	0.000	0.000
1974	0.196	0.388	0.413	0.003	0.000	0.000	0.000
1975	0.154	0.371	0.469	0.006	0.001	0.000	0.000
1976	0.101	0.572	0.324	0.003	0.000	0.000	0.000
1977	0.140	0.289	0.567	0.003	0.000	0.000	0.000
1978	0.158	0.230	0.558	0.050	0.003	0.000	0.000
1979	0.413	0.172	0.403	0.012	0.001	0.000	0.000
1980	0.028	0.476	0.452	0.038	0.004	0.001	0.000
1981	0.316	0.186	0.460	0.038	0.000	0.000	0.000
1982	0.038	0.306	0.558	0.096	0.001	0.000	0.000
1983	0.279	0.148	0.547	0.016	0.008	0.001	0.000
1984	0.396	0.311	0.244	0.040	0.007	0.002	0.000
1985	0.235	0.394	0.364	0.006	0.000	0.000	0.000
1986	0.056	0.126	0.797	0.019	0.002	0.001	0.000
1987	0.022	0.253	0.691	0.031	0.003	0.000	0.000
1988	0.175 0.069	0.146	0.573	0.099	0.006	0.001	0.000
1989		0.514	0.402	0.014	0.001	0.000	0.000
1990	0.190	0.078	0.697	0.023	0.010	0.002	0.000 0.000
1991 1992	0.317 0.243	0.360 0.428	0.281 0.313	0.038 0.014	0.004 0.002	0.001 0.000	0.000
1992	0.243	0.428	0.608	0.014	0.002	0.000	0.000
1993	0.049	0.266	0.608	0.074	0.003	0.000	0.000
	0.064						
1995 1996	0.044	0.408 0.226	0.366 0.630	0.150 0.092	0.031 0.015	0.002 0.001	0.000
1996	0.036	0.226	0.630	0.092	0.015	0.001	0.000
1997	0.027	0.280	0.423	0.236	0.047	0.007	0.001
1998	0.073	0.187	0.333	0.123	0.073	0.003	0.001
2000	0.188	0.292	0.428	0.069	0.020	0.003	0.000
2000	0.140	0.203	0.510	0.127	0.010	0.002	0.000

Year	0	1	2	3	4	5	6+
2001	0.039	0.073	0.604	0.265	0.018	0.001	0.000
2002	0.242	0.284	0.321	0.140	0.012	0.000	0.000
2003	0.088	0.185	0.643	0.073	0.010	0.001	0.000
2004	0.020	0.234	0.670	0.060	0.015	0.001	0.000
2005	0.020	0.131	0.618	0.210	0.018	0.003	0.000
2006	0.016	0.525	0.378	0.072	0.008	0.000	0.000
2007	0.001	0.306	0.631	0.054	0.008	0.000	0.000
2008	0.017	0.115	0.812	0.053	0.003	0.000	0.000
2009	0.007	0.515	0.311	0.147	0.019	0.001	0.000
2010	0.017	0.447	0.494	0.034	0.008	0.000	0.000
2011	0.000	0.477	0.467	0.048	0.007	0.002	0.000
2012	0.007	0.183	0.789	0.020	0.001	0.000	0.000
2013	0.043	0.457	0.388	0.095	0.016	0.000	0.000
2014	0.007	0.482	0.377	0.106	0.026	0.002	0.000
2015	0.000	0.141	0.759	0.092	0.009	0.000	0.000
2016	0.022	0.303	0.509	0.160	0.006	0.000	0.000

Table 3.2.1.1 Atlantic menhaden historical bait landings from 1950-1984 and recent bait landings (1000 mt) from 1985-2016.

Year	Historic Bait (1000 mt)	Year	Recent Bait (1000 mt)
1950	11.3	1985	26.6
1951	20.4	1986	21.6
1952	14.2	1987	25.5
1953	25.8	1988	43.8
1954	19.3	1989	31.5
1955	14.6	1990	28.1
1956	23.3	1991	29.7
1957	24.7	1992	33.8
1958	14.7	1993	23.4
1959	20.6	1994	25.6
1960	19.4	1995	28.4
1961	25.1	1996	21.7
1962	26.6	1997	24.2
1963	24.4	1998	38.4
1964	20.2	1999	34.8
1965	23.6	2000	33.5
1966	13.7	2001	35.3
1967	11.6	2002	36.2
1968	9.5	2003	33.2
1969	10.6	2004	34.0
1970	21.6	2005	38.4
1971	13.5	2006	27.2
1972	10.3	2007	42.1
1973	14.8	2008	47.6
1974	14.5	2009	39.2
1975	21.7	2010	42.7
1976	19.6	2011	52.6
1977	23.1	2012	63.7
1978	25.9	2013	37.0
1979	13	2014	41.6
1980	26.2	2015	45.8
1981	22.4	2016	43.1
1982	19.9		
1983	19.1		
1984	14.3		

Table 3.2.3.1 Catch-at-age for the northern commercial bait fishery (includes small amount of recreational catch).

Year	0	1	2	3	4	5	6+
1985	0.000	0.000	0.671	0.180	0.117	0.025	0.006
1986	0.000	0.000	0.088	0.624	0.259	0.027	0.003
1987	0.000	0.000	0.087	0.624	0.259	0.027	0.003
1988	0.000	0.000	0.074	0.632	0.264	0.027	0.003
1989	0.000	0.000	0.083	0.627	0.261	0.027	0.003
1990	0.000	0.000	0.119	0.605	0.247	0.026	0.003
1991	0.000	0.000	0.153	0.584	0.234	0.026	0.003
1992	0.000	0.000	0.180	0.567	0.224	0.026	0.003
1993	0.000	0.000	0.215	0.546	0.211	0.025	0.003
1994	0.000	0.000	0.107	0.498	0.343	0.048	0.004
1995	0.000	0.000	0.086	0.478	0.434	0.002	0.000
1996	0.000	0.000	0.437	0.439	0.118	0.005	0.000
1997	0.000	0.000	0.152	0.326	0.388	0.116	0.018
1998	0.004	0.000	0.109	0.399	0.396	0.078	0.013
1999	0.005	0.000	0.149	0.483	0.311	0.041	0.010
2000	0.000	0.004	0.410	0.322	0.228	0.029	0.007
2001	0.000	0.000	0.113	0.734	0.135	0.014	0.004
2002	0.000	0.000	0.058	0.568	0.318	0.055	0.000
2003	0.000	0.000	0.127	0.666	0.197	0.010	0.000
2004	0.000	0.000	0.252	0.523	0.198	0.025	0.003
2005	0.000	0.000	0.227	0.538	0.207	0.025	0.003
2006	0.000	0.004	0.269	0.575	0.144	0.008	0.000
2007	0.000	0.000	0.386	0.495	0.110	0.008	0.002
2008	0.000	0.000	0.246	0.608	0.132	0.014	0.000
2009	0.000	0.000	0.181	0.616	0.185	0.017	0.000
2010	0.000	0.000	0.365	0.393	0.216	0.024	0.002
2011	0.000	0.000	0.142	0.488	0.325	0.044	0.000
2012	0.000	0.000	0.392	0.473	0.125	0.008	0.002
2013	0.000	0.000	0.254	0.563	0.157	0.026	0.000
2014	0.000	0.000	0.059	0.642	0.270	0.027	0.002
2015	0.000	0.000	0.059	0.642	0.270	0.027	0.002
2016	0.000	0.000	0.078	0.709	0.175	0.039	0.000

Table 3.2.3.2 Catch-at-age for the southern commercial bait fishery (includes small amount of recreational catch).

Year	0	1	2	3	4	5	6
1985	0.003	0.176	0.611	0.172	0.034	0.003	0.000
1986	0.003	0.148	0.644	0.172	0.030	0.003	0.000
1987	0.003	0.133	0.678	0.153	0.031	0.003	0.000
1988	0.003	0.161	0.616	0.180	0.035	0.003	0.000
1989	0.003	0.148	0.652	0.164	0.030	0.003	0.000
1990	0.005	0.320	0.532	0.118	0.022	0.002	0.000
1991	0.002	0.246	0.607	0.120	0.022	0.002	0.000
1992	0.005	0.320	0.532	0.118	0.022	0.002	0.000
1993	0.010	0.397	0.418	0.144	0.029	0.003	0.000
1994	0.003	0.198	0.622	0.147	0.027	0.003	0.000
1995	0.000	0.392	0.374	0.218	0.017	0.000	0.000
1996	0.001	0.049	0.738	0.179	0.033	0.000	0.000
1997	0.000	0.083	0.521	0.303	0.074	0.012	0.006
1998	0.039	0.067	0.534	0.237	0.108	0.012	0.003
1999	0.000	0.053	0.722	0.169	0.049	0.006	0.000
2000	0.008	0.234	0.639	0.118	0.001	0.000	0.000
2001	0.003	0.061	0.685	0.235	0.014	0.003	0.000
2002	0.000	0.041	0.255	0.504	0.178	0.020	0.002
2003	0.006	0.099	0.752	0.130	0.013	0.000	0.000
2004	0.000	0.068	0.736	0.163	0.030	0.003	0.000
2005	0.000	0.015	0.528	0.430	0.024	0.003	0.000
2006	0.000	0.290	0.485	0.201	0.024	0.000	0.000
2007	0.000	0.273	0.688	0.028	0.011	0.000	0.000
2008	0.000	0.039	0.865	0.080	0.013	0.003	0.000
2009	0.004	0.264	0.414	0.288	0.030	0.000	0.000
2010	0.000	0.367	0.545	0.065	0.023	0.000	0.000
2011	0.000	0.391	0.514	0.080	0.015	0.000	0.000
2012	0.000	0.089	0.892	0.018	0.000	0.000	0.000
2013	0.009	0.612	0.284	0.091	0.003	0.000	0.000
2014	0.000	0.523	0.328	0.090	0.058	0.000	0.000
2015	0.000	0.248	0.702	0.050	0.000	0.000	0.000
2016	0.000	0.283	0.437	0.264	0.016	0.000	0.000

Table 4.2.1.1 Values for each index used in the assessment and the associated CV values included in the stock assessment. Each index is scaled to its mean value.

Year	YOY index	CV	SAD index	CV	NAD index	CV
1959	0.69	0.93				
1960	0.33	0.92				
1961	0.31	0.94				
1962	1.67	0.86				
1963	1.02	1.04				
1964	0.16	0.98				
1965	0.43	0.88				
1966	0.61	0.95				
1967	0.81	0.98				
1968	0.58	0.81				
1969	0.64	0.75				
1970	0.40	0.87				
1971	1.64	0.74				
1972	2.06	0.70				
1973	1.50	0.86				
1974	2.19	0.81				
1975	2.99	0.82				
1976	3.46	0.80				
1977	2.91	0.82				
1978	1.58	0.82				
1979	2.46	0.80				
1980	1.57	0.63			0.67	0.71
1981	2.38	0.68			0.41	0.80
1982	2.23	0.65			2.33	0.64
1983	1.16	0.69			0.85	0.68
1984	0.91	0.73			0.37	0.88
1985	1.71	0.52			0.67	0.74
1986	1.07	0.56			3.73	0.62
1987	0.43	0.55			3.45	0.63
1988	1.34	0.50			1.70	0.37
1989	1.34	0.44			1.07	0.39
1990	1.57	0.43	3.34	0.64	0.54	0.37
1991	1.14	0.43	1.08	0.52	0.65	0.36
1992	0.71	0.43	0.69	0.58	0.61	0.34
1993	0.16	0.48	0.47	0.58	0.53	0.42
1994	0.58	0.44	0.44	0.61	0.27	0.42
1995	0.36	0.41	0.14	0.45	0.48	0.37
1996	0.31	0.40	0.72	0.47	0.22	0.40
1997	0.54	0.39	0.48	0.53	0.18	0.36
1998	0.55	0.43	0.56	0.59	0.14	0.39

Year	YOY index	CV	SAD index	CV	NAD index	CV
1999	0.80	0.46	0.47	0.58	0.36	0.34
2000	0.71	0.41	0.77	0.71	0.25	0.34
2001	0.41	0.40	0.61	0.59	0.27	0.42
2002	0.96	0.41	0.66	0.57	0.54	0.36
2003	0.50	0.39	0.60	0.65	0.21	0.32
2004	0.63	0.39	0.45	0.48	0.31	0.34
2005	0.83	0.38	1.21	0.45	0.66	0.34
2006	0.38	0.38	3.72	0.45	0.74	0.31
2007	0.58	0.39	0.26	0.48	1.18	0.29
2008	0.41	0.37	0.44	0.46	1.20	0.44
2009	0.34	0.38	2.73	0.55	1.07	0.35
2010	0.63	0.39	0.66	0.42	0.94	0.31
2011	0.35	0.38	2.94	0.41	1.63	0.33
2012	0.24	0.37	1.00	0.41	1.42	0.31
2013	0.24	0.37	0.77	0.41	1.21	0.33
2014	0.49	0.37	0.66	0.48	2.44	0.31
2015	0.41	0.41	0.69	0.40	1.24	0.33
 2016	0.62	0.42	0.42	0.55	2.50	0.34

Table 6.2.1.1 Selectivity slope and A_{50} of the ascending and descending limbs with associated SE for the bait and reduction fisheries, and the NAD and SAD indices.

			Ascending Limb			D	escend	ling Lim	b	
Fishery/Index	Region	Period	Slope	SE	A50	SE	Slope	SE	A50	SE
Reduction	North	1955-1969	3.63	0.18	2.32	0.10	1.67	4.17	3.81	3.14
Reduction	North	1969-1993	5.31	0.93	2.13	0.10	1.49	1.91	2.83	1.23
Reduction	North	1994-2016	5.19	2.13	2.21	0.14	0.54	0.42	1.50	0.04
Reduction	South	1955-1971	3.92	0.24	1.15	0.05	2.08	1.25	1.75	0.02
Reduction	South	1972-2004	2.16	0.15	3.33	0.18	4.36	0.87	-1.00	0.003
Reduction	South	2005-2016	4.80	1.88	1.36	0.15	1.44	0.85	1.50	0.001
Bait	North	1955-2016	5.71	2.23	2.47	0.21	4.27	3.29	2.19	0.46
Bait	South	1955-2016	36.21	28306	1.08	62.8	0.67	1.16	2.98	6.28
NAD	North		2.42	5318	2.09	20.56	NA	NA	NA	NA
SAD	South		35.0	0.016	0.13	0.033	4.08	0.04	1.75	0.02

Table 6.2.2.1 Fishing mortality rate at age estimates from 1955-2016.

Table 6.2.2.							
Ages	0	1	2	3	4	5	6+
1955	0.006	0.210	1.137	2.992	2.953	2.522	1.596
1956	0.011	0.369	3.167	10.457	10.710	9.069	5.718
1957	0.008	0.287	2.502	8.348	8.535	7.081	4.437
1958	0.008	0.276	1.358	3.259	3.160	2.696	1.707
1959	0.008	0.262	1.772	5.148	5.183	4.433	2.805
1960	0.003	0.087	0.502	1.372	1.361	1.142	0.719
1961	0.005	0.179	0.601	0.880	0.735	0.608	0.383
1962	0.009	0.301	1.078	1.765	1.537	1.276	0.804
1963	0.010	0.325	1.252	2.189	1.948	1.586	0.994
1964	0.011	0.349	1.076	1.281	0.956	0.703	0.430
1965	0.013	0.424	1.337	1.537	1.137	0.868	0.538
1966	0.014	0.465	1.229	0.836	0.354	0.181	0.101
1967	0.009	0.294	0.828	0.707	0.411	0.279	0.169
1968	0.009	0.302	0.834	0.741	0.447	0.326	0.201
1969	0.008	0.262	0.705	0.509	0.241	0.148	0.088
1970	0.010	0.329	0.922	0.644	0.274	0.123	0.051
1971	0.009	0.283	0.792	0.635	0.309	0.144	0.053
1972	0.036	0.309	2.318	1.498	0.619	0.350	0.130
1973	0.021	0.187	1.664	1.714	1.085	0.612	0.222
1974	0.017	0.155	1.371	1.358	0.841	0.481	0.177
1975	0.016	0.145	1.202	0.987	0.544	0.311	0.121
1976	0.016	0.139	1.215	1.162	0.706	0.408	0.153
1977	0.015	0.129	1.012	0.713	0.337	0.193	0.076
1978	0.014	0.129	1.007	0.695	0.322	0.187	0.075
1979	0.016	0.144	1.093	0.728	0.315	0.181	0.068
1980	0.023	0.205	1.595	1.101	0.507	0.296	0.117
1981	0.019	0.168	1.330	0.976	0.479	0.277	0.107
1982	0.023	0.206	1.506	0.844	0.281	0.156	0.063
1983	0.026	0.224	1.636	0.921	0.307	0.170	0.067
1984	0.028	0.244	1.798	1.052	0.377	0.209	0.082
1985	0.011	0.105	1.096	1.491	1.082	0.582	0.207
1986	0.008	0.068	0.545	0.468	0.266	0.129	0.045
1987	0.011	0.097	0.767	0.578	0.291	0.159	0.059
1988	0.017	0.156	1.208	0.827	0.382	0.204	0.080
1989	0.023	0.205	1.733	1.573	0.929	0.502	0.185
1990	0.013	0.119	1.237	1.853	1.387	0.687	0.229
1991	0.017	0.153	1.329	1.417	0.917	0.459	0.157
1992	0.012	0.111	1.063	1.449	1.052	0.500	0.164
1993	0.016	0.137	1.092	0.980	0.572	0.261	0.086
1994	0.015	0.129	0.972	0.774	0.396	0.184	0.100
1995	0.031	0.278	2.280	2.201	1.257	0.733	0.455
1996	0.019	0.174	1.539	2.152	1.506	0.707	0.384

Ages	0	1	2	3	4	5	6+
1997	0.025	0.226	1.743	1.520	0.853	0.362	0.182
1998	0.027	0.244	1.830	1.450	0.769	0.288	0.128
1999	0.018	0.167	1.287	1.117	0.646	0.235	0.100
2000	0.011	0.100	0.920	1.252	0.871	0.435	0.246
2001	0.016	0.140	1.120	0.996	0.555	0.293	0.171
2002	0.016	0.142	1.133	0.923	0.492	0.254	0.146
2003	0.017	0.156	1.165	0.709	0.290	0.123	0.061
2004	0.011	0.097	0.792	0.751	0.446	0.218	0.121
2005	0.001	0.114	0.708	0.641	0.381	0.166	0.082
2006	0.001	0.071	0.543	0.803	0.566	0.314	0.187
2007	0.001	0.070	0.466	0.606	0.422	0.184	0.093
2008	0.001	0.060	0.411	0.533	0.372	0.165	0.084
2009	0.001	0.077	0.474	0.473	0.295	0.118	0.055
2010	0.001	0.097	0.591	0.657	0.428	0.167	0.076
2011	0.001	0.086	0.549	0.721	0.509	0.192	0.084
2012	0.001	0.058	0.387	0.619	0.474	0.157	0.059
2013	0.000	0.051	0.327	0.379	0.251	0.111	0.057
2014	0.001	0.066	0.422	0.454	0.293	0.129	0.065
2015	0.001	0.076	0.489	0.579	0.392	0.159	0.075
2016	0.001	0.062	0.436	0.654	0.478	0.210	0.107

Table 6.2.3.1 Numbers at age in billions of fish estimated from the base run of the BAM model for 1955-2016.

Ages 0 1 2 3 4 5 6+ 1955 26.735 4.348 2.744 0.540 0.000 0.000 0.000 1956 28.328 8.668 1.553 0.460 0.015 0.000 0.000 1957 13.599 9.142 2.640 0.034 0.000 0.000 0.000 1958 79.353 4.400 3.021 0.113 0.000 0.000 0.000 1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1963 8.846 2.744 0.887 0.213 0.025 0.003 0.005 1964 8.	101 1333 20	710.						
1956 28.328 8.668 1.553 0.460 0.015 0.000 0.000 1957 13.599 9.142 2.640 0.034 0.000 0.000 0.000 1958 79.353 4.400 3.021 0.113 0.000 0.000 0.000 1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1962 11.644 3.308 1.230 0.436 0.645 0.005 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.011 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003	Ages	0	1	2	3	4	5	6+
1957 13.599 9.142 2.640 0.034 0.000 0.000 0.000 1958 79.353 4.400 3.021 0.113 0.000 0.000 0.000 1959 11.646 25.675 1.470 0.405 0.002 0.000 0.000 1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004	1955	26.735	4.348	2.744	0.540	0.000	0.000	0.000
1958 79.353 4.400 3.021 0.113 0.000 0.000 0.000 1959 11.646 25.675 1.470 0.405 0.002 0.000 0.000 1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1962 11.644 3.308 1.230 0.436 0.645 0.005 0.001 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.007	1956	28.328	8.668	1.553	0.460	0.015	0.000	0.000
1959 11.646 25.675 1.470 0.405 0.002 0.000 0.000 1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1962 11.644 3.308 1.230 0.436 0.645 0.005 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 <	1957	13.599	9.142	2.640	0.034	0.000	0.000	0.000
1960 10.263 3.770 8.701 0.130 0.001 0.000 0.000 1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1962 11.644 3.308 1.230 0.436 0.645 0.005 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 <t< td=""><td>1958</td><td>79.353</td><td>4.400</td><td>3.021</td><td>0.113</td><td>0.000</td><td>0.000</td><td>0.000</td></t<>	1958	79.353	4.400	3.021	0.113	0.000	0.000	0.000
1961 10.195 3.340 1.522 2.749 0.019 0.000 0.000 1962 11.644 3.308 1.230 0.436 0.645 0.005 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 <	1959	11.646	25.675	1.470	0.405	0.002	0.000	0.000
1962 11.644 3.308 1.230 0.436 0.645 0.005 0.000 1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.007 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.255 1.754 1.179 0.192 0.053 0.042 0.018 <td< td=""><td>1960</td><td>10.263</td><td>3.770</td><td>8.701</td><td>0.130</td><td>0.001</td><td>0.000</td><td>0.000</td></td<>	1960	10.263	3.770	8.701	0.130	0.001	0.000	0.000
1963 8.836 3.764 1.078 0.218 0.042 0.082 0.001 1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1979 5.429 3.718 0.926 0.178 0.092 0.020 0.011 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 <td< td=""><td>1961</td><td>10.195</td><td>3.340</td><td>1.522</td><td>2.749</td><td>0.019</td><td>0.000</td><td>0.000</td></td<>	1961	10.195	3.340	1.522	2.749	0.019	0.000	0.000
1964 8.499 2.855 1.198 0.161 0.014 0.004 0.010 1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.012 1971 15.2525 1.754 1.179 0.192 0.053 0.018 0.027 <	1962	11.644	3.308	1.230	0.436	0.645	0.005	0.000
1965 7.807 2.744 0.887 0.213 0.025 0.003 0.005 1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 <	1963	8.836	3.764	1.078	0.218	0.042	0.082	0.001
1966 11.312 2.515 0.791 0.122 0.026 0.005 0.003 1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013	1964	8.499	2.855	1.198	0.161	0.014	0.004	0.010
1967 6.542 3.639 0.695 0.121 0.030 0.011 0.004 1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007	1965	7.807	2.744	0.887	0.213	0.025	0.003	0.005
1968 8.446 2.116 1.195 0.159 0.034 0.012 0.007 1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007	1966	11.312	2.515	0.791	0.122	0.026	0.005	0.003
1969 11.488 2.730 0.689 0.271 0.043 0.013 0.009 1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010	1967	6.542	3.639	0.695	0.121	0.030	0.011	0.004
1970 5.429 3.718 0.926 0.178 0.092 0.020 0.012 1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014	1968	8.446	2.116	1.195	0.159	0.034	0.012	0.007
1971 15.225 1.754 1.179 0.192 0.053 0.042 0.018 1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031	1969	11.488	2.730	0.689	0.271	0.043	0.013	0.009
1972 12.029 4.925 0.582 0.279 0.058 0.023 0.032 1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056	1970	5.429	3.718	0.926	0.178	0.092	0.020	0.012
1973 12.452 3.788 1.592 0.030 0.035 0.018 0.027 1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058	1971	15.225	1.754	1.179	0.192	0.053	0.042	0.018
1974 19.646 3.978 1.384 0.157 0.003 0.007 0.020 1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 <	1972	12.029	4.925	0.582	0.279	0.058	0.023	0.032
1975 30.335 6.299 1.500 0.184 0.023 0.001 0.013 1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028	1973	12.452	3.788	1.592	0.030	0.035	0.018	0.027
1976 25.286 9.740 2.401 0.235 0.039 0.008 0.007 1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056	1974	19.646	3.978	1.384	0.157	0.003	0.007	0.020
1977 24.619 8.123 3.734 0.372 0.042 0.011 0.007 1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008	1975	30.335	6.299	1.500	0.184	0.023	0.001	0.013
1978 20.840 7.917 3.144 0.709 0.103 0.018 0.010 1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029	1976	25.286	9.740	2.401	0.235	0.039	0.008	0.007
1979 37.572 6.702 3.066 0.600 0.200 0.044 0.014 1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157	1977	24.619	8.123	3.734	0.372	0.042	0.011	0.007
1980 22.123 12.059 2.556 0.537 0.164 0.087 0.031 1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048	1978	20.840	7.917	3.144	0.709	0.103	0.018	0.010
1981 25.994 7.054 4.328 0.271 0.101 0.059 0.056 1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087	1979	37.572	6.702	3.066	0.600	0.200	0.044	0.014
1982 14.911 8.322 2.626 0.597 0.058 0.037 0.058 1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 <	1980	22.123	12.059	2.556	0.537	0.164	0.087	0.031
1983 29.858 4.752 2.982 0.304 0.145 0.026 0.053 1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 <t< td=""><td>1981</td><td>25.994</td><td>7.054</td><td>4.328</td><td>0.271</td><td>0.101</td><td>0.059</td><td>0.056</td></t<>	1981	25.994	7.054	4.328	0.271	0.101	0.059	0.056
1984 32.063 9.496 1.672 0.303 0.068 0.064 0.044 1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 <t< td=""><td>1982</td><td>14.911</td><td>8.322</td><td>2.626</td><td>0.597</td><td>0.058</td><td>0.037</td><td>0.058</td></t<>	1982	14.911	8.322	2.626	0.597	0.058	0.037	0.058
1985 25.474 10.174 3.275 0.145 0.060 0.028 0.056 1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1983	29.858	4.752	2.982	0.304	0.145	0.026	0.053
1986 16.898 8.217 4.034 0.571 0.018 0.012 0.038 1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1984	32.063	9.496	1.672	0.303	0.068	0.064	0.044
1987 11.039 5.471 3.382 1.221 0.202 0.008 0.029 1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1985	25.474	10.174	3.275	0.145	0.060	0.028	0.056
1988 25.323 3.562 2.186 0.820 0.387 0.090 0.021 1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1986	16.898	8.217	4.034	0.571	0.018	0.012	0.038
1989 15.925 8.119 1.342 0.341 0.203 0.157 0.057 1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1987	11.039	5.471	3.382	1.221	0.202	0.008	0.029
1990 18.112 5.078 2.912 0.124 0.040 0.048 0.087 1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1988	25.323	3.562	2.186	0.820	0.387	0.090	0.021
1991 14.965 5.832 1.986 0.441 0.011 0.006 0.057 1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1989	15.925	8.119	1.342	0.341	0.203	0.157	0.057
1992 15.980 4.799 2.204 0.274 0.060 0.003 0.033 1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1990	18.112	5.078	2.912	0.124	0.040	0.048	0.087
1993 6.622 5.150 1.892 0.397 0.036 0.013 0.018 1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1991	14.965	5.832	1.986	0.441	0.011	0.006	0.057
1994 13.688 2.127 1.978 0.331 0.084 0.012 0.016	1992	15.980	4.799	2.204	0.274	0.060	0.003	0.033
	1993	6.622	5.150	1.892	0.397	0.036	0.013	0.018
1995 10.592 4.402 0.824 0.391 0.086 0.034 0.015	1994	13.688	2.127	1.978	0.331	0.084	0.012	0.016
	1995	10.592	4.402	0.824	0.391	0.086	0.034	0.015

Ages	0	1	2	3	4	5	6+
1996	11.178	3.350	1.468	0.044	0.024	0.015	0.016
1997	9.913	3.577	1.240	0.164	0.003	0.003	0.011
1998	9.354	3.154	1.256	0.113	0.020	0.001	0.007
1999	9.796	2.970	1.089	0.105	0.015	0.006	0.004
2000	6.730	3.138	1.107	0.157	0.019	0.005	0.005
2001	6.825	2.172	1.250	0.230	0.025	0.005	0.004
2002	13.005	2.193	0.832	0.213	0.048	0.009	0.004
2003	10.276	4.177	0.837	0.140	0.048	0.017	0.006
2004	11.003	3.296	1.574	0.136	0.039	0.021	0.013
2005	16.032	3.552	1.318	0.372	0.036	0.015	0.018
2006	9.593	5.225	1.397	0.339	0.111	0.015	0.018
2007	9.756	3.128	2.143	0.423	0.086	0.037	0.016
2008	12.369	3.181	1.285	0.702	0.131	0.033	0.028
2009	9.561	4.033	1.319	0.445	0.233	0.054	0.033
2010	18.654	3.117	1.644	0.429	0.157	0.103	0.048
2011	11.411	6.081	1.246	0.475	0.126	0.061	0.081
2012	8.517	3.720	2.457	0.376	0.131	0.045	0.076
2013	9.936	2.777	1.546	0.872	0.114	0.048	0.068
2014	10.791	3.240	1.163	0.582	0.338	0.053	0.066
2015	8.781	3.519	1.336	0.398	0.209	0.150	0.066
2016	13.363	2.863	1.436	0.428	0.126	0.084	0.116

Table 6.2.3.2 Fecundity at age in billions of eggs during 1955-2016.

Ages	0	1	2	3	4	5	6+
1955	0	3997	73328	33639	6	0	0
1956	0	6470	37082	31334	1490	0	0
1957	0	5341	37163	2339	1	0	0
1958	0	4796	42541	5989	1	0	0
1959	0	7905	20820	20472	263	0	0
1960	0	8650	72952	6279	124	2	0
1961	0	3577	35282	109844	1722	28	0
1962	0	5501	25313	27155	53504	785	13
1963	0	7929	23408	13305	4665	11211	202
1964	0	7214	28587	8816	1430	604	2120
1965	0	6401	23197	12471	2153	465	1248
1966	0	3664	24386	7805	2404	541	515
1967	0	11002	16444	9909	3055	1341	528
1968	0	4427	47781	11941	5017	1657	1061
1969	0	7651	16953	26979	6633	3052	1552
1970	0	18198	27062	13081	16370	5618	3999
1971	0	6624	61831	15251	7722	11250	8288
1972	0	7126	31830	36484	8984	6109	11893
1973	0	2211	29076	3723	8832	5018	12191
1974	0	2897	32878	9196	613	2923	8691
1975	0	2677	23259	11962	2590	212	7813
1976	0	2718	16169	12529	3851	1497	2423
1977	0	1413	17150	12589	4065	1426	2078
1978	0	1407	11114	18367	7680	2594	1395
1979	0	1935	13161	14333	11650	5700	2906
1980	0	2113	9691	15145	9889	8297	6287
1981	0	1291	10876	5738	6976	6226	7751
1982	0	2474	12030	9330	2930	4637	9863
1983	0	1324	16332	7688	6276	2239	10889
1984	0	2750	10745	8857	3822	4982	5712
1985	0	1873	14167	5096	3886	2483	6987
1986	0	1466	17309	14321	1384	1311	4742
1987	0	1565	11985	29796	11951	1024	4687
1988	0	642	10729	19058	21558	9235	3752
1989	0	3417	6898	8903	11838	14494	9143
1990	0	4653	31159	3625	2289	4909	11573
1991	0	3436	35208	19615	711	541	9402
1992	0	7874	27394	13968	5070	273	4146
1993	0	2261	36742	18390	3000	1580	2729
1994	0	3105	21942	19238	7200	1339	2741
1995	0	1921	19633	19877	9128	4331	1986
1996	0	965	32003	3014	2728	2447	2758

Ages	0	1	2	3	4	5	6+
1997	0	995	22684	12350	350	660	2656
1998	0	1354	12509	8169	2803	134	2436
1999	0	6819	15854	5331	2086	1173	1038
2000	0	3450	28708	8697	2049	1017	1402
2001	0	1588	44837	15755	2610	859	1267
2002	0	5107	25590	20510	5713	1360	1165
2003	0	4491	22357	10599	7914	3130	1360
2004	0	3621	31381	7499	4328	4974	3215
2005	0	1019	23972	21593	2726	1992	5164
2006	0	3905	17782	18410	10774	1289	2625
2007	0	4006	42630	22109	7994	5060	1486
2008	0	5316	28684	35443	12430	4446	4745
2009	0	6804	30650	23450	16859	7370	5712
2010	0	5812	26584	22392	11892	8954	8596
2011	0	12612	28746	21970	9115	5595	7714
2012	0	7008	53446	18876	10425	3884	7766
2013	0	5245	31008	42647	7965	5709	6467
2014	0	6120	24064	27462	23931	4446	10294
2015	0	6645	27645	19350	14312	13270	6000
2016	0	5406	29713	20790	8793	7212	11571

Table 6.2.3.3 Biomass of Atlantic menhaden (1000s mt) by age from 1959 to 2016.

Year	0	1	2	3	4	5	6+	Total
1955	745.9	271.7	566.6	181.0	0.0	0.0	0.0	1765
1956	603.4	503.6	304.8	162.8	6.9	0.0	0.0	1582
1957	477.3	485.4	413.4	12.1	0.0	0.0	0.0	1388
1958	1491.8	289.0	473.1	34.1	0.0	0.0	0.0	2288
1959	521.7	1127.1	231.5	118.7	1.2	0.0	0.0	2000
1960	262.7	314.4	1125.9	37.0	0.6	0.0	0.0	1741
1961	346.6	214.4	294.7	699.5	8.1	0.1	0.0	1564
1962	462.3	249.1	225.9	146.1	261.4	3.2	0.0	1348
1963	377.3	309.4	202.1	71.9	20.8	46.9	0.7	1029
1964	345.9	246.4	235.0	49.5	6.5	2.3	7.7	893
1965	270.9	233.5	181.9	68.5	10.5	1.9	4.2	771
1966	446.8	180.6	174.8	41.4	11.3	2.4	1.9	859
1967	287.2	335.5	135.3	48.5	14.0	5.8	2.2	828
1968	416.4	172.4	304.3	60.2	20.4	6.8	4.3	985
1969	548.0	247.1	137.2	124.7	26.4	10.4	5.9	1099
1970	174.3	402.3	199.8	66.3	62.0	17.8	11.7	934
1971	570.9	173.6	352.8	75.9	31.5	36.3	20.9	1262
1972	141.9	350.7	178.7	154.3	35.6	19.9	33.6	915
1973	287.6	201.1	277.9	16.0	29.4	16.1	31.6	860
1974	457.8	223.2	270.4	50.6	2.2	7.9	22.6	1035
1975	515.7	291.0	243.8	63.3	11.5	0.7	17.5	1143
1976	391.9	366.2	289.3	71.3	17.8	5.5	7.2	1149
1977	389.0	274.6	394.4	86.3	18.9	6.1	6.5	1176
1978	431.4	277.1	305.6	144.1	38.8	10.6	5.7	1213
1979	680.0	266.1	315.2	117.8	64.1	24.3	10.5	1478
1980	349.5	412.4	254.1	113.5	53.6	38.8	22.7	1245
1981	517.3	258.9	370.9	50.3	36.1	28.3	32.2	1294
1982	217.7	346.2	276.5	97.8	17.0	19.9	38.0	1013
1983	603.1	178.7	334.6	61.2	38.7	10.8	39.2	1266
1984	545.1	378.9	198.7	65.4	21.4	24.9	24.2	1258
1985	428.0	376.4	339.6	34.4	20.6	11.9	30.1	1241
1986	297.4	289.2	414.7	114.2	7.0	5.9	20.3	1149
1987	161.2	214.5	329.7	241.2	65.6	4.4	18.3	1035
1988	433.0	127.5	237.2	159.2	120.7	42.3	14.2	1134
1989	390.2	370.2	146.5	69.8	65.1	68.4	35.8	1146
1990	420.2	316.4	412.6	26.8	12.6	22.5	48.7	1260
1991	576.1	313.8	342.5	119.4	3.8	2.6	36.6	1395
1992	346.8	355.1	331.4	80.9	24.7	1.2	17.7	1158
1993	210.6	249.8	339.1	110.2	14.7	6.8	11.0	942
1994	169.7	153.2	284.0	105.9	34.9	6.0	10.6	764
1995	90.0	211.7	161.4	115.1	41.5	18.4	8.4	647
1996	133.0	132.6	276.2	15.6	12.1	9.5	10.5	590

Year	0	1	2	3	4	5	6+	Total
1997	154.6	133.8	216.8	62.3	1.5	2.4	9.0	580
1998	392.9	147.9	174.0	41.9	11.7	0.5	7.1	776
1999	177.3	247.7	172.8	30.9	8.7	4.2	3.5	645
2000	66.6	208.7	225.2	48.7	9.3	3.6	4.5	567
2001	234.1	122.5	298.8	81.8	12.0	3.3	3.9	756
2002	339.4	186.2	183.5	95.7	24.9	5.4	3.8	839
2003	308.3	269.4	172.8	53.3	30.8	11.8	4.8	851
2004	113.3	218.8	284.8	42.1	19.2	17.0	10.8	706
2005	258.1	139.6	229.1	118.9	13.8	8.4	16.1	784
2006	237.9	303.6	210.5	103.5	50.1	6.2	10.6	922
2007	282.0	217.7	386.9	126.3	37.6	21.2	7.0	1079
2008	541.8	241.1	243.6	205.5	58.2	18.7	18.2	1327
2009	297.3	309.4	256.0	133.7	86.5	30.7	21.8	1135
2010	690.2	243.1	273.4	127.9	59.8	43.3	32.5	1470
2011	422.2	490.1	240.2	131.7	46.7	26.4	36.0	1393
2012	291.3	293.9	461.2	109.5	51.8	18.8	35.7	1262
2013	339.8	220.3	281.3	250.9	41.2	24.9	30.2	1189
2014	369.1	257.0	218.1	162.5	123.3	21.3	41.4	1193
2015	300.3	279.0	250.5	114.0	74.3	62.8	28.5	1109
2016	457.0	227.0	269.3	122.5	45.5	34.4	52.6	1208

Table 6.4.1.1 Likelihood components for the base run and all sensitivity runs.

							SAD	NAD	cRn	cRs	cBn	cBs					
Run	total	unwgt	cRn L	cRs L	cBn L	cBs L	lenc	lenc	agec	agec	agec	agec	SAD	NAD	JAI	priors	SRfit
																-	
Base run	-4314	-4299	0.14	1.46	0.05	0.07	-1470	-1348	-605	-548	-295	-303	57.9	67.6	143.0	11.3	-7.4
Am-076	-4286	-4281	0.07	0.62	0.02	0.03	-1471	-1346	-607	-546	-295	-303	47.7	96.7	142.1	1.6	-8.3
																-	
Am-089	-3129	-3113	0.02	0.10	0.00	0.01	-1471	0	-610	-546	-296	-309	60.1	0.0	58.4	11.3	-7.1
																-	
Am-090	-4298	-4282	0.15	0.76	0.10	0.06	-1470	-1348	-604	-545	-292	-305	50.5	81.4	148.7	11.3	-7.3
																-	
Am-091	-4312	-4299	0.13	1.94	0.05	0.08	-1470	-1346	-604	-548	-294	-302	63.3	67.1	131.1	11.3	-6.4
																-	
Am-092	-4289	-4272	0.12	1.62	0.06	0.08	-1470	-1347	-602	-544	-295	-303	57.9	73.0	156.3	11.3	-8.5
Am-100	-4286	-4281	0.07	0.62	0.02	0.03	-1471	-1346	-607	-546	-295	-303	47.65	96.73	142.07	1.56	-8.3
																-	
Am-101	-3129	-3113	0.02	0.10	0.00	0.01	-1471	0	-610	-546	-296	-309	60.11	0.0	58.4	11.3	-7.1
																-	
Am-102	-4298	-4282	0.15	0.76	0.10	0.06	-1470	-1348	-604	-545	-292	-305	50.54	81.4	148.7	11.3	-7.3
																-	
Am-103	-4312	-4299	0.13	1.94	0.05	0.08	-1470	-1346	-604	-548	-294	-302	63.29	67.1	131.1	11.3	-6.4

Table 6.4.1.2 Standard deviation of the normalized residuals for the base run and each sensitivity run.

Run	SAD lenc	NAD lenc	cRn agec	cRs agec	cBn agec	cBs agec	SAD	NAD	JAI
Base run	0.35	0.41	1.08	1.28	1.18	1.15	2.11	1.94	2.24
Am-076	0.37	0.35	1.06	1.32	1.07	1.13	1.91	2.32	2.23
Am-089	0.26		1.03	1.33	0.96	0.98	2.15		1.43
Am-090	0.37	0.36	1.12	1.34	1.13	1.13	1.97	2.13	2.28
Am-091	0.34	0.41	1.10	1.27	1.23	1.17	2.21	1.93	2.15
Am-092	0.35	0.41	1.08	1.32	1.17	1.14	2.11	2.01	2.33
Am-100	0.37	0.35	1.06	1.32	1.07	1.13	1.91	2.32	2.23
Am-101	0.26	0.21	1.03	1.33	0.96	0.98	2.15	5.03	1.43
Am-102	0.37	0.36	1.12	1.34	1.13	1.13	1.97	2.13	2.28
Am-103	0.34	0.41	1.1	1.27	1.23	1.17	2.21	1.93	2.15

Table 6.4.1.3 Estimated R_0 and index catchabilities (q) from each of the sensitivity runs.

Run	R_0	q NAD	q2 NAD	q SAD	q_1 JAI	q ₂ JAI
Base run	13.78	2.25		0.21	0.10	0.06
Am-076	16.65	0.58		0.19	0.08	0.05
Am-089	22.83			0.10	0.07	0.03
Am-090	63.33	6.79		0.10	0.03	0.02
Am-091	6.85	2.10		0.31	0.18	0.12
Am-092	14.35	2.21		0.22	0.07	
Am-100	13.82	2.25		0.21	0.1	0.06
Am-101	14.1	3.19	1.42	0.2	0.1	0.06
Am-102	13.48	2.58	2.98	0.22	0.1	0.06
Am-103	33.9	0.04	0.18	0.11	0.03	0.03

Table 6.4.2.1 Likelihood components for the base run and retrospective analyses.

Run	total	unwgt	cRn L	cRs L	cBn L	cBs L	SAD lenc	NAD lenc	cRn	cRs	cBn agec	cBs agec	SAD	NAD	JAI	priors	SRfit
Kull	totai	unwgt	CIVITE	CIVS L	CDITE	CD3 L	ieric	ienc	agec	agec	agec	agec	JAD	NAD	JAI	priors_	JIVIIC
Base run	-4314	-4299	0.14	1.46	0.05	0.07	-1470	-1348	-605	-548	-295	-303	57.9	67.6	143.0	11.3	-7.4
End year 2015	-4195	-4181	0.11	1.19	0.03	0.05	-1416	-1300	-595	-536	-288	-292	56.4	63.1	126.8	11.3	-6.4
End year 2014	-4059	-4046	0.10	1.10	0.03	0.05	-1362	-1253	-584	-528	-280	-282	57.2	64.3	120.9	11.3	-5.6
End year 2013	-3942	-3928	0.06	0.66	0.01	0.03	-1309	-1206	-575	-517	-271	-275	55.0	65.2	105.5	11.3	-4.9
End year 2012	-3811	-3798	0.06	0.58	0.01	0.02	-1255	-1160	-565	-509	-262	-270	51.9	68.3	102.8	11.3	-5.0
End year 2011	-3674	-3659	0.05	0.53	0.01	0.02	-1201	-1114	-553	-497	-253	-259	53.0	68.0	95.9	11.3	-5.7
End year 2010	-3561	-3547	0.03	0.28	0.00	0.01	-1149	-1068	-545	-484	-243	-249	44.1	64.1	82.5	11.3	-4.7

Table 6.4.2.2 Standard deviation of the normalized residuals for the base run and each retrospective run.

Run	SAD lenc	NAD lenc	cRn agec	cRs agec	cBn agec	cBs agec	SAD	NAD	JAI
Base run	0.35	0.41	1.08	1.28	1.18	1.15	2.11	1.94	2.24
Retrospective									
2015	0.36	0.38	1.09	1.30	1.14	1.16	2.12	1.90	2.13
Retrospective									
2014	0.34	0.38	1.10	1.30	1.14	1.17	2.18	1.94	2.10
Retrospective									
2013	0.33	0.36	1.09	1.34	1.09	1.09	2.19	1.99	1.98
Retrospective									
2012	0.33	0.35	1.09	1.34	1.10	1.01	2.17	2.07	1.97
Retrospective									
2011	0.33	0.35	1.10	1.36	1.09	1.00	2.25	2.09	1.92
Retrospective									
2010	0.29	0.35	1.12	1.40	1.05	1.00	2.10	2.07	1.80

Table 6.4.2.3 Estimated R_0 and index catchabilities (q) from the retrospective analysis.

Run	R_0	q NAD	q SAD	q_1 JAI	q ₂ JAI
Base run	13.78	2.25	0.21	0.10	0.06
Retrospective 2015	14.08	1.72	0.21	0.10	0.06
Retrospective 2014	14.29	1.56	0.21	0.09	0.06
Retrospective 2013	15.67	0.77	0.19	0.08	0.06
Retrospective 2012	16.24	0.64	0.18	0.08	0.06
Retrospective 2011	16.74	0.61	0.17	0.08	0.05
Retrospective 2010	19.15	0.31	0.14	0.07	0.05

Table 7.2.1.1 Fishing mortality and fecundity benchmarks (targets and thresholds) along with terminal year values from the base run of the BAM. Fecundity (FEC) is in billions of eggs.

Reference Points	Benchmark	Current value
F _{21%} (threshold)	1.85	0.51
F _{36% (target)}	0.80	0.51
FEC _{21% (threshold)}	57,295	83,486
FEC _{36% (target)}	99,467	83,486

Table 7.2.2.1 Benchmarks calculated for the base run and each sensitivity run along with the 2016 values relative to the benchmark values. Values with a dash (–) indicate an extreme scenario that hit a bound on the maximum level of F.

Run	F _{21%}	F _{36%}	FEC _{21%}	FEC _{36%}	F ₂₀₁₆ /F _{21%}	F ₂₀₁₆ /F _{36%}	FEC ₂₀₁₆ /FEC _{21%}	FEC ₂₀₁₆ /FEC _{36%}
Base run	1.85	0.80	57295	99467	0.28	0.64	1.46	0.84
Am-076	1.56	0.74	69203	120183	0.19	0.41	2.16	1.25
Am-089	1.63	0.82	94892	164784	0.12	0.23	2.32	1.33
Am-090	-	4.18	-	69829	-	0.13	-	1.29
Am-091	0.91	0.51	93196	161886	0.58	1.05	0.90	0.52
Am-092	1.84	0.80	59670	103555	0.30	0.69	1.32	0.76
Am-100	1.85	0.81	57443	99725	0.28	0.64	1.46	0.84
Am-101	1.68	0.76	58614	101784	0.26	0.57	1.75	1.01
Am-102	1.93	0.81	56046	97269	0.30	0.70	1.34	0.77
Am-103	1.64	0.82	140904	244652	0.09	0.18	1.88	1.08

Table 7.2.2.2 Benchmarks calculated for the base run and each retrospective run.

Run	F _{21%}	F _{36%}	FEC _{21%}	FEC _{36%}
Base run	1.85	0.80	57295	99467
Retrospective 2015	1.58	0.72	58539	101622
Retrospective 2014	1.51	0.70	59411	103141
Retrospective 2013	1.54	0.73	65141	113104
Retrospective 2012	1.54	0.74	67485	117189
Retrospective 2011	1.57	0.78	69580	120834
Retrospective 2010	1.57	0.79	79593	138203

12.0 Figures

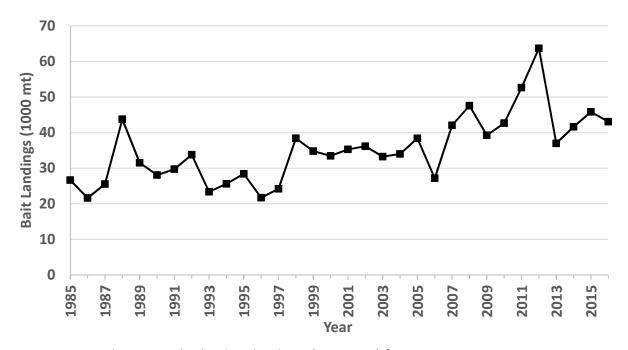


Figure 3.2.2.1. Atlantic menhaden bait landings (1000s mt) from 1985 to 2016.

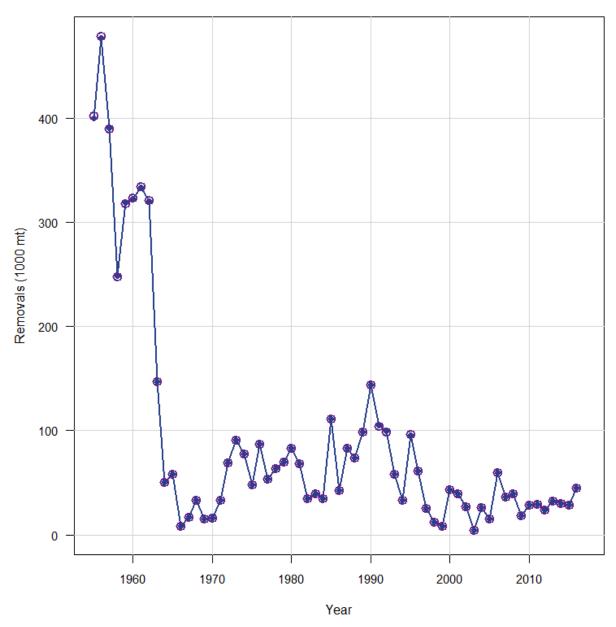


Figure 6.1.1. Observed and predicted removals of Atlantic menhaden from 1955-2016 from north of Virginia Eastern Shore by the commercial reduction fishery.

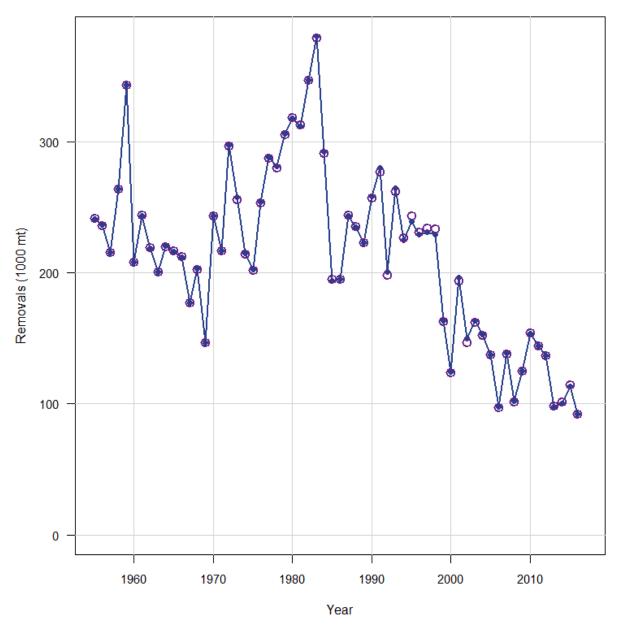


Figure 6.1.2. Observed and predicted removals of Atlantic menhaden from 1955-2016 from Virginia Eastern Shore and south by the commercial reduction fishery.

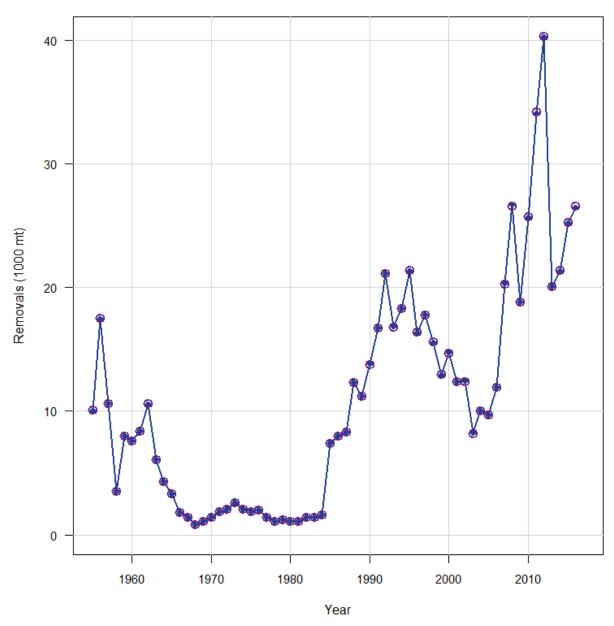


Figure 6.1.3. Observed and predicted removals of Atlantic menhaden from 1955-2016 from north of Virginia Eastern Shore by the commercial bait fishery.

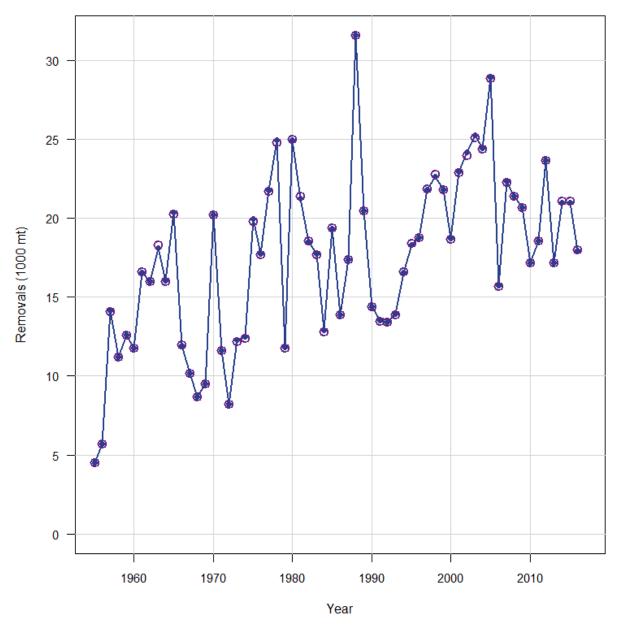


Figure 6.1.4. Observed and predicted removals of Atlantic menhaden from 1955-2016 from Virginia Eastern Shore and south by the commercial bait fishery.

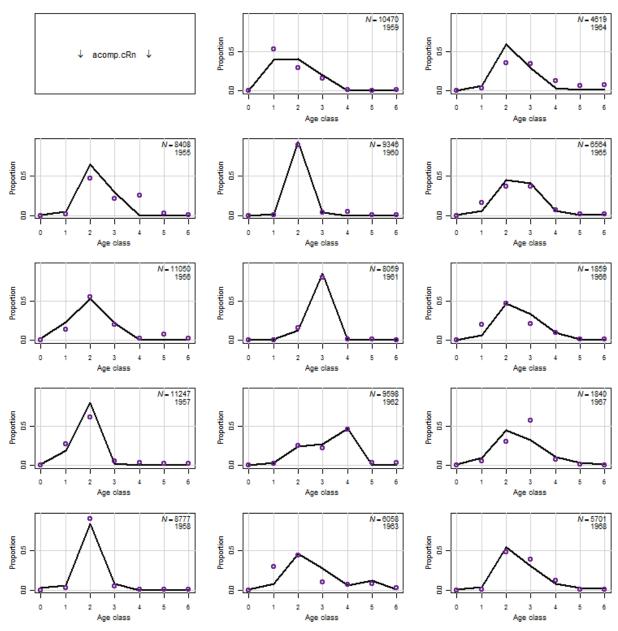


Figure 6.1.5. Annual observed and predicted catch-at-age of Atlantic menhaden from 1955-2016 from north of Virginia Eastern Shore by the commercial reduction fishery.

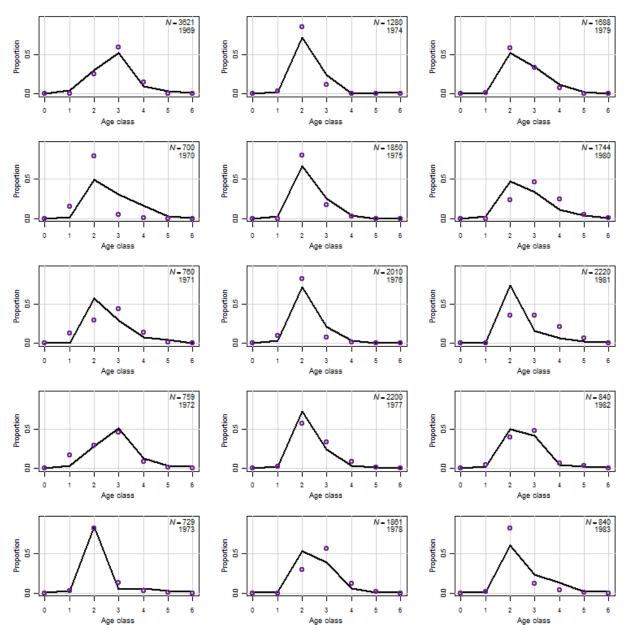


Figure 6.1.5. Continued.

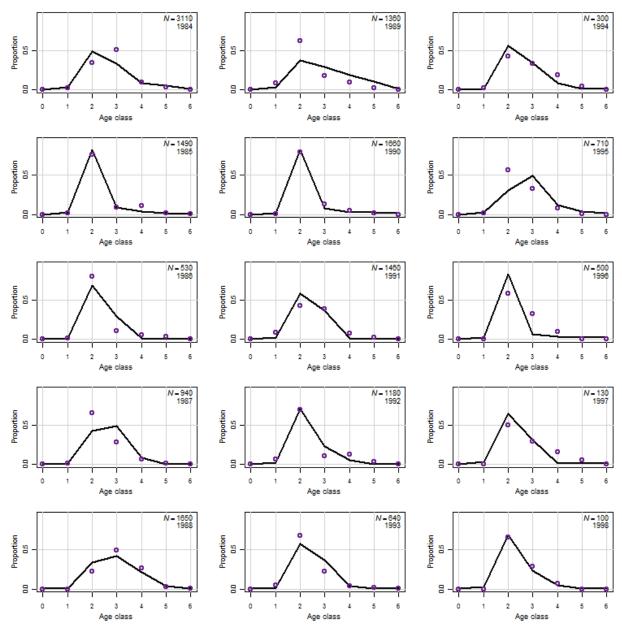


Figure 6.1.5. Continued.

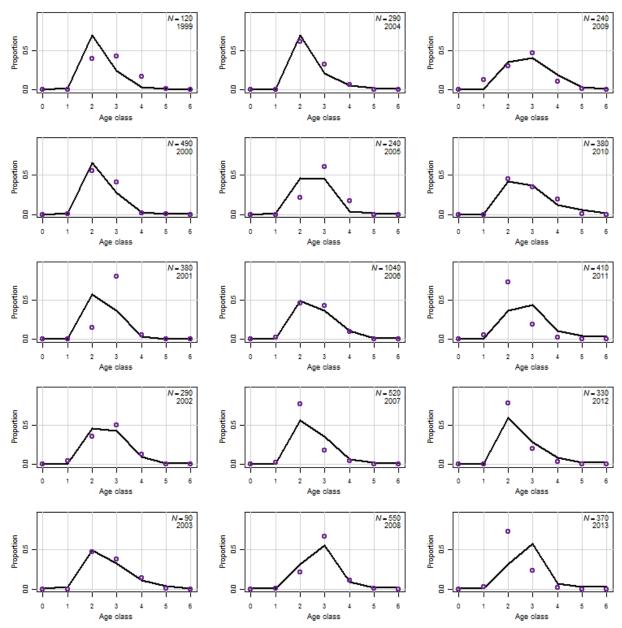


Figure 6.1.5. Continued.

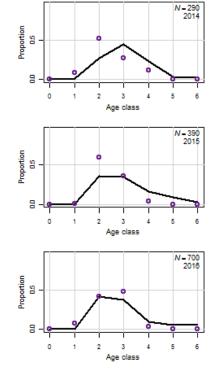


Figure 6.1.5. *Continued*.

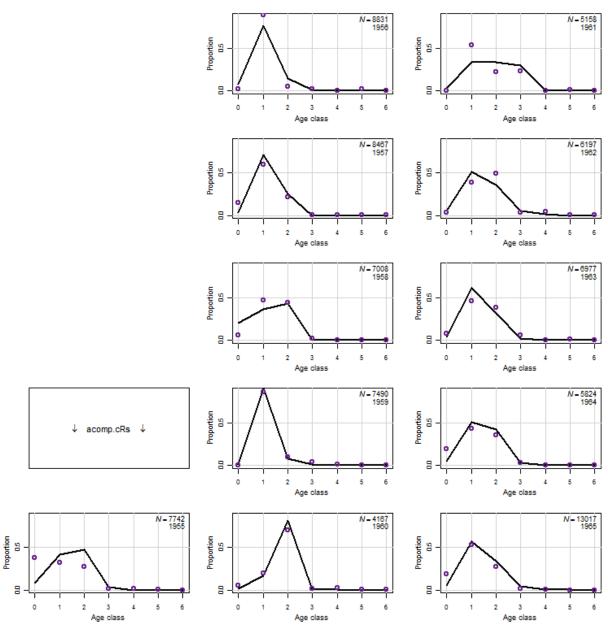


Figure 6.1.6. Annual observed and predicted catch-at-age of Atlantic menhaden from 1955-2016 from Virginia Eastern Shore and south by the commercial reduction fishery.

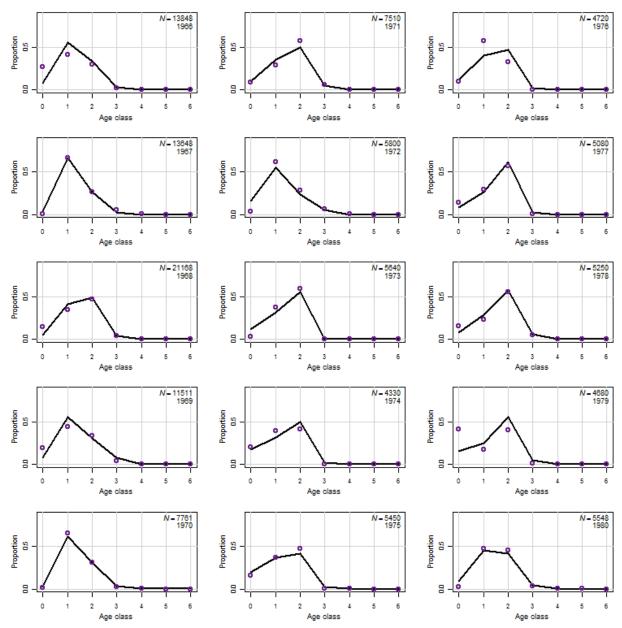


Figure 6.1.6. Continued.

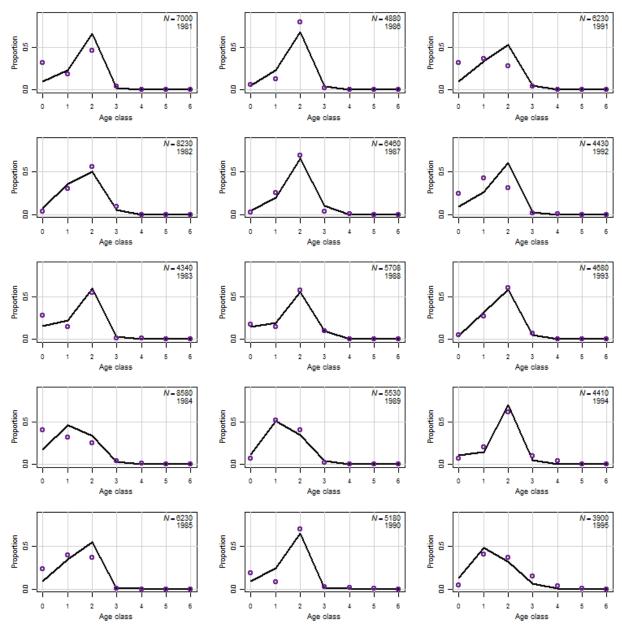


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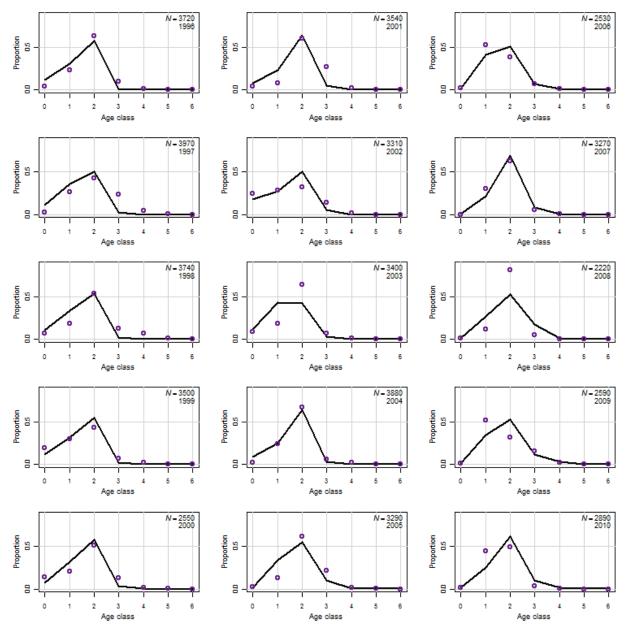


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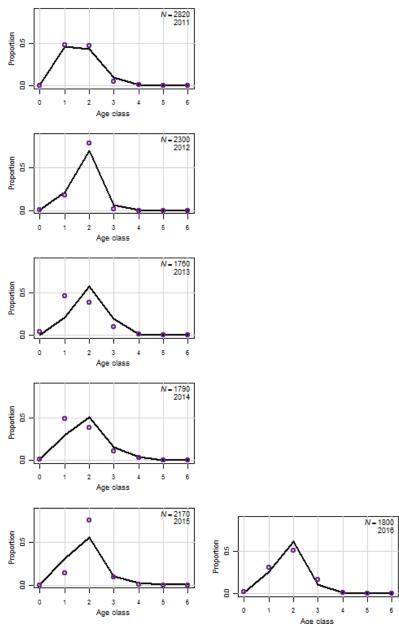


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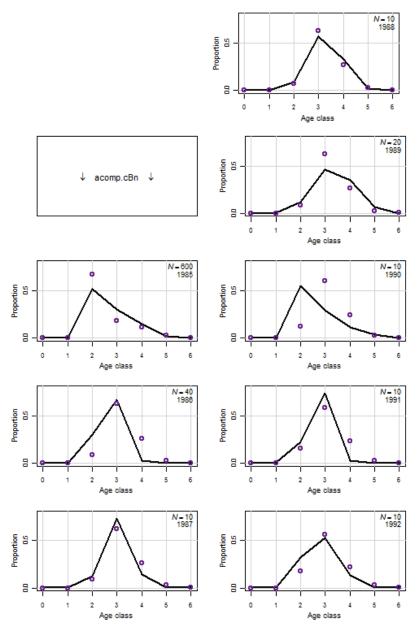


Figure 6.1.7. Annual observed and predicted catch-at-age of Atlantic menhaden from 1985-2016 from north of Virginia Eastern Shore by the commercial bait fishery.

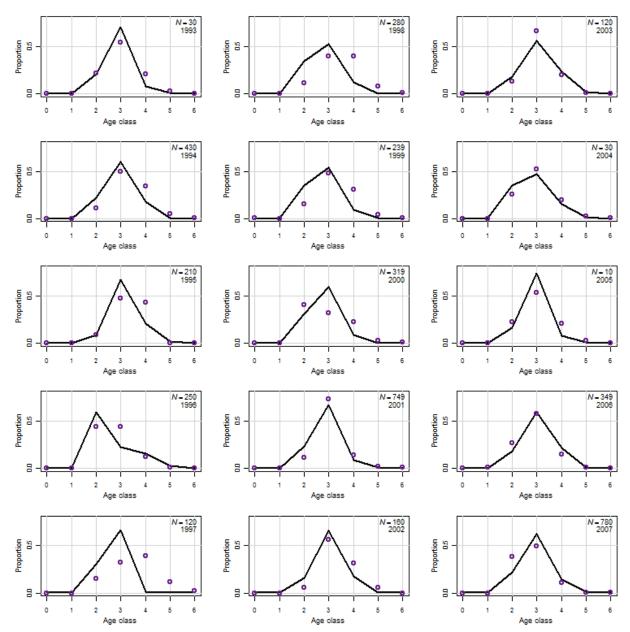


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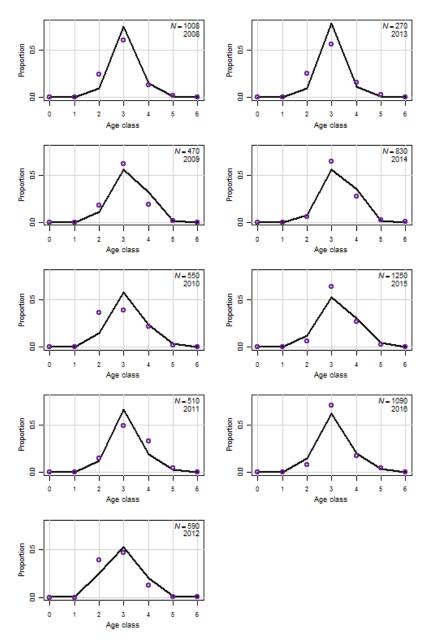


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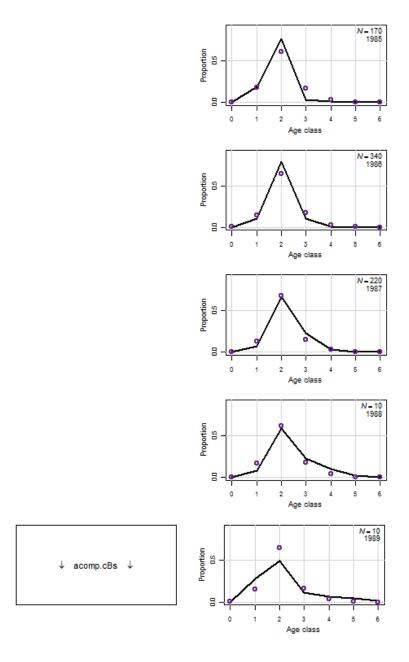


Figure 6.1.8. Annual observed and predicted catch-at-age of Atlantic menhaden from 1985-2016 from Virginia Eastern Shore and south by the commercial bait fishery.

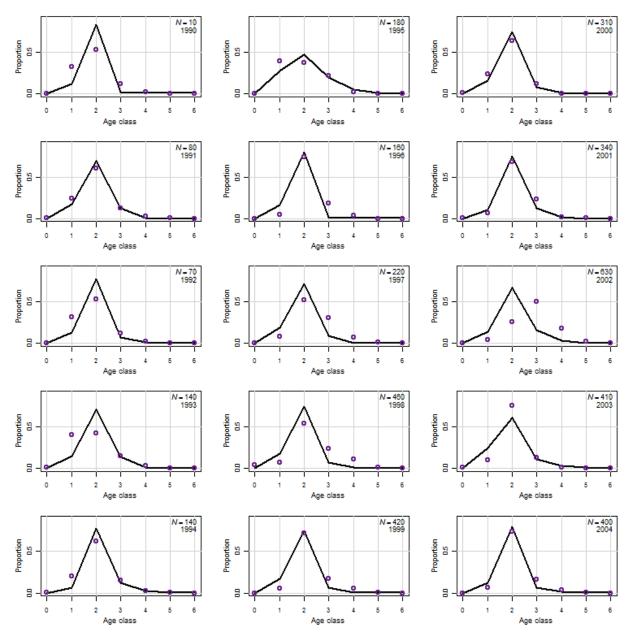


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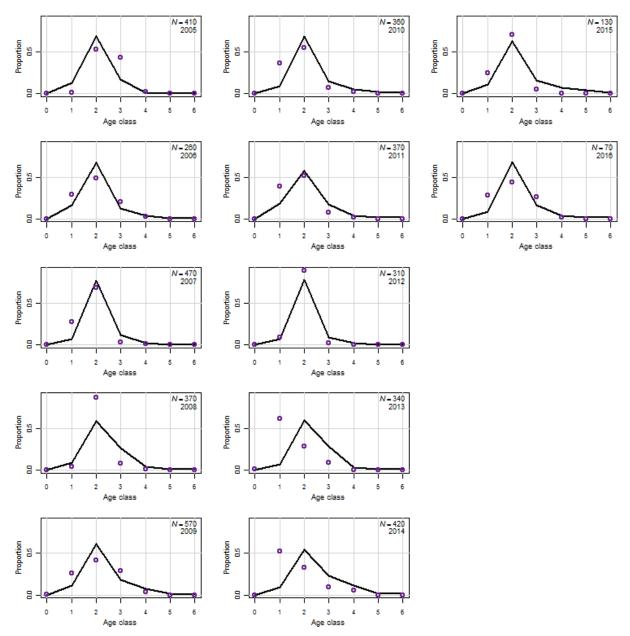


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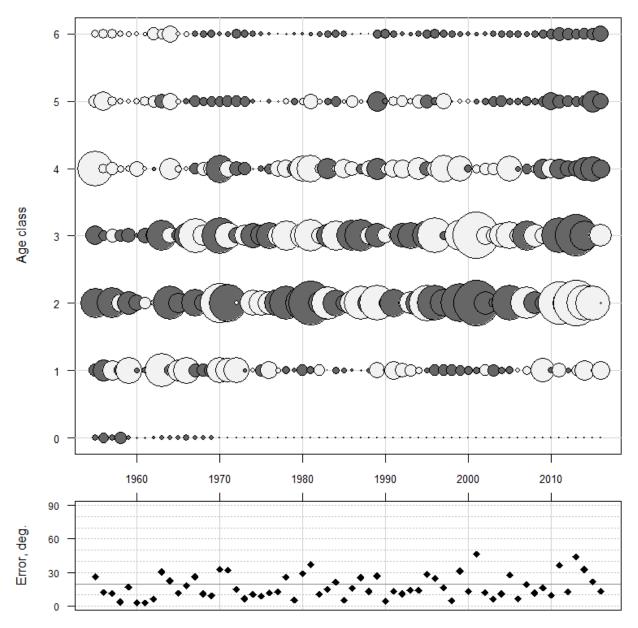


Figure 6.1.9. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted catch-at-age for Atlantic menhaden from 1955-2016 from north of Virginia Eastern Shore by the commercial reduction fishery. The error degrees in the upper panel represents a composite fit by year across ages, while in the lower plot contains correlations between years.

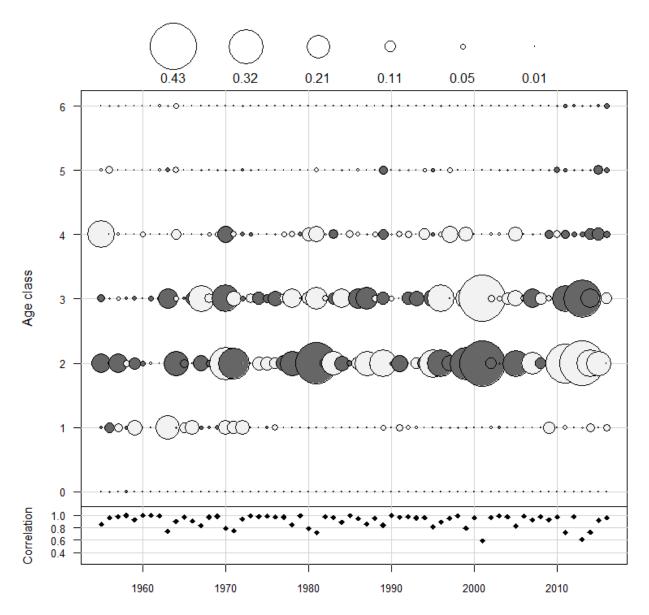


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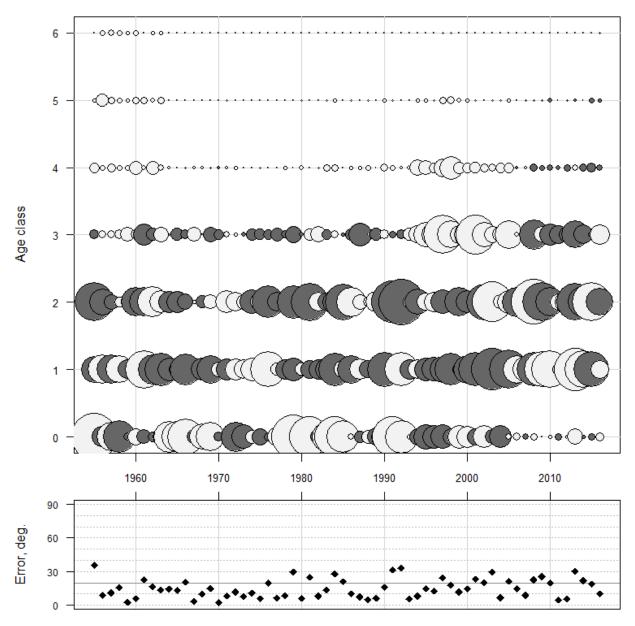


Figure 6.1.10. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted catch-at-age for Atlantic menhaden from 1955-2016 from Virginia Eastern Shore and south by the commercial reduction fishery. The error degrees in the upper panel represents a composite fit by year across ages, while in the lower plot contains correlations between years.

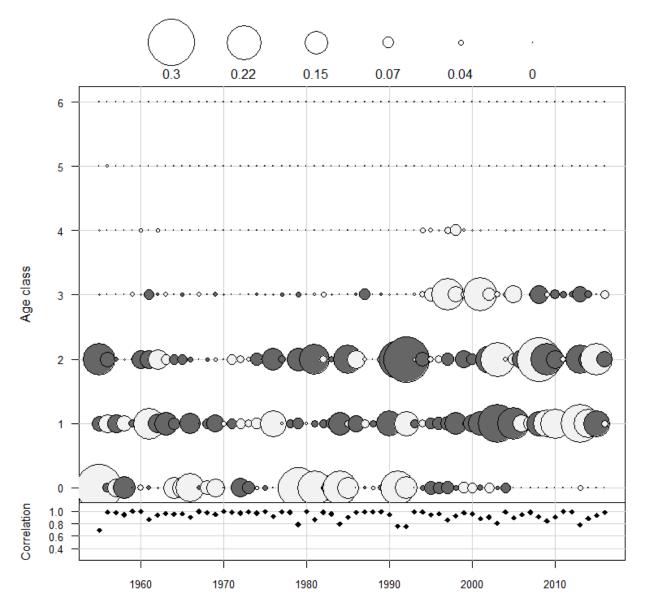


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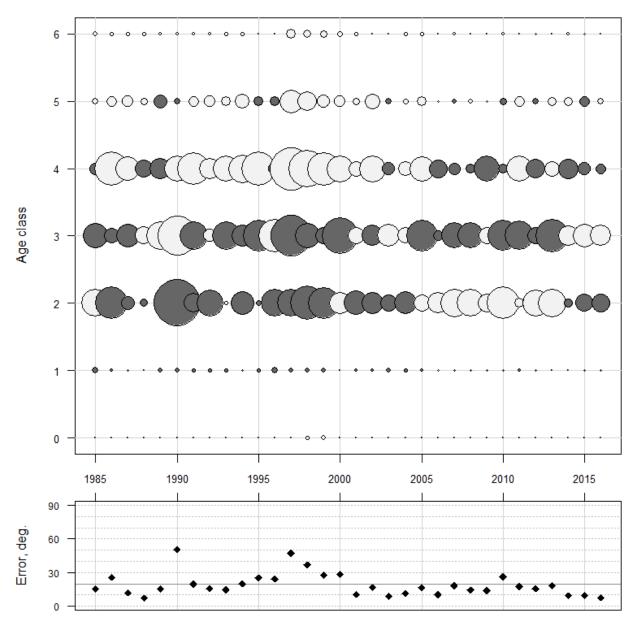


Figure 6.1.11. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted catch-at-age for Atlantic menhaden from 1985-2016 from north of Virginia Eastern Shore by the commercial bait fishery. The error degrees in the upper panel represents a composite fit by year across ages, while in the lower plot contains correlations between years.

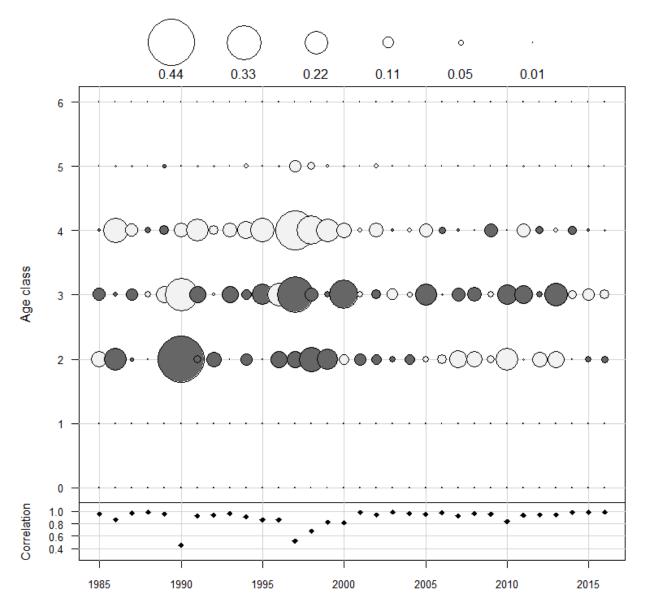


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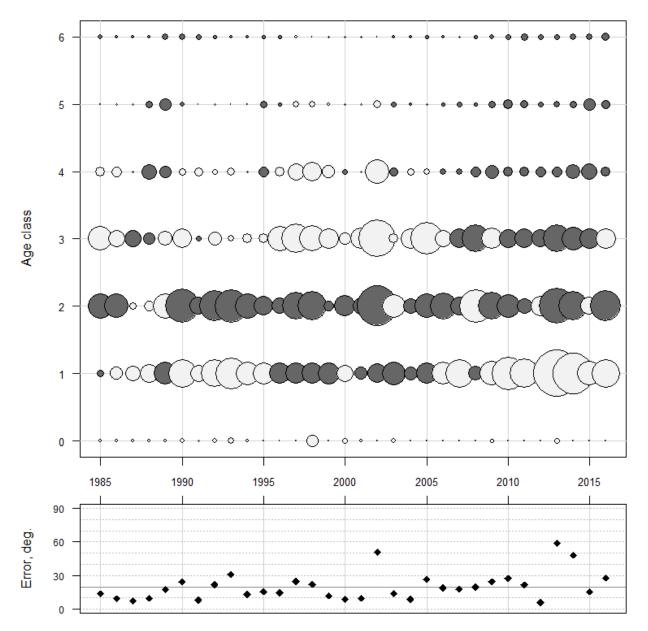


Figure 6.1.12. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted catch-at-age for Atlantic menhaden from 1985-2016 from Virginia Eastern Shore and south by the commercial bait fishery. The error degrees in the upper panel represents a composite fit by year across ages, while in the lower plot contains correlations between years.

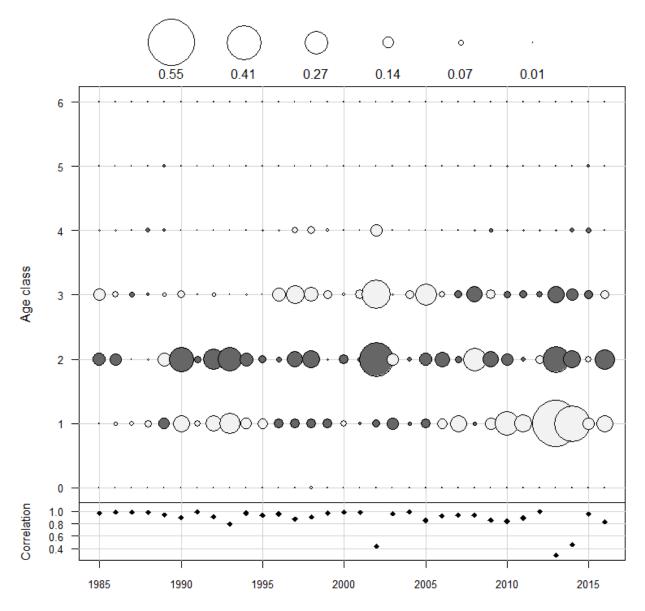


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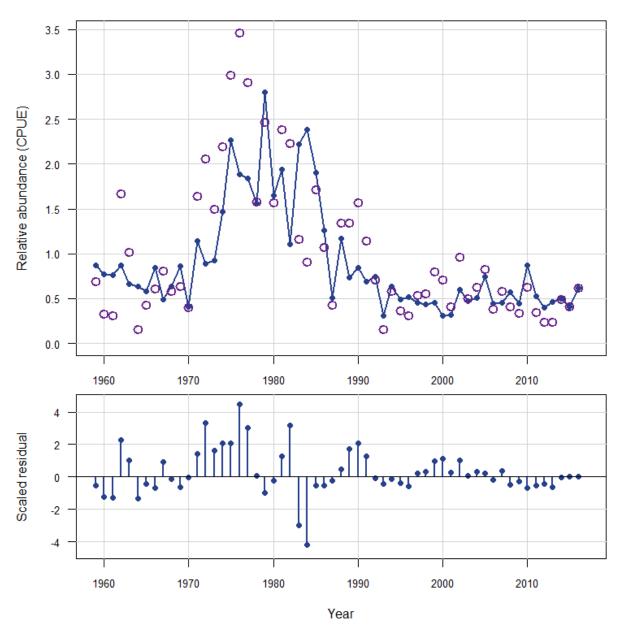


Figure 6.1.13. The observed and predicted recruitment index for 1959-2016 comprised of a series of state surveys.

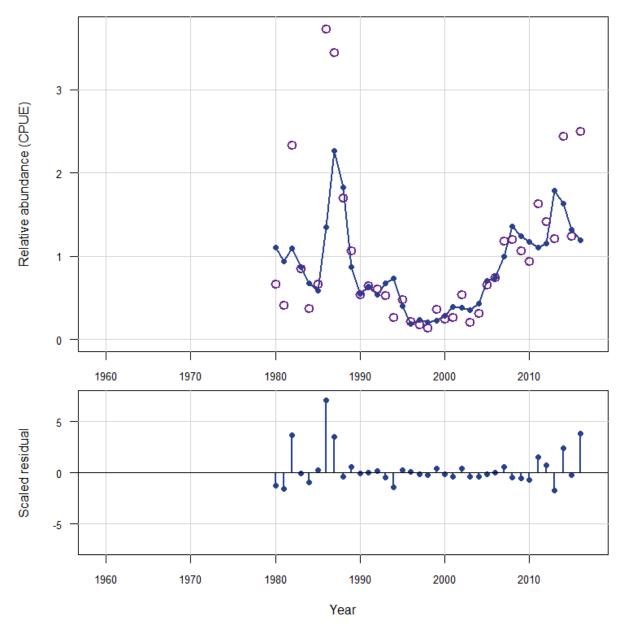


Figure 6.1.14. The observed and predicted NAD index for 1980-2016 comprised of a series of state trawl surveys in the northern region.

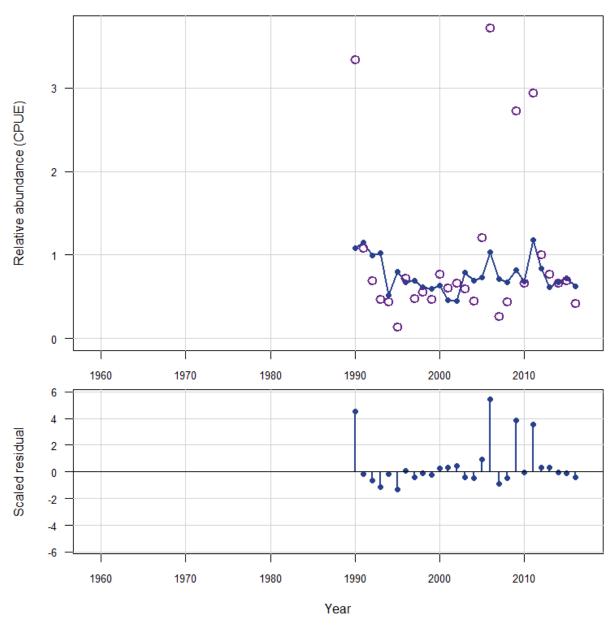


Figure 6.1.15. The observed and predicted SAD index for 1990-2016 comprised of two state trawl surveys in the southern region.

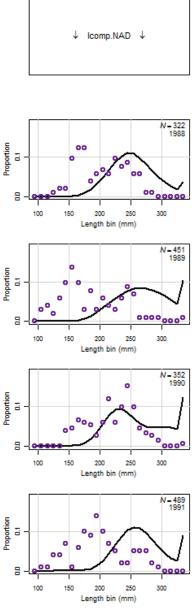


Figure 6.1.16. Annual observed and predicted length measurements of Atlantic menhaden from 1986-2016 for the NAD index.

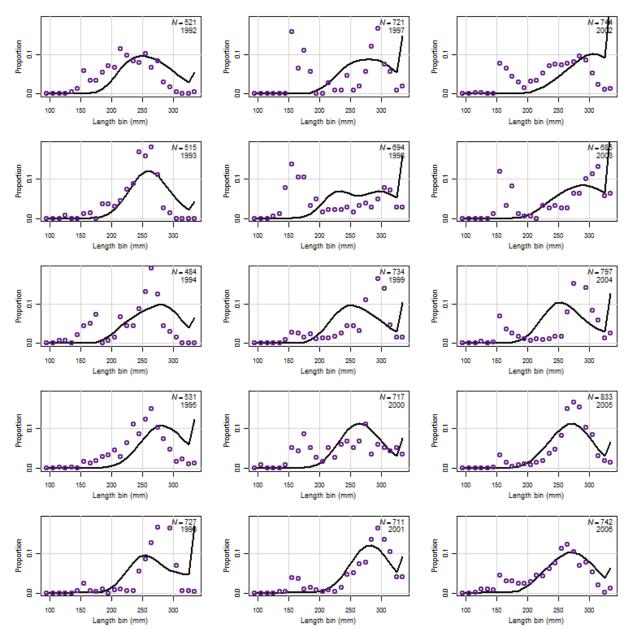


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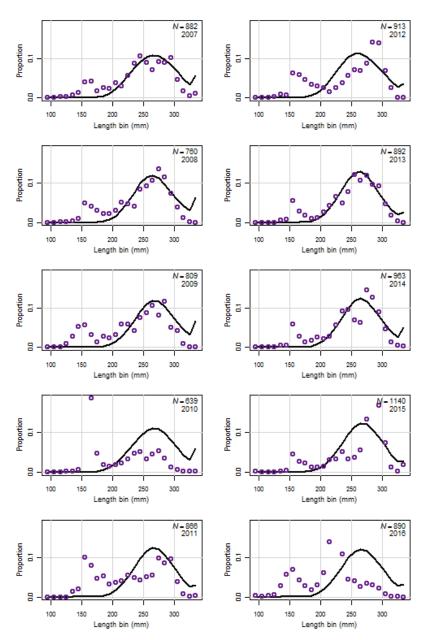
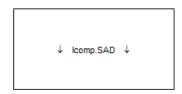


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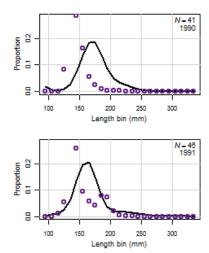


Figure 6.1.17. Annual observed and predicted length measurements of Atlantic menhaden from 1990-2016 for the SAD index.

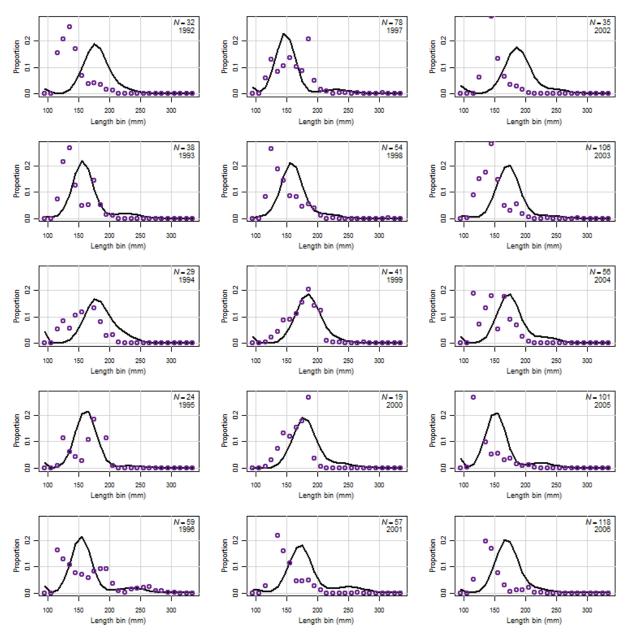


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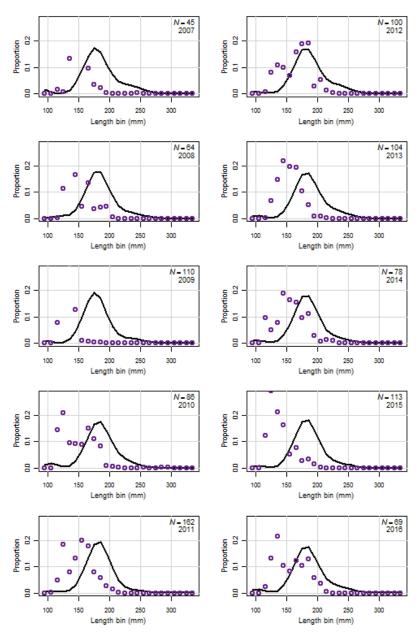


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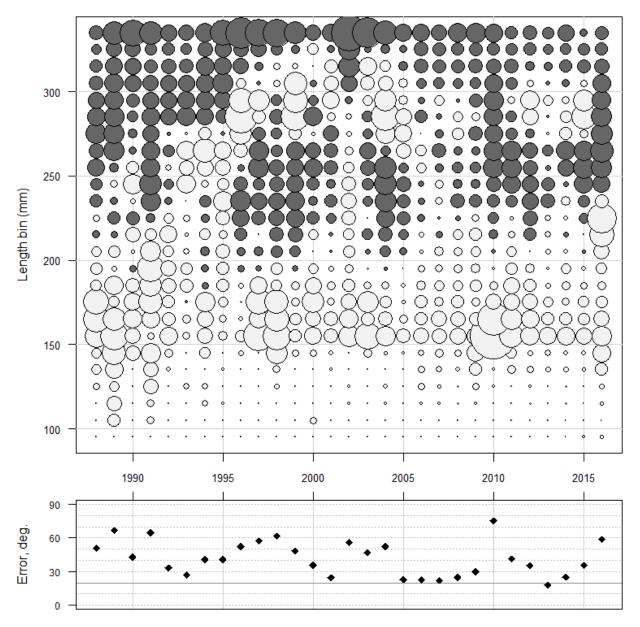


Figure 6.1.18. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted lengths for Atlantic menhaden from 1986-2016 from the NAD. The error degrees in the upper panel represents a composite fit by year across lengths, while in the lower plot contains correlations between years.

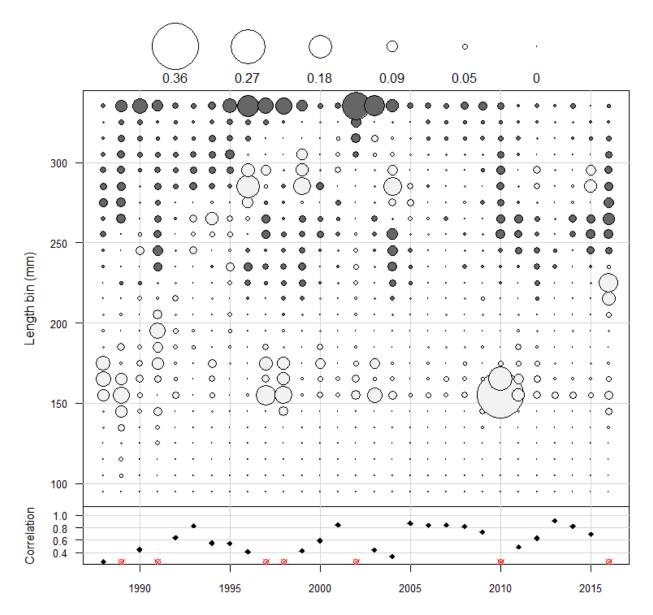


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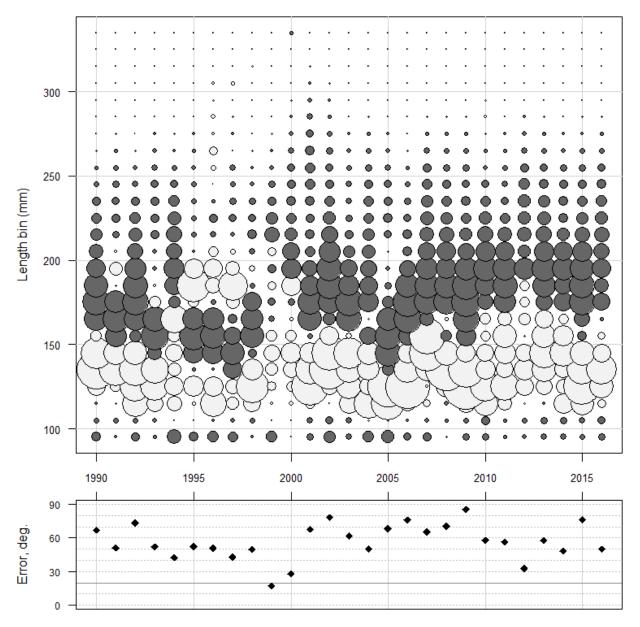


Figure 6.1.19. Relative (above) and absolute (next page) bubble plots of the residuals of the predicted lengths for Atlantic menhaden from 1990-2016 from the SAD. The error degrees in the upper panel represents a composite fit by year across lengths, while in the lower plot contains correlations between years.

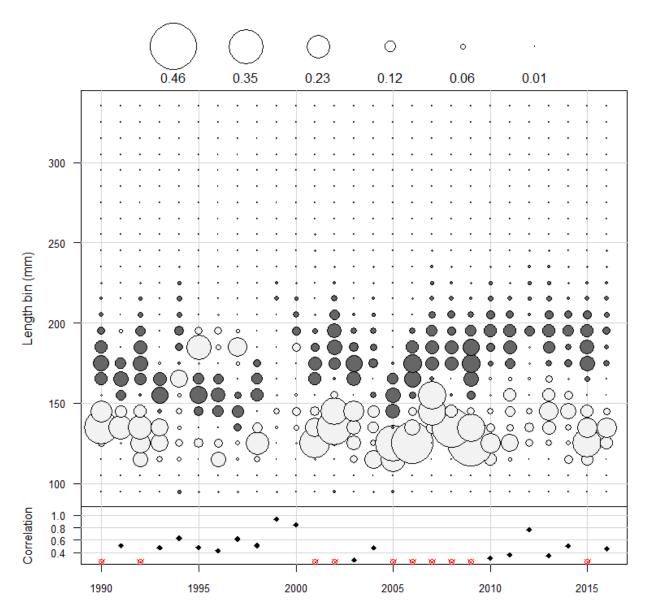


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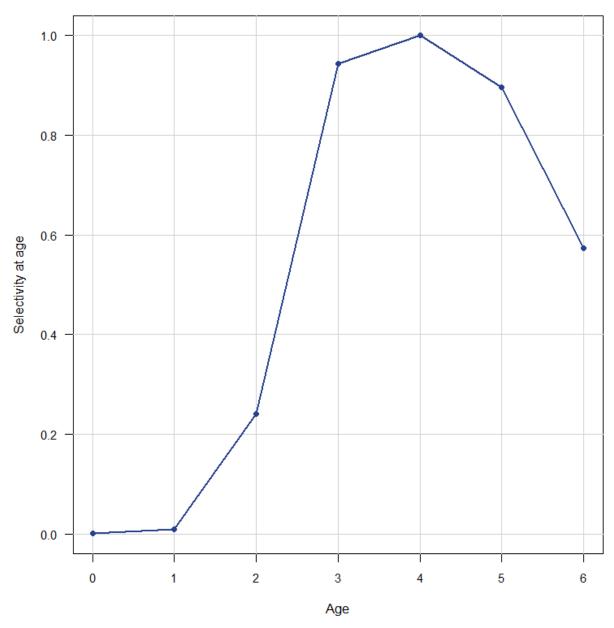


Figure 6.2.1.1. Selectivity for the northern commercial reduction fleet for 1955-1969.

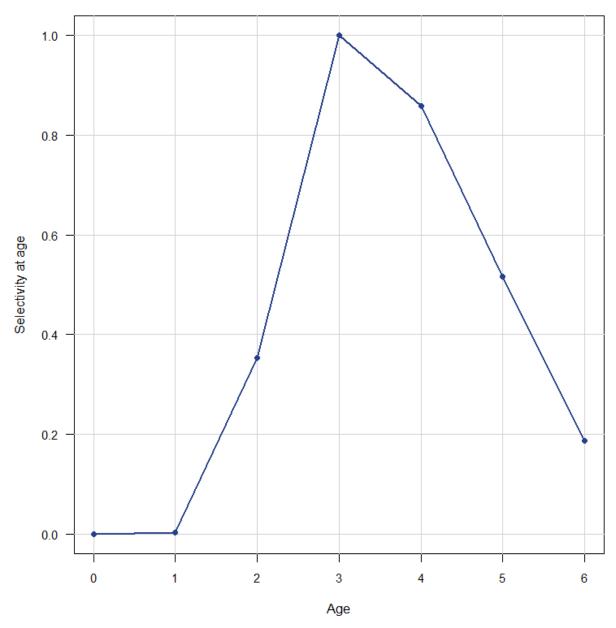


Figure 6.2.1.2. Selectivity for the northern commercial reduction fleet for 1970-1993.

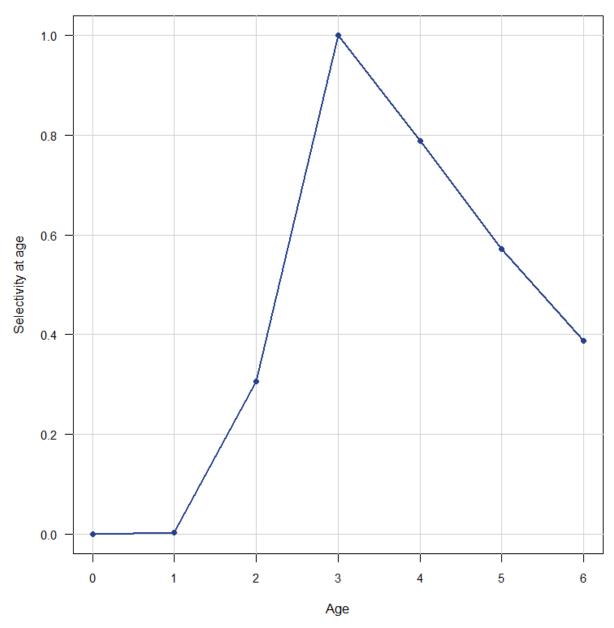


Figure 6.2.1.3. Selectivity for the northern commercial reduction fleet for 1994-2016.

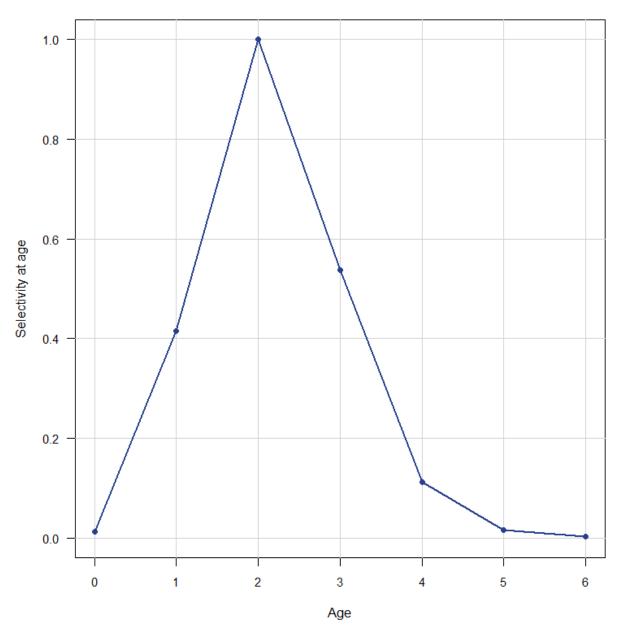


Figure 6.2.1.4. Selectivity for the southern commercial reduction fleet for 1955-1971.

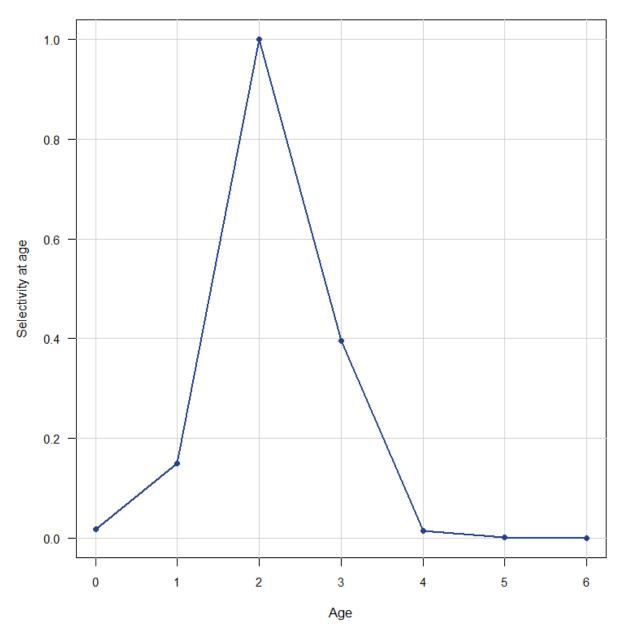


Figure 6.2.1.5. Selectivity for the southern commercial reduction fleet for 1972-2004.

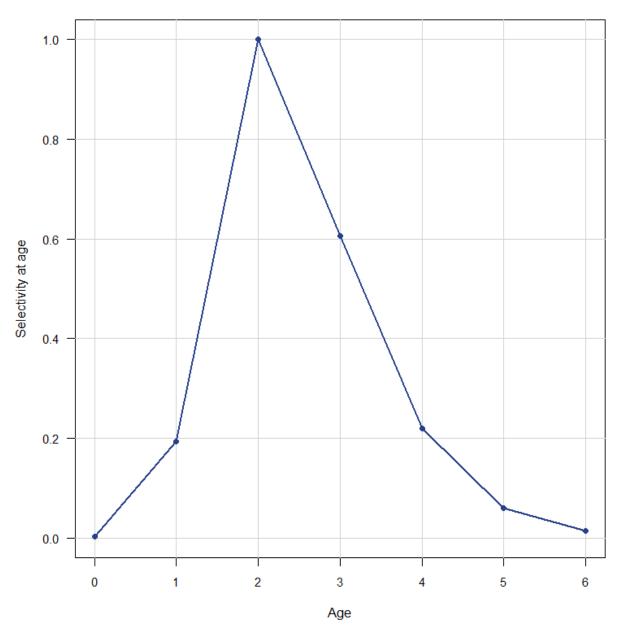


Figure 6.2.1.6. Selectivity for the southern commercial reduction fleet for 2005-2016.

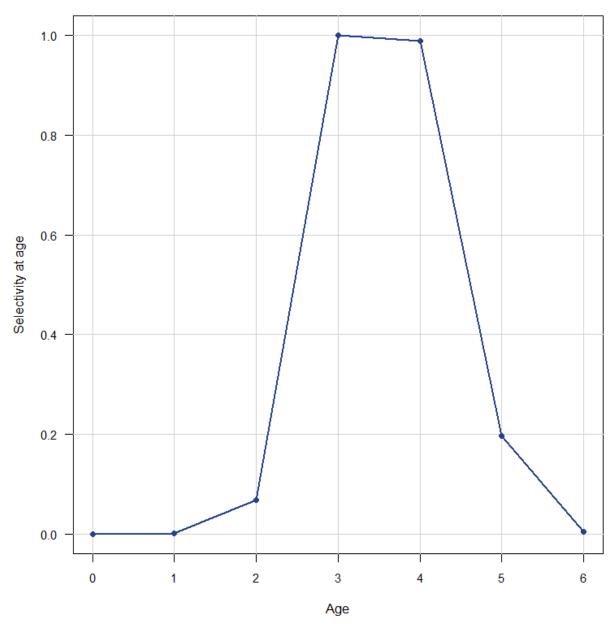


Figure 6.2.1.7. Selectivity for the northern commercial bait fleet for 1955-2016.

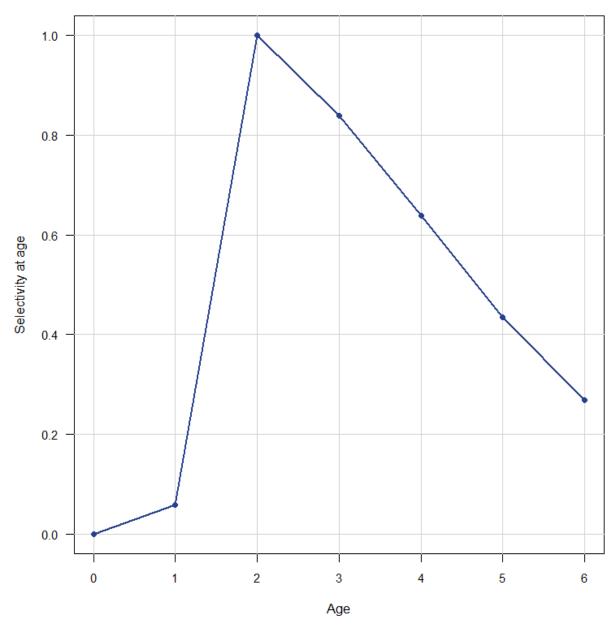


Figure 6.2.1.8. Selectivity for the southern commercial bait fleet for 1955-2016.

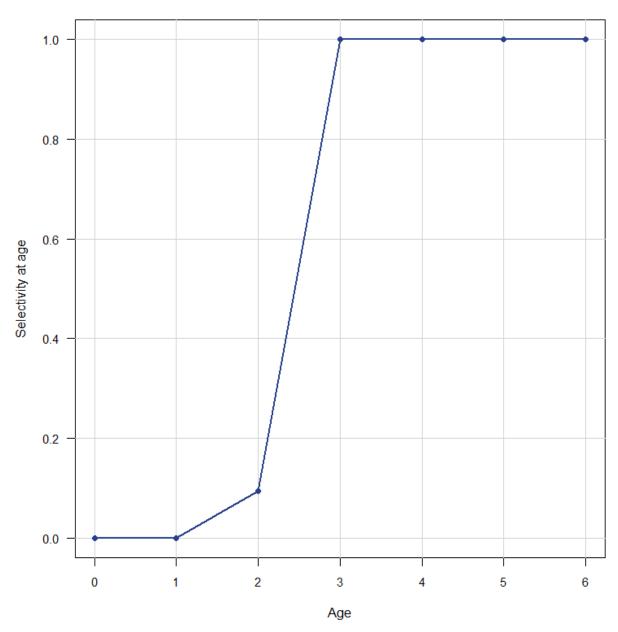


Figure 6.2.1.9. Selectivity for the NAD index for 1980-2016.

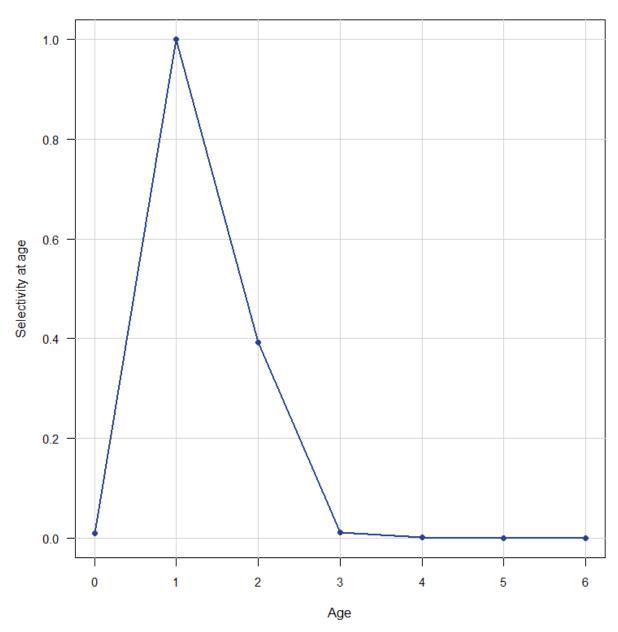


Figure 6.2.1.10. Selectivity for the SAD index for 1990-2016.

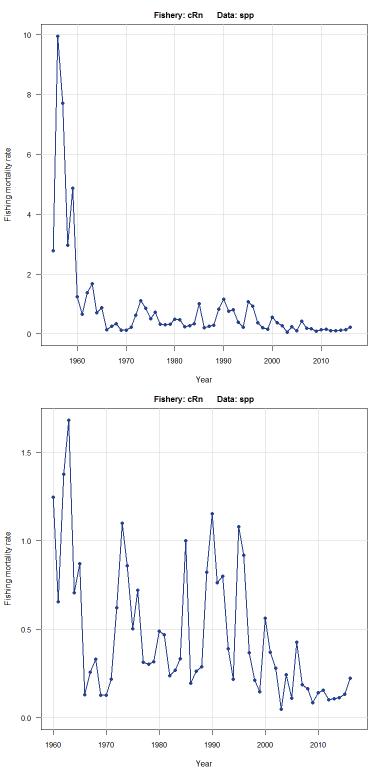


Figure 6.2.2.1. Full fishing mortality rate for the northern commercial reduction fishery from 1955-2016 (upper panel) and truncated to 1960-2016 (lower panel).

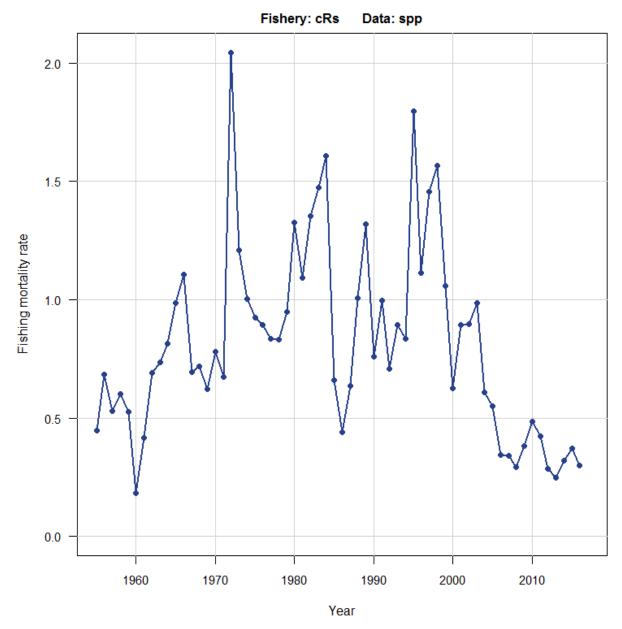


Figure 6.2.2.2. Full fishing mortality rate for the southern commercial reduction fishery from 1955-2016.

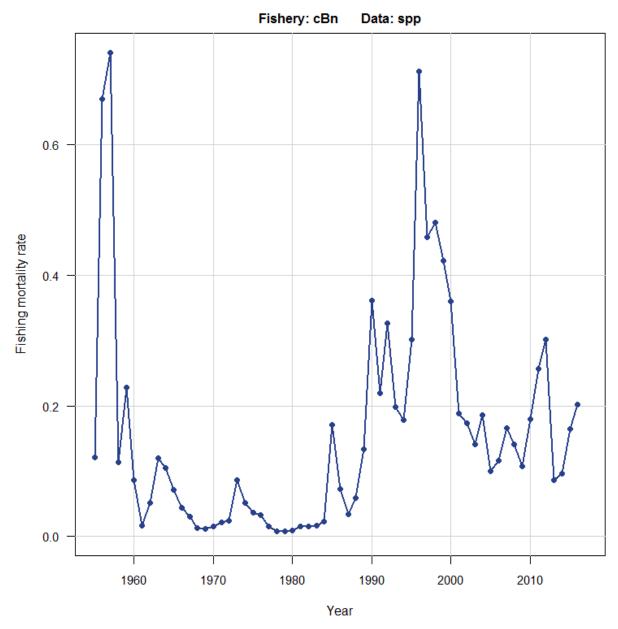


Figure 6.2.2.3. Full fishing mortality rate for the northern commercial bait fishery from 1955-2016.

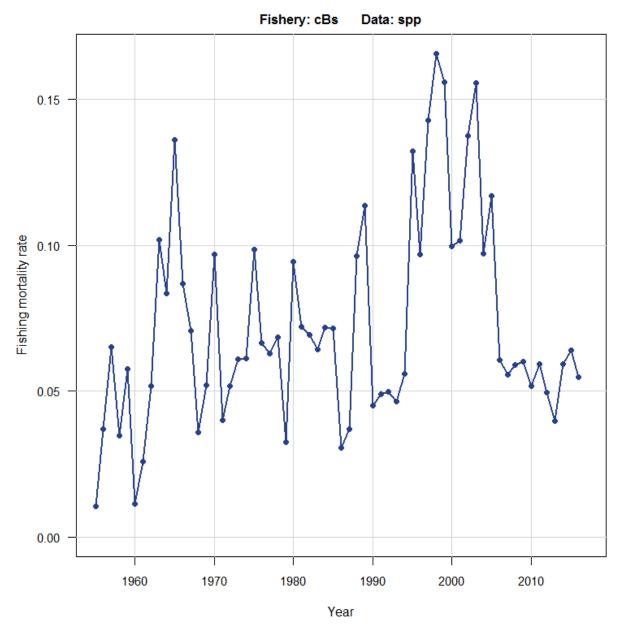


Figure 6.2.2.4. Full fishing mortality rate for the southern commercial bait fishery from 1955-2016.

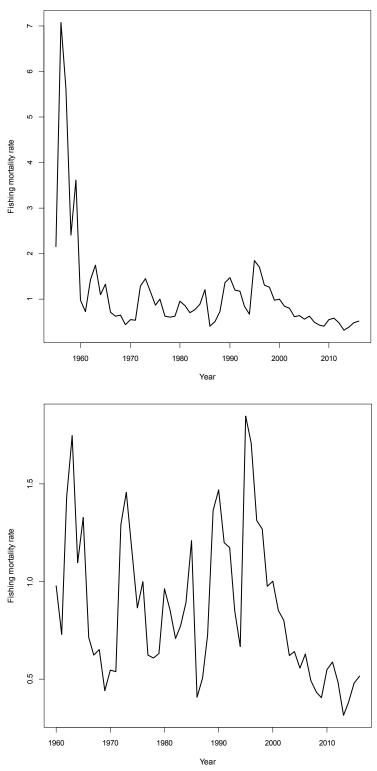


Figure 6.2.2.5. Geometic mean *F* across ages 2 to 4 over the time course of the fishery from 1955-2016 (upper panel) and truncated to 1960-2016 (lower panel).

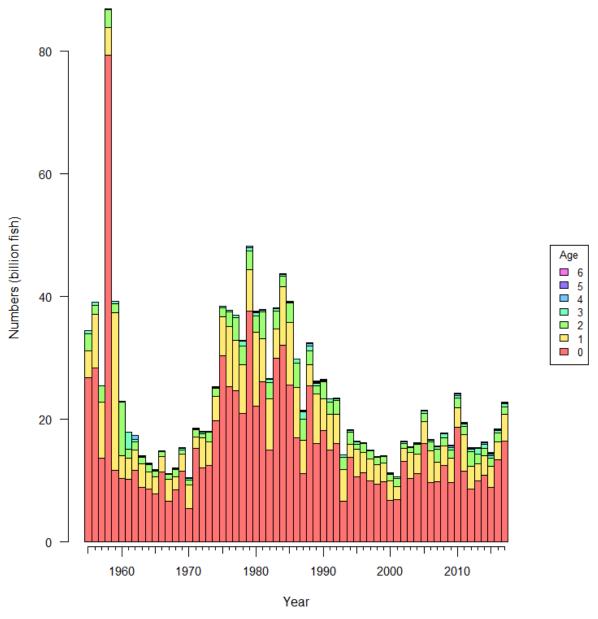


Figure 6.2.3.1. Numbers at age (above) and proportion of numbers at age (next page) estimated from the base run of the BAM for ages 0-6+ during the time period 1955-2016.

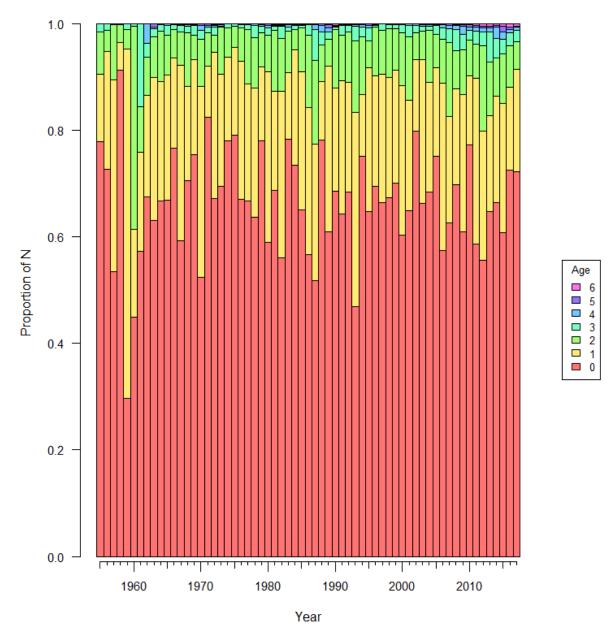


Figure 6.2.3.1. Continued.

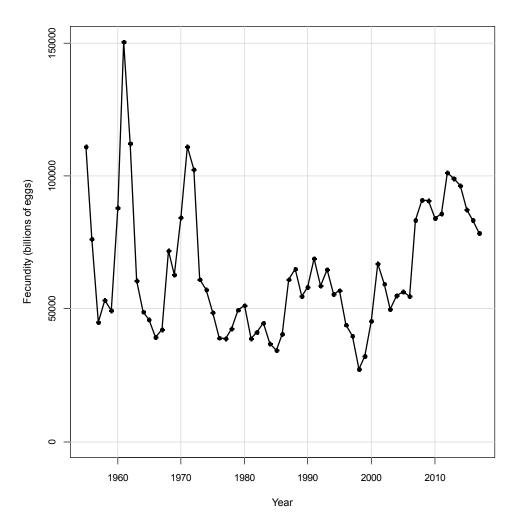


Figure 6.2.3.2. Fecundity in billions of eggs from 1955-2017, with the last year being a projection based on 2016 mortality.

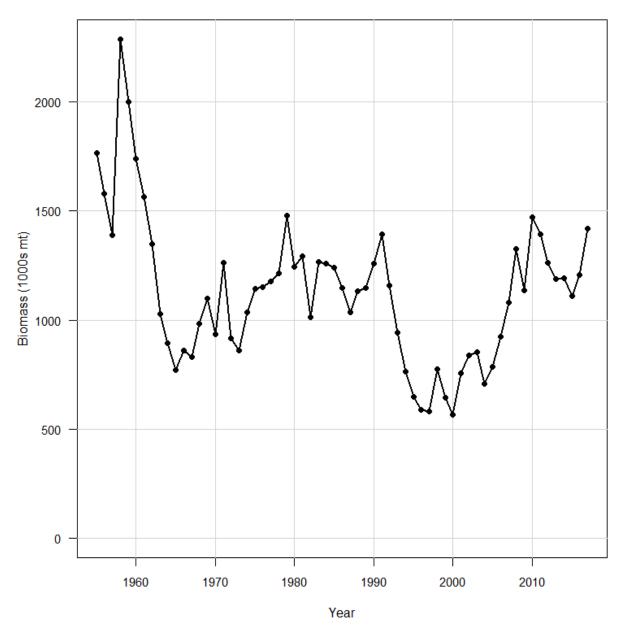


Figure 6.2.3.3. Biomass (above) and proportion of biomass at age (next page) over time as predicted from the base run of the BAM for Atlantic menhaden, with the last year being a projection based on 2016 mortality.

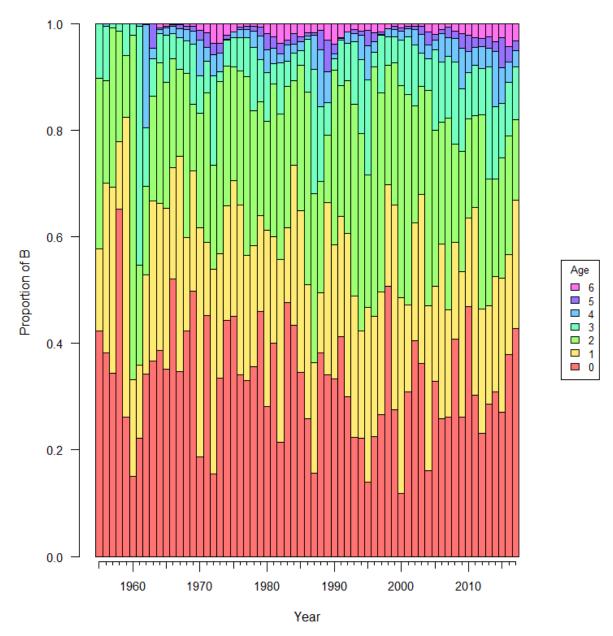


Figure 6.2.3.3. Continued.

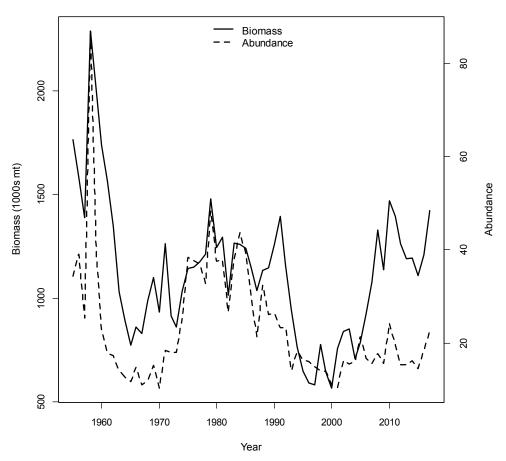


Figure 6.2.3.4. Biomass (1000s mt) and abundance over time for Atlantic menhaden from 1959-2016.

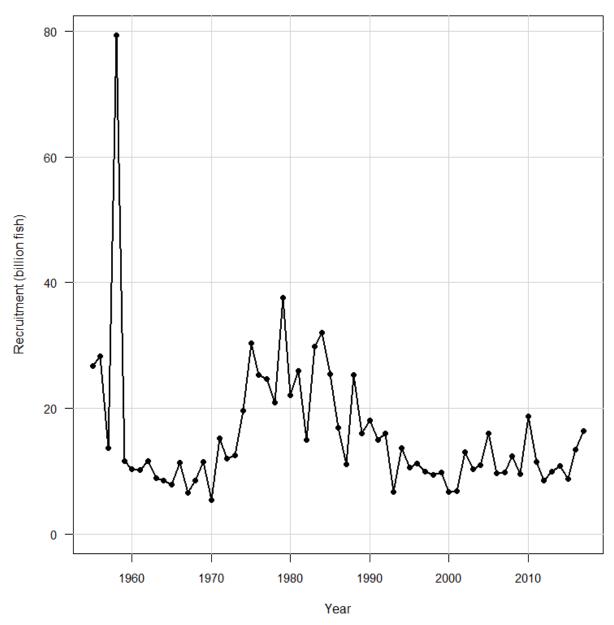


Figure 6.2.3.5. Number of recruits in billions of fish predicted from the base run of BAM for 1955-2017, with the last year being a projection based on 2016 mortality.

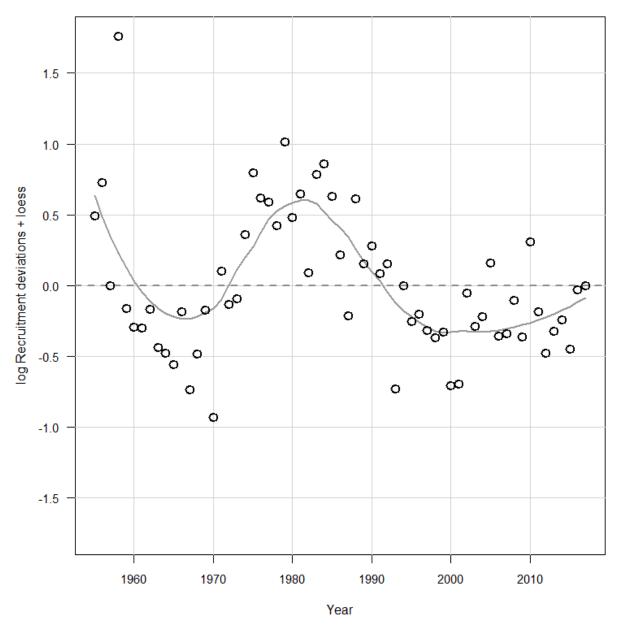


Figure 6.2.3.6. Deviations in log recruitment from 1955-2017 with a loess smoother, with the last year being a projection based on 2016 mortality.

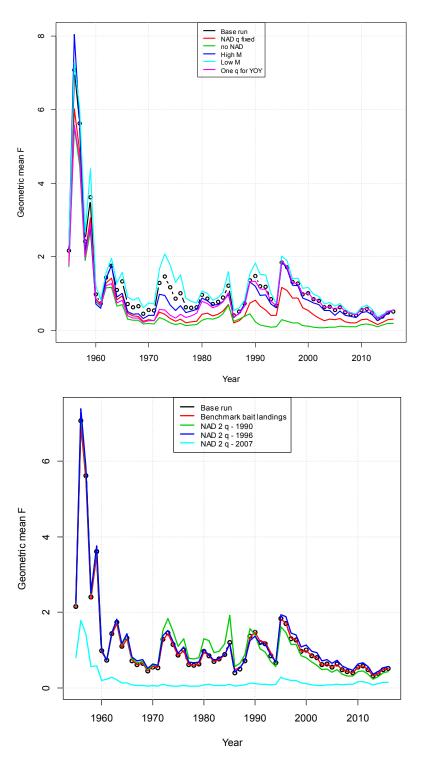


Figure 6.4.1.1 Geometric mean of *F* for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

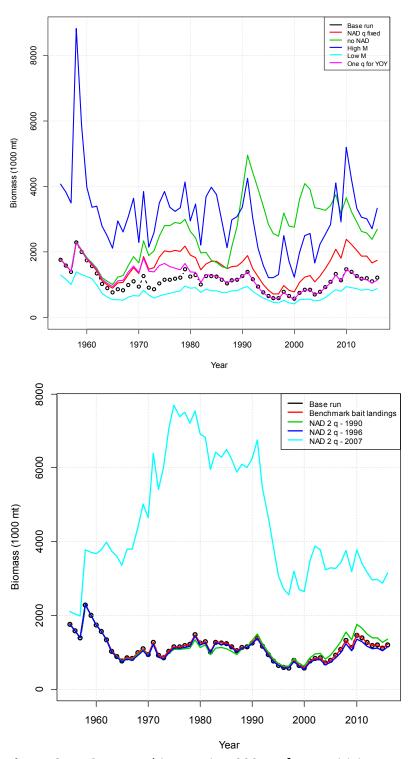


Figure 6.4.1.2 Age-1+ biomass in 1000 mt for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

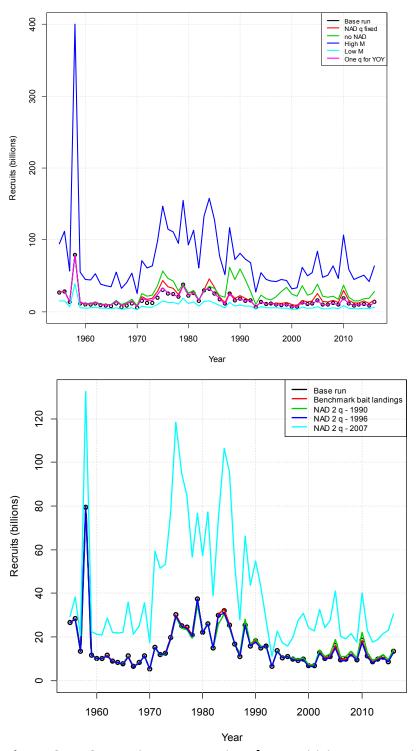


Figure 6.4.1.3 Recruitment over time for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

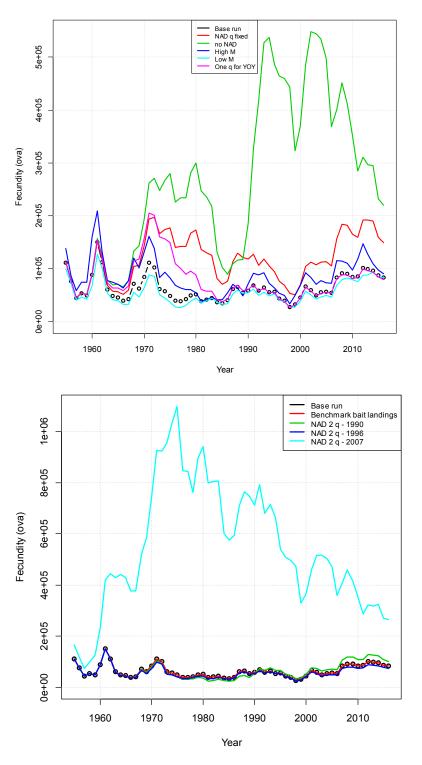


Figure 6.4.1.4 Fecundity over time for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

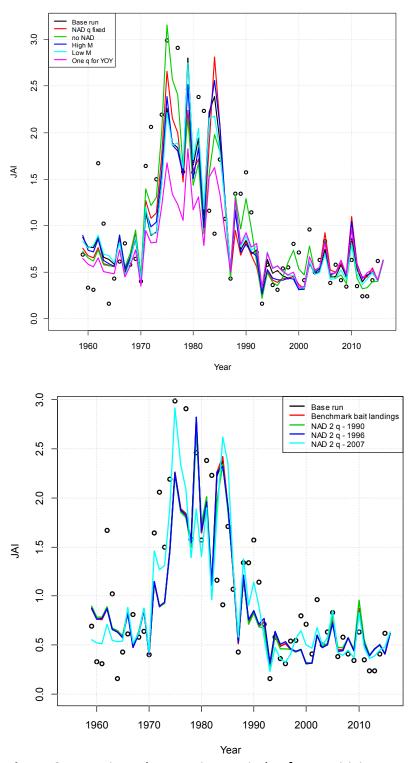


Figure 6.4.1.5 Fit to the recruitment index for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

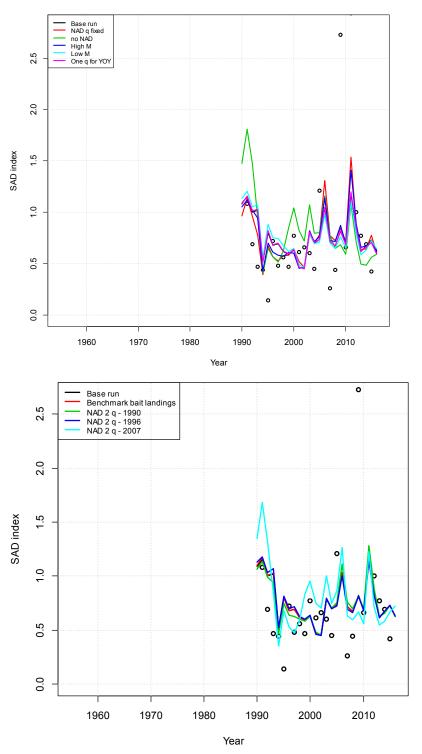


Figure 6.4.1.6 Fit to the SAD index for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

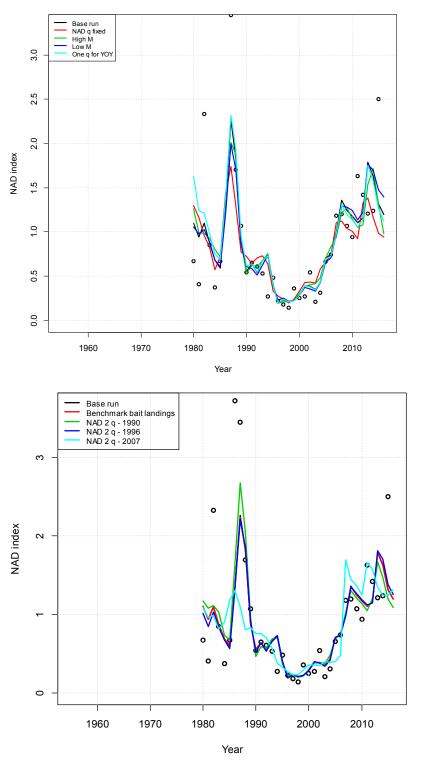


Figure 6.4.1.7 Fit to the NAD index for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

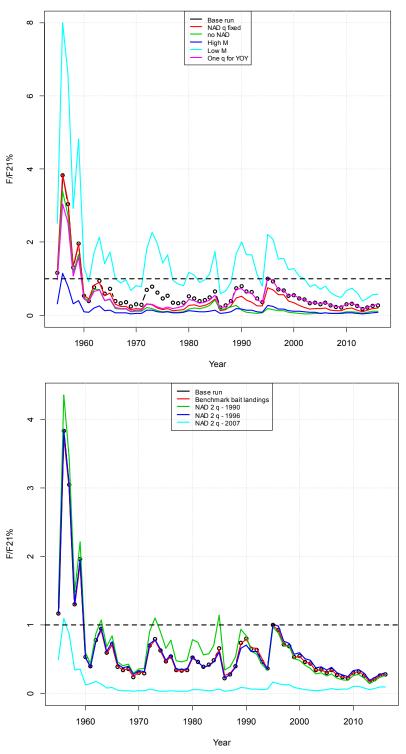


Figure 6.4.1.8 Full F over $F_{21\%}$ for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

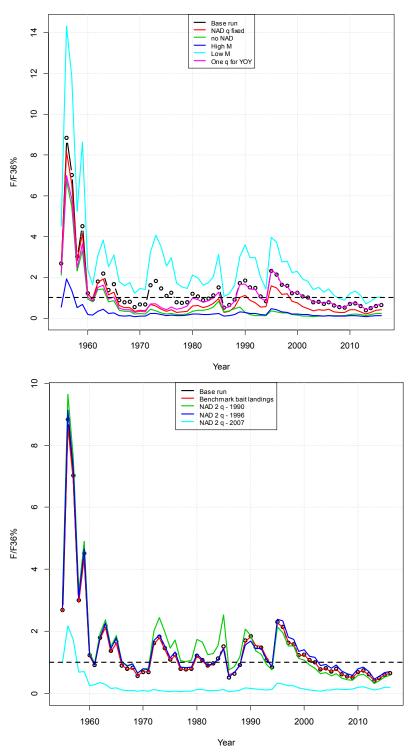


Figure 6.4.1.9 Full F over $F_{36\%}$ for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

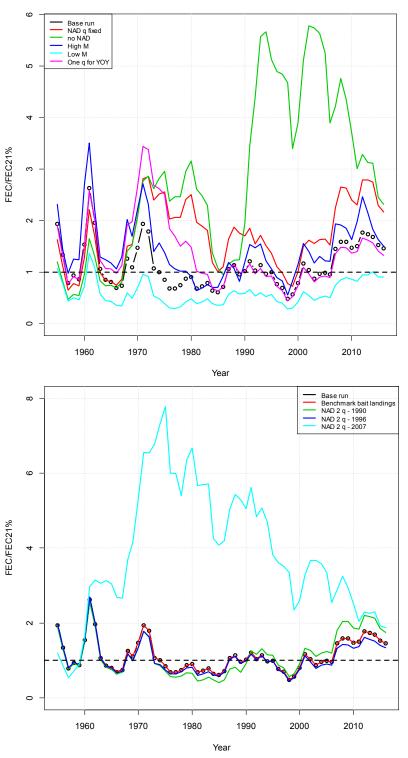


Figure 6.4.1.10 Fecundity over $FEC_{21\%}$ for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

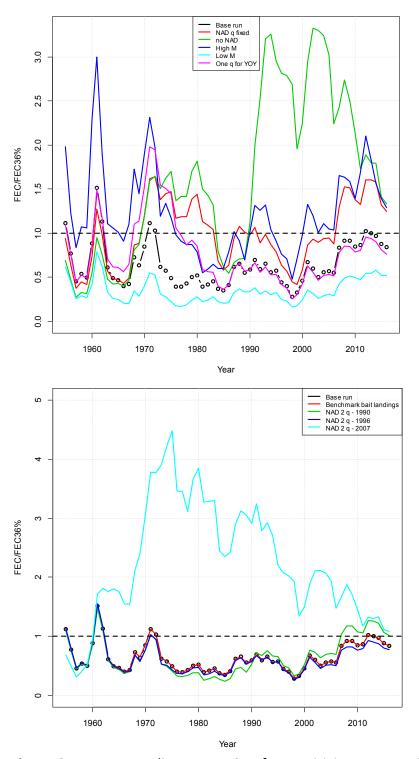


Figure 6.4.1.11 Fecundity over $FEC_{36\%}$ for sensitivity runs considering differences in growth and life history parameters and differences in indices and catchability in the assessment model.

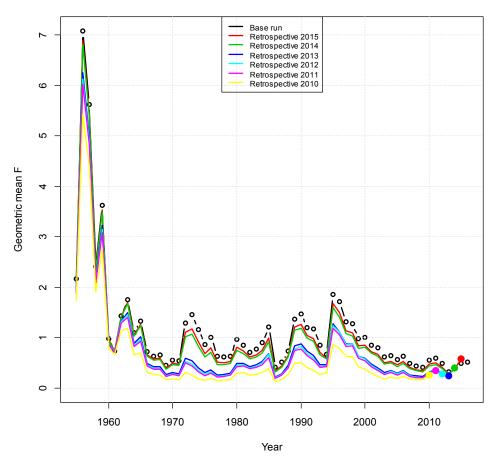


Figure 6.4.2.1 Fishing mortality over time for the retrospective analysis of the assessment model.

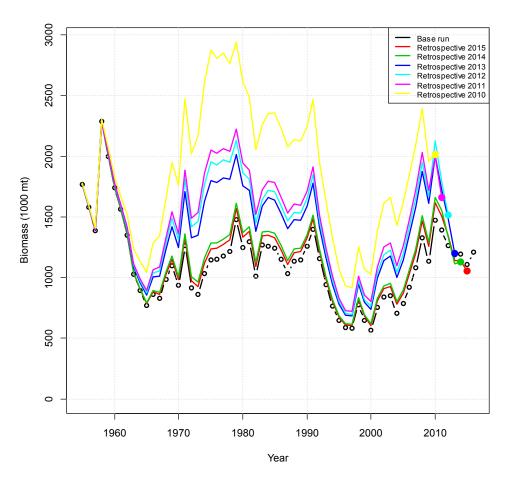


Figure 6.4.2.2 Age-1+ biomass in 1000s mt over time for the retrospective analysis of the assessment model.

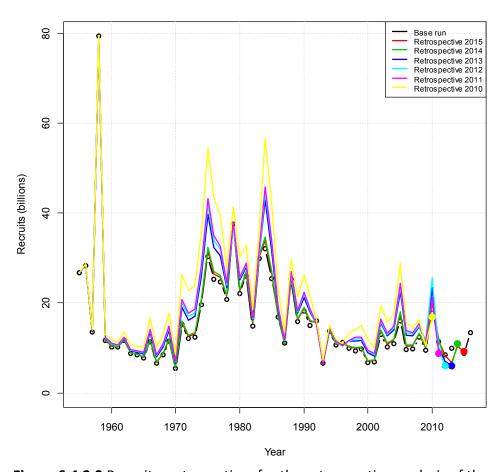


Figure 6.4.2.3 Recruitment over time for the retrospective analysis of the assessment model.

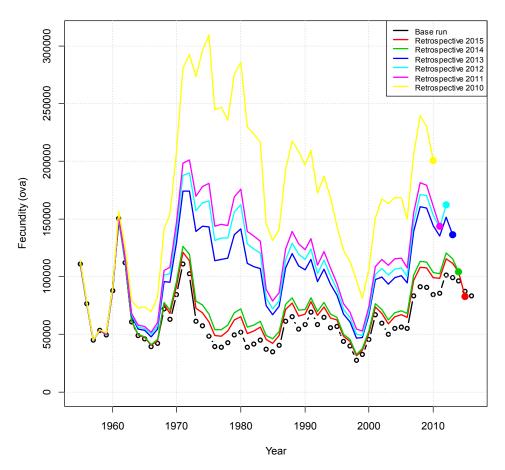


Figure 6.4.2.4 Fecundity over time for the retrospective analysis of the assessment model.

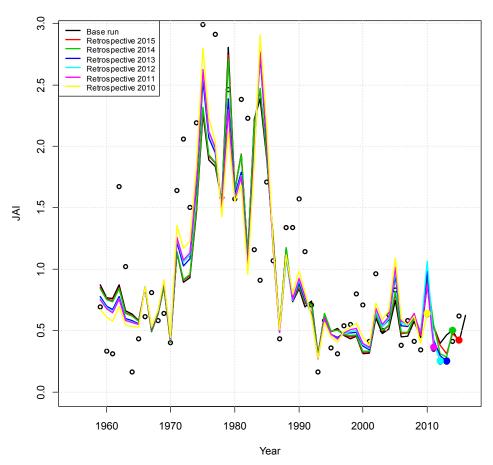


Figure 6.4.2.5 Fit to the JAI index over time for the retrospective analysis of the assessment model.

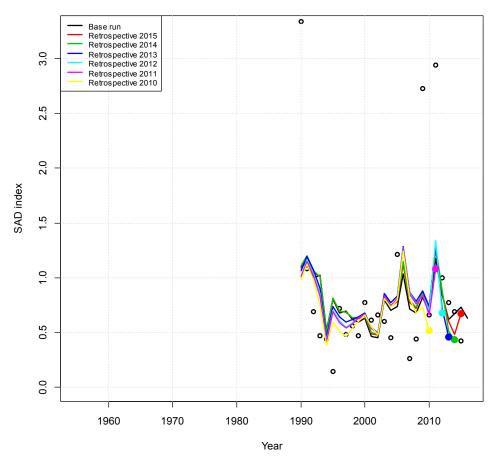


Figure 6.4.2.6 Fit to the SAD index over time for the retrospective analysis of the assessment model.

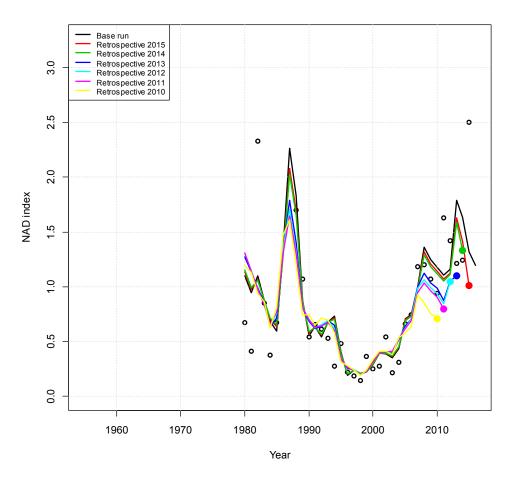


Figure 6.4.2.7 Fit to the NAD index over time for the retrospective analysis of the assessment model.

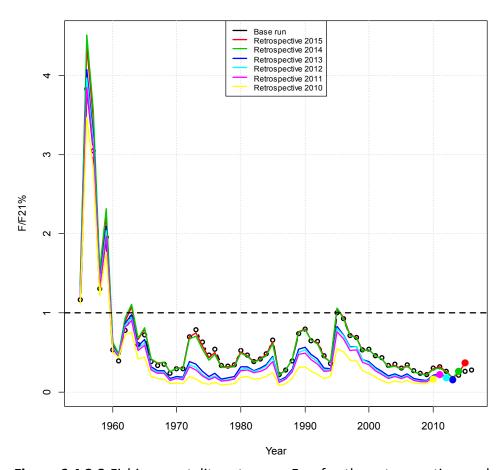


Figure 6.4.2.8 Fishing mortality rate over $F_{21\%}$ for the retrospective analysis of the assessment model.

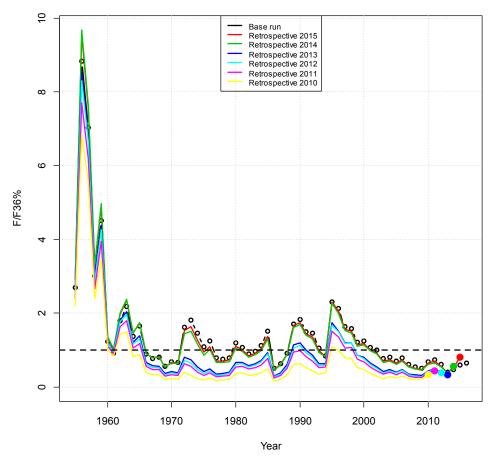


Figure 6.4.2.9 Fishing mortality rate over $F_{36\%}$ for the retrospective analysis of the assessment model.

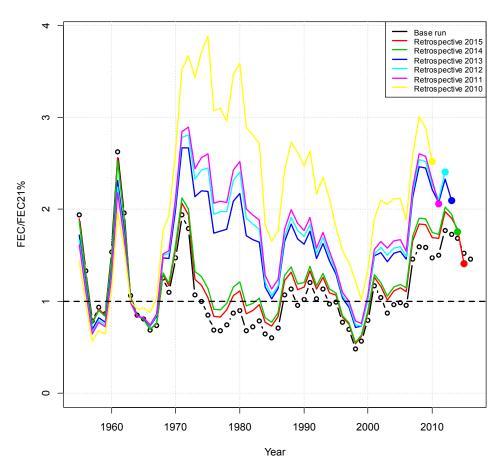


Figure 6.4.2.10 Fecundity over $FEC_{21\%}$ for the retrospective analysis of the assessment model.

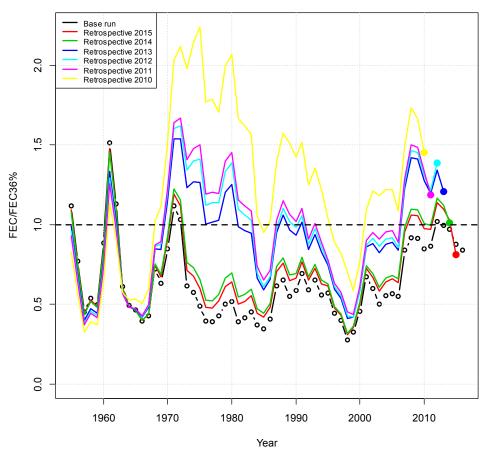


Figure 6.4.2.11 Fecundity over $FEC_{36\%}$ for the retrospective analysis of the assessment model.

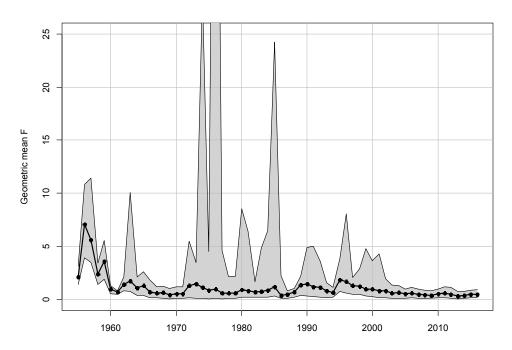


Figure 6.5.1. Geometric mean fishing mortality at ages-2 to -4 over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run.

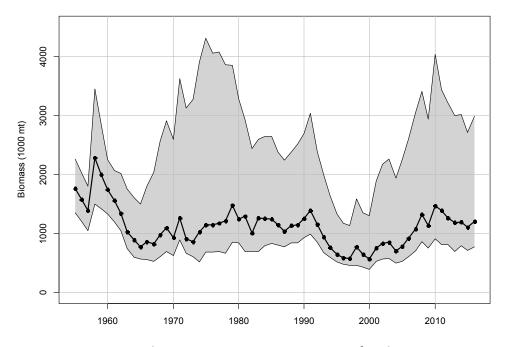


Figure 6.5.2. Age-1+ biomass in 1000s mt over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run.

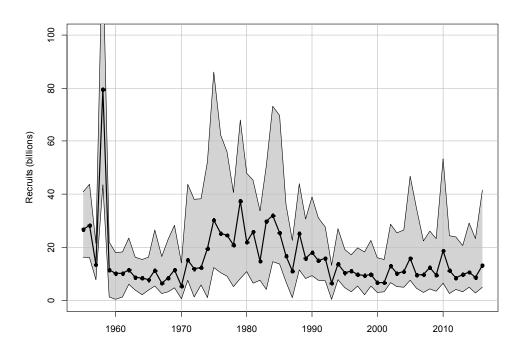


Figure 6.5.3. Recruitment over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run.

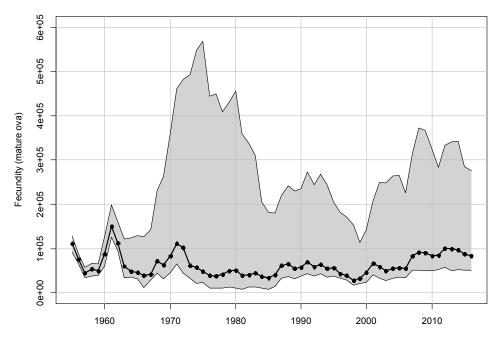
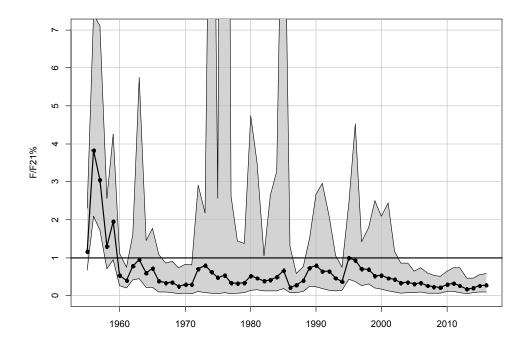


Figure 6.5.4. Fecundity over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run.



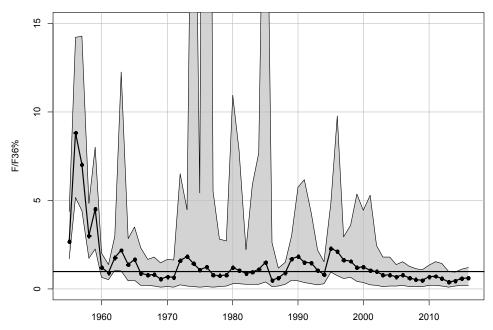
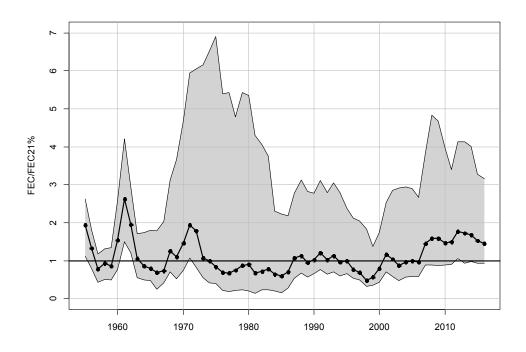


Figure 7.2.1.1 Geometric mean fishing mortality at ages-2 to -4 over time compared to the recommended SPR benchmarks based on the minimum and median $F_{X\%}$ during the time period 1960-2012.



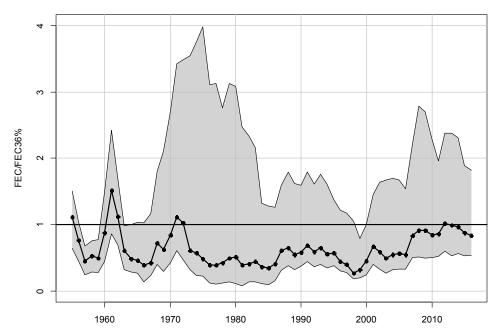


Figure 7.2.1.2. Fecundity over time compared to the recommended fecundity based benchmarks associated with the SPR benchmarks based on the minimum and median $F_{X\%}$ during the time period 1960-2012.

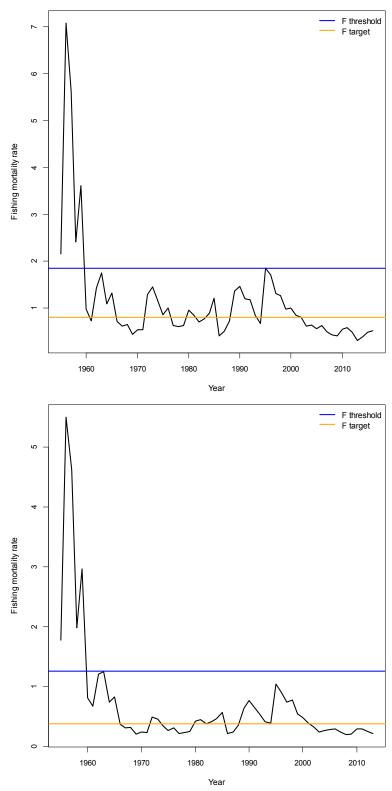


Figure 7.2.1.3 Update (above) and benchmark (below) geometric mean fishing mortality rate for ages-2 to 4 over time with the fishing mortality rate reference points indicated as horizontal lines.

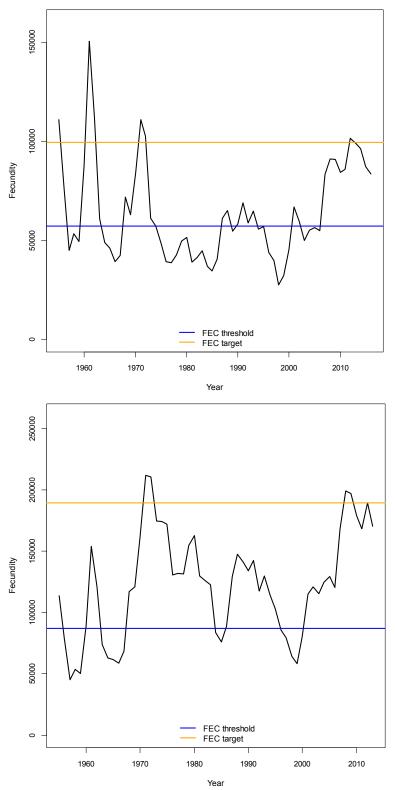


Figure 7.2.1.4 Update (above) and benchmark (below) fecundity over time with the fecundity reference points indicated as horizontal lines.

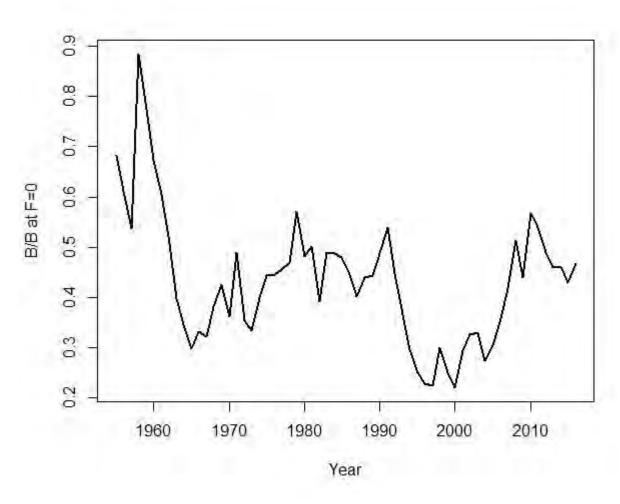


Figure 7.2.1.5. Biomass over time divided by the biomass at F = 0.

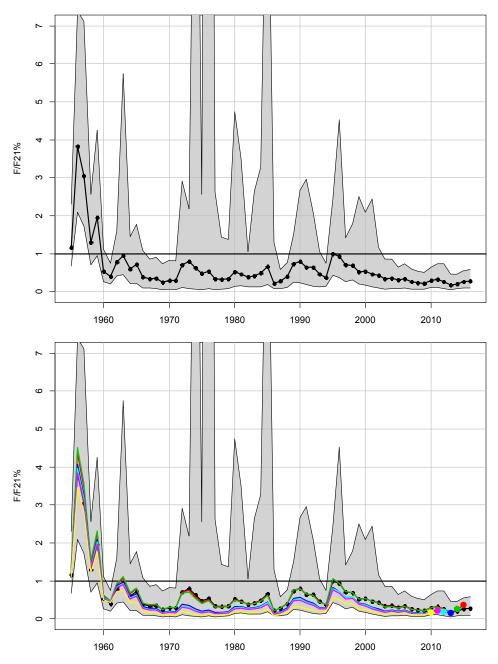


Figure 7.2.2.1. Geometric mean fishing mortality at ages-2 to 4 over $F_{21\%}$ over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run. In lower panel, the retrospective analysis is overlaid on the MCB analysis.

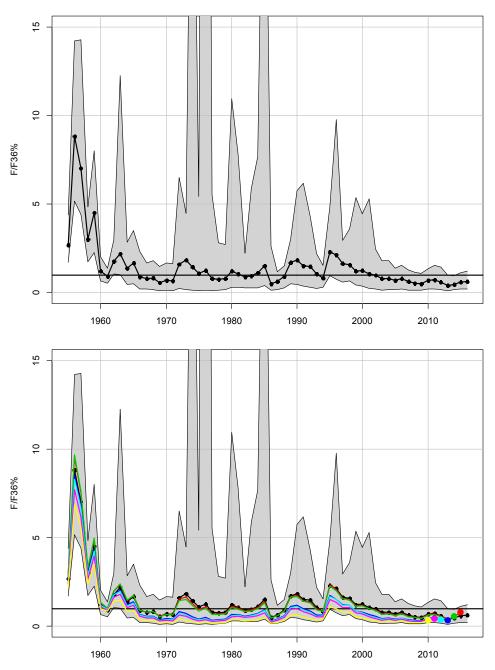


Figure 7.2.2.2. Geometric mean fishing mortality at ages-2 to 4 over $F_{36\%}$ over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run. In lower panel, the retrospective analysis is overlaid on the MCB analysis.

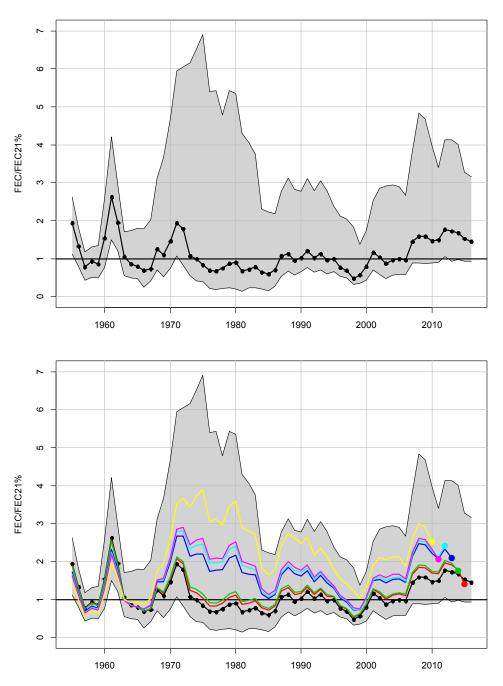


Figure 7.2.2.3. Fecundity over $FEC_{21\%}$ over time for the MCB runs. Gray area indicates 95% confidence interval; black line indicates base run. In lower panel, the retrospective analysis is overlaid on the MCB analysis.

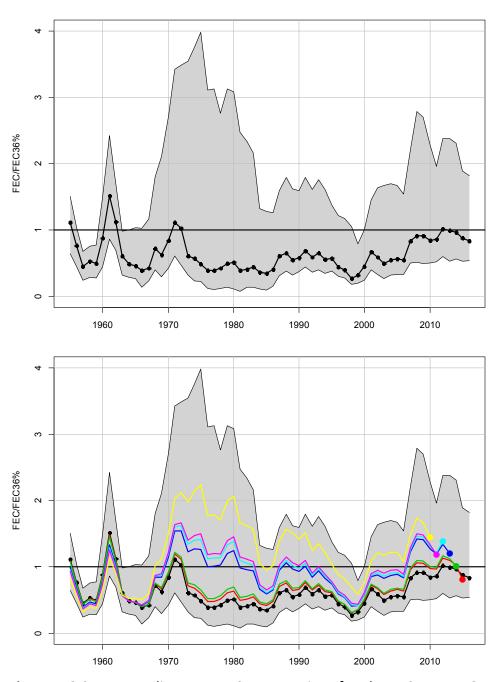


Figure 7.2.2.4. Fecundity over $FEC_{36\%}$ over time for the MCB runs. Gray area indicates 95% confidence interval; black lines indicates base run. In lower panel, the retrospective analysis is overlaid on the MCB analysis.

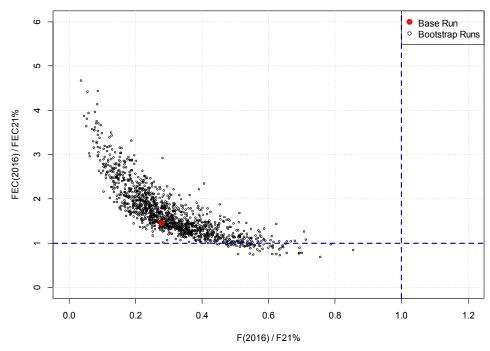


Figure 7.2.2.5. Plot of the terminal year geometric mean fishing mortality at ages-2 to 4 and the terminal year fecundity relative to their respective threshold benchmarks for the base run and each bootstrap run.

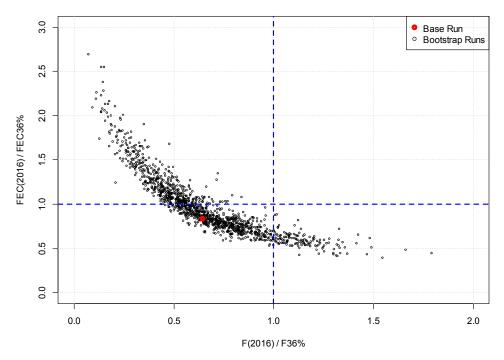
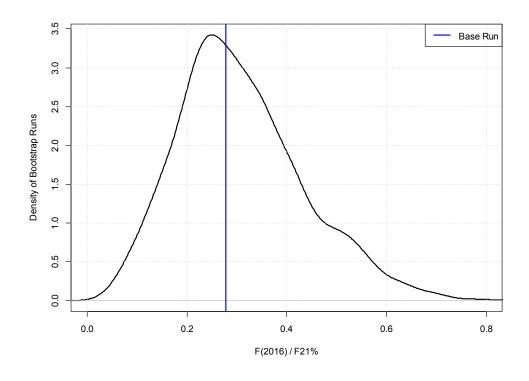


Figure 7.2.2.6. Plot of the terminal year geometric mean fishing mortality at ages-2 to 4 and the terminal year fecundity relative to their respective target benchmarks for the base run and each bootstrap run.



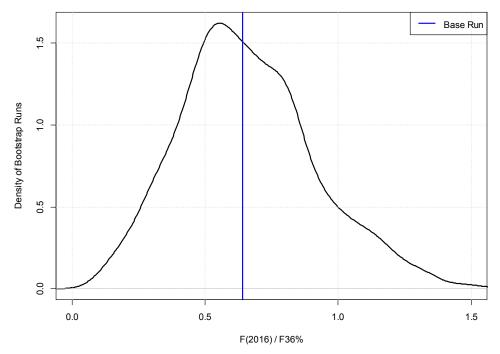
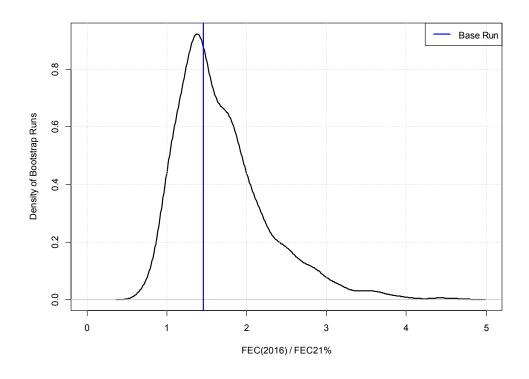


Figure 7.2.2.7. Density plots for terminal year geometric mean fishing mortality at ages-2 to 4 over the $F_{21\%}$ threshold (above) and $F_{36\%}$ target (below) benchmarks across the base run and MCB runs.



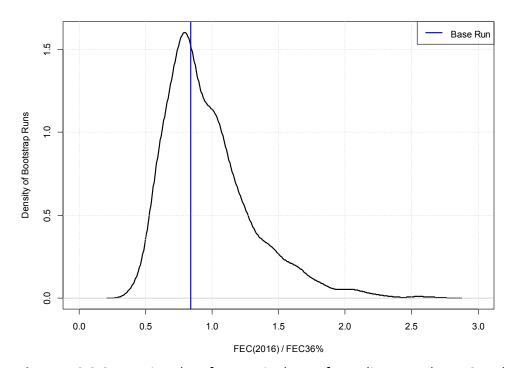


Figure 7.2.2.8. Density plots for terminal year fecundity over the $FEC_{21\%}$ threshold (above) and $FEC_{36\%}$ target (below) benchmarks across the base run and MCB runs.

13.0 Appendix A. Standardization of Abundance Indices for Atlantic Menhaden

Three indices of abundance for Atlantic menhaden were developed from several surveys and used in the most recent benchmark stock assessment (SEDAR 2015). Below is a description of the GLM standardization of each of the surveys and any changes or notes in the survey or model structure for this report.

Rhode Island Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, bottom temperature, and depth as categorical factors was compared with nested submodels using AIC. The model that included year and bottom temperature was selected because it produced the lowest AIC (% deviance = 41). The model was unchanged from the previous benchmark assessment and updated through 2016.

Connecticut Long Island Sound Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, stratum, month, starting depth of the tow, surface temperature, bottom temperature, surface salinity, bottom salinity, and season was compared with nested submodels using AIC. The model that included year, and depth was selected because it produced the lowest AIC and good model diagnostics. The model formula was unchanged from the previous benchmark assessment, but the use of the standard glm model was a departure from the previously selected model (zero inflated negative binomial model) from the benchmark assessment.

<u>Adult Index:</u> A full model that predicted catch as a linear function of year, stratum, month, starting depth of the tow, surface temperature, bottom temperature, surface salinity, bottom salinity, and season was compared with nested submodels using AIC. The model that included year and stratum was selected because it produced the lowest AIC and good model diagnostics. The model was changed from the previous benchmark assessment, which had year and season as effects.

Connecticut River Seine Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, month, and site was compared with nested submodels using AIC. The same model parameterization as the previous assessment for binomial (year+month+site) and lognormal (year+month) components was used.

Connecticut Thames Seine Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, month, and site was compared with nested submodels using AIC. The same model parameterization as the previous assessment (year+month+site) for both the binomial and lognormal components was used.

New York Peconic Bay Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, depth, and bottom salinity was compared with nested submodels using AIC. The model including year, depth, and bottom salinity factors was selected because it produced the lowest AIC (% deviance = 32). While data was supplied for the update assessment, adding the 2014-2016 data resulted in an

unstable model with convergence issues and unreasonable estimated values. This could not be resolved and therefore this index was not updated with the last 3 years of data (2014-2016), although values from the previous benchmark were included in the update.

New York Western Long Island Seine Survey

AgeO Index: A full model that predicted catch as a linear function of year, month, region, temperature, and salinity was compared with nested submodels using AIC. Relative to the previous assessment, the covariate dissolved oxygen was eliminated from consideration because of missing values, particularly early in the time series. This decision probably should have been made during the previous assessment because data filtering to complete dissolved oxygen led to the elimination of data for 1997. Slightly different parameterizations were therefore supported for the binomial (year+month+region+temp+salinity) and lognormal (year+month+region+temp) components. The estimated index and CV for 1988 differs considerably from that of the previous assessment. Since dissolved oxygen was no longer considered, more data records were retained for analysis, including a single catch of 30,000 fish which created a much higher index value. This haul also contributed to the extremely high bootstrapped CV value for that year.

New Jersey Ocean Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, station, stratum, vessel, month, starting depth of the tow, bottom temperature, bottom salinity, and bottom dissolved oxygen was compared with nested submodels using AIC. Additionally, a zero inflated negative binomial model was also run for comparison. The zero inflated model that included year, bottom temperature, and bottom salinity was selected because it produced the lowest AIC and good model diagnostics. The choice of zero inflated over standard glm was made from the outcome of the vuongs non nested hypothesis test. The model formula was unchanged from the previous benchmark assessment, but the use of the zero inflated model was a departure from the previously selected model from the benchmark assessment.

<u>Adult Index:</u> A full model that predicted catch as a linear function of year, station, stratum, vessel, month, starting depth of the tow, bottom temperature, bottom salinity, and bottom dissolved oxygen was compared with nested submodels using AIC. The model that included year, bottom temperature, and bottom salinity was selected because it produced the lowest AIC and good model diagnostics. The model was unchanged from the previous benchmark assessment.

New Jersey Juvenile Striped Bass Seine Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, month, river, salinity, and dissolved oxygen was compared with nested submodels using AIC. For the previous assessment both model components were parameterized the same (year+month+river+sal+DO), however, for the update assessment, the supported binomial model differed slightly (year+month+river+DO) while the lognormal model remained the same.

Delaware Inland Bays Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, sea surface temperature, and surface salinity was compared with nested submodels using AIC. The full model was selected because it produced the lowest AIC (% deviance = 42). The model was unchanged from the previous benchmark assessment and updated through 2016.

Delaware 16 ft Trawl Survey

<u>AgeO index</u>: A full model that predicted catch as a linear function of year, station, month, starting depth of the tow, surface temperature, surface salinity, surface dissolved oxygen, and tide was compared with nested submodels using AIC. The model that included year, surface temperature, surface salinity, and tide was selected because it produced the lowest AIC and good model diagnostics. The model was changed from the previous benchmark assessment, which only had year and temperature as effects.

<u>Adult index</u>: A full model that predicted catch as a linear function of year, station, month, starting depth of the tow, surface temperature, surface salinity, surface dissolved oxygen, and tide was compared with nested submodels using AIC. The model that included year, surface temperature, surface salinity, and tide was selected because it produced the lowest AIC and good model diagnostics. The model was changed from the previous benchmark assessment, which only had year, surface temperature, and surface salinity as effects.

Delaware 30 ft Trawl Survey

<u>Adult index</u>: A full model that predicted catch as a linear function of year, month, and station as categorical factors was compared with nested submodels using AIC. The model that included year and month was selected because it produced the lowest AIC. The model was unchanged from the previous benchmark assessment and updated through 2016.

Maryland Coastal Bays Trawl Survey

<u>AgeO Index:</u> A full model that predicted catch as a linear function of year, surface salinity, and sea surface temperature was compared with nested submodels and the submodel that included year and salinity was selected because it produced the lowest AIC (% deviance = 32). The model was unchanged from the previous benchmark assessment and updated through 2016.

Maryland Juvenile Striped Bass Seine Survey

<u>AgeO index</u>: A full model that predicted catch as a linear function of year, month, and region was compared with nested submodels using AIC. The same model parameterization as previous assessment (year+month+region) for both the binomial and lognormal components was used.

ChesFIMS Trawl Survey

<u>Adult index</u>: A full ZINB that predicted catch as a function of the categorical variables year and season was compared with nested submodels using AIC. For the 2015 benchmark stock assessment, a reduced model that removed the covariate season from the count model of the ZINB was selected because it produced the lowest AIC. This index was not updated through 2016 and remained unchanged from the benchmark assessment.

ChesMMAP Trawl Survey

<u>Adult index</u>: A full ZINB model that predicted catch as a function of the categorical variables year, stratum and cruise, and the continuous variable area swept was compared with nested submodels using AIC. For the 2015 benchmark stock assessment and this update, a reduced model that removed the covariate year from the negative binomial count sub-model was selected because it produced the lowest AIC.

Virginia Striped Bass Seine Survey

<u>AgeO index:</u> A full model that predicted catch as a linear function of year, month, river, salinity, and temerpature was compared with nested submodels using AIC. Same model parameterization as previous assessment (year+month+river+sal+temp) for both the binomial and lognormal components. Models were fitted with and without 2016 data due to gear change and no calibration coefficients. Troy Tuckey (VIMS) discovered that a gear changed occurred in 1999 and indications thus far are that there is not catchability differences for YOY striped bass, but potential changes for menhaden have not been evaluated.

VIMS Juvenile Fish Trawl Survey

<u>AgeO index:</u> Models that predicted catch as a linear function of year, river system and either bottom salinity, bottom temperature, depth, or dissolved oxygen were compared using AIC. The model that included year and depth was selected because it produced the lowest AIC and no convergence problems (% deviance = 36). The model is unchanged from the most recent benchmark assessment and updated through 2016.

<u>Adult index:</u> A full model that predicted catch as a linear function of year, river system, bottom salinity, bottom temperature, depth, or dissolved oxygen was compared with nested submodels using AIC. The model with year, river system, bottom salinity, bottom temperature, and depth selected because it produced the lowest AIC (% deviance=18). The model is unchanged from the most recent benchmark assessment and updated through 2016.

South Carolina Electrofishing Survey

<u>AgeO index:</u> A full ZINB model that predicted catch as a function of the categorical variables year, month, tidal stage, and stratum, and the continuous variables depth, salinity duration, and water temperature was compared with nested submodels using AIC. In both the 2015 benchmark assessment and the 2017 update, a reduced model that removed the covariates month, tidal stage, depth, duration and water temperature from the negative binomial count sub-model and the covariates depth duration and water temperature from the binomial sub-model was selected because it produced the lowest AIC.

Georgia Ecological Monitoring Trawl Survey

<u>AgeO index</u>: A full model that predicted catch as a linear function of year, surface salinity, tow duration, depth, and sea surface temperature was compared with nested submodels. The submodel that included year, tow duration, temperature, and salinity was selected because it produced the lowest AIC. The model was unchanged from the latest benchmark assessment and updated through 2016.

<u>Adult index:</u> A full model that predicted catch as a linear function of year, surface salinity, tow duration, depth, and sea surface temperature was compared with nested submodels. The submodel that included year, temperature, salinity, tow duration, and depth was selected because it produced the lowest AIC. For the 2015 benchmark assessment, year, temperature, and salinity was selected so the model is slightly changed for the update.

SEAMAP-SA Coastal Trawl Survey

<u>Adult index:</u> A full ZINB that predicted catch as a function of the categorical variables year, season, and strata and continuous variables water temperature and salinity was compared with nested submodels using AIC. A reduced model that removed the covariate salinity from the count model of the ZINB was selected because it produced the lowest AIC. The model is unchanged from the most recent benchmark assessment and updated through 2016.



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Biological Ecological Reference Points Workgroup

DATE: July 14, 2017

SUBJECT: Review of Hilborn et al. 2017

At its May meeting, the Atlantic Menhaden Management Board tasked the Biological Ecological Reference Points Workgroup (WG) to review Hilborn et al. (2017). The WG contacted Dr. Hilborn, who agreed to present the main conclusions of his research and examples from other research that supported those conclusions. The WG developed a list of questions that were distributed to Dr. Hilborn prior to the call to help guide the discussion. After the discussion the WG concluded:

- 1. The overarching conclusion of Hilborn et al. (2017) is that modeling of the impacts of fishing on forage fish needs to be approached on a case-by-case basis. Management must recognize the high natural variability of forage fish populations and the adaptation of predators to that variability. Predators that focus on young, immature fish may not be affected by fishing pressure on their forage species, since forage species production is heavily influenced by environmental conditions. However, predators with a different size preference may compete with the fishery for suitable size prey. Flexible prey preferences and size selectivity by the predators, fishery size selectivity, environmental effects on recruitment strength etc. are all factors that need to be considered when models are built for each specific system. Trophic models such as Ecopathwith-Ecosim (EwE) often do not incorporate these factors and can overestimate the effect of fishing on forage fish on predators. The general conclusions of this paper are consistent with the previous conclusions of the WG in that ecosystem models should be built specific to the system of interest (see Memo M15-30).
- Models of Intermediate Complexity for Ecosystem assessments (MICE) were recommended by Dr. Hilborn for most systems. These models are built specifically to address the main management questions that are under consideration and are useful for addressing the impacts of fishing on predator-prey dynamics.
- 3. The 2015 Atlantic Menhaden Peer Review Workshop Report also recommends that ecosystem reference points be developed through the use of "minimum sufficient complexity" models (similar to MICE) that couple Atlantic menhaden dynamics with that of their main predators.
- 4. The WG is currently developing of a suite of intermediate complexity menhaden-specific models that align with the general recommendations from both Dr. Hilborn and the 2015 Stock Assessment Peer Review Panel. The WG anticipates that these models will be ready for peer review in 2019.
- 5. Both Hilborn et al. (2017) and Pikitch et al. (2012) agree that specific ecosystem models are preferred. However, the difference between the two lies in what reference points to use in the interim while ecosystem-specific models are in production. Pikitch et al. (2012) recommends the use of default generic reference points based on an expectation of a negative response in predator populations caused by forage fisheries. In contrast, Hilborn et al. (2017) finds very little evidence that fishing on forage fish affects the population growth rate of predators, even

- predators for which a large fraction of their diet is comprised of the forage species in question (i.e., 'dependent' predators).
- 6. The WG notes that they have encountered problems in translating the EwE-derived generalizations into single-species equivalents that place emphasis on maintaining a portion of total biomass rather than spawning potential. See the conclusions section of Memo M17-74 for further details.
- 7. Overall, the selection of reference points is highly dependent on the management goals and objectives that are determined by the preferred tradeoffs of a specific ecosystem.

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G Model FISH-4642; No. of Pages 11

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Fisheries Research xxx (2017) xxx-xxx

Contents lists available at ScienceDirect

Fisheries Research

journal homepage: www.elsevier.com/locate/fishres



When does fishing forage species affect their predators?

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ARTICLE INFO

Article history: Received 26 August 2016 Received in revised form 12 January 2017 Accepted 16 January 2017 Handled by George A. Rose Available online xxx

Keywords:
Forage fish
Small pelagics
Marine predators
Ecosystem based fishery management
Ecopath

ABSTRACT

This paper explores the impact of fishing low trophic level "forage" species on higher trophic level marine predators including other fish, birds and marine mammals. We show that existing analyses using trophic models have generally ignored a number of important factors including (1) the high level of natural variability of forage fish, (2) the weak relationship between forage fish spawning stock size and recruitment and the role of environmental productivity regimes, (3) the size distribution of forage fish, their predators and subsequent size selective predation (4) the changes in spatial distribution of the forage fish as it influences the reproductive success of predators. We show that taking account of these factors generally tends to make the impact of fishing forage fish on their predators less than estimated from trophic models. We also explore the empirical relationship between forage fish abundance and predator abundance for a range of U.S. fisheries and show that there is little evidence for a strong connection between forage fish abundance and the rate of change in the abundance of their predators. We suggest that any evaluation of harvest policies for forage fish needs to include these issues, and that models tailored for individual species and ecosystems are needed to guide fisheries management policy.

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1. Introduction

There has been considerable interest in recent years on the impact of fishing low trophic level fishes, commonly called "forage fish", on the higher trophic level fishes, marine birds and marine mammals (Cury et al., 2011; Pikitch et al., 2012; Smith et al., 2011). For our purposes we consider forage fish to be the major small pelagic fishes and squid, but the juveniles of many species are also an important part of the diet of many predators. There is good evidence and theory to suggest that (1) fishing reduces the abundance of targeted fish stocks, and (2) reproductive success of predators is affected by the local density of their prey. The logic seems clear, lower fishing pressure results in more forage fish in the ocean, and thus better reproductive success and higher abundance of the higher trophic level predators. Pikitch et al. and Smith et al. used

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ecosystem models to quantitatively evaluate the impact of fishing forage fish on their predators, and both papers suggested that forage fish should be harvested at rates lower than would provide long term maximum yield of the forage fish.

Although it would therefore seem obvious that fishing forage fish would have a negative effect on the abundance of their predators, the empirical relationships between forage fish abundance and predator abundance, or population rates of change, have not been examined in a systematic way. There is evidence in the literature (Cury et al., 2011) showing changes in reproductive success in relation to local food abundance, but the assumed link between the changes in total population size of predators and the total forage fish abundance has not been evaluated against historical trends in abundance. Another way to explore the impact of fishing forage fish is to examine the population trends in a dependent predator. Given that most forage fish in the U.S. have been harvested more heavily in the past than they are at present, if predator populations increased under past fishing pressure on forage species, then fishing at those levels did not preclude the ability of the predators to increase. For many reasons, the predators of most concern should be those others that have been decreasing in abundance over recent decades.

http://dx.doi.org/10.1016/j.fishres.2017.01.008

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Please cite this article in press as: Hilborn, R., et al., When does fishing forage species affect their predators? Fish. Res. (2017), http://dx.doi.org/10.1016/j.fishres.2017.01.008

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Most forage fish are well documented to undergo substantial fluctuations in abundance unrelated to fishing (Schwartzlose et al., 1999), a feature that is ignored in the ecosystem models used to evaluate ecological impacts of fishing which were mentioned above. This was recognized as a deficiency by the authors of the Pikitch et al. paper. "Major fluctuations in forage fish abundance have been observed and recorded for centuries. Forage fish can respond dramatically to shifts in oceanic conditions and may exhibit strong decadal-scale variability. Forage fish may be capable of responding quickly to favorable environmental conditions, but their populations cannot be expected to maintain a steady state and can plummet when conditions become unfavorable" (Pikitch et al., 2012, page 84).

Such fluctuations can range over three orders of magnitude. Vert-pre et al. (2013) showed that for about 50% of fish stocks, there were major changes in the productivity of the stocks unrelated to fish stock size. Given great natural variability in abundance of forage fish, a key question is how much does fishing impact abundance relative to the natural fluctuations?

The commonly accepted assumption that higher spawning stock sizes lead (in expectation) to higher recruitment (Myers and Barrowman, 1996; Myers et al., 1994) is implicit in EwE models that do not break taxonomic groups into size or age groups, and explicit in ATLANTIS models and EwE models that do break a group into stages. The assumption that increasing spawning stock size will lead to higher recruitment has been challenged first by Gilbert (1997) then by Szuwalski et al. (2014) who showed that most stocks do not exhibit a stock recruit relationship and of those that do, a large fraction of them have shifts in average recruitment over time. Myers et al. (1999) estimated that forage fish show clear relationships between spawning stock abundance and recruitment, but low spawning stock and low recruitment can be explained equally well by low recruitment generating low spawning stock (Szuwalski et al., 2014). If abundance of forage fish and their recruitment are primarily environmentally driven, then the impact of fishing on the food supply of higher trophic level predators is mainly through depletion of prey cohorts by fishing, not by reduced recruitment.

In addition to the assumption of a direct link between spawning stock and recruitment, the EwE models used to evaluate the impacts of fishing forage fish have a direct link between forage fish abundance, predator consumption and predator abundance implicit in the dynamics. However, few of these models have considered the life histories of the forage fish and their predators in enough detail to capture several key issues in the interaction between fishing on forage fish and impacts on dependent predators. None of the 11 EwE models used by Pikitch et al. considered the size or age structure of the forage fish (Essington and Plaganyi, 2013) and in five cases the modeling was not conducted at the species level, but instead grouped up to eight forage species, amongst which many may exhibit negative covariation in abundance. Indeed, two of the authors of the Pikitch et al. study subsequently questioned the use of "recycled" ecosystem models (i.e., those developed for other purposes) to understand the impacts of forage fish abundance on their predators; "We find that the depth and breadth with which predator species are represented are commonly insufficient for evaluating sensitivities of predator populations to forage fish depletion" (Essington and Plaganyi, 2013). All of the models used by Pikitch et al. were such recycled mod-

A key factor determining reproductive success of many birds and marine mammals is the local density of prey within their foraging range of the breeding sites (Thaxter et al., 2012). So in addition to the variability induced by natural fluctuations in total abundance of the forage fish, the spatial availability can also vary, and two breeding colonies feeding on the same stock may see strikingly different

food availability. Local density can either amplify natural variability in food supply, or the predators may be able to concentrate on high density locations even at low prey abundance, thus buffering them from the fluctuations in total abundance. Despite the importance of local forage abundance for central place foragers, there is little evidence relating abundance of forage species to the abundance of mobile predators. Jensen et al. (2012) cited several of the studies showing the importance of local abundance to central place foragers but also reviewed the empirical literature relating marine predatory fish abundance to abundance of their prey and found few clear links apart from a decline in cod productivity following the collapse of both herring and capelin in the Barents Sea (Hamre, 1994; Hjermann et al., 2004).

This brings us to another important factor in the life history of forage fish and their predators that is neglected in almost all of the EwE models. Some marine predators consume forage fish at sizes and ages before the fishery harvests them. This is most true for predatory fish and marine birds, where mouth gape sizes limit the maximum size of prey that can be eaten, and probably least true for marine mammals. As an example, Nelson et al. (2006) showed that the mean size of Atlantic menhaden (Brevoortia tyrannus) eaten by striped bass (Morone saxatilis) in Massachusetts was 8.4 cm but the mean size taken by the fishery was 28 cm. In the extreme, if the recruitment of forage fish is not affected by fishing, and the predators consume sizes smaller than taken by the fishery, then the fishery would have no impact on the food available to the predator. In other words, the fishery harvests only those individuals that have survived and grown large enough to escape most of their predators.

To summarize, the impact of fishing forage fish on dependent predators will depend on (1) the alternative prey available to the predators, (2) the impact of fishing on the recruitment of the forage fish, (3) natural variability in recruitment, (4) the relationship between abundance of the forage fish and what is actually available to the predators, (5) the overlap between sizes/ages eaten by the predators and those taken by the fishery, and (6) other factors that may limit the predator population abundance.

In this paper we explore these issues for a range of U.S. forage fish and their predators. First, we examine the relationship between forage fish abundance and predator population growth rates, then we evaluate the recruitment pattern for each forage species and evaluate the evidence regarding the relative importance of fishing and environmental influences on the recruitment. Thirdly, we compare the size/ages taken by predators to those taken by the fishery. We then model the changes in forage fish abundance as a function of different assumptions regarding the dependence of recruitment on fish stock size and environmental variability to generate scenarios of forage fish abundance as a function of fishing pressure. Finally we examine how much the abundance of forage fish in the target size range is affected by fishing.

2. Materials and methods

Eleven species of forage fish in the U.S. were selected for analysis, and for each of these species we conducted a literature review to identify: (1) what predators eat those species, (2) the importance of the forage fish species in the diet of the predator, and (3) the size range of each forage species found in the diet of the predator. The selected forage species were the Pacific sardine (Sardinops sagax), Northern anchovy (Engraulis mordax), Market squid (Doryteuthis opalescens), Pacific hake (Merluccius productus), Pacific chub mackerel (Scomber japonicus), Atlantic herring (Clupea harengus), Atlantic menhaden, Atlantic mackerel (Scomber scombrus), Shortfin squid (Illex illecebrosus), Longfin inshore squid (Doryteuthis pealeii) and Gulf menhaden (Brevoortia patronus).

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2.1. Literature search

A systematic review of the literature was conducted by querying the Academic Search and Google's online search engine for articles on prey and predators occurring in the California Current, U.S. East Coast and the Gulf of Mexico. Queries included topical keywords for diet and abundance for identified predators in the geographic range.

2.1.1. Diet

We recorded data from 127 relevant citations in peer-reviewed journal publications, books, technical reports, theses and from online databases (e.g. www.fishecology.org in September and October 2015). Data included individual occurrences of a predator eating a prey. Each record includes information on the citation, study location, date (year and season of observations), sampling methods (e.g. stomach content, visual observation), predator (life-history stage, size/age/sex, sample size) and prey (amount consumed and size eaten, usually estimated through otoliths or beak measurements).

The importance of a prey species in the diet of a predator was defined as the mean proportion of a forage fish consumed by a specific predator reported in a specific unit for measuring consumption. When more than one unit of consumption was available, the following order of preference was set: prey proportions by mass were preferred, followed by numbers, energetic contribution and finally frequency of occurrence.

2.1.2. Abundance of predators

The predators for which the importance of a single prey species was equal to or greater than 0.2 were selected as "dependent predators". We identified 86 different populations of dependent predators of which 52 are commercially important fish species or stocks, 33 are top predators (seabirds and marine mammals) and one is an invertebrate.

Abundance data for the dependent predators were obtained from several sources. For marine mammals, data were obtained primarily from the NMFS Marine Mammal Stock Assessments (Caretta et al., 2006; Waring et al., 2015). For commercially important fish species, data were obtained primarily from the RAM Legacy Stock Assessment Database (Ricard et al., 2012). Other sources of abundance data for seabirds and other species include agencies and government websites, peer-reviewed journal publications, books, technical reports and theses. Information on abundance trends were found for 50 of the 86 dependent predators species identified in this study.

An index of abundance was calculated using available data such as total and spawning stock biomass, density, estimated number of individuals, counts, pup production, nesting pairs, standardized catch per unit effort, breeding pairs and number of nests. The sources for these data are shown in supplemental Table S1.

Graphical data were extracted with DataThief III (Tummers, 2006) when original data in tabular form could not be found.

We compared the population per capita rates of change of the predators to the abundance of forage fish. For exploited species, we used the surplus production, should be there instead of; defined as the change in abundance from one year to the next, plus the catch. The relationship between forage fish abundance and predator rate of change was assessed using a linear model and the significance of the slope was tested using an F test.

2.2. Recruitment analysis

We analyzed the estimated forage fish abundance and subsequent recruitment to assess if recruitment was better explained by environmental variability or fish abundance. The spawner-recruit data were obtained from the RAM Legacy Stock Assessment Database (www.ramlegacy.org) for the forage fish of concern. Four models were fit to the data and compared using AIC: a traditional Beverton-Holt stock-recruitment model, a hockey-stick model, a model that assumes that recruitment is random and independent of stock size and a regime-shift model. In the latter, the presence of regimes was identified by estimating breakpoints in the recruitment time series where the statistical properties (mean and/or variance) change. Different segmentation algorithms exist to search over the entire parameter space for the number and location of breakpoints that maximize the likelihood of the data subject to a penalty to prevent overfitting. We used the PELT algorithm (Pruned Exact Linear Time) proposed by Killick et al. (2012) implemented in the "change point" library (Killick and Eckley, 2014) for the statistical software R (R Core Team, 2014). Differences in both the mean and the variance among segments were allowed and model selection was based on AIC while constraining the minimum segment length to either 5 or 10 years. The PELT method was preferred over the simpler sequential t-test method of Rodionov and Overland (2005) used by Vert-pre et al. (2013) because the latter does not search over all possible combinations of breakpoint locations

Stock-recruitment models (other than regime shift) were fitted using the software AD Model Builder (Fournier et al., 2012). For each model we computed the likelihood and the AIC assuming lognormal errors. The number of parameters in the regime-shift model was computed as the number of breakpoints plus the number of means and variances estimated. We excluded from the analysis the squid as well as the Northern anchovy, because the time series of abundance data available for these stocks were discontinuous.

2.3. Impacts of fisheries on prey abundance

We gathered biological and fisheries information on six species of forage fish and implemented a simulation model to quantify the reduction in food availability to predators from fishing given the size selectivity of both the fishery and the predators. An age structured model was used to simulate the effects of different fishing mortalities on fish abundance. The numbers of individuals of age a at time t were modeled as:

$$N_{a+1,t+1} = N_{a,t} \exp^{(-M+F\nu_a)}$$
 (1)

where M is the natural mortality, F the fishing mortality and v_a is an age specific selectivity. Two different scenarios of recruitment were simulated:

$$\begin{cases} N_{1,t} = R_t & Scenario 1 \\ N_{1,t} = \frac{aSE_{t-1}}{1+bS} & Scenario 2 \end{cases}$$
 (2)

In Scenario 1, we assumed that recruitment was independent of the spawning biomass, while in Scenario 2 we used the standard Beverton-Holt stock-recruitment equation. Spawning stock biomass was calculated as:

$$S_t = \sum_a w_a m_a N_a \tag{3}$$

where w_a is the average weight of an individual of age a and m_a is the proportion of sexually mature individuals of age a. Weight at age was calculated as a power function of the average length

$$w_a = \alpha L_a{}^{\beta} \tag{4}$$

Length at age was modeled using the standard Von Bertalanffy growth equation.

$$L_a = L_{\infty}(1 - e^{(-k(a - t_0))}) \tag{5}$$

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Table 1Stock specific parameters used in the simulations. L∞ is asymptotic length, K is the Von-Bertalanffy growth rate, t0 = scale parameter of growth curve, M = instantaneous natural mortality rate, α = length to weight scale parameter, β = length to weight power.

Stock Parameters	Atlantic Herring	Atlantic Menhaden	Gulf Menhaden	Pacific Chub Mackerel	Pacific Hake	Pacific Sardine
L∞ (cm)	32	36.5	26.25	39.2	52	23.7
K	0.36	0.363	0.39	0.39	0.32	0.318
t0 (years)	-1.17	-1.3	-0.99	-2	0	-2.01
M	0.52	0.45	1.1	0.5	0.213	0.4
$\alpha (\times 10^{-6})$	8.21	4.07	7.41	2.7	5	7.52
В	3	3.2	3.19	3.4	3	3.2332
Maturity at age	1 = 0; 2 = 0.01; 3 = 0.21; 4 = 0.81; 5 = 0.98; 6+=1	<2=0; 2=0.12; 3=0.85; 4+=1	<2=0; 2+=1	0 = 0; 1 = 0.48; 2 = 0.63; 3 = 0.76; 4 = 0.85; 5-6 = 0.91; 7+=1	1 = 0; 2 = 0.01; 3 = 0.21; 4 = 0.82; 5 = 0.98; 6+ =1	1=0; 2=0.99; 2+=1
Selectivity at age	1 = 0; 2 = 0.18; 3 = 0.54; 4 = 0.7; 5+=1	<2=0; 2 = 0.1; 3-4=1; 5 = 0.19; 6+=0	1 = 0.05; 2 = 1; 3-4 = 0.35; 5 +=0	0=0.5; 1+=1	1 = 0.07; 2 = 0.18; 3 = 0.37; 4 = 0.62; 5 = 0.81; 6 = 0.92; 7 = 0.97; 8+=1	1 = 0.18; 2 = 0.37; 3 = 0.62; 4 = 0.81; 5 = 0.92; 6 + =1

A global food depletion estimate can be calculated by comparing the equilibrium biomass for a given F with the equilibrium biomass in the unfished state. However, as predators may select prey by size, we are interested in assessing the food depletion for different prey's length intervals. We generated a length composition of the population by assuming that the size of individuals within an age class is normally distributed with mean L_a and standard deviation σ_a . For simulation purposes we assumed a constant coefficient of variation in size-at-age of 20%. We calculated the numbers of individuals (Eq. (6)) and the biomass (Eq. (7)) in the size interval $l_1 - l_2$ as:

$$N_{l_1 - l_2} = \sum_{a} N_{a, l_1 - l_2} \tag{6}$$

$$B_{l_1 - l_2} = \sum_{a} w_a N_{a, l_1 - l_2} \tag{7}$$

For each fish stock we ran the model for 5000 years under different fishing mortalities and randomly sampled 500 iterations to assess the reduction in the food available to predators. Under Scenario 1, the model was forced using the historical recruitment estimated in stock assessments in order to account for natural variability (we sequentially repeated the recruitment time series to achieve 5000 observations). To perform the simulation under the assumption of a stock recruitment relationship (Scenario 2) we used the spawner-recruit curve best fit to the stock assessment data. To account for natural variability, we calculated the log residuals and used them as multiplicative errors. Similar to Scenario 1, we sequentially repeated the observed errors to achieve 5000 observations.

Our simulations are a simplification of the stock dynamics, since key parameters such as selectivity, growth and natural mortality can be time, size or density dependent. For each fish stock we gathered mortality, growth, maturity, vulnerability to fishing and weight-at-length parameters from stock assessment documents. We ran the simulations for only one fishery for a given stock; when more than one fishery targeted that stock, we used the vulnerability to the fishery that accounted for the largest fraction of the catch.

We calculated the biomass depletion for four size ranges, (small, small-medium, medium-large and large fish) set at the quartiles of the length frequency distribution in the unfished state. We explored the impacts of fishing under F = 0, $0.5\,F_{\rm MSY}$, and $F_{\rm MSY}$. When possible, the value of $F_{\rm MSY}$ was calculated using the stock-recruitment, maturity and growth parameters used in the simulations. For stocks where the stock-recruitment relationship was a flat line, the calculation of $F_{\rm MSY}$ was unreliable, and instead we used the value estimated as part of the stock assessment which was often a proxy. For each F, we computed the median biomass compared to median

biomass in the unfished state. Parameters used in the simulations are summarized in Table 1.

3. Results

3.1. Diet data compilation

The literature review yielded 1041 predator-prey pairs that contained information on predators' diet (size eaten and/or proportion of the prey in the diet). For a given predator and prey species, the database can contain several records, since we included an individual entry for the same pair of species if data were obtained in different locations and/or different years or when the data were recorded for different sexes or stages in the life cycle. These records corresponded to 119 species of predators and 11 species of prey, and included multiple years of data for the same species in one location as well as data for one species from different regions. The number of individual predator species identified for each forage fish ranged from five for the Gulf menhaden to 46 for the Northern anchovy.

We identified 203 prey-predator pairs where the mean proportion of a prey item in the diet in a given location was larger than 0.2 (Table S1).

3.2. Empirical relationships between predator and prey trends

Trends in abundance of both predator and prey covering overlapping periods were available for 50 predator-prey pairs out of the 203 pairs where the proportion of a specific forage fish in the diet was larger than 0.2. When multiple abundance time series were available we selected the longest one that did not present gaps in the data. Trends in abundance of most dependent predators were either growing, stable, or fluctuating between periods of high and low abundance (Figs. 1 and S1). Six cases showed a clear decreasing trend in the predator's abundance index over time: Atlantic cod (*Gadus morhua*) in Georges Bank, sablefish (*Anoplopoma fimbria*) on the Pacific coast, mako shark (*Isurus oxyrinchus*), silky shark (*Carcharhinus falciformis*) and spiny dogfish (*Squalus acanthias*) in the N.W. Atlantic, and yellowtail rockfish (*Sebastes flavidus*) on the Pacific coast. No obvious relationship between the prey and predator abundance was apparent in the majority of the cases (Fig. 1 insets)

Although a positive relationship between prey and predator abundance can be interpreted as evidence of trophic dependence, a better way to assess the role of prey abundance in the population dynamics of the predator is to analyze the predator population rate of change or surplus production against the abundance of the

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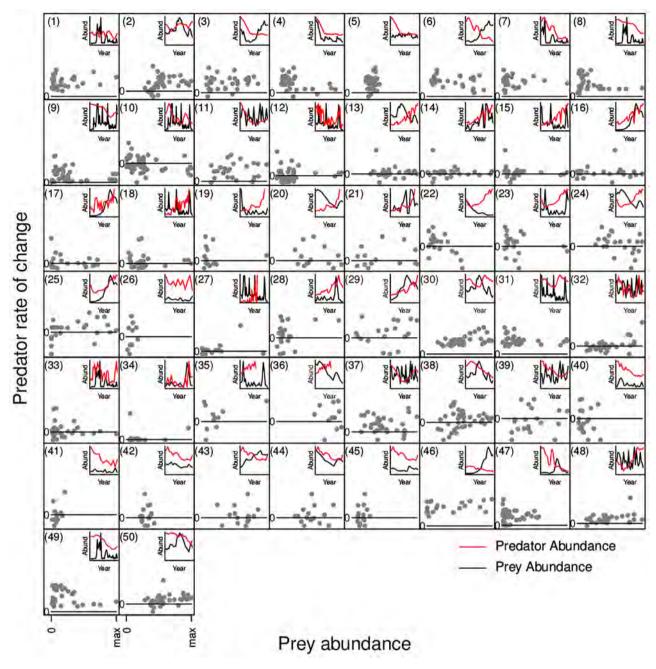


Fig. 1. Relationship between the annual surplus production of the predators and prey abundance. Each panel shows a pair of temporally overlapping predator rate of change and prey abundance data (grey dots). The subplot in each panel shows the relative trend in the abundance index for the prey (black line) and the predator (red line). (1) albacore tuna and shortfin squid; (2) arrowtooth flounder and Pacific hake; (3) Atlantic bluefin tuna and Atlantic bluefin tuna and Atlantic menhaden; (6) Atlantic cod and Atlantic bluefin tuna and Atlantic menhaden; (6) Atlantic cod and Atlantic herring; (7) Atlantic cod and shortfin squid; (8) bigeye tuna and shortfin squid; (9) black rockfish and Northern anchovy; (10) bluefin tuna and Northern anchovy; (11) bluefish and longfin inshore squid; (12) Brandt's cormorant and Northern anchovy; (13) California sea lion and Pacific hake; (14) California sea lion and market squid; (15) California sea lion and Northern anchovy; (16) California sea lion and Pacific sardine (18) California brown pelican and Northern anchovy; (19) common murre and Northern anchovy; (20) common murre and Pacific hake; (21) common murre and market squid; (22) thresher shark and Pacific chub mackerel; (23) thresher shark and Northern anchovy; (24) thresher shark and Pacific hake; (25) thresher shark and Pacific sardine; (26) dolphinfish and shortfin squid; (27) elegant tern (chicks) and Northern anchovy; (28) humpback whale and Northern anchovy; (29) humpback whale and Pacific sardine; (30) North Pacific albacore and Pacific bacore and Northern anchovy; (32) offshore hake (mid Atlantic bight) and shortfin squid; (34) Pacific bonito and Northern anchovy; (35) Pacific harbor seal and Northern anchovy; (36) Pacific harbor seal and Pacific hake; (37) Gulf of Maine pollock and longfin inshore squid; (38) sablefish and Pacific hake; (39) shortfin mako shark and shortfin squid; (41) silky shark and shortfin squid; (42) spiny dogfish and Atlantic menhaden; (43) spiny dogfish and Atlantic harbor squid; (49) swordfi

prey. The data set showed almost no evidence of a strong positive relationship between the predator surplus production and the prey abundance (Fig. 1). While in half of the cases the slope estimates were positive, in only four cases did we find a statistically

significant positive relationships between predator and prey abundance (Fig. S2) (with no correction for multiple comparisons): arrowtooth flounder (*Atheresthes stomias*) and Pacific hake (Figure 1.2), yellowtail rockfish and Pacific hake (Figure 1.50), North Pacific

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Table 2

IdDIC 2
Summary table for the regime shift (shifts), random, Beverton-Holt and hockey-stick stock recruitment (SR) models. We recognize that this violates the independence
assumption of the AIC, but believe it is indicative of relative strength of evidence for competing hypotheses. N is number of years in the time series and Corr is the coefficient
of auto-correlation of the logarithm of recruitment. N shifts = number of estimated breakpoints.

Species	Area	N	Corr	N shifts	AIC Shifts	AIC BH	AIC Hockey	AIC Random	Winner
Pacific chub mackerel	California Current	79	0.66	6	166	201	206	239	Shift
Atlantic herring	US East Coast	37	0.34	2	76	81	81	85	Shift
Gulf menhaden	Gulf of Mexico	35	0.06	1	20	22	22	20	Random
Atlantic menhaden	US East Coast	51	0.50	3	63	83	91	89	Shift
Pacific hake	California Current	47	-0.29	1	166	168	168	166	Random
Pacific sardine	California Current	27	0.84	2	85	63	62	112	Hockey
Atlantic mackerel	US East Coast	47	0.52	2	143	129	129	155	BH/Hockey

albacore (Thunnus alalunga) and Pacific hake (Figure 1.30), and offshore hake (Merluccius albidus) (mid Atlantic bight) and longfin inshore squid (Doryteuthis pealeii) (Figure 1.32). The percent variance explained in these four cases ranged from 10% to 34%. The 95% confidence bounds on the estimated slope (y and x axes in units of standard deviation) were often wide, with upper bounds exceeding a value of 0.5 in close to half of the cases.

3.3. Recruitment analysis

For the seven species assessed, the stock-recruitment models outperformed the regime shift and the random models in two cases: Pacific sardine and Atlantic herring (Table 2). For the other five species the regime-shift or the random model had lower values of AIC. This result was independent of the minimum segment length specified for the changepoint analysis (shorter segment lengths yielded larger number of breakpoints, but the general result remained the same).

The hockey-stick and the Beverton-Holt models performed similarly when fit to the stock-recruitment data. Only in three cases -Pacific chub mackerel, Atlantic herring and Pacific sardine - was a breakpoint estimated by the hockey-stick model, indicating a decrease in recruitment below a given stock size. The breakpoint was estimated respectively at 17%, 19% and 13% of the maximum value of spawning biomass in the series. For Atlantic mackerel, a linear decrease in recruitment over the entire time series was favored with no identifiable breakpoint. The species for which evidence of decreased recruitment at lower spawning stock size was strongest also showed a highly auto-correlated recruitment (Table 2). By contrast, no evidence of a decrease in recruitment at low stock abundance was observed for the two menhaden stocks and for Pacific hake. Pacific hake and Gulf menhaden both had the lowest AIC for the random model while a regime-shift model was favored for Atlantic menhaden. Pacific chub mackerel and Atlantic herring also had the lowest AIC for the regime-shift model.

Pacific chub mackerel, Atlantic mackerel and Pacific sardine do show significantly lower recruitment at lower spawning stock size. However, each of those species shows highly auto-correlated recruitments that are consistent with environmentally driven regime changes and the apparent spawner recruit relationship may in fact simply be that periods of low recruitment lead to periods of low spawning stock size.

3.4. Simulated impacts of fisheries on prey abundance

For the six examples considered, the simulations conducted assuming recruitment is independent of spawning stock (Scenario 1) suggest that the abundance of small and small-medium size fish is unaffected by fishing (Fig. 2) and even in the absence of fishing the abundance of all sizes fluctuates greatly. Typically, the small sizes tend not to be caught in the corresponding fisheries (Fig. 3). In contrast, the abundance of large fish can be substantially reduced when F is set at F_{MSY} . When a stock-recruitment relationship is

assumed (Scenario 2), in most cases a reduction in fish abundance was observed for all size ranges, the magnitude of which increased with fishing pressure.

Additionally, variability was reduced as fishing pressure increased. The two exceptions were Pacific hake and Gulf menhaden (Fig. 2). For these two species, the fit of the Beverton-Holt curve was flat in the range of observed abundances, which is similar to the assumption that recruitment is independent of stock size (Fig. 4). The fishery simulated for Gulf menhaden targeted almost exclusively individuals of age 2 (approximately 15 cm, Fig. 3), while the population was mainly composed of 0+ (small) and 1+ (smallmedium) fish. This is most likely the main reason why abundance of fish does not respond to fishing pressure for this stock. In the case of Pacific hake, a substantial fishing impact was observed only for medium-large and large fish, which corresponds to the sizes selected by the fishery.

These results emphasize the relevance of the size composition of the diet when the fishing effects on predators are assessed. Unfortunately, data on the size compositions of diets are scarce. We could only find 74 records of size of forage fish prey (Fig. 3). While some predators selectively eat small fish (usually not selected by the fishery), others prey on a large range of forage fish sizes. The degree of overlap between fisheries and predators is highly variable. For example, most predators foraging on market squid and Pacific hake do not seem to be in direct competition with fisheries. On the other hand, Pacific chub mackerel, Pacific sardine and Atlantic herring fisheries seem to overlap with predator's preferred prey sizes.

4. Discussion

4.1. Trends in predator populations and growth rates of predators

For the populations studied, we found little evidence that the abundance of individual species of forage fish was positively related to the per capita rate of change in their predator populations. Of the 50 comparisons, we found five that had a significantly positive relationship between prey abundance and predator rate of change The fact that only four of the time series of predator abundance showed a downward trend also provides some evidence that historical fishing practices on forage prey species have not led to major predator decreases.

Given the very large range of abundance fluctuations seen in many of the forage fish populations, it is surprising that a relationship between forage fish abundance and predator rate of change does not emerge. The most obvious explanation would be diet flexibility. If the predators can switch between alternative prey, then the fluctuations in any individual forage species may be well buffered by the predator switching to other forage species. We also explored various time lags between prey abundance and predator rate of change, and did not find higher rates of correlation. We did not look at the abundance of forage species in aggregate in our one species at a time comparison.

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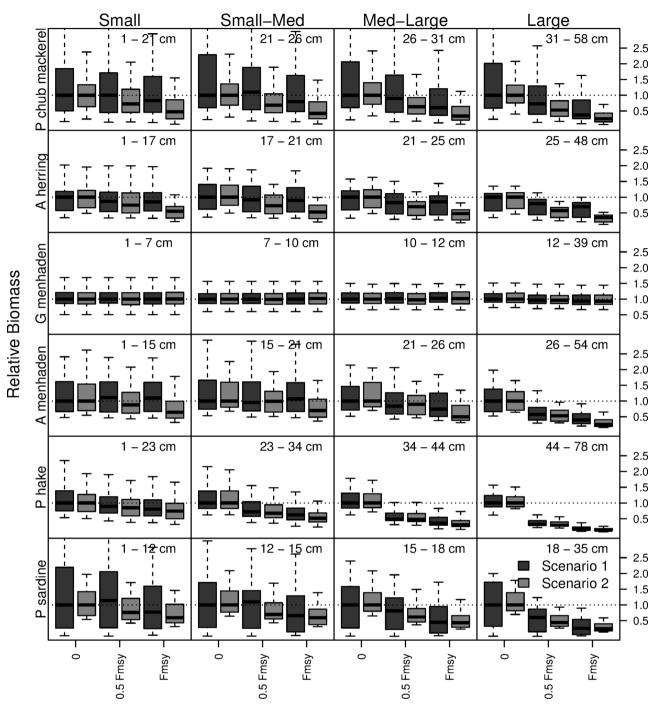


Fig. 2. Change in prey abundance predicted by the simulation model for six forage fish species in different size ranges. Scenario 1: recruitment independent of stock size; Scenario 2: Beverton-Holt stock recruitment relationship.

4.2. Recruitment analysis

If we simply look at the spawner-recruit data for the forage species examined we see little evidence that smaller spawning stocks produce smaller recruitments for both Atlantic and Gulf menhaden, and Pacific hake. Good year classes seem to come from both large and small spawning stock sizes. Pacific chub mackerel, Atlantic mackerel and Pacific sardine do show significantly lower recruitment at lower spawning stock size. However, each of those species shows highly auto-correlated recruitments that are consistent with environmentally driven regime changes and the apparent spawner recruit relationship may in fact simply be that periods of low environmental suitability result in long periods of low

recruitment leading to low spawning stock. The relatively short life span of forage fish and several shifts from high to low productivity over the recruitment time series enhances this effect.

We have used statistical tests with changepoint analysis to try to quantify the support for regime changes vs stock-recruitment relationships and for each of these three species (Pacific chub mackerel, Atlantic herring and Atlantic Menhaden) the AIC analysis supports a regime change. This approach is only exploratory and does not provide a reliable basis for choosing a single operating model. Rather, the policy implications of alternative hypotheses should be evaluated within a management-strategy-evaluation framework and understanding the changes in recruitment is essential before evaluating alternative harvest strategies. However, we would argue



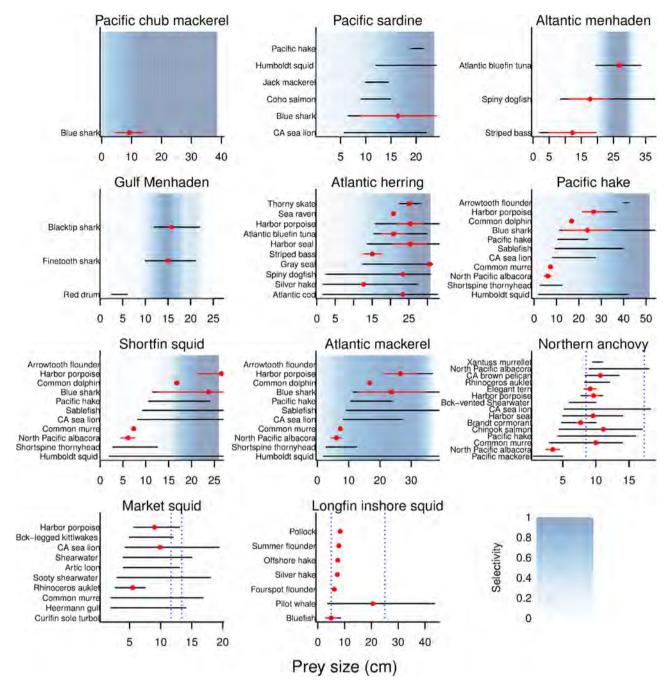


Fig. 3. Prey size consumed by different predators. Black lines indicate the range of sizes eaten. The red dots indicate the mean size of the prey, and the red line the standard deviation. The shading in the background indicates how fishery selectivity changes with fish length. When no estimates of fishery selectivity were found the dotted blue lines indicate the size range of the commercial catch.

that there is strong evidence that recruitments are largely independent of fishing pressure as has been widely accepted for Pacific sardine (Punt et al., 2016) and suggested for many other species globally (Szuwalski and Hilborn, 2015). It is of course not credible that recruitment is independent of stock size for all stock sizes (no eggs, no recruits). We assert only that the range of spawning stock sizes is often not wide enough within regimes to see any effect. It should be noted that within-regime stock-recruitment analysis is subject to strong time series bias, with over-representation of high recruitments at low stock size and low recruitments at high stock size (Walters, 1985) leading to overestimation of the initial stock-recruitment slope and reduced apparent dependence of recruitment on spawning stock size.

4.3. Impacts of fisheries on prey abundance

We found that small size classes are largely unaffected by fishing when the recruitments are simulated at historical levels assuming no impact of spawning stock, and that many, but not all of the predators rely on the smaller sized fish not targeted by fisheries. If we assume a spawner recruit model, then recruitment at F_{MSY} is reduced, so that the abundance of small size classes is also reduced. Given that for most stocks examined, a random recruitment or regime recruitment model was estimated to be best, the evidence for those stocks examined supports little impact of fishing on abundance of smaller size classes of fish. Thus one cannot generalize about the impacts of fishing on food availability to predators

Please cite this article in press as: Hilborn, R., et al., When does fishing forage species affect their predators? Fish. Res. (2017), http://dx.doi.org/10.1016/j.fishres.2017.01.008

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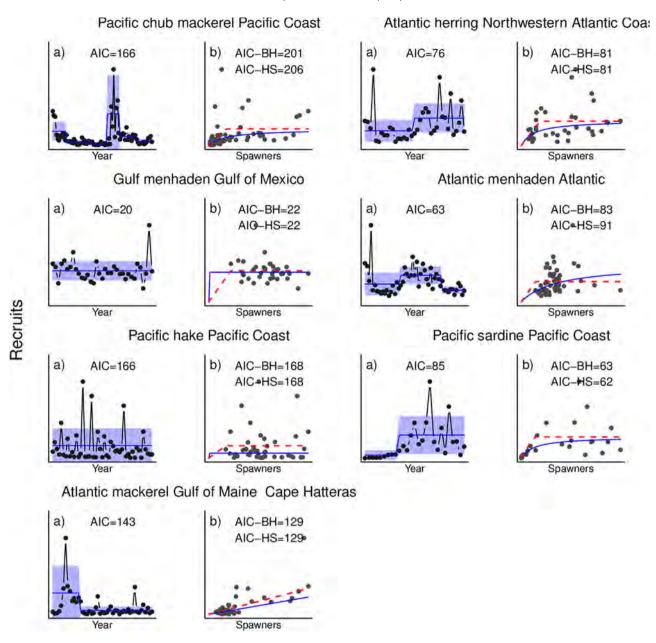


Fig. 4. Alternative models to explain recruitment variability: a regime-shift model, a Beverton-Holt stock-recruitment model and the hockey-stick model. The blue lines indicate the model maximum likelihood estimates. The purple polygons indicate the standard deviation in each regime identified by the changepoint analysis.

and each case must be examined on its own merits with respect to the impact of fishing on recruitment and the size preferences of the predators.

The diet of predators consists not only of the key species we examined here, but many other species, including juveniles of many larger species. Furthermore, the impact of fishing higher trophic level fishes has often caused forage species to be more abundant than they would be in the absence of fishing (Christensen et al., 2014; Kolding et al., 2016; Jennings and Collingridge, 2015).

4.4. Spatial distribution of forage fish

A major factor (though one which has been considered only qualitatively in this paper) is the relationship between the distribution of the forage fish, their abundance, and the location of breeding sites for dependent birds and mammals. Large fluctuations in abundance of the forage fish are accompanied by major changes in their distributional range – at high abundance the fish are found over a

much larger area than at low abundance (MacCall, 1990). If there tend to be "core" areas where even at low overall abundance the forage fish can be found at high density, and these core areas are close to breeding sites of predators, predators would see far more stability in prey availability than indicated by total population size. On the other hand, if fisheries target prey hotspots or feeding areas close to breeding sites, then the impact of fishing may be larger than expected based on overall prey depletion.

This spatial dynamic is an important factor in modulating the response of pelican and sea lion abundance to fishing sardines and anchovy on the US West coast. Pelicans are more vulnerable to declines in sardine and anchovy because of a more restricted diet and more limited foraging area compared to sea lions (Punt et al., 2016). Spatial dynamics are especially important to consider when the distribution of forage fish shifts. Robinson et al. (2015) showed that decreases in the penguin population at Robben Island in South Africa were primarily due to changes in the distribution of sardines, not to the total sardine abundance.

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Cury et al. (2011) showed a relationship between the abundance of key prey species and reproductive success of birds. However the index of forage fish abundance in half of the data sets they presented was not the total abundance of forage fish, but rather either local abundance measured around the nesting site, or amount of prey brought to the nest. Thus for those data sets, the relationship between total abundance of prey as influenced by fishing and reproductive success would be weaker than the relationship shown in the paper. Perhaps the best example of this is the data presented for three nesting sites for two bird species in Cook Inlet, Alaska (Piatt, 2002). Prey abundance around the nesting site was estimated by hydroacoustic surveys, and two of the sites generally showed good reproductive success associated with high prey abundance while one of the sites showed poor reproductive success and lower prey abundance. However, these results related to the same fish stock,

The EwE models used in the Pikitch et al. and Smith et al. papers did not take the spatial structure of the forage fish populations into account, but instead assumed that total prey abundance, as influenced by fishing, was exactly what would determine the growth and survival of the predators. To evaluate the influence of fishing on the predators reliably, the changes in spatial distribution need to be considered. This is why both the Punt et al. (2016) and Robinson et al. (2015) papers estimate far less influence of fishing on predator populations than the simpler EwE models of Pikitch et al. and Smith et al. though some of the models used in the Smith et al. paper were ATLANTIS models that included some elements of spatial structure. Walters et al. (2016) also showed that the impact of fishing forage fish would depend greatly on how models were structured and that the conclusions of EwE models are very sensitive to model setup.

subject to the same fishery, at all three sites.

5. Conclusions

The purpose of this paper is to identify key factors that need to be included when analyzing the impacts of fishing on forage fish. We find several reasons to concur with the conclusion of Essington and Plaganyi (2013) that the models used in previous analysis were frequently inadequate for estimating impact of fishing forage species on their predators.

The most important feature that needs to be considered is the natural variability in forage fish population size. Their abundance is highly variable even in the absence of fishing, and a creditable analysis of the fishing impacts must consider how the extent of fishing-induced depletion compares with that of natural variability. As an example, Punt et al. (2016) estimated that the probability that brown pelicans would drop below 0.5 K with fishing was 5.3%, and without fishing was 4.5%. For marine fishes in general, "stochastic depletion" i.e. populations falling below 0.5 K, can be expected about 5% of the time even in the absence of fishing (Thorson et al., 2014). Models like EwE without stochasticity would suggest zero probability of such declines in the absence of fishing.

There is a need for a much more thorough analysis of the nature of recruitment trends in forage fish. That there are major environmentally-driven regime changes for many species is unarguable, but what exactly changes is unclear. It is unrealistic to assume that there is no relationship between spawning stock abundance and subsequent recruitment, so what is presumably changing with the environment is either the basic carrying capacity for forage fish, the basic productivity (recruits per spawner) or some combination of the two. The actual dynamics may not involve discrete regimes, but rather gradual changes in the spawner recruitment relationship. The harvest strategy that maximizes long-term fishery yield will depend greatly on exactly how the spawner recruit relationship is changing. If it is the carrying capacity that changes, then a constant fishing mortality rate will produce

long-term yields that are very close to the theoretical optimum (Walters and Parma, 1996). If, however, it is the underlying productivity that changes, the fishing mortality rate may need to be respectively increased or decreased as productivity changes upwards or downwards.

The size distribution of both predator and prey and the size selectivity in diet need to be included in any analysis. In cases where recruitment is largely independent of spawning stock, and the predators take prey before they are fished, there is no influence of the fishery on availability of prey to predators. We identified numerous examples where this is the case (Fig. 3), but it is not universal. Some predators compete directly with the fishery for the same sizes of prey and such competition must be considered if we are to manage fisheries appropriately for both predators and prey.

We have found several examples of the importance of changes in spatial distribution of prey affecting the predators that suggest any analysis that does not consider such changes will not properly evaluate the impact of fishing forage fish on their predators. These include the South African penguin and sardine interaction and the Cook Inlet example (Piatt, 2002).

Our analysis of the relationship between predator rate of change and abundance of individual prey species suggests little evidence for strong connections. This is likely due to the many factors discussed above that mediate the link between fishing, prey abundance, spatial distribution and size, and predator population dynamics. The fact that few of the predator populations evaluated in this study have been decreasing under existing fishing policies suggests that current harvest strategies do not threaten the predators and there is no pressing need for more conservative management of forage fish. Hannesson (2013) showed that declines of Pacific sardine, Norwegian spring spawning herring, and Peruvian anchoveta had small impacts on their fish predators, although he relied on catches of the predators rather than direct measures of abundance. This is further evidence that general rules proposed by Pikitch et al. (2012) are not appropriate for all species and a case by case analysis is needed.

Pikitch et al. (2012) argued forcefully that their analysis provided general conclusions that should be broadly applied. However, relevant factors are missing from the analysis contained in their work, and this warrants re-examination of the validity and generality of their conclusions. We have illustrated how consideration of several factors which they did not consider would weaken the links between impacts of fishing forage fish on the predator populations.

Smith et al. (2011) were much more reserved in their conclusions, ending primarily with the estimate that fishing mortality rates on forage fish could be well below $F_{\rm MSY}$ with only a 20% decrease in catch of forage fish while having appreciable benefits to their predators. All single species population models show little decrease in yield with fishing mortality rates less than $F_{\rm MSY}$ and this would be true for forage fish as well. The very simple logistic growth model suggests that a fishing morality rate of $0.5\,F_{\rm MSY}$ would produce 75% of MSY. However, the evidence presented here suggest that reductions in fishing mortality rate would benefit predators less than argued by Pikitch et al. (2012). Most of the issues we raised in this paper apply to most of the models used by Smith et al. (2011).

It must be remembered that small pelagic fish stocks are a highly important part of the human food supply, providing not only calories and protein, but micronutrients, both through direct human consumption and the use of small pelagics as food in aquaculture. Some of the largest potential increases in capture fisheries production would be possible by fishing low trophic levels much harder than currently (Garcia et al., 2012; Kolding et al., 2016). While fishing low trophic levels harder may reduce the abundance of higher level predators, that cost should be weighed against the environmental cost of increasing food production in other ways. As Sharpless and Evans (2013) point out, fish provide food without

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substantial use of freshwater, fertilizer, antibiotics and soil erosion. Forage fish also have among the lowest carbon footprints of any form of protein production (Pelletier et al., 2011). Thus it is not clear that from a global environmental perspective that reductions in fishing mortality rates on forage fish would necessarily be precautionary.

We have used examples of predators and forage fish only from U.S. fisheries, which are widely recognized to be among the best managed in the world, and also have extensive legal protections for many higher trophic level birds and mammals. While the deficiencies we have identified in the existing models are general, the status and trends of predators and prey may be quite different in other parts of the world.

Acknowledgments

We thank Dr. A.D.M. Smith and two anonymous reviewers for constructive comments. RH, EB and RA were supported by donations to the University of Washington from 27 fishing groups and fishing companies in the United States. OPJ was supported by the Science Center for Marine Fisheries (SCeMFiS).

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.fishres.2017.01.

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Atlantic States Marine Fisheries Commission

Draft Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden



ASMFC Vision Statement: Sustainably Managing Atlantic Coastal Fisheries

Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden

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This is a report of the Atlantic States Marine Fisheries Commission pursuant to U.S. Department of Commerce, National Oceanic and Atmospheric Administration Award Nos. XXXXXXXXX.



The Atlantic States Marine Fisheries Commission seeks your input on Draft Amendment 3 to the Atlantic Menhaden Fishery Management Plan.

The public is encouraged to submit comments regarding this document during the public comment period. Comments must be received by **5:00 PM (EST) on XXXXX.** Regardless of when they were sent, comments received after that time will not be included in the official record. The Atlantic Menhaden Management Board will consider public comment on this document before finalizing Amendment 3.

You may submit public comment by attending a public hearing held in your state or jurisdiction or mailing, faxing, or emailing written comments to the address below. Comments can also be referred to your state's members on the Atlantic Menhaden Management Board or Atlantic Menhaden Advisory Panel; however, only comments received at a public hearing or written comments submitted to the Commission will become part of the public comment record.

Mail: Megan Ware Email: comments@asmfc.org

Atlantic States Marine Fisheries Commission (Subject: Amend 3)
1050 N. Highland Street, Suite 200 A-N Phone: (703) 842-0740
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If your organization is planning to release an action alert in response to Draft Amendment 3, or if you have questions, please contact Megan Ware at (703)-842-0740.

The timeline for completion of Amendment 3 is as follows:

	Oct 2016	Nov 2016 – Jan 2017	Feb 2017	Mar – July 2017	Aug 2017	Sept – Oct 2017	Nov 2017
Approval of Draft PID by Board	X						
Public review and comment on PID		x					
Board review of public comment; Board direction on what to include in Draft Amendment 3			x				
Preparation of Draft Amendment 3				х			
Review and approval of Draft Amendment 3 by Board for public comment <i>Current Step</i>					x		
Public review and comment on Draft Amendment 3						X	
Board review of public comment on Draft Amendment 3							х
Review and approval of the final Amendment 3 by the Board, Policy Board and Commission							х

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1.0 INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC), under the authority of the Atlantic Coastal Fisheries Cooperative Management Act, is responsible for managing Atlantic menhaden (*Brevoortia tyrannus*) from Maine through Florida. ASMFC has coordinated the interstate management of Atlantic menhaden in state waters (0-3 miles) since 1981. Amendment 3 to the Interstate Fishery Management Plan for Atlantic menhaden replaces Amendment 2 (ASMFC, 2013). Management authority in the exclusive economic zone (3-200 miles from shore) lies with NOAA Fisheries.

1.1 BACKGROUND INFORMATION

At their May 2015 meeting, the Atlantic Menhaden Management Board (Board) initiated the development of Amendment 3 to the Atlantic Menhaden FMP to pursue the development of ecological reference points (ERPs) and revisit allocation methods. The Board approved the Amendment 3 Public Information Document for public comment in October 2016. Public comment was received and hearings were held between December 2016 and January 2017. At their February 2017 meeting, the Board tasked the Plan Development Team (PDT) with developing Draft Amendment 3.

1.1.1 Statement of Problem

1.1.1.1 Ecological Reference Points

Amendment 2 established single-species reference points to manage the menhaden stock. These reference points were based on maximum spawning potential (MSP) and included a measure of fishing mortality (F) and spawning stock biomass (SSB) to determine an overfishing and overfished status. Per Amendment 2, overfishing was defined by a target and threshold of F_{30%MSP} and F_{15%MSP}, respectively, while an overfished stock was defined by a target and threshold of SSB_{30%MSP} and SSB_{15%MSP}, respectively.

In 2015, the Board approved a new Atlantic Menhaden Benchmark Stock Assessment which updated the reference points for Atlantic menhaden in order to provide a better measure of sustainability (SEDAR, 2015). Specifically, the reference points were changed to be the maximum and median geometric mean fishing mortality rate for ages 2-4 during 1960-2012, a period deemed sustainable. Corresponding reference points based on fecundity (FEC) were also established to determine an overfished status. This method was applied to the 2017 Stock Assessment Update. Resulting reference points are an overfishing threshold and target of $F_{21\%}$ and $F_{36\%}$, respectively, and an overfished threshold and target of $FEC_{21\%}$ and $FEC_{36\%}$, respectively. As of 2016, the terminal year used in the 2017 Stock Assessment Update, the stock is not overfished and overfishing is not occurring.

An important outcome of the 2015 Stock Assessment and Peer Review Report was the high priority given to the development of ERPs for Atlantic menhaden management. Menhaden serve an important role in the marine ecosystem as they convert phytoplankton into protein

and, in turn, provide a food source to a variety of species including larger fish (e.g., weakfish, striped bass, bluefish, cod), birds (e.g., bald eagles, osprey), and marine mammals (e.g., humpback whales, bottlenose dolphin). As a result, changes in the abundance of menhaden may have implications for the marine ecosystem. ERPs provide a method to assess the status of menhaden not only with regard to the sustainability of human harvest, but also with regard to their interactions with predators and the status of other prey species. This method accounts for several species' menhaden predation requirements when setting an overfished and overfishing threshold for menhaden. The benefit of this approach is that it allows fishery managers to consider the harvest of menhaden within a broad ecosystem context, which includes other fish, birds, mammals, and humans who utilize and depend on marine resources.

1.1.1.2 Allocation

Amendment 2 established a first-ever commercial total allowable catch (TAC) for Atlantic menhaden and divided this catch into commercial quotas for participating jurisdictions from Maine through Florida. The allocation formula assigns each state a percentage of the TAC based on each jurisdiction's average landings between 2009 and 2011. Since it was implemented in 2013, the quota system has maintained the annual directed harvest of menhaden below the annual coastwide TAC set by the Board.

Amendment 2 requires allocation to be revisited every three years. In reviewing menhaden allocations, the Board expressed interest in investigating different allocation methods and timeframes given concerns that the current approach may not strike a balance between gear types and regions. Specifically, some states have expressed concern that under the current allocation method, increases in the TAC result in limited benefits to small-scale fisheries. In addition, there is concern that the current allocation method does not provide a balance between the present needs of the fishery and future growth opportunities. Given the apparent geographic expansion of the stock, particularly in New England, the 2009-2011 time-period on which allocation is based may limit states who currently have minimal quota from participating in the growing fishery. Some states have also found evidence of un-reported landings during the reference period, meaning the quota system may have reduced their fisheries to a greater extent than originally intended.

1.1.2 Benefits of Implementation

Amendment 3 is designed to integrate the ecological role of menhaden into the management of the species and establish an allocation method which provides fair and equitable access to all participants in the fishery.

Amendment 3 contains a management program designed to account for the multiple roles that menhaden play, both in supporting fisheries for human use and the marine ecosystem. Issues addressed in Amendment 3 include:

1. <u>Reference Points:</u> How menhaden are allocated between the marine ecosystem and those that harvest menhaden for human use.

- 2. <u>Allocation Method:</u> How menhaden are allocated between those jurisdictions and fisheries which directly or indirectly harvest menhaden.
- 3. Allocation Timeframe: The timeframe upon which the allocation method is based.
- 4. <u>Quota Transfers:</u> How menhaden quota is moved between those stakeholders which receive an allocation.
- 5. <u>Quota Rollovers:</u> Whether unused quota can be rolled over into the subsequent fishing year.
- 6. <u>Incidental Catch:</u> How landings from non-directed and small scale fisheries are accounted for in the management of the species.
- 7. <u>Episodic Events Program:</u> Whether there is a program designed to minimize discards in the fishery when menhaden are in greater abundance than they normally occur.
- 8. <u>Chesapeake Bay Reduction Fishery Cap:</u> Whether there is a cap which limits harvest by the reduction fishery in the Chesapeake Bay, an important nursery ground for menhaden.

1.1.2.1 Ecological Benefits

Atlantic menhaden occupy an important link in the coastal marine food chain as they transfer planktonic material into animal biomass. Due to their interconnectivity with other species, menhaden help to provide top-down controls on phytoplankton and zooplankton populations while supporting a variety of predator species. These predators include important commercial and recreational species such as striped bass and weakfish, iconic birds such as osprey and bald eagles, and charismatic marine mammals such as the humpback whale. Reduced menhaden populations may impact the abundance and diversity of predator populations, particularly if other prey options are limited or not available. Given menhaden are found from Maine to Florida, the species serves an ecological role along much of the Atlantic coast. Thus, maintaining a healthy Atlantic menhaden population contributes to a balanced marine ecosystem (see *Section 1.2.1.5 Ecological Roles* for additional information).

1.1.2.2 Social/Economic Benefits

Menhaden play an important ecological role while supporting valuable and culturally significant commercial fisheries. Incorporating ecological reference points into menhaden management may provide ancillary benefits to a wide variety of coastal stakeholders who value species which depend on menhaden as a food source. Establishing quota allocation methods that provide fair and equitable access to all fishery participants may enhance social and economic benefits by increasing derived value and stabilizing economic returns. This in turn improves resilience in fishery-dependent communities along the Atlantic coast.

1.2 DESCRIPTION OF THE RESOURCE

1.2.1 Species Life History

1.2.1.1 Stock Structure and Migration

Atlantic menhaden is a euryhaline species that inhabits nearshore and inland tidal waters from Florida to Nova Scotia, Canada. Size-frequency information and tagging studies indicate that the

Atlantic menhaden resource is a single unit stock (Dryfoos et al., 1973; Nicholson, 1972; Nicholson, 1978). Recent genetic studies also support the designation of Atlantic menhaden as a single stock (Anderson, 2007; Lynch et al., 2010).

Spawning occurs principally at sea, with some activity in bays and sounds in the northern portion of its range (Judy and Lewis, 1983). Eggs hatch at sea and the larvae are transported by ocean currents (Checkley et al., 1988; Nelson et al., 1977; Quinlan et al., 1999) to estuaries where they metamorphose and grow rapidly as juveniles (Edwards, 2009). Adults stratify by size during the summer, with older and larger individuals migrating farthest, reaching Narragansett Bay by May and the Gulf of Maine by June. During November and December, most of the adult population moves south to the Virginia and North Carolina capes. Adults that remain in the south Atlantic region during spring and summer migrate further south later in the year, reaching northern Florida by fall. Schools of adult menhaden reassemble in late March or early April and migrate northward. By June the population is redistributed from Florida to Maine (Ahrenholz, 1991).

1.2.1.2 Age and Growth

During the 1950s and early 1960s, Atlantic menhaden older than age-6 were present in the spawning population; however, fish older than age-6 have been uncommon in recent years. Today, the majority of the landings are comprised of fish ages 1-4 (SEDAR, 2015).

The growth of Atlantic menhaden varies from year-to-year and occurs primarily during the warmer months (AMTC, 2006). Growth of juveniles is density-dependent (Ahrenholz et al., 1987) such that growth rates are accelerated during the first year when juvenile abundance is low and are reduced when juvenile abundance is high. Lengths of young-of-year menhaden range in size, and this variation is a function of density, timing of larval ingress, temperature, and food availability (Ahrenholz, 1991; Houde, 2011). Adult menhaden can reach a total length of up to 500 mm and a weigh over 1.5 kg (Cooper, 1965; SEDAR, 2015; Smith and O'Bier, 1996). Due to their extensive migratory range (see *Section 1.2.1.1*), larger fish of a given age are captured farther north than smaller fish of the same age (Nicholson, 1978; Reish et al., 1985). This fact complicates attempts to estimate overall growth for the entire stock from size-at-age data compiled from a single area along the coast.

1.2.1.3 Spawning and Reproduction

Some Atlantic menhaden become sexually mature during their first year, with more than 50% mature at age-2 (SEDAR, 2015). First-spawning age-3 fish have accounted for most of the stock's egg production since 1965 (Vaughan and Smith, 1988). Atlantic menhaden mature at smaller sizes at the southern end of their range (180 mm FL in the south Atlantic versus 210 mm FL in the Chesapeake Bay and 230 mm farther north) because of latitudinal differences in size-at-age and the fact that larger fish of a given age are distributed farther north than smaller fish of the same cohort (Lewis et al., 1987).

Spawning of Atlantic menhaden is thought to occur throughout the year (Higham and Nicholson, 1964); however, it varies by season and region based on migration patterns.

Spawning in the north occurs in the summer months (Judy and Lewis, 1983; Kendall and Reintjes, 1975; Lozano and Houde, 2012), spawning in the Mid-Atlantic occurs in early fall, and peak spawning in the South Atlantic Bight occurs in December (Higham and Nicholson, 1964; Judy and Lewis, 1983; Lozano and Houde, 2012). Spawning is followed by the coastward dispersion of eggs and larvae, and ingress into estuaries where juvenile development occurs (Houde et al., 2016; Lozano and Houde, 2013; Rice et al., 1999; SABRE, 1999; Warlen, 1994; Warlen et al., 2002).

Timing and location of spawning seem to be limited by temperature, usually occurring in waters warmer than 14-16°C (Stegmann et al. 1999, Light and Able, 2003), or within the 15-20°C isotherms (MDSG 2009). Hall et al. (1991) report that temperatures below 5°C or above 33°C are lethal to larvae. Based on a review of field and laboratory studies, Warlen et al. (2002) concluded that optimum temperature for hatching, larval survival, and growth is ≥16°C. Reported salinities range from ~25 to 33 (MDSG 2009), although salinity tolerances for eggs and larvae are wide ranging. Available literature has not been summarized to indicate typical or persistent locations of continental shelf spawning areas but egg concentrations have been observed near shorelines, bay mouths, inlets, and 70 to 140 km offshore (Judy and Lewis 1983; Kendall and Reintjes, 1975; Marak et al., 1962).

Recently, there has been progress in relating measures of primary productivity to recruitment and growth of young-of-year (YOY) menhaden. Research has shown there is a positive correlation between recruitment and euphotic-zone chl-a and integrated annual primary production in the Chesapeake Bay (Houde and Harding, 2009), suggesting that menhaden populations are controlled in part by bottom-up processes (i.e., quantity of food available). Despite these findings, additional work has found no significant correlation between YOY menhaden abundance and chl-a for the entire four-decade period that included times of both low and high menhaden recruitment events in Chesapeake Bay. The strong correlation between YOY menhaden abundance and chl-a in recent years (1989-2004) as noted above did not persist throughout the longer time series (1966-2006). On average, years with low freshwater flow and low turbidity supported higher abundances and recruitment of YOY menhaden (Houde et al., 2016; Love et al., 2006; Lynch et al., 2010). Other correlations between YOY menhaden abundance and environmental or hydrographic variables were not significant or were only marginally significant (e.g., negative correlations with total dissolved phosphorus and with abundances of zooplankton taxa favored by low salinities). These conflicting bodies of work further highlight the complexity that exists between nutrient cycling, climatic drivers, and understanding the life history traits of Atlantic menhaden.

1.2.1.4 Mortality

The Atlantic menhaden population is subject to a high natural mortality rate, particularly during the first two years of life. Estimates of natural mortality have ranged from M=0.37 (Schaaf and Huntsman, 1972) to M=0.52 (Dryfoos et al., 1985). Previous assessments, beginning with Ahrenholz et al. (1987), used M=0.45, whereas the 2015 Benchmark Stock Assessment used a time varying but age constant natural mortality to better account for known sources of natural

mortality such as predation, pollution, habitat degradation, toxic algal blooms, and hypoxia (SEDAR, 2015).

Predation remains a large source of natural mortality for menhaden due to their high abundance in estuaries and coastal waters (Ahrenholz, 1991). Many large piscivorous sea mammals, birds, and fish are potential predators of Atlantic menhaden, including bluefish, striped bass, king mackerel, Spanish mackerel, pollock, cod, weakfish, silver hake, tunas, swordfish, bonito, tarpon, and a variety of sharks. See additional details in *Section 1.2.1.5: Ecological Roles*.

Coastal pollution, habitat degradation, and disease also threaten marine fish species such as Atlantic menhaden which spend their first year of life in estuarine waters and the rest of their life in both ocean and estuarine waters. Fish kills, due principally to low dissolved oxygen conditions, disease, and parasites are additional yet poorly understood sources of natural mortality (Burkholder et al., 1992; Blazer et al., 1999; Noga, 2000; Law, 2001; Glasgow et al., 2001; Vogelbein et al., 2001; Kiryu et al., 2002; Reimschussel et al., 2003; Burkholder et al., 2005). A variety of diseases are thought to affect menhaden survival (Stephens et al., 1980; Noga and Dykstra, 1986; Noga et al., 1988; Levine et al., 1990a; Levine et al., 1990b; Dykstra and Kane, 2000; Goshorn et al., 2004; Stine et al., 2005; Blazer et al., 2007). Menhaden are also known to induce fatal hypoxic events, where reports of such school-induced hypoxia and resulting fish kills going back to the 1800's (Oviatt et al., 1972; Smith, 1999).

1.2.1.5 Ecological Roles

Menhaden occupy an important link in the coastal marine food chain, transferring planktonic material into animal biomass. As a result, menhaden influence the conversion and exchange of energy and organic matter within the coastal ecosystem throughout their range (Lewis and Peters, 1984; Peters and Lewis, 1984; Peters and Schaaf, 1981). Studies have indicated that menhaden are a part of the diet of many species including striped bass, bluefish, weakfish, and piscivorous birds (Viverette et al. 2007). As a result, changes in the abundance and distribution of menhaden can have impacts on a variety of species given their role in the food web.

Atlantic menhaden occupy two distinct types of feeding niches during their lifetime. Phytoplankton is the major food of juvenile and young adult menhaden. The role of zooplankton in the diet becomes more important in older menhaden as gill-raker spacing on their filtering apparatus increases in size (Friedland et al., 1984; 2006). The relative importance of each food type varies with ontogeny, region, and local availability.

The role of Atlantic menhaden in systems function and community dynamics has received much attention in recent years. Spatially-explicit bioenergetics models have been used to estimate the carrying capacity of menhaden in the Chesapeake Bay as well as the reduction of habitat volume from eutrophication and hypoxia (Brandt and Mason, 2003; Luo et al., 2001). Additionally, simulation models of Narragansett Bay and the Chesapeake Bay indicate that Atlantic menhaden could have substantial effects on zooplankton and phytoplankton populations, and on nutrient dynamics (Durbin and Durbin 1975; 1998; Gottlieb 1998).

However, a study by Lynch et al. (2010) suggests that the menhaden population probably plays little role in removing nitrogen from Chesapeake Bay waters, and may actually provide additional nitrogen to Bay phytoplankton. Results suggest that YOY menhaden focus their grazing on patches of elevated phytoplankton abundance and/or supplement their diet with other sources (e.g. zooplankton and detritus) to maintain a positive nitrogen balance. As a result, the study suggests that menhaden may play a minimal role in net nitrogen removal from the Chesapeake Bay.

1.2.2 Stock Assessment Summary

Based on tagging (Dryfoos et al., 1973; Nicholson, 1978) and genetic studies (Anderson, 2007; Lynch, 2010), the Atlantic menhaden fishery is believed to be a single stock or population of fish, and is assessed as a single coastwide stock. Data used in the stock assessment includes commercial and recreational landings at-age from Maine to Florida, two fishery independent adult indices based on nine state surveys, one each for the northern and southern regions, and a juvenile abundance index (JAI) developed from state seine, trawl, and other gear surveys along the coast.

Growth is estimated using a time invariant weight-length relationship based on fishery-dependent data that is bias corrected using the methods in Schueller et al. (2014). Weight at age is estimated from overall weight-length parameters and annual lengths at age. Maturity at age is developed using maturity records from reduction fishery catches and NEAMAP survey data. A logistic regression is fit to length and maturity data in addition to using time-varying lengths at age to calculate time-varying maturity at age. Natural mortality is calculated by an age-varying, time invariant approach using the methods of Lorenzen (1996) that are scaled to tagging estimates of natural mortality. This estimate of natural mortality accounts for multiple sources of mortality including predation, pollution, habitat degradation, toxic algal blooms, and hypoxia. The assessment model is structured into "fleets-as-areas" in order to account for differences between bait and reduction fisheries in the north and south. In addition, dome shaped selectivity is used for all fishery fleets.

The Beaufort Assessment Model (BAM) is used to produce final assessment results. This is a statistical forward-projection model that has been used in previous Atlantic menhaden assessments (SEDAR, 2015).

1.2.2.1 Abundance and Structure

Annual Atlantic menhaden population size (age 0 and older at the start of the fishing season) has ranged from approximately 10 to 85 billion fish since 1955 (Figure 2). Population size averaged 45.0 billion menhaden during 1955-1959 when landings were high (averaging >600,000 mt). During the 1960's, the menhaden stock contracted geographically, and the population averaged 14.9 billion fish. Total menhaden landings dropped to a low of 172,200 mt in 1969. In the 1970s and 1980s the menhaden population began to expand and the population size averaged 30.8 billion fish. During this time period, average landings rose to over 300,000 mt. During the 1990s, the Atlantic menhaden stock contracted again, and catches declined from

429,300 mt in 1990 to 206,000 mt in 1999. From 2000-2016, the population size averaged 16.4 billion fish and total catches have averaged about 200,000 mt per year.

The oldest menhaden age classes comprise the smallest proportion of the population (Figure 2), but this proportion has increased in recent years (SEDAR, 2015). For this reason, biomass is likely increasing at a faster rate than abundance because of the increased number of older fish at age and the associated increase in weight at age (SEDAR, 2015).

1.2.2.2 Fishing Mortality

Highly variable fishing mortalities are noted throughout the entire time series and are dependent upon fishing effort. The highest fishing mortalities for the commercial reduction fishery in the north are estimated to have occurred in the 1950s (Figure 3), whereas the highest fishing mortality rates for the commercial reduction fishery in the south are estimated to have occurred during the 1970s and 1990s (Figure 3). The highest fishing mortalities for the commercial bait fishery in the north are estimated to have occurred in the 1950s and 1990s (Figure 4), while the highest fishing mortality rates for the commercial bait fishery in the south are estimated to have occurred during the late 1990s and early 2000s (Figure 4).

In the 2015 Benchmark Stock Assessment, the Technical Committee (TC) initially recommended that the Board adopt a fishing mortality threshold based on the maximum F value at age-2 during the 1960-2012 time period and a target fishing mortality based on the median F value during this time period. However, in order to provide a more robust measure of fishing pressure under changing selectivity, it was recommended by the Peer Review panel that the geometric mean fishing mortality on ages-2 to -4 be used instead of the suggested age-2 reference points. This recommendation was accepted for use by the TC because these ages represent the fully selected fishing mortality rates depending upon the year and fishery (i.e., bait and reduction). As a result of the 2017 Stock Assessment Update, the fishing mortality reference points are F-target ($F_{36\% MSP}$) = 0.80 and F-threshold ($F_{21\% MSP}$) = 1.85.

Based on these reference points, fishing mortality has remained below the fishing mortality threshold (1.85) since the 1960s, hovered around the target (0.80) throughout most of the time-series, and was estimated to be 0.51 in 2016 (the terminal year of the assessment).

1.2.2.3 Recruitment

Age-0 recruits of Atlantic menhaden (Figure 5) were high during the late 1950s, especially the 1958 year-class. Recruitment was generally poor during the 1960s and high during the late 1970s and early 1980s. Since then, recruitment has been low with notable year classes in 2005 and 2010. The estimated number of age-0 fish in 2016 (the terminal year of the assessment) was 13.36 billion fish.

1.2.2.4 Spawning Stock Biomass (Fecundity)

Often reproductive capacity of a stock is modeled using female weight-at-age, primarily because of a lack of fecundity data. To the extent that egg production is not linearly related to female weight, indices of egg production (fecundity) are better measures of the reproductive

output of a stock at a given size and age structure. Additionally, fecundity better emphasizes the important contribution of older and larger individuals to egg production. Thus, in the most recent benchmark stock assessment (SEDAR, 2015), modeling increases in egg production with size was preferable to female biomass as a measure of the reproductive capability of the stock.

Population fecundity (*FEC*, number of maturing ova) was highest in the early 1960s, early 1970s, and the present decade, and has generally been higher with older age classes making up a larger proportion of the population (Figure 6). Large values of population fecundity were present in 2012 and 2013. Throughout the time series, age-2 and age-3 fish have produced most of the total estimated number of eggs spawned annually; however, in more recent years, ages-4+ have contributed a higher proportion to the overall number of eggs.

1.2.2.5 Maximum Spawning Potential

Amendment 2 (2013) implemented maximum spawning potential (MSP) based reference points that relate current stock conditions as a percent of unfished conditions. An unfished stock is equal to 100% MSP. Considering the modeling and data input changes that occurred in the 2015 Benchmark Stock Assessment, the TC and Peer Review Panel recommended new MSP based reference points that are applicable to the results of the assessment (ASMFC 2015).

The fecundity (FEC) reference points match the F reference points, meaning they are equal to the fecundity estimated when the population reaches equilibrium when fishing under the fishing mortality target and threshold MSP levels, respectively. The associated reference points for population fecundity are FEC-target (FEC_{36%MSP}) = 99,467 (billions of eggs), and FEC-threshold (FEC_{21%MSP}) = 57,295 (billions of eggs). In other words, the FEC target would maintain 36% of the spawning potential of an unfished stock, and the threshold would preserve 21% of the spawning potential of an unfished stock. In 2016, fecundity was estimated to be 83,486 billion eggs.

1.2.3 Current Stock Status

The current stock status determination is based on the 2017 Atlantic Menhaden Stock Assessment Update (ASMFC, 2017). The fishing mortality reference points are F-target ($F_{36\%}$) = 0.80 and F-threshold ($F_{21\%}$) = 1.85. The associated reference points for population fecundity are FEC-target ($FEC_{36\%}$) = 99,467 (billions of eggs), and FEC-threshold ($FEC_{21\%}$) = 57,295 (billions of eggs). As of 2016, overfishing is not occurring because fishing mortality for the terminal year is estimated to be F = 0.51, below both the target and the threshold (Figure 7). Additionally, the stock is not overfished because fecundity for 2016 is estimated to be FEC = 83,486 billion eggs, above the threshold and just below the target (Figure 8).

1.3 DESCRIPTION OF THE FISHERY

1.3.1 Commercial Fishery

Atlantic menhaden have supported one of the United States' largest fisheries since colonial times. Menhaden have repeatedly been listed as one of the nation's most important commercial fisheries in terms of quantity. Preliminary Atlantic menhaden landings in 2016 totaled 181,344 mt (399.8 million lb) (Table 16). Landings records indicate that roughly 25 million mt (55.1 billion lb) of Atlantic menhaden have been caught by fishing fleets operating from Maine to Florida since 1940.

Native Americans were the first to use menhaden, primarily as fertilizer. Colonists soon recognized the value of menhaden as fertilizer and local seine fisheries gradually developed from Maine to New York. In 1811, the menhaden oil industry began in Rhode Island (Frye, 1999). Numerous small factories were located along the Northeast coasts; however, their supply was limited to fish that could be captured by the traditional shore-based seines. In 1845, the purse seine was introduced, enabling fishermen to harvest a larger quantity of menhaden further from shore. By 1870, the industry had expanded southward, with several plants in the Chesapeake Bay and North Carolina areas (Whitehurst, 1973). The industry gradually developed during the late 1800s and early 1900s and was described in considerable detail prior to World War I by Greer (1915). After World War I, the primary use of menhaden changed from fertilizer to animal feed due to the development of a process known as fish reduction. Menhaden meal began to be mixed into poultry, swine, and cattle feeds as the amount used for fertilizer decreased (Harrison, 1931). The current commercial fishery is divided into the reduction fishery, in which menhaden are produced into fish meal and fish oil, and the bait fishery, in which menhaden are harvested as a bait source for other commercial and recreational fisheries. A variety of gears are used to harvest menhaden commercially.

1.3.1.1 Reduction Fishery

Vessels, Reduction Plants, and Harvest Capacity

Several technological advances have helped the menhaden reduction fishery maintain its viability over the last century. The early menhaden purse seine reduction fishery utilized sailing vessels; however, the introduction of coal-fired steamers after the Civil War enabled the reduction fishery to fish further grounds. In the 1930s, vessels again improved through the use of diesel-power which replaced many of the coal-fired steamers. A critical development in the reduction fishery was the use of spotter aircraft in 1946. This practice is still used today to locate schools of menhaden. The refrigeration of vessel holds in the 1960s and 1970s was another crucial development for the reduction fishery. Despite restricted access to a number of traditional fishing grounds, a reduced fleet size, and fewer processing plants to land fish, refrigerated holds enabled the fleet to maximize the harvest during peak resource availability. Refrigeration also allowed the fleet to stay out longer and access a wider geographic area, greatly improving the ability to catch fish when and where they were available. All seven vessels in the menhaden fleet in 2013 utilized refrigerated fish holds, compared to only 60% of the fleet in 1980.

Currently, menhaden reduction operations use spotter aircraft to locate schools of menhaden and direct vessels to the fish. When a school is located, two purse boats, with a net stretched between them, are deployed. The purse boats encircle the school and close the net to form a purse, or bag. The net is then retrieved to concentrate the catch, and the mother ship comes along the side and pumps the catch into refrigerated holds. Individual sets can vary from 10 mt to more than 100 mt, and large vessels can carry 400-600 mt of refrigerated fish.

Overall, the total number of vessels participating in the menhaden reduction fishery has declined through time. Greer (1915) reported 147 vessels in 1912. During 1955-1959, about 115-130 vessels fished during the summer season, while 30-60 participated in the North Carolina fall fishery. As the resource declined during the 1960s, fleet size decreased by more than 50%. Through the 1970s, approximately 40 vessels fished during the summer season, while roughly 20 were active in the fall fishery. During 1980-1990, 16-33 vessels fished the summer season, and the level of effort in the fall fishery ranged from 3 to 25 vessels. In 2013, only seven vessels participated in the reduction fishery.

One of the major changes in the reduction fishery has been the decrease in the number of operating reduction plants. During peak landing years (1953-1962), there were anywhere from 19 to 25 reduction plants in operation located along the Atlantic coast from Maine to Florida. Many plants closed in the late 1960s as the resource began to decline and, in 1975, there were 12 reduction plants in operation. In 1985, this decreased to six plants and by 1994, there were only three plants located in Virginia and North Carolina. A major change in the reduction industry took place following the 1997 fishing season, when the two reduction plants operating in Reedville, VA, consolidated into a single company and a single factory; this significantly reduced effort and overall production capacity. Another major event within the industry occurred in the spring of 2005 when the fish factory in Beaufort, NC, closed and the owners sold the property to coastal developers. Today, there is a single reduction plant along the U.S. Atlantic coast located in Reedville, Virginia.

Reduction landings averaged 310,900 mt from 1940-2016, but only averaged 161,700 mt from 2000 – 2016 (Table 17, Figure 9). Reduction landings since 1940 peaked in 1956 at 712,100 mt, with the lowest value since 1940 occurring in 2013 (131,000 mt). It is important to note that 2013 was the first year a TAC was implemented in the menhaden fishery. This TAC represented a 20% reduction from average landings in 2009-2011. Other causes of declines in reduction harvest include lower menhaden abundance, reduced fleet size, and reduced reduction plant capacity.

The menhaden reduction fishery is seasonal as the presence of menhaden schools is dependent on the temperature of coastal waters. Two fairly distinct fishing seasons occur: the 'summer fishery' and the 'fall fishery'. The summer fishery begins in April with the appearance of schools of menhaden off the North Carolina coast. The fish migrate northward, appearing off southern New England in May-June. The fall fishery begins when migratory fish appear off Virginia and North Carolina. In early fall, this southward migration is initiated by cooling ocean

temperatures. By late November-early December, most of the fish are found between Cape Hatteras and Cape Fear, North Carolina.

Reduction Fishery Products

Menhaden reduction plants, through a process of heating, separating, and drying, produce fish meal, fish oil, and fish solubles from fresh menhaden. Meal is a valuable ingredient in poultry and livestock feeds because of its high protein content (at least 60%). Meal can also be found in pet foods for fish and dogs. Menhaden oil is (or has been) used in cooking oils, margarine, soap, linoleum, waterproof fabrics, and certain types of paint. Menhaden oil is often marketed as a source of omega-3 fatty acids and can be incorporated into food and beverage products as well as dietary supplements. Solubles are the aqueous liquid component remaining after oil removal. In general, most meal producers add the soluble component to the meal to create a product termed "full meal". Solubles can be used in the aquaculture industry as an attractant and as a fertilizer.

Internal Waters Processing

Section 306 of the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265) allows foreign fish processing vessels to operate within the internal waters of a state with the permission of the Governor of that state. Up to three internal waters processing (IWP) ventures operated within Maine's coastal waters during 1988-1993. Under state jurisdiction, a foreign vessel was permitted to process menhaden caught by US vessels into fish meal and oil during the 1988-1993 fishing seasons. In 1987, two New England-based menhaden vessels began to fish in the Gulf of Maine, landing the catch at a Canadian processing plant. Another Canadian factory in Nova Scotia processed menhaden in 1992 and 1993. No menhaden have been processed in the North Atlantic since the summer of 1993.

1.3.1.2 Bait Fishery

Menhaden from bait fisheries is primarily harvested with purse seines, pound nets, gill nets, and trawls, with a smaller amount of harvest coming from cast nets, fyke nets, and haul seines. Menhaden are taken for bait in almost all Atlantic coast states and are frequently used for bait in crab pots, lobster pots, and hook and line fisheries (both sport and commercial).

Since 1985, the proportion of menhaden landed as bait has generally increased (Table 17, Figure 9). Reported bait landings averaged 10% of the total Atlantic menhaden landings from 1985-2000 and 20% of total landings from 2001-2016. This increase in the percent of coastal bait landings can be attributed to better data collection in the fishery and a decline in coastal reduction landings. The closure of reduction plants in New England and the Mid-Atlantic may have influenced growth in the bait fishery, making more product available for the lobster and crab pot fisheries, as well as bait for sport fishermen. Additionally, the passage of a net ban in Florida in November 1994 reduced the availability of bait in that state, which may have opened up new markets for menhaden bait caught in Virginia and the Mid-Atlantic States. The appearance of growth in the Atlantic coast bait fishery must be tempered by the knowledge that reporting systems for bait landings, particularly for Atlantic menhaden, have historically

been incomplete.

Menhaden bait landings have not always been well-documented leading to an under-estimate of historic harvest. Historically, there have been some well-documented, large-scale, directed bait fisheries for menhaden using gears such as purse seines, pound nets, and gill nets; however, there have also been many small-scale directed bait fisheries, such as those using cast nets and beach seines, which have supplied large quantities of bait and had few, if any, reporting requirements. Estimates of menhaden bait landings have improved over the years as most states implemented reporting requirements for the smaller scale fisheries by the late 2000s. States were required to implement timely reporting as a part of Amendment 2 (2012) in order to monitor quota allocations.

Given the geographic expanse of the menhaden bait fishery, there are regional differences in how and when menhaden are harvested. In the southeast, menhaden landings are dominated by Florida and North Carolina. In Florida, menhaden landings are primarily landed with cast nets since the state implemented a net ban in 1994. Prior to this time, Florida had significant bait landings from gill nets and purse seines. Fishermen in North Carolina use cast nets, gill nets, and pound nets to harvest menhaden. The principal use for menhaden as bait in North Carolina is in the blue crab fishery. In addition, some keep menhaden alive in holding tanks for "slow trolling" of species such as king mackerel. There are no directed menhaden fisheries in South Carolina and Georgia.

Menhaden bait landings in Virginia are dominated by purse seine vessels referred to as 'snapper rigs'. These vessels range from about 80-135 ft long and primarily sell bait to the sport and crab fisheries. In contrast, the Maryland and Potomac River bait fisheries are primarily executed by pound nets, a large fixed gear. The pound net fishery in the Chesapeake Bay region is carried out by numerous small, non-refrigerated vessels. Maximum hold capacity of these pound net vessels is 9 mt or less, but daily catches are usually well below vessel capacity and are limited by the number of fish encountered in the fixed gear. The majority of these fish supply the local blue crab fishery.

In the Mid-Atlantic, there has been an expansion of the purse seine bait fishery, particularly in New Jersey. The New Jersey menhaden fishery utilizes about 20 carry vessels and about 15 catch vessels per year. Most operations have a catch vessel paired with a specific carry vessel, but some vessels are both catch and carry. Carry vessel length ranges from 59-90 ft and catch vessel length ranges from 40-88 ft. Net length is restricted to 150 fathoms (900 ft) by regulation. In New York and Delaware, menhaden bait landings are primarily caught in pound nets, gill nets, casts, and seines.

In the New England region, purse seine landings in Maine, Massachusetts and Rhode Island account for the majority of the recorded bait landings. The New England operators are fairly small, typically with one harvest vessel, ranging in size from the 30 to 90 feet in length. In Rhode Island, there is a historic floating fish trap fishery which harvests the majority of menhaden landed in the state. In Connecticut, smaller directed gill net fisheries also harvest

menhaden. The bulk of menhaden landings for bait in New England are used in the lobster fishery.

1.3.2 Recreational Fishery

Menhaden are important bait in many recreational fisheries and, as a result, some recreational fishermen employ cast nets to capture menhaden or snag them with hook and line. Recreational harvest is not well captured by the Marine Recreational Information Program (MRIP) because there is not a known direct harvest for menhaden, other than for bait. MRIP intercepts typically capture the landed fish from recreational trips as fishermen come to the dock or on the beach. Since the menhaden caught by recreational fishermen are used as bait during their trip, they typically are not part of the catch that is seen by the surveyor completing the intercept.

From what is known, recreational catch has varied over time with a high of 672.3 mt in 1992 and a low of 12.2 metric tons in 2000. The average harvest between 1981 and 2015 was 206.8 mt. Landings have averaged 382.5 mt between 2011 and 2015. Preliminary recreational landings from 2016 are 845 mt, which would be a new high for the time series (Figure 10).

1.3.3 Subsistence Fishing

No subsistence fisheries for Atlantic menhaden have been identified at this time.

1.3.4 Non-Consumptive Factors

Menhaden provide an important forage base for many fish, bird, and marine mammal species. Please refer to *Section 1.1.2.1 Ecological Benefits*.

1.3.5 Interactions with Other Fisheries

Incidental bycatch of other finfish species in menhaden purse seines has been a topic of interest and concern for many years (Christmas et al., 1960; Oviatt, 1977; Smith, 1896). Past studies have indicated that there is little or no bycatch in the menhaden purse seine fishery; however, there is currently no requirement for at-sea observers.

The Virginia Institute of Marine Science studied bycatch levels of finfish, turtles, and marine mammals in the Atlantic menhaden fishery. Results from that study indicated that bycatch in the 1992 Atlantic menhaden reduction fishery was minimal, comprising about 0.04% by number (Austin et al., 1994). The maximum percentage of bycatch occurred in August (0.14%) while the lowest occurred in September (0.002%). Among important recreational species, bluefish accounted for the largest portion of bycatch (0.0075% of the total menhaden catch). No marine mammals, sea turtles, or other protected species were killed, captured, entangled, or observed during sampling.

Additional data are available from the Gulf of Maine IWP fishery in 1991. Every catch unloaded onto the processing vessel was inspected by a state observer. A total of 93 fish were taken as bycatch along with roughly 60,000,000 individual menhaden (D. Stevenson, Maine DMR, pers. comm.; as cited in ASMFC 1992).

1.4 HABITAT CONSIDERATIONS

1.4.1 Physical Description of Habitat

1.4.1.1 *Gulf of Maine*

The Gulf of Maine is a semi-enclosed sea of 36,300 mi² (90,700 km²) bordered on the northeast, north and west by the coasts of Nova Scotia, New Brunswick, and the New England states. To the south and east, the Gulf is open to the North Atlantic Ocean; however, Georges Bank forms a partial southern boundary below about 165 ft (50 m). The interior of the Gulf of Maine is characterized by five major deep basins (>600 ft, 200 m) which are separated by irregular topography that includes shallow ridges, banks, and ledges. Basins make up about 30% of the floor area (Thompson, 2010). Retreating glaciers (18,000–14,000 years ago) left behind a variety of patchily distributed sediment types including silt, sand, clay, gravel, and boulders (NMFS, 2015). Major tributary rivers are the St. John in New Brunswick; St. Croix, Penobscot, Kennebec, Androscoggin, and Saco in Maine; and Merrimack in Massachusetts.

The predominantly rocky coast of Maine is characterized by steep terrain and bathymetry, with numerous islands, embayments, pocket beaches, and relatively small estuaries. Tidal marshes and mud flats occur along the margins of these estuaries. Farther south, the coastline is more uniform with few sizable bays, inlets, or islands, but with many small coves. Extensive tidal marshes, mud flats, and sandy beaches along this portion of the coast are gently sloped. Marshes exist along the open coast and within the coves and estuaries.

The surface circulation of the Gulf of Maine is generally counterclockwise, with an offshore flow at Cape Cod which joins the secondary, clockwise gyre on the northern edge of Georges Bank. The Northeast and Great South Channels, which bookend Georges Bank, serve as the primary inflow and outflow channels of marine waters, respectively. Some of the water entering the Northeast Channel flows into the Bay of Fundy; another portion turns west to feed the Maine Coastal Current, initiating the counterclockwise direction of flow. The counterclockwise gyre is more pronounced in the spring when river runoff adds to the southwesterly flowing coastal current. Surface currents reach velocities of 1.5 knots (80 cm/sec) in eastern Maine but gradually diminish to 0.2 knots (10-20 cm/sec) in Massachusetts Bay where tidal amplitude is about 10 ft (3 m) (Thompson, 2010).

There is great seasonal variation in sea surface temperature in the Gulf, ranging from 4°C in March throughout the Gulf to 18°C in the western Gulf and 14°C in the eastern Gulf in August. The Gulf of Maine sea surface temperature has been warming steadily over the last 35 years. In the most recent decade, the warming trend (0.23 °C /year) was faster than 99 percent of the

global ocean (Pershing et al., 2015). The warming is related to a northward shift in the Gulf Stream and to changes in the Atlantic Multidecadal Oscillation and Pacific Decadal Oscillation (Pershing et al., 2015). The salinity of the surface layer also varies seasonally, with minimum values in the west occurring during summer, from the accumulated spring river runoff, and during winter in the east under the influence of runoff from the St. Lawrence River (from the previous spring). With the seasonal temperature and salinity changes, the density stratification in the upper water column also exhibits a seasonal cycle. From well mixed, vertically uniform conditions in winter, stratification develops through the spring and reaches a maximum in the summer. Stratification is more pronounced in the southwestern portion of the Gulf where tidal mixing is diminished.

1.4.1.2 Mid-Atlantic Region

The coastal zone of the Mid-Atlantic states varies from a glaciated coastline in southern New England, to the flat and swampy coastal plain of North Carolina. Along the coastal plain, the beaches of the barrier islands are wide, gently sloped, and sandy, with gradually deepening offshore waters. The area is characterized by a series of sounds, broad estuaries, large river basins (e.g., Connecticut, Hudson, Delaware, and Susquehanna), and barrier islands. Conspicuous estuarine features are Narragansett Bay (Rhode Island), Long Island Sound and Hudson River (New York), Delaware Bay (New Jersey and Delaware), Chesapeake Bay (Maryland and Virginia), and the nearly continuous band of estuaries behind barrier islands along southern Long Island, New Jersey, Delaware, Maryland, Virginia, and North Carolina. The complex estuary of Currituck, Albemarle, and Pamlico Sounds behind the Outer Banks of North Carolina (covering an area of 2,500 square miles) is an important feature of the region. Coastal marshes border those estuaries along much of the glaciated coast from Cape Cod to Long Island Sound. Nearly continuous marshes occur along the shores of the estuaries behind the barrier islands.

At Cape Hatteras, the Continental Shelf extends seaward approximately 20 mi (33 km), and gradually widens northward to about 68 mi (113 km) off New Jersey and Rhode Island where it is intersected by numerous underwater canyons. Surface circulation north of Cape Hatteras is generally southwesterly during all seasons, although this may be interrupted by coastal indrafting and some reversal of flow at the northern and southern extremities of the area. Speeds of drift north of Cape Hatteras are on the order of six miles (9.7 km) per day. There may be a shoreward component to this drift during the warmer half of the year and an offshore component during the colder half. The western edge of the Gulf Stream meanders off Cape Hatteras, sometimes coming within 12 mi (20 km) of the shore; however, it becomes less discrete and veers to the northeast above Cape Cod. Surface currents as high as 4 knots (200 cm/sec) have been measured in the Gulf Stream off Cape Hatteras.

Hydrographic conditions in the Mid-Atlantic region vary seasonally due to river runoff and changing water temperatures. The water column becomes increasingly stratified in the summer and homogeneous in the winter due to fall-winter cooling of surface waters. In the winter, the mean range of sea surface temperatures is 0-7°C off Cape Cod and 1-14°C off Cape Charles (at the southern end of the Delmarva Peninsula). In the summer, the mean range is 15-21°C off Cape Cod and 20-27°C off Cape Charles. The tidal range averages slightly over 3 ft (1 m) on Cape

Cod, decreasing to the west. Within Long Island Sound and along the south shore of Long Island, tide ranges gradually increase, reaching 6 ft (2 m) at the head of the Sound and in the New York Bight. South of the Bight, tide ranges decrease gradually to slightly over 3 ft (1 m) at Cape Hatteras. Prevailing southwest winds during the summer along the Outer Banks often lead to nearshore upwelling of colder bottom water from offshore, so that surface water temperatures can vary widely during that period (15-27°C over a period of a few days).

The waters of the coastal Mid-Atlantic region have a complex and seasonally dependent circulation pattern. Seasonally varying winds and irregularities in the coastline result in the formation of a complex system of local eddies and gyres. Surface currents tend to be strongest in late spring, due to river runoff, and during periods of highest winds in the winter. In late summer, when winds are light and estuarine discharge is minimal, currents tend to be sluggish, and the water column is generally stratified.

1.4.1.3 South Atlantic Region

The south Atlantic coastal zone extends in a large oceanic bight from Cape Hatteras south to Biscayne Bay and the Florida Keys. North of Florida, the south Atlantic coastal zone is bordered by a coastal plain that stretches inland for a hundred miles and a broad continental shelf that reaches into the ocean for nearly an equal distance. This broad shelf tapers down to a very narrow and precipitous shelf off the southeastern coast of Florida. The irregular coastline of North Carolina, South Carolina, Georgia, and eastern Florida is generally endowed with extensive bays and estuarine waters, bordered by nutrient-rich marshlands. Barrier beaches and dunes protect much of the shoreline. Along much of the southern coast from central South Carolina to northern Florida, estuarine salt-marsh is prominent. Most of the east coast of Florida varies little in general form. Sand beaches with dunes are sporadically interrupted by mangrove swamps and low banks of earth and rock.

The movements of oceanic waters along the South Atlantic coast have not been well defined. The surface currents, countercurrents, and eddies are all affected by environmental factors, particularly winds. The Gulf Stream flows along the coast at 6-7 miles per hour (10-11 km/hr). It is nearest to the coast off southern Florida and gradually moves away from the coast as it flows northward. Inshore of the Gulf stream, there is a current that flows southward for most of the year in regions north of Cape Canaveral.

Sea surface temperatures during the winter increase southward from Cape Hatteras to Fort Lauderdale, Florida, with mean minimums ranging from 2-20°C and maximums ranging from 17-26°C. In the summer, the increases are more gradual, ranging north to south from minimums of 21-27°C to maximums of 28-30°C. Mean sea-surface salinity is generally in the range of 34 to 36 ppt year round. Mean tidal range is just over 3 ft (1 m) at Cape Hatteras and increases gradually to about 6-7 ft (2 m) along the Georgia coast. Tides decrease south of Cape Canaveral to 3 ft (1 m) at Fort Lauderdale.

1.4.2 Environmental Requirements of Atlantic Menhaden

1.4.2.1 Temperature, Salinity, and Dissolved Oxygen

While Atlantic menhaden occur throughout a wide range of physicochemical conditions, several studies have raised questions about the species' environmental limits and optimum conditions. In particular, studies have noted an affinity of young menhaden for low salinity waters. Wilkens and Lewis (1971) speculated that larval menhaden require low salinity water to metamorphose properly, and Lewis (1966) found that, although larvae metamorphosed in salinities of 15-40 ppt, one-third of the juveniles developed slightly crooked vertebral columns. Furthermore, larvae reared by Hettler (1976) at a lower salinity of 5-10 ppt exhibited significantly higher activity levels, metabolic rates, and growth rates than those reared at 28-34 ppt. Rogers et al. (1984) noted that pre-juveniles of many fishes, including those of *Brevoortia* species, enter estuarine habitats during seasonal peaks of freshwater influx when the area of low salinity and fresh tidal water is greatest.

Studies also suggest that temperature also has an important effect on larval development and dispersion. In the South Atlantic region, sea surface temperature readings during the months of highest egg capture were generally 12-20°C (Walford and Wicklund, 1968). In the North Atlantic, the lowest temperature at which Atlantic menhaden eggs and larvae were collected was between 10 and 13°C (Ferraro, 1980). The temperature range for the Mid-Atlantic region was 0-25°C, but most eggs and larvae were collected at 16-19°C (Kendall and Reintjes, 1975). Studies suggest that the limits of larval temperature tolerance are affected by acclimation time. Survival above 30°C (Lewis and Hettler, 1968) and below 5°C (Lewis, 1965) was progressively extended by acclimation temperatures closer to test values, suggesting that rapid changes to extreme temperatures are more likely to be lethal than prolonged exposure to slowly changing values. Mortality of juvenile Atlantic menhaden to a temperature decrease of 10°C (from 15 to 5°C) was less when temperature was decreased at a rate of 6.7°C /h or lower.

A potential management consideration is that, historically, estuarine zones received freshwater from contiguous wetlands and riverine systems. However, channelization, diking of river courses, ditching and draining of marginal wetlands, and urbanization have reduced the freshwater retention capacities of coastal wetlands. Furthermore, extensive filling of estuarine marshlands has diminished the area receiving runoff in many locations. In combination, these changes cause the rapid discharge of freshwater during brief periods and reduced amounts of freshwater at other times. High inflows, particularly those that occur in early spring after the arrival of pre-juvenile menhaden, can expose fish to extreme fluctuations of temperature, turbidity, and other environmental conditions. Although the effects of altered freshwater flow regimes on Atlantic menhaden are not known, effects on other estuarine dependent, offshore spawned fishes range from disappearance (Rogers et al., 1984) to death (Nordlie et al., 1982).

Dissolved oxygen, particularly at low levels, can also impact the survival of menhaden. Lewis and Hettler (1968) observed increased survival of juveniles at 35.5°C with increased dissolved oxygen (DO) saturation. Burton et al. (1980) reported a mean lethal DO concentration of 0.4

mg/l, but warned against interpretation of this value as "safe", in view of the interactive nature of environmental factors.

1.4.2.2 Primary Production

Abundance of YOY juvenile menhaden is strongly and positively correlated with *chl-a* and primary production in the Chesapeake Bay (Houde and Harding, 2009). Although recent research indicates that age-1+ menhaden may derive most energy from zooplankton food (Lynch et al., 2010; Friedland et al., 2011), it is apparent that YOY menhaden can efficiently filter small phytoplankton (Friedland et al., 2006) and that it is their primary food. The timing, intensity, quality, and spatial variability of the spring phytoplankton bloom in the Chesapeake Bay show high inter-annual variability and are strongly affected by climate (Adolf et al., 2006; Miller and Harding, 2007). This variability in primary production is likely a key factor controlling production potential of young menhaden in estuarine habitats.

1.4.2.3 Sediments and Turbidity

Forest clearing, and the removal of the buffer provided by trees, shrubs, plants, and wetlands, has led to changes in sediment loading due to unrestricted stormwater flow (Brush, 1986). This results in erosion that brings increased sediment into estuaries, such as the Chesapeake Bay. In addition, the dramatic increase in impermeable surfaces has also increased runoff, as impervious surfaces amplify storm water discharges into streams (Goetz and Jantz, 2006). One consequence of these changes is that sediment grain size has changed over time so that very fine sediment now predominates, which reduces light penetration. Secchi disk readings from the Chesapeake Bay have steadily declined since 1985 from just over 2 meters to about 1 meter in 2008 (Greer, 2008). Because filter feeding juvenile menhaden can retain particles as small as 5-7 μ m, and to a minor extent particles <5 μ m, there is a possibility that menhaden feeding could be compromised (Friedland et al., 1984).

The resulting increased turbidity acts to shade submerged aquatic vegetation (SAV), thus decreasing the extent and composition of SAV beds. Loss of SAV may indirectly affect menhaden by increasing turbidity even further as a result of increased sediment resuspension (Orth et al., 2006), which in turn can lower phytoplankton productivity. SAV has also been shown to exercise control over ecosystem function through nutrient recycling and linkage to fish productivity (Orth et al., 2006; Hughes et al., 2009), which may impact menhaden abundance, although specific impacts are not known at present.

1.4.2.4 Water Movement

Currents and circulation features play an important role in cueing reproduction, and in controlling dispersal of larval stages, assuring that some larvae are transported to the coastal estuaries and embayments that serve as juvenile nurseries. Most larval menhaden are found shoreward of the Gulf Stream Front (GSF); those sampled in the GSF, or seaward of it, presumably are rapidly advected northeast and lost to the population although it is possible that warm-core rings and onshore streamers could return some larvae to the shelf (Hare and Govoni, 2005). There is ample evidence, based on observations and models, that coastward transport of larvae is supported by favorable winds and currents on the shelf (Checkley et al.

1988; Werner et al., 1999). Models and observations of advective mechanisms at estuary mouths present a less-clear picture of how menhaden larvae move into estuaries, although it is apparent that winds, tides, and larval behavior control the ingress.

Inter-annual variability in recruitment is believed to be, at least partly, controlled by variability in oceanographic conditions that affect hydrography, circulation, and possibly biological productivity. Weather and climate patterns are probable drivers of such variability. Wood et al. (2004) demonstrated that prevalence of a late-winter climate pattern that brings dry and warm weather to the Mid-Atlantic region is associated with high recruitment of Atlantic menhaden. This weather pattern may promote favorable shoreward transport or feeding conditions for early-stage menhaden larvae while on the continental shelf.

1.4.2.5 Substrate and System Features

The association of Atlantic menhaden with estuarine and nearshore systems during all phases of its life cycle is well documented. It is evident that young menhaden require these food rich waters to survive and grow, and the fishery is concentrated near major estuarine systems. Filling of estuarine wetlands, in addition to exacerbating extremes in environmental conditions, has physically limited the nursery habitat available to Atlantic menhaden and other estuarine-dependent species. The relative importance, however, of different habitat types (i.e. sounds, channels, marshes) and salinity regimes has received little detailed attention (Rogers and Van Den Avyle 1989).

1.4.3 Identification and Distribution of Essential Habitat

Estuarine and nearshore waters along the Atlantic coast from Florida to Nova Scotia serve as important habitat for juvenile and/or adult Atlantic menhaden. Within this wide geographic range, hydrographic and circulation features constrain population distribution (MDSG 2009). Adult menhaden distribution is bounded by the Gulf Stream Front on the seaward side and by water temperatures greater than 10°C (MDSG 2009).

Adult Atlantic menhaden spawn in oceanic waters along the continental shelf, as well as in sounds and bays in the northern extent of their range (Judy and Lewis, 1983). Winds and tides transport larvae shoreward from the shelf (Checkley et al., 1988; Werner et al., 1999) toward nursery grounds in the estuaries. Larvae are between one and three months old, usually closer to two months, at first ingress into estuaries (Warlen et al., 2002; MDSG, 2009). After entering the estuary, larvae congregate in large concentrations near the upstream limits of the tidal zone, where they metamorphose into juveniles (June and Chamberlin 1959, Houde 2011).

Historically, Chesapeake Bay was considered to be the most productive nursery area (contributing 69% of Atlantic menhaden recruits [age 1] to the coast wide population), followed by the south Atlantic (17%), and the Mid-Atlantic sections from Maryland to New York (12%) (Ahrenholz et al., 1989; ASMFC, 2004; Anstead et al., 2017). However new research credits the Chesapeake Bay with 30% of age 1 recruits and New England and the southeast estuaries contributing equal portions to the population (Anstead et al., 2016). Furthermore, recruits from

all three areas, in the same proportions, have been shown to persist in the population beyond the first year to ages 2-4, therefore becoming part of the reproductive population (Anstead et al. 2017).

1.4.4 Anthropogenic Impacts on Atlantic Menhaden and Their Habitat

The human population along the coast is steadily increasing, and the average number of people per square mile in coastal counties has nearly doubled since 1960 (U.S Census Bureau 2010). Increasing human presence precipitates industrial and municipal expansion, thus intensifying anthropogenic pressure on resources and accelerating competition for use of land and water. Consequently, estuarine and coastal habitats have been significantly reduced and continue to be stressed by dredging, filling, coastal construction, energy plant development, pollution, waste disposal, nutrient loading, and other human-related activities.

Degraded water quality in estuaries threatens critical nursery habitat for young menhaden. Concern has been expressed (Ahrenholz et al., 1987) that the outbreaks of ulcerative mycosis in the 1980s may have been symptomatic of deteriorating water quality in estuarine waters along the east coast. Human population growth and increasing development in the coastal zone are expected to further reduce water quality unless steps are taken to ameliorate their effect on the environment (Cross et al., 1985). Altering habitats and water quality can affect menhaden habitat use and productivity - responses that are magnified in estuaries where human use and biological productivity heavily interact.

Perhaps the most significant physical alteration of the Chesapeake Bay watershed in recent decades has been the increase in impervious surfaces. More than 400,000 hectares are currently categorized as impervious surface and that value continues to climb (Brush 2009). These surfaces increase the nutrient, sediment, and contaminant flow rate to the Chesapeake Bay (Clagett 2007), and exacerbate eutrophication and expansion of hypoxic and anoxic zones. Although not well studied at present, reduced water quality associated with increases in impervious surfaces could diminish habitat quality for menhaden or their predators.

Menhaden fish kills, both human-caused and naturally occurring, are a persistent problem in bays and estuaries throughout the range. Most states keep records of fish kills, documenting water quality, number of fish killed, and likely causes. Localized die-offs often occur due to critically low dissolved oxygen (DO) levels, which may result from a variety of factors including high temperature, low flow, overcrowding, or algal blooms. Infectious diseases, parasites, toxicants, or miscellaneous human activity (e.g. thermal shock or fishing discards) may also cause localized mortality. In Maryland, nearly 50 years of records document annual menhaden kills ranging from tens to tens-of-millions of fish (max est. 47M fish in 1974), caused by a variety of factors from concussive explosions to disease and toxicants from spills or discharge (C. Poukish, MD DNR, pers. comm.). The most common factor was low DO in the presence of algal blooms, which causes an annual spring die-off. In the Neuse and Tar-Pamlico River estuaries in North Carolina, low oxygen events cause significant mortality of Atlantic menhaden and other fish species nearly every summer (R. Wilson Laney, USFWS, pers. Comm.). In Florida, nutrient

inputs, exacerbated by low flushing in the Indian River Lagoon, result in Harmful Algal Blooms (HABs) and, ultimately, menhaden kills (K. Smith, FL FWC, pers. comm.).

In recent years the menhaden population appears to be rebounding and expanding to reoccupy its historic geographic range. With more fish returning to areas heavily used and impacted by humans, the potential for fish kills increases. For example, in 2016, tens of thousands of menhaden were killed when a lock closure trapped them in the Shinnecock Canal in New York.

At one time, fish kills may have solely been a natural occurrence, but anthropogenic impacts to water quality and flow have certainly exacerbated the frequency and intensity of these mortality events. State efforts to track fish kills can provide information on patterns and trends. North Carolina, for example, instituted a fish kill investigation procedure in 1996 to collect and track fish kill information. Data is maintained in a central database and is reviewed as part of an effort to monitor water quality trends.

A growing body of literature is beginning to describe shifts in species distributions and spawning locations and seasons, possibly due to a changing climate on the Atlantic coast (e.g. Walsh et al., 2015; Kleisner et al., 2016). Menhaden ingress to estuaries is sensitive to changes in wind patterns and temperatures, which are known to be variable and may be influenced by climate change (Quinlan et al., 1999; Austin, 2002). Moreover, nursery habitats within bays and estuaries are likely to be altered by the effects of climate change, in some cases potentially enhancing menhaden productivity and other cases, resulting in lower production and recruitment. The effects of climate change are predicted to include: increased water temperatures, sea-level rise, and changes in precipitation patterns and climate variability (Sherman et al., 2009). These changes can influence salinity, temperature, and nutrients throughout nursery grounds.

In addition to long-term climate change, the Atlantic coast has also experienced shorter-term, decadal fluctuations in weather, shifting between cold-wet and warm-dry periods. Austin (2002) showed that the 1960s were warmer and wetter than the 1970s and 1990s in the Mid-Atlantic. Menhaden recruitment success tends to be relatively high in years when late winterspring conditions are warm and dry (Wood, 2000). Although menhaden recruitment has been correlated with the Atlantic Multidecadal Oscillation (Buchheister et al., 2016), the correlation between Chesapeake Bay and southern New England is reversed and the mechanisms of influence are unknown. The generally low recruitment of YOY menhaden in recent years appear to be constrained by frequent cool and wet winter-spring conditions that favor recruitment of anadromous spawners, but not offshore-spawning fishes such as menhaden (Kimmel et al., 2009). It is not certain whether climate change will have positive or negative impacts on the long-term abundance and productivity of menhaden.

1.4.5 Description of Programs to Protect, Restore, & Preserve Atlantic Menhaden Habitat

The federal Coastal Zone Management Act provides a framework under which individual coastal states have developed their own coastal habitat protection programs. In general,

wholesale dredging and filling are not allowed. Individual development projects are subject to state and federal review and permit limitations. Every Atlantic coast state has a coastal habitat protection program in place (Table 11.27 in ASMFC 1992). These protection programs have greatly reduced the loss of vital coastal habitat to dredging and filling since the mid-1970s. Virtually all proposals affecting coastal habitat are now reviewed by a variety of local, state, and federal agencies, and wholesale destruction of coastal wetlands is rare. Many important estuarine habitats are now protected as part of various wildlife refuges, national and state parks, and public and private nature preserves. In addition, a federal permit program is conducted by the U.S. Army Corps of Engineers, generally in cooperation with the state programs. Every state also conducts water quality protection programs under the federal Clean Water Act. National Pollution Discharge Elimination System permits are required for point-source discharges.

Unfortunately, these programs provide much less control over non-point pollution, especially from agricultural and silvicultural activities, and excess nutrient inputs from diverse sources continue to contribute to hypoxic and anoxic conditions in estuarine menhaden habitat. Additional work to more precisely define menhaden habitat parameters for all life stages and to develop accompanying map products is needed to inform diverse multi-agency and project applicant consultations and permitting processes so that further impacts to menhaden habitats are avoided or minimized.

1.5 IMPACTS OF THE FISHERY MANAGEMENT PROGRAM

1.5.1 Biological and Ecological Impacts

1.5.1.1 Reference Points

The adoption of ecosystem reference points (ERPs) will expand the focus of menhaden management by assessing the status of menhaden in relation to other prey and predator species. ERPs will seek to ensure maintenance of a forage base needed to support larger finfish (e.g. striped bass, bluefish, weakfish), coastal birds (e.g. osprey), and marine mammals (e.g. humpback whales). An ecosystem approach to setting reference points for menhaden may also increase the spawning biomass of the menhaden stock, promoting a higher stock abundance along the coast.

Sustained use of the existing single-species reference points using the method outlined in the 2015 Stock Assessment will continue to provide a greater measure of sustainability than the reference points established in Amendment 2; however, these reference points consider the status of menhaden independent of other species. As a result, it is unclear if they are protecting a large enough forage base to support predator populations. Under the current reference points, the menhaden stock is not overfished and overfishing is not occurring.

1.5.1.2 Total Allowable Catch

Limiting menhaden harvest through a Total Allowable Catch (TAC) provides a way to maintain the menhaden population above the overfished threshold and below the overfishing threshold.

After the TAC is harvested in a given year, the directed fishery closes. This allows for greater protection of the spawning biomass, as opposed to allowing fishing to continue above and beyond the TAC. If properly set and enforced, quotas will prevent overfishing and ensure a sustainable resource for the future. Maintenance of a sustainable resource will also increase the forage base for commercially and recreationally important predator species.

1.5.1.3 Quota Allocation

The purpose of quota allocation in this Amendment is to identify a fair and equitable method through which menhaden quota can be distributed to various fisheries, gear types and regions. An allocation method which addresses the needs of each user group and is flexible to respond to future changes in the fishery will provide stability for the fishery and resource. It may also reduce the need for other management tools, such as an incidental catch provision or small-scale fishery set aside (Section 4.3.5: Incidental Catch and Small Scale Fisheries).

1.5.1.4 Chesapeake Bay Reduction Fishery Cap

The intent of the Chesapeake Bay Reduction Fishery Cap is to ensure protection of an important nursery ground for menhaden. Currently, harvest of menhaden by the reduction fishery in the Chesapeake Bay is prohibited when 100% of the cap has been reached. This protection helps support menhaden recruitment in the Bay and protects a forage base for predators such as striped bass.

The Chesapeake Bay Reduction Fishery Cap was originally implemented in 2005 to prevent localized depletion of menhaden. Given the concentrated harvest of menhaden within the Chesapeake Bay, there was concern that localized depletion could be occurring in the Bay. In 2005, the Board established the Atlantic Menhaden Research Program (AMRP) to evaluate the possibility of localized depletion. Results from the peer review report in 2009 were unable to conclude localized depletion is occurring in the Chesapeake Bay and noted that, given the high mobility of menhaden, the potential for localized depletion could only occur on a "relatively small scale for a relatively short time".

While the AMRP peer review report was not able to provide conclusive evidence that localized depletion is occurring, maintenance of the Chesapeake Bay reduction fishery cap does provide a greater level of protection in the region than the TAC alone.

1.5.1.5 Data Collection and Reporting Requirements

This Amendment requires states to implement timely quota monitoring programs so that the harvest of menhaden stays within the TAC and the potential for overages is limited. Furthermore, purse seine or bait seine vessels are required to submit Captain's Daily Fishing Reports on a daily basis, and states must collect biological samples relative to their level of harvest. This level of reporting is necessary for the implementation of a quota management system, as lengthy delays could lead to quota overages or premature closures of the fishery. Furthermore, continued biological sampling will increase knowledge on the stock's age structure, improving the precision of menhaden abundance estimates in future stock assessments.

1.5.2 Social and Economic Impacts

This Amendment includes several measures which could carry social and economic impacts, notably potential changes to the reference points and allocation method. The use of ERPs may affect those who derive value from finfish, coastal birds, or marine mammals which predate upon menhaden. Ensuring a stable forage base for these species could increase their abundances, leading to positive social and economic impacts for individuals, groups, or communities which rely on these resources for consumptive (e.g., commercial or recreational harvest) or non-consumptive (e.g., bird or whale watching) purposes. Individuals who hold non-use values (e.g., existence value from knowing a particular environmental resource exists or bequest value from preserving a natural or cultural heritage for future generations) associated with affected species may also benefit from increased abundances. Estimates of potential economic or social impacts to these stakeholders as a result of ERPs is challenging given complex and dynamic ecological relationships as well as the lack of socioeconomic data, especially for nonmarket goods and services.

For the commercial fisheries, ERPs may lead to changes in the TAC, which could negatively impact the bait and reduction fisheries. The extent and distribution of negative socioeconomic effects arising from changes to the TAC is dependent on price elasticities (responsiveness of demand to a change in price), substitute products, fishing costs, alternative employment opportunities, fishing community structure, and possibly other factors.

Identifying quota allocation methods which are fair and equitable among fishery sectors, gear types, and regions will enhance socioeconomic net benefits if changes in allocation result in higher value use of the menhaden resource. Shifts in allocation, while potentially beneficial overall, could disadvantage individual stakeholders through reductions in harvests, revenues, and profits. Implementation of data collection programs to ensure effective quota monitoring may add additional management costs.

A recently completed socioeconomic study of the commercial bait and reduction fisheries, funded by the ASMFC, contains several findings which elucidate possible social and economic impacts resulting from changes in menhaden management. In this study, researchers interviewed and surveyed industry members to uncover salient themes, analyzed historic landings data to resolve market relationships, performed economic impact analyses to consider the effects of various TAC changes, and conducted a public opinion survey to assess attitudes toward menhaden management (see Whitehead and Harrison, 2017 for the full report). Interviews and surveys of commercial fishers and other industry members found mixed opinions on several subjects; however, many agreed that the demand for menhaden bait, oil, and meal has increased in recent years. Exogenous demand increases, if leading to increases in ex-vessel prices, could benefit menhaden bait and reduction industry members; however, it is important to note that these benefits are unrelated to management actions discussed in this Amendment.

Analysis of historic landings data revealed that prices for menhaden were negatively related to landings levels, but that this relationship was small and insignificant in some instances. In particular, state-level analysis showed ex-vessel price is insensitive to landings. This finding suggests that reductions in the TAC might reduce commercial fishery revenues as decreases in landings are not fully compensated by higher prices. Ex-vessel prices of menhaden are not uniform along the coast, with some states having higher prices than others.

Economic impact analyses of changes to the TAC found income and employment decreases (increases) corresponding to TAC decreases (increases), with the largest impacts concentrated in New Jersey and Virginia. For example, the analysis suggests that when totaling direct, indirect, and induced economic changes in the bait fishery, a 5% increase in the TAC from the 2017 baseline would result in 18 more jobs, a \$476,000 increase in total earnings, and a \$1.7 million increase in total economic output. Looking at the reduction sector, a 5% increase in the TAC from the 2017 baseline is estimated to increase total economic output (includes direct, indirect, and induced economic effects) by \$3.6 million in Northumberland county and add 77 full and part-time jobs. Interestingly, subsequent analysis of coastal county income and employment changes in response to changes in bait landings (not reduction landings) showed little effect, casting some doubt on the conclusion that adjustments in menhaden TAC consistently lead to changes in fishery income and employment in the bait fishery. It may also be that the magnitude of impact is dependent the size of the fishery in each state and the ability of fishermen to harvest other species.

A public opinion survey asked respondents to vote for or against hypothetical TAC changes which led to associated changes in fishery revenues, jobs, and ecosystem services. Results from this survey indicated that the public recognized management tradeoffs and were willing to trade some economic losses for improvements in ecosystem services. For example, survey respondents were willing to forgo \$10.5-12 million in ex-vessel revenue in exchange for positive impacts on gamefish. On the other hand, survey respondents were willing to accept \$4-7 million in additional ex-vessel revenue in exchange for negative impacts to gamefish. The range of results is due to the variety of model configurations used in the analysis. It is also important to note that respondent characteristics and attitudes (ie: knowledge of menhaden, perceived importance of fishery to state) significantly influenced voting patterns.

2.0 GOALS AND OBJECTIVES

2.1 HISTORY OF MANAGEMENT

The first coastwide fishery management plan (FMP) for Atlantic menhaden was approved in 1981 (ASMFC 1981). The 1981 FMP did not recommend or require specific management actions, but provided a suite of options should they be needed. After the FMP was approved, a combination of additional state restrictions, the establishment of local land use rules, and changing economic conditions resulted in the closure of most reduction plants north of Virginia (ASMFC 1992). In 1988, ASMFC concluded that the 1981 FMP had become obsolete and initiated a revision to the plan.

The 1992 Plan Revision included a suite of objectives to improve data collection and promote awareness of the fishery and its research needs (ASMFC 1992). Under this revision, the menhaden program was directed by the Board, which at the time was composed of up to five state directors, up to five industry representatives, one representative from the National Marine Fisheries Service, and one representative from the National Fish Meal and Oil Association.

Amendment 1, passed in 2001, provided specific biological, social/economic, ecological, and management objectives for Atlantic menhaden. No recreational or commercial management measures were implemented as a result of Amendment 1. Representation on the Board was also revised in 2001 to include three representatives from each state in the management unit, including the state fisheries director, a legislator, and a governor's appointee. This restructuring brought the Board's composition in line with others at the Commission. The reformatted Board has passed two amendments and six addenda to the 1992 FMP revision.

Addendum I (2004) addressed biological reference points for menhaden, specified the frequency of stock assessments to be every three years, and updated the habitat section of the FMP.

Addendum II (2005) instituted a harvest cap on the reduction fishery in the Chesapeake Bay. This cap, based on average landings from 2000-2004, was established for the 2006 through 2010 fishing seasons. Addendum II also outlined a series of research priorities to examine the possibility of localized depletion of Atlantic menhaden in the Chesapeake Bay. They included: determining menhaden abundance in Chesapeake Bay; determining estimates of removal of menhaden by predators; exchanging of menhaden between bay and coastal systems; and conducting larval studies.

Addendum III (2006) revised the Chesapeake Bay Reduction Fishery Cap to 109,020 metric tons, which is an average of landings from 2001-2005. Implementation of the cap remained for the 2006 through 2010 fishing seasons. Addendum III also allowed a harvest underage in one year to be added to the next year's quota. As a result, the maximum cap in a given year was extended to 122,740 metric tons.

Addendum IV (2009) extended the Chesapeake Bay harvest cap three additional years (2011-2013) at the same levels as established in Addendum III.

Addendum V (2011) established a new F threshold and target rate based on maximum spawning potential (MSP) with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species.

Amendment 2, approved in December 2012, established a 170,800 metric ton (mt) total allowable catch (TAC) for the commercial fishery beginning in 2013. This TAC represented a 20% reduction from average landings between 2009 and 2011. The 2009-2011 time period was also

used to allocate the TAC among the jurisdictions. In addition, the Amendment established requirements for timely reporting and required states to be accountable for their respective quotas by paying back any overages the following year. The amendment included provisions that allowed for the transfer of quota between jurisdictions and a bycatch allowance of 6,000 pounds per trip for non-directed fisheries that operated after a jurisdiction's quota has been landed. Further, it reduced the Chesapeake Bay reduction fishery harvest cap by 20% to 87,216 metric tons.

At its May 2015 meeting, the Board established an 187,880 mt TAC for the 2015 and 2016 fishing years. This represents a 10% increase from the 2013 and 2014 TAC. In October 2016, the Board approved a TAC of 200,000 mt for the 2017 fishing year, representing a 6.45% increase from the 2015 and 2016 fishing years.

In August 2016, the Board approved Addendum I which added flexibility to the current bycatch provision by allowing two licensed individuals to harvest up to 12,000 pounds of menhaden bycatch when working together from the same vessel using stationary multi-species gear. The intent of this Addendum was to accommodate cooperative fishing practices which traditionally take place in the Chesapeake Bay.

In May 2013, the Board approved Technical Addendum I which established an episodic events set aside program. This program set aside 1% of the coastwide TAC for the New England States (Maine through Connecticut) to harvest Atlantic menhaden when they occur in higher abundance than normal. In order to participate in the program, a state must reach its individual quota prior to September 1, require daily harvester reporting, and implement a trip limit no greater than 120,000 pounds. At its October 2013 meeting, the Board extended the episodic event set aside program through 2015, adding a re-allocation provision that distributes unused set aside as of October 31 to all states based on the same allocation percentages included in Amendment 2. At its May 2016 meeting, the Board again extended the episodic events program until final action on Amendment 3 and added New York as an eligible state to harvest under the program.

At its February 2014 meeting, the Board passed a motion to manage the menhaden cast net fisheries under the bycatch allowance for 2014 and 2015, with the states bearing responsibility for reporting. At its November 2015 meeting, the Board approved a motion to continue the management of cast net fisheries under the bycatch allowance for 2016. In February 2017, the Board extended management of the cast net fishery under the bycatch provision until implementation of Amendment 3.

2.2 PURPOSE AND NEED FOR ACTION

The 2015 Atlantic Menhaden Benchmark Stock Assessment and Peer Review Report categorized the development of ERPs as a high priority for management of the species. Currently, the stock is assessed with single-species biological reference points, which are defined in the 2015 Stock Assessment. While the stock assessment accounts for natural

mortality, this factor alone may not adequately account for the unique and significant ecological services that menhaden provide, or how changes in the population of predator species may impact the abundance of menhaden. ERPs are intended to consider the multiple roles that menhaden play, both in supporting fisheries for human use and their role in the marine ecosystem.

In addition, Amendment 2 requires quota allocations to be revisited every three years. The Atlantic menhaden quota is currently allocated to Atlantic coast jurisdictions based on average landings between 2009 and 2011. In revisiting the allocations, the Board decided to investigate different allocation methods and timeframes given concerns that the current allocation method does not strike a balance between gear types and regions, as well as current and future harvest opportunities. Some states have also expressed concerns about unreported landings during the baseline years and the administrative burden of managing small allocations, the cost of which may outweigh the value of the fishery they are allocated.

In order to consider the implementation of ERPs as well as changes to the allocation method and timeframe, the Board should consider changes in the management tools used to regulate the fishery.

2.3 GOAL

Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden replaces Amendment 2 to the 1981 FMP for Atlantic Menhaden.

The goal of Amendment 3 is to manage the Atlantic menhaden fishery in a manner which equitably allocates the resource's ecological and economic benefits between all user groups. The primary user groups include those who extract and utilize menhaden for human use, those who extract and utilize predators which rely on menhaden as a source of prey, and those whose livelihood depends on the health of the marine ecosystem. Pursuit of this goal will require a holistic management approach which allocates the resource in a method that is biologically, economically, and socially sound in order to protect the resource and those who benefit from it.

2.4 OBJECTIVES

The following objectives are intended to support the goal of Amendment 3.

- Maintain the Atlantic menhaden stock at levels which sustain viable fisheries and support predators which depend on the forage base.
- Ensure sufficient menhaden spawning stock biomass to prevent stock depletion and recruitment failure.
- Construct regulations based on the best available science and coordinate management efforts among the Atlantic coast jurisdictions.
- Develop a management program which ensures fair and equitable access to the fishery for all regions and gear types.

- Support a greater understanding of menhaden biology and multi-species interactions that may bear upon predator-prey dynamics.
- Maintain existing culture and social features of the fishery to the extent possible.

2.5 MANAGEMENT UNIT

The management unit for Amendment 3 is defined as the range of Atlantic menhaden within U.S. waters of the northwest Atlantic Ocean, from the estuaries eastward to the offshore boundary of the Exclusive Economic Zone (EEZ). This definition is consistent with recent stock assessments which treat the entire resource in U.S. waters of the northwest Atlantic as a single stock.

2.5.1 Management Area

The management area for Amendment 3 shall be the entire Atlantic coast distribution of the resource from Maine through Florida.

2.6 REFERENCE POINTS

2.6.1 History of Reference Points

2.6.1.1 Amendment 1 Reference Points

The reference points outlined in Amendment 1 (2001) were developed from the historic spawning stock per recruit (SSB/R) relationship. As such, F_{REP} was selected as the $F_{threshold}$, representing replacement level of stock, and F_{target} was based on F_{MAX} , representing the maximum fishing mortality before the process of recruitment overfishing begins. The Board also adopted a spawning stock biomass target, a proxy for B_{MSY} (the biomass that allows the fish stock to produce maximum sustainable yield), and a spawning stock biomass threshold.

2.6.1.2 Addendum 1 Reference Points

Based on the 2003 Benchmark Stock Assessment for Atlantic menhaden, the reference points were modified per the recommendation of the TC (ASMFC 2004). The TC recommended using population fecundity (number of maturing or ripe eggs) as a more direct measure of reproductive output of the population compared to spawning stock biomass (the weight of mature females). For Atlantic menhaden, older menhaden release more eggs than younger menhaden per unit of female biomass. By using the number of eggs released, more reproductive importance is given to older fish in the population. The TC also recommended modifications to the fishing mortality (F) target and threshold. Specifically, the TC recommended continued use of F_{REP} as the $F_{\text{threshold}}$, but estimated it using fecundity per recruit rather the SSB per recruit. They also recommended that the F_{target} be based on the 75th percentile. This approach was consistent with the approach used for the $F_{\text{threshold}}$. For biomass (or egg) benchmarks, the TC recommended maintaining the approach used in Amendment 1.

2.6.1.3 Addendum V Reference Points

In November 2011, Addendum V was approved, which established an interim fishing mortality threshold of $F_{15\%MSP}$ and target of $F_{30\%MSP}$, where MSP is the maximum spawning potential.

2.6.1.4 Amendment 2 Reference Points

The Board adopted an interim biomass threshold of SSB_{15%MSP} and target of SSB_{30%MSP} to match the interim fishing mortality reference points adopted through Addendum V.

2.6.1.5 2015 Benchmark Stock Assessment Reference Points

As a part of the 2015 Stock Assessment, the TC recommended that the Board adopt reference points based on the maximum and median geometric mean fishing mortality rate for ages 2-4 during 1960-2012. The 1960-2012 time period represents a time with little to no restrictions on total harvest in which the population appears to have been sustainable given that the population did not experience collapse. Because the fisheries have dome-shaped selectivity, which varies by fleet over time, the age at full fishing mortality changes over time. Ages 2-4 represent the ages of fully selected fishing mortality rates depending upon the year and fishery (i.e., bait and reduction). The Board accepted these updated reference points following approval of the 2015 Stock Assessment for management use.

2.6.1.6 2017 Stock Assessment Update

Using the method outlined in the 2015 Stock Assessment (Section 2.6.1.5), the 2017 Stock Assessment Update determined the overfishing threshold and target to be $F_{21\%MSP}$ and $F_{36\%MSP}$, respectively. The overfished threshold and target were calculated to be $FEC_{21\%MSP}$ and $FEC_{36\%MSP}$, respectively.

2.6.2 ASMFC Multi-Species Management Efforts

In May 2010, the Board tasked the Multi-Species Technical Committee (MSTC), along with the Atlantic Menhaden TC, with developing alternative reference points for menhaden that account for predation. These groups led to a reformation of the subcommittee that updated and refined the Multispecies Virtual Population Analysis (MSVPA). The MSVPA-X model generated a natural mortality matrix which could be input to the single-species menhaden assessment. While this approach was attempted for several Atlantic menhaden stock assessments, the Board tasked this group with developing ERPs for menhaden using multispecies models. This joint subcommittee was eventually renamed the Biological Ecological Reference Points Workgroup (BERP Workgroup) because model consideration for the Board task expanded beyond the MSVPA. The overarching goal of the BERP Workgroup is to develop menhaden-specific ERPs that account for the abundance of menhaden and the species role as a forage fish.

In the *Ecological Reference Points for Atlantic Menhaden* report, the BERP Workgroup presented a suite of preliminary ERP models and ecosystem monitoring approaches for feedback as part of the 2015 Benchmark Stock Assessment (Appendix E, SEDAR 40 Stock Assessment Report). In this report, the BERP Workgroup recommended the use of facilitated workshops to develop specific ecosystem and fisheries objectives to drive further development of ERPs for Atlantic menhaden. This Ecosystem Management Objectives Workshop (EMOW)

contained a broad range of representation including Commissioners, stakeholders, and technical representatives to provide various perspectives on Atlantic menhaden management. The EMOW identified potential ecosystem goals and objectives that were reviewed and approved by the Board. The BERP Workgroup then assessed the ability of each preliminary ERP model to address the identified management objectives and performance measures, and selected models accordingly.

Currently, the BERP Workgroup is evaluating this suite of multispecies models to ensure they are able to generate ERPs which meet as many management objectives as possible. One of the models under consideration is a Bayesian surplus production model with a time-varying population growth rate. This model estimates the trend in total Atlantic menhaden stock biomass and fishery exploitation rate by allowing the population growth rate to fluctuate annually in response to changing environmental conditions. The approach produces dynamic, maximum sustainable yield-based ERPs that account for the forage services menhaden provide. Another production model being evaluated is a Steele-Henderson model, which permits nonfisheries effects (predation and environmental) to be quantified and incorporated into the single-species stock assessments. As a result, fixed and time-varying ecological thresholds can be estimated. This approach is not intended to replace more complex multispecies ecosystem assessment models, but rather to expand the scope of the single-species assessments to include the effects of fishing, predation, and environmental effects. Finally, a multispecies statistical catch-at-age model is being considered. In this approach, single-species models are linked using trophic calculations to provide a predator-prey feedback between the population models. The model is believed to be an improvement from the existing MSVPA because the use of statistical techniques may help to estimate many of the model parameters while incorporating the inherent uncertainty in the data. An external model being considered is an Ecopath with Ecosim model; however, the application of this model is to explore tradeoffs, not quota setting advice. For example, this model could be used to project fishery performance under the various reference points produced from the other multi-species models.

The development of menhaden-specific ERPs is expected to continue over the next couple of years. In 2017, the BERP Workgroup will finish their review of the merits of each modeling approach and decide which models are appropriate frameworks for menhaden ERPs. In 2018, the BERP Workgroup will hold data workshops to collect, select, and standardize the data that will be used as model inputs. This will include data that pertains not only to menhaden abundance but also the abundance of species such as bluefish, striped bass, and other prey species. In early 2019, assessment workshops will be held to review preliminary model results and in the fall of 2019, the multi-species models will be peer-reviewed, along with the current single-species model, which has traditionally been used for menhaden management. This will allow for direct comparison between the two modeling approaches. Table 18 outlines the current schedule for the BERP Workgroup.

2.6.3 External Guidelines for the Management of Forage Fish

In addition to the menhaden-specific ERPs, which are being developed by the BERP Workgroup, there are also precautionary guidelines for developing ERPs for forage fish in general. These guidelines are based on a series of models that look at a variety of forage fish species across diverse ecosystems. An advantage of these guidelines is that they are readily available for use and provide a precautionary approach to the management of forage fish. However, given they are based on a variety of species and regions, the guidelines are not specific to the Atlantic menhaden stock and, as a result, make generalizations regarding stock recruit relationships and the prevalence of menhaden in predator diets.

One guideline for the management of forage fish species is the 75% rule-of-thumb, which recommends that forage fish populations be maintained at three-fourths of their unfished biomass levels to lower impacts on marine ecosystems (Smith et al., 2011). The peer-reviewed analysis investigated five regions around the world to determine ecosystem impacts of fishing low trophic level species. While results varied among forage fish species, in general, the analysis found that the proportion of ecological groups impacted increased with the depletion of forage fish. Relative abundance of the forage fish species in comparison to other prey species and food web connectivity were found to be important factors in determining the level of impact on other ecological groups. The study concluded that a target of 75% unfished biomass for forage fish species would reduce impacts on other species while maintaining fisheries yields at roughly 80% of their current levels. Menhaden was not a species included in this study.

The Lenfest Ocean Program, a grant-making program managed by The Pew Charitable Trusts, has also developed guidelines for the development of forage fish ERPs. In their 2012 report by Pikitch et al., Lenfest describes how they used a suite of 10 previously published Ecopath with Ecosim models to assess the impacts of forage fish harvest on a variety of ecosystems. The Chesapeake Bay was a region modeled in this analysis. Various management strategies which specify fishing mortality were run in the Ecopath with Ecosim models to determine impacts on predator populations. From these results, a general equation was developed to predict predator responses to forage fish harvest. The analysis recommends a hockey stick control rule in which fishing mortality is dependent on stock size but would not exceed half of the forage species natural mortality rate. Maximum allowable fishing mortality would occur when the stock is at carrying capacity (unfished biomass) and F declines linearly to zero when biomass falls below 40% of unfished biomass. This report was reviewed by three external reviewers; however, the full report has not been reviewed by a scientific journal.

Although generalized forage fish models may provide interim guidance on how to manage menhaden while ERPs are developed, some contend that harvest policies for lower trophic level species should be based on models specific to the species of interest, even in the interim. Hilborn et al. (2017) investigated eleven species of U.S. forage fish, including Atlantic menhaden, to determine what factors should be analyzed when assessing the impacts of fishing lower trophic level species on predators. Given spawner-recruit data indicates good year classes can come from both small and large stock sizes, Hilborn et al. (2017) states that

recruitment is likely dependent on environmental conditions and stock abundance may be variable even in the absence of fishing. Further, the paper states that precautionary guidelines may not consider the size of prey eaten by various predator species, versus those that are harvested by the fishery. Hilborn et al. (2017) also notes that the spatial distribution of forage fish in relation to the location of predators may be a critical factor, particularly if there are 'core' areas of forage fish abundance on which predators are dependent. As a result, Hilborn et al. (2017) contends that harvest control strategies should include these factors (i.e. natural variability of forage fish abundance, size selectivity of predators, spatial distribution of forage fish) when assessing the impact of forage fish harvest on predator species.

In summary, there is varied advice on how to manage forage fish species. While some support the use of precautionary guidelines to manage forage fish until ERPs can be developed, others contend that species-specific models are needed to account for natural population variability and changes in spatial distribution.

2.6.4 Definition of Overfishing and Overfished/Depleted

The Board will evaluate the current status of the Atlantic menhaden stock with respect to its reference points. Changes to the reference points can be made through Board action following a peer-reviewed stock assessment or through Adaptive Management (*Section 4.6*). The Board can adopt any advice of the stock assessment report or peer review report. Reference points can be recalculated during an update or benchmark stock assessment.

Threshold reference points are the basis for determining stock status (i.e., whether overfishing is occurring or if a stock is overfished). When the fishing mortality rate (F) exceeds the F_{threshold}, then overfishing is occurring. This means that the rate of removal of fish by the fishery exceeds the ability of the stock to replenish itself. When the biomass or reproductive output (measured as population fecundity) falls below the threshold, then the stock is overfished, meaning there is insufficient mature female biomass or egg production to replenish the stock.

Reference points will direct the Board on when additional management measures are needed in the menhaden fishery. If the current F exceeds the threshold level, the Board will take steps to reduce F to the target level. If current F exceeds the target, but is below the threshold, the Board may consider steps to reduce F to the target level. If current F is below the target F, then no action is necessary to reduce F. Similarly, if the current biomass/fecundity is below the threshold level, the Board will take steps to increase biomass/fecundity to the target level; if current biomass/fecundity is below the target, but above the threshold, the Board may consider steps to increase biomass/fecundity to the target level. If current biomass/fecundity is above the target biomass/fecundity, then no action is necessary to increase biomass/fecundity.

Option A: Single-Species Reference Points

Single-species reference points are used to manage the Atlantic menhaden fishery. Single-species reference points for the Atlantic menhaden population are based on the maximum and median geometric mean fishing mortality rate for ages 2-4 during 1960-2012. Using this

method, the 2017 Stock Assessment Update found the fishing mortality target and threshold for Atlantic menhaden to be F_{36%MSP} and F_{21%MSP} and the corresponding fecundity target and threshold for Atlantic menhaden to be FEC_{36%MSP} and FEC_{21%MSP}. As of 2016, the terminal year of the 2017 Stock Assessment Update, the stock is not overfished and overfishing is not occurring (Table 1). Under this option, the development of ERPs would not be pursued.

Option B: BERP Workgroup Continues to Develop Menhaden-Specific ERPs with Interim Use of Single-Species Reference Points

Under this option, single-species reference points are used to manage the Atlantic menhaden fishery while the BERP Workgroup continues to develop menhaden-specific ERPs. The single-species reference points used in the interim match those described above in Option A. As of 2016, the terminal year of the 2017 Stock Assessment Update, the stock is not overfished and overfishing is not occurring (Table 1). The expected timeline for completion of ERPs is late 2019, as outlined in *Section 2.6.2*.

Option C: BERP Workgroup Continues to Develop Menhaden-Specific ERPs with Interim Use of Pikitch et al. Reference Points

Under this option, a hockey stick harvest control rule is used to manage the Atlantic menhaden fishery while the BERP Workgroup continues to develop menhaden-specific ERPs. Under the hockey stick control rule, fishing mortality does not exceed one half of the natural mortality rate when stock size is equal to unfished biomass. As the biomass decreases from B_0 (unexploited biomass), the fishing rate linearly decreases along the control rule. If biomass falls below 40% unfished biomass ($B/B_0<0.4$), fishing is prohibited. Figure 1 shows the hockey stick control rule applied to Atlantic menhaden. Current biomass from the 2017 Stock Assessment Update is $B/B_0=0.467$, which is above the biomass threshold of $B/B_0=0.4$. As a result, the stock is not overfished. Should biomass fall below $B/B_0=0.4$, fishing would stop and a moratorium would be put in place. The target fishing mortality rate corresponding to current biomass ($B/B_0=0.467$) is 0.041. As of the terminal year of the 2017 Stock Assessment Update, the current fishing mortality rate is $F_{2016}=0.204$. This is above the fishing mortality rate recommended by the hockey-stick control rule but below the threshold of F=1/2M=0.367. This would indicate that fishing is higher than it should be at current biomass levels and a TAC should be set with the goal of achieving F=0.041.

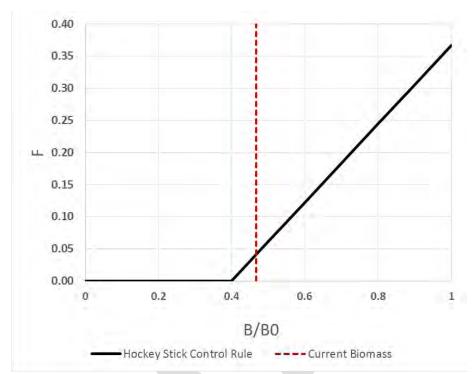


Figure 1: The Pikitch et al. (2012) hockey stick harvest control rule applied to Atlantic Menhaden. The black line represents the control rule and is defined by the points ($B=B_0$, F=0.5M) and ($B=0.4*B_0$, F=0), where B_0 is the unexploited biomass. When biomass falls below 40% unfished biomass, fishing is prohibited and the black line is horizontal. The red dotted line represents the current biomass as of the 2017 Stock Assessment Update. The red dotted line intersects the black line at ($B/B_0=0.467$, F=0.041).

Option D: BERP Workgroup Continues to Develop Menhaden-Specific ERPs with Interim Use of 75% Rule of Thumb

Under this option, the 75% rule of thumb is used to manage the Atlantic menhaden fishery while the BERP Workgroup continues to develop menhaden-specific ERPs. Under the 75% rule of thumb, a fishing mortality rate is established to achieve 75% unfished biomass per recruit. Based on results of the 2017 Stock Assessment Update, the fishing mortality rate that achieves the 75% unfished biomass is F=0.160. As of 2016, the terminal year of the 2017 Stock Assessment Update, $F_{2016}=0.204$ which is above this reference point (Table 1), indicating a reduction in fishing mortality would be needed.

Option E: BERP Workgroup Continues to Develop Menhaden-Specific ERPs with Interim Use of 75% Target, 40% Threshold

Under this option, a F_{target} that achieves 75% unfished biomass and a F_{threshold} which achieves 40% unfished biomass are used to manage the Atlantic menhaden fishery while the BERP Workgroup continues to develop menhaden-specific ERPs. Based on results of the 2017 Stock Assessment Update, the F_{target} that achieves 75% unfished biomass is 0.160, and the F_{threshold} that achieves 40% unfished biomass is 1.493. As of the terminal year of the 2017 Stock

Assessment Update, F_{2016} =0.204, which is above the target but below the threshold (Table 1), indicating overfishing is not occurring.

Table 1: Reference point alternatives presented in Options A through E and the current F-based reference points for the terminal year of the 2017 Stock Assessment Update. The single-species reference point values shown in this table are reported in a different currency then those reported in the Assessment Update report so that the various reference point options can be compared on a common scale. More specifically, all fishing mortality rates in the table are averaged over total biomass (includes ages 0 through 6) and weighted by age. In contrast, the single-species reference point values shown in *Section 1.2.3: Current Stock Status* are based on the geometric mean fishing mortality rates for ages 2-4.

Reference Point	Fishing Mortality Rule	Resulting Biomass-Weighted F
Single-species reference	F=F _{21%MSP}	1.164 (threshold)
points (Options A and B)	F=F _{36%MSP}	0.408 (target)
Pikitch et al. reference points	F=0.5M	0.367 (threshold)
(Option C)	F at current B/B ₀	0.041 (target)
75% rule of thumb (Option D)	F=F75%B ₀	0.160
75% target with 40%	F=F40%B ₀	1.493 (threshold)
threshold (Option E)	F=F75%B ₀	0.160 (target)
Current status	F ₂₀₁₆	0.204

2.6.4 Stock Rebuilding Program

If it is determined that the Atlantic menhaden resource is experiencing overfishing or has become overfished, the Board will initiate and develop a rebuilding schedule.

3.0 MONITORING PROGRAM SPECIFICATION

In order to achieve the goals and objectives of Amendment 3, the collection and maintenance of quality data is necessary.

3.1 COMMERCIAL CATCH AND LANDINGS PROGRAM

The reporting requirements for the Atlantic menhaden fishery are based on Captains Daily Fishing Reports (CDFRs) and a Board approved method for timely quota monitoring (Section 3.1.2). ASMFC, National Marine Fisheries Service (NMFS), US Fish & Wildlife Service (USFWS), the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils, and all the Atlantic coastal states have developed a coastwide fisheries statistics program called the Atlantic Coastal Cooperative Statistics Program (ACCSP). A minimum set of reporting requirements for fishermen and dealers has been developed as the standard for data collection on the Atlantic coast.

3.1.1 Reduction Fishery Catch Reporting Process

Daily vessel unloads (in thousands of standard fish) are emailed to NMFS each day. Harvest by the Reedville menhaden fleet is reported through Captains Daily Fishing Reports (CDFRs), which are deck logbooks that are maintained by the Virginia reduction purse-seine vessels. CDFRs are an important tool to monitor reduction harvest in the Chesapeake Bay so that harvest does not exceed the Chesapeake Bay Reduction Fishery Cap (Section 4.3.7).

Total removals by area are calculated at the end of the fishing season. At-sea catches from the CDFRs are summed by vessel, and compared to total vessel unloads from company catch records. Individual at-sea sets are then multiplied by an adjustment factor (company records/ at-sea estimates). Adjusted catches by set are converted to metric tons, and summed by fishing area. Catch totals are reported by ocean fishing areas and the Chesapeake Bay Bridge Tunnel delineates catches inside and outside of the Chesapeake Bay.

A NMFS port agent samples purse-seine catches dockside in Reedville, VA throughout the fishing season (May through December), providing data for age composition determination.

3.1.2 Bait Fishery Catch Reporting Process

Quota monitoring, whether for a state, region, coast, fleet, or sector is dependent upon the strength of state specific monitoring programs. As a part of Amendment 2, each state was required to implement a timely quota monitoring system in order to maintain menhaden harvest within the TAC and minimize the potential for overages. Table 19 outlines the reporting requirements of each jurisdiction under Amendment 2.

In order to monitor the menhaden quota allocations prescribed in Amendment 3, states must, at a minimum, maintain the current quota monitoring system in place. States must require menhaden purse seine and bait seine vessels (or snapper rigs) to submit CDFR's or similar daily trip level reports. Mandatory reporting requirements will be reviewed as a part of the annual fishery review (*Section 5.3 Compliance Reports*). States which habitually exceed their quota should assess the effectiveness of their current reporting program and make changes as necessary (e.g. increase the frequency of reporting). It is recommended that states collect the following ACCSP data elements: (1) trip start date; (2) vessel identifier; (3) individual fisherman identifier; (4) dealer identification; (5) trip number; (6) species; (7) quantity; (8) units of measurement; (9) disposition; (10) county or port landed; (11) gear; (12) quantity of gear; (13) number of sets; (14) fishing time; (15) days/hours at sea; (16) number of crew; and (17) area fished. See Tables 20 and 21 for details on these data elements.

If an allocation method is implemented which does not have a jurisdictional component, states must work to report landings via the Standard Atlantic Fisheries Information System (SAFIS). Specifically, menhaden landings must be reported through SAFIS so that regional, fleet, disposition, or coastwide quotas may be monitored in near real-time. SAFIS is an electronic platform which allows fishermen and dealers to submit commercial landings reports into a

single database. This system, which meets ACCSP data standards, allows managers to monitor landings and appropriately respond when a quota is met. It also fulfils state and federal reporting requirements, and allows fishermen and dealers to access previous data submissions. States may choose to implement either a one ticket or two ticket system; however, the system must be comprehensive to all fishermen who are required to report through SAFIS. Reports should include: date, species landed, quantity landed, units of measure, disposition (bait or reduction), state landed, and gear type. Gear type will be critical if a fleet-capacity option is chosen. It is recommended that trip-level reports be submitted to SAFIS, at a minimum, on a weekly basis. Fleets which are managed under a soft cap do not have to report landings to SAFIS; however, states must monitor these landings and report them as part of the Annual Compliance Report.

For jurisdictions which have a statutory requirement that landings be submitted to the state, landings reports may be subsequently uploaded to SAFIS following reporting to the state. If a state is unable to implement SAFIS reporting by the start of the 2018 fishing year, that state must submit landings reports to ASMFC so that a regional, fleet, sector, or coastwide quota may be monitored in 2018. All states must implement SAFIS reporting by 2019. Per *Section 4.5.3.1*, New Hampshire, Pennsylvania, South Carolina, and Georgia are exempt from timely quota monitoring and are not required to report through SAFIS.

Any changes to a state's current quota monitoring program must be reviewed by the PDT and approved by the Board.

3.1.2.1 Incidental Catch Reporting

Landings of menhaden under Section 4.3.5: Incidental Catch and Small Scale Fisheries must be reported as a part of the Annual Compliance Report. Landings of menhaden after the directed fishery has closed are required to be reported through the timely reporting system outlined in Section 3.1.2. The exception to this rule is if Option E: Small-Scale Fishery Set Aside is implemented; under this option, landings by small-scale gears are not required to be reported to SAFIS, but states must monitor landings and report them as a part of the Annual Compliance Report.

3.1.2.2 Episodic Events Reporting

States participating in the Episodic Events Program (Section 4.3.6) must implement daily trip level harvester reporting. Each state must track landings, either through state landings reports or SAFIS, and submit weekly reports to ASMFC staff. As the set aside is used, staff may request states submit reports on a more frequent basis, in order to avoid overages.

3.2 RECREATIONAL FISHERY CATCH REPORTING PROCESS

The Marine Recreational Information Program (MRIP) contains estimated Atlantic menhaden catches from 1981-2016. Recreational harvest of menhaden was previously collected through the Marine Recreational Fisheries Statistics Survey (MRFSS), which was a recreational data collection program used from 1981-2003. The MRFSS program was replaced by MRIP in 2004

and was designed to provide more accurate and timely reporting as well as greater spatial coverage. The MRFSS and MRIP programs were simultaneously conducted in 2004-2006 and this information was used to calibrate past MRFSS recreational harvest estimates against MRIP recreational harvest estimates. Recreational catches of menhaden were downloaded from http://www.st.nmfs.noaa.gov/st1/recreational/queries/index.html using the query option.

An online description of MRIP survey methods can be found here: http://www.st.nmfs.noaa.gov/recreational-fisheries/index#meth

3.3 FOR-HIRE FISHERY CATCH REPORTING PROCESS

ACCSP standards allow for the use of MRIP for-hire sampling or a census system such as ACCSP's eTrips. For-hire sampling provides bimonthly data but eTrips can provide data within a 24-hour period.

3.4 SOCIAL AND ECONOMIC COLLECTION PROGRAMS

Data on a number of variables relevant to social and economic dimensions of menhaden fisheries are collected through existing ACCSP data collection programs and MRIP; however, no explicit mandates to collect socioeconomic data for menhaden currently exist. In addition to landed quantities, commercial menhaden harvesters and dealers may report ex-vessel prices or value, fishing and landing locations, landing disposition, and a variety of measures capturing fishing effort. MRIP regularly collects information on recreational fishing effort and landings, and occasionally gathers socioeconomic data on angler motivations and expenditures; however, menhaden which are caught and then subsequently used as recreational bait are not always effectively captured in the survey.

A recent socioeconomic study of commercial menhaden fishery was conducted to collect information on the bait and reduction sectors and help inform management decisions (Whitehead and Harrison 2017). As a part of the study, researchers interviewed 43 industry members from both the bait and reduction fisheries to better understand gear usage, substitute products, market changes, and fishing community characteristics. Those interviewed include commercial fishermen, bait dealers, bait shop owners, and reduction facility managers. The study also performed county level, state-level, and coastwide analysis on menhaden landings and ex-vessel value to determine socioeconomic trends in the fishery. In addition, an economic impact analysis was conducted to determine effects (including direct, indirect, and induced impacts) from changes to the TAC. Finally, a public opinion survey was conducted in eight states to determine the public's tradeoff between economic increases and ecosystem services. Over 2,000 members of the public participated in the survey.

While this socio-economic study helped provided a more complete picture of the menhaden commercial fishery, information on factors such as fishing costs, employment levels, processing and distribution are not collected regularly for commercial menhaden fisheries. This information would be useful for future socioeconomic analyses.

3.5 BIOLOGICAL DATA COLLECTION PROGRAMS

3.5.1 Fishery-Dependent Data Collection

3.5.1.1 Reduction Fishery

The Beaufort Laboratory of the Southeast Fisheries Science Center conducts biological sampling of the Atlantic menhaden reduction fishery (Smith 1991). The program began sampling in the Mid-Atlantic and Chesapeake Bay areas during 1952-1954 and has continued uninterrupted since 1955, sampling the entire range of the Atlantic menhaden purse-seine reduction fishery. Detailed descriptions of the sampling procedures and estimates gathered through the program are cited in Smith (1991).

The biological data, or port samples, for length- and weight-at-age are available from 1955 through 2016, and represents one of the longest and most complete time series of fishery data in the nation. The NMFS employs a full-time port agent at Reedville, VA to sample catches throughout the fishing season for age and size composition of the reduction catch (Table 22).

3.5.1.2 Bait Fishery

10 Fish Sampling

Each state in the New England (ME, NH, MA, RI, CT) and Mid-Atlantic (NY, NJ, DE) regions are required to collect one 10-fish sample (age and length) per 300 metric tons landed for bait purposes. The TC recommends collecting the samples by gear type. One 10-fish sample consists of 10 fish collected from a distinct landing event (e.g., purse seine trip, pound net set). Each collection of 10 fish is from an independent sampling event; multiple 10-fish samples should not be collected from the same landing event.

Each state in the Chesapeake Bay (MD, PRFC, VA) and South Atlantic (NC, SC, GA, FL) regions are required to collect one 10-fish sample (age and length) per 200 metric tons landed for bait purposes. The TC recommends collecting the samples by gear type. One 10-fish sample consists of 10 fish collected from a distinct landing event (e.g., purse seine trip, pound net set). Each collection of 10 fish is an independent sampling event; multiple 10-fish samples should not be collected from the same landing event.

De minimis states are not required to conduct fishery-dependent biological sampling in the menhaden fishery (Section 4.5.3: De Minimis Fishery Guidelines).

Table 23 shows the number of 10-fish samples collected by the jurisdictions in 2016 as well as the number of age and length samples collected.

Pound Net Monitoring

Catch information from pound net fisheries is critical to determine changes in the relative abundance of adult menhaden along the east coast. At a minimum, each state with a pound net fishery must collect catch and effort data elements for Atlantic menhaden including total pounds (lbs) landed per day and number of pound nets fished per day. A pound net fishery includes floating fish traps and fishing weirs. These are harvester trip level ACCSP data

requirements. In order to characterize selectivity of this gear in each state, a goal of collecting five 10-fish samples annually is recommended. One 10-fish sample consists of 10 fish collected from a distinct landing event (e.g., pound net set). Each collection of 10 fish is an independent sampling event; multiple 10-fish samples should not be collected from the same landing event.

3.5.2 Fishery-Independent Data Collection

Assessment of the Atlantic menhaden stock requires information from a variety of fishery-independent surveys along the coast. As a part of the 2015 Benchmark Stock Assessment and the 2017 Stock Assessment Update, sixteen fishery-independent surveys were used to create a Juvenile Abundance Index, seven surveys were used to create a Northern Adult Index, and two surveys were used to create a Southern Adult Index. For many of the surveys used, the primary objective is to measure the abundance of species other than menhaden; however the bycatch of menhaden in these surveys can provide important information regarding stock conditions. Table 24 shows the surveys used to assess the status of Atlantic menhaden in the 2015 and 2017 stock assessments. State and federal agencies and academic institutions conducting these surveys are encouraged to continue them into the future to allow for the best possible assessment of Atlantic menhaden recruitment.

3.5.3 Observer Programs

As a condition of state and/or federal permitting, many vessels are required to carry at-sea observers when requested. A minimum set of standard data elements are to be collected through the ACCSP at-sea observer program (refer to the ACCSP Program Design document for details). Specific fisheries priorities will be determined by the Discard/Release Prioritization Committee of ACCSP.

3.6 ASSESSMENT OF STOCK CONDITION

An Atlantic menhaden stock assessment will be performed every three years by the Stock Assessment Subcommittee (SASC). The TC and Advisory Panel (AP) will meet to review the stock assessment and all other relevant data sources. The stock assessment report shall follow the general outline as approved by the Interstate Fisheries Management Program Policy Board (ISFMP Policy Board) for all Commission-managed species. In addition to the general content of the report as specified in the outline, the stock assessment report may also address the specific topics detailed in the following sections. Specific topics in the stock assessment may change as the SASC continues to provide the best model and metrics possible to assess the Atlantic menhaden stock.

3.6.1 Assessment of Population Age/Size Structure

Estimates of Atlantic menhaden age and size structure are monitored based on results of the stock assessment. Improvements to data sources and modeling assumptions during the 2015 Benchmark Stock Assessment, such as increased sampling of the bait fishery, addition of several

surveys, and incorporation of dome shaped selectivity, greatly improved the understanding of size and age distribution of the menhaden stock.

3.6.2 Assessment of Annual Recruitment

Recruitment of Atlantic menhaden is currently estimated through two primary methods. The first is the estimate of recruitment to age-1 from the stock assessment model. The second is the examination of various fishery-independent data sources, including the juvenile abundance indices that are integrated in to the statistical modeling process.

3.6.3 Assessment of Fecundity

Population fecundity, a measure of total egg production by the population, is estimated from the stock assessment model every three years. Given egg production is not linearly related to female weight, indices of egg production may provide a better measures of reproductive output of a stock.

3.6.4 Assessment of Fishing Mortality

Fishing mortality (F) rates are estimated by the stock assessment model. Currently, fishing mortality rates are estimated for the reduction fishery, the bait fishery, and the recreational fishery.

3.7 STOCKING PROGRAM

There is currently no stocking program in place for Atlantic menhaden.

4.0 MANAGEMENT PROGRAM

4.1 RECREATIONAL FISHERY MANAGEMENT MEASURES

No recreational fishery management measures are proposed in this amendment. Recreational landings of Atlantic menhaden are currently believed to be insignificant in terms of total harvest. Therefore, regulation of the recreational fishery is unnecessary at this time. The Board has the option of considering management changes to the recreational fishery through a future addendum, as detailed in Adaptive Management (*Section 4.6*).

4.2 FOR-HIRE FISHERIES MANAGEMENT MEASURES

No management measures for the for-hire fisheries are proposed in this amendment. The Board has the option of considering management changes to the recreational fishery through a future addendum, as detailed in Adaptive Management (Section 4.6).

4.3 COMMERCIAL FISHERY MANAGEMENT MEASURES

4.3.1 Total Allowable Catch

The Board will set an annual or multi-year TAC based on the following procedure.

The Atlantic Menhaden TC will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, survey indices, assessment modeling results, and target mortality levels. The TC will calculate TAC options based on the Board selected method of setting a TAC (see *Section 4.3.1.1*). The Board will set an annual TAC through Board action, with the option of setting a multi-year TAC.

4.3.1.1 TAC Setting Method

The Board will set the TAC based on the best available science (e.g., projection analysis); however, if the projections are not recommended for use by the TC, the Board will set a quota based on an ad-hoc approach. This could include the ad-hoc approach used by the Regional Fishery Management Councils (Berkson et al., 2011) (see description below) or an ad-hoc approach that is informed by the Commission's ongoing development of a Risk and Uncertainty Policy.

Projection Analysis Used to Set a TAC (Preferred Method)

Projection analysis is conducted to explore a range of TAC alternatives and determine the percent risk of exceeding the F_{target} or the F_{threshold}. Monte Carlo Bootstrap runs of the base model run are used as the basis for the projection analysis. The Board can request specific TAC levels to be explored through the projection analysis or specify the probability level of the fishing mortality rate being between the F_{target} and F_{threshold}. Important assumptions of the projection analysis are that it does not include structural (model) uncertainty, fisheries are assumed to continue fishing at their estimated current proportions of total effort, and mortality is assumed to occur throughout the year.

Ad-hoc Approach to Setting a TAC

Should the TC not recommend the use of projection analysis to inform the specification process, an ad hoc approach used by several regional Fishery Management Councils can be adopted. This ad-hoc method is typically used for species with poor assessment data or uncertain stock assessment results. In these situations, most Councils use their landings/catch data as the only reliable means of setting harvest limits. A document entitled "Calculating Acceptable Biological Catch for Stocks that Have Reliable Catch Data Only (Only Reliable Catch Stocks – ORCS)" was recently published, and serves as guidance to set interim removal levels under these conditions (Berkson et al., 2011).

To summarize the ORCS report; generally, an average of the last 3-5 years of landings are used to reflect recent history. A precautionary multiplier is then applied to decrement the average landings and set a harvest limit. The appropriate multiplier is cautiously decided based on

factors such as life history, ecological function, stock status, and an understanding of exploitation. Typically, this multiplier can range from 0.85 to 0.25 (Table 25).

In the New England approach for Atlantic herring and red crab, the multiplier was chosen at 1.0 suggesting catch be maintained at current levels. The rationale was that the stock was not overfished and overfishing was likely not occurring. Other evidence, such as size at age, also indicated that the overall stock status was good. Further, landings were well monitored and discards of the target stock were low.

In the case of the Pacific Fishery Management Council the multiplier for coastal pelagics was set at 0.25. This number reflected the importance of herring as forage for Stellar Sea Lions and other endangered mammals, the high level of exploitation, and the fact that Pacific Herring spawn in discreet aggregations that are vulnerable to fishing.

It should be noted that the multiplier is never set at a value greater than 1.0; indicating that catch should not be allowed to increase in these uncertain situations. Table 26 provides some additional decision making framework information that goes into the choice of a multiplier.

It is also important to note that in the Council process, the Science and Statistical Committee (SSC) sets an Overfishing Limit (OFL). The Council is then charged with setting an Allowable Biological Catch (ABC) which is below the OFL. Should this process be adopted in the Atlantic menhaden fishery, the TC will recommend a multiplier to be used in the ad-hoc method. The Board can then set a TAC that is at or below the catch level.

4.3.1.2 Indecision Clause

If the Board is unable to approve a TAC for the subsequent fishing year, a TAC needs to be specified. The following putlines options should the Board not set a TAC for the subsequent fishing year by December 31st of the current year:

<u>Option A:</u> The TAC for the subsequent fishing year will be set at three-fourths of the TAC for the current year. For example, if the current TAC is 200,000 mt, the subsequent year's TAC would be set at 150,000 mt.

<u>Option B:</u> The TAC for the subsequent fishing year will be the same as the TAC for the current fishing year; however, unused quota from the current fishing year cannot be rolled over into the subsequent year and quota overages which occur in the subsequent year cannot be ameliorated through quota transfers or quota reconciliation, depending on what is chosen in *Section 4.3.3: Quota Transfers*.

<u>Option C:</u> The TAC for the subsequent fishing year will be the same as the TAC for the current fishing year; however, in the subsequent fishing year there will be no episodic events set aside program and no incidental catch provision (this does not include Option E: Small Scale Fishery Set Aside in *Section 4.3.5*). Should a percentage of TAC be reserved for the episodic events set

aside and/or the incidental catch provision, this amount of TAC will not be redistributed to the commercial fishery based on the allocation method chosen in *Section 4.3.2*.

<u>Option D:</u> The TAC for the subsequent fishing year will be the same as the TAC for the current fishing year. In addition, all provisions of the current management plan (including quota transfers, quota rollovers, episodic events set aside, and incidental catch provision) will be maintained.

4.3.2 Quota Allocation

The Board must determine how to allocate the TAC among the different participants in the menhaden fishery. Once an allocation has been harvested, the directed fishery for that state, coast, region, disposition, or fleet closes. Menhaden harvest for specific gear types or states may be permitted after an allocation has been reached, depending on the management options selected in Section 4.3.3: Quota Transfers, Section 4.3.5: Incidental Catch and Section 4.3.6: Episodic Events Set Aside Program. Should quota not be allocated by jurisdiction, states will be required to submit trip-level reports to SAFIS for near real-time monitoring of the quota. See Section 3.1.2 Bait Fishery Catch Reporting Process for additional information. The Board has the authority to adjust the closure of a fishery relative to the percent of quota harvested through Board action.

To account for the various combinations of allocation methods and timeframes, the management alternatives have been divided into four tiers. A management alternative must be selected in each tier to compile a single allocation method. To achieve the current allocation method specified in Amendment 2 (status quo), the Board would select: Tier 1, Option C: None of the Above; Tier 2, Option C: None of the Above; Tier 3, Option B: Jurisdictional; and Tier 4, Option A: 2009-2011.

The first tier presents three allocation options:

- Dispositional subdivision of the TAC between the bait and reduction fisheries
- ➤ Allocation Based on TAC level the allocation method switches to one which is more favorable to the bait fishery when the TAC is above 212,500 mt
- None of the above none of the options in this tier are chosen

The second tier presents three allocation options:

- Fleet Capacity subdivision of the TAC by gear type
- Fixed Minimum subdivision of TAC by jurisdiction but each jurisdiction gets a baseline percentage
- None of the above none of the options in this tier are chosen

The third tier presents three allocation options:

- Coastwide no subdivision of TAC
- ➤ Jurisdictional subdivision of TAC by state
- Regional subdivision of TAC by region

The fourth tier presents five timeframe options that are presented for calculating allocation percentages:

- > 2009-2011 (status quo)
- **>** 2012-2016
- **>** 1985-2016
- **>** 1985-1995
- Weighted (50% each to 1985-1995 and 2012-2016)

Allocation percentages for the various options can be found in Tables 2-12.

Tier 1: Disposition, Allocation Based on TAC Level, or None of the Above Option A: Disposition Quota

Menhaden commercial TAC is divided between the bait and reduction fishery. Should the bait quota not be further divided into jurisdictional quotas, SAFIS will be used to monitor landings in season. Once 80% of the bait allocation is reached (as indicated through SAFIS), a trip limit of 25,000 pounds will be implemented in the bait sector. The respective fisheries will close when 95% of the allocation has been reached (as indicated through SAFIS or CDFRs) in order to minimize overages. A fisherman cannot land menhaden more than once in a single calendar day. If the bait quota is further allocated by jurisdiction, the following do not apply: trip limits, a required fishery closure when 95% of the allocation has been reached, and reporting through SAFIS.

<u>Sub-option 1:</u> Seventy percent of the overall menhaden commercial TAC is allocated to the reduction fishery, and 30% of the overall TAC is allocated to the bait fishery. For reference, 30% of 200,000 metric tons (the 2017 TAC) is 60,000 mt or roughly 132 million pounds.

<u>Sub-option 2:</u> The percentage of menhaden commercial TAC allocated to the reduction fishery and the bait fishery is dependent on historical landings from one of the timeframes selected in Tier 4 (Table 2).

Option B: Allocation Based on TAC Level

The coastwide menhaden commercial TAC will be allocated using two different methods depending on the level at which the annual TAC is set. At or below the baseline annual TAC level of 212,500 mt, quotas will be allocated to jurisdictions based on average landings from 2009-2011 (i.e. the current allocation method, Table 10). If the annual TAC is set above the base level TAC, the difference between the annual TAC and 212,500 mt will be allocated using a strategy that is more favorable to the bait fishery. A sub-option below must be selected to determine the allocation method used when the TAC is greater than 212,500 mt.

*This allocation method cannot be combined with any of the other allocation methods presented in Tier 2 or Tier 3. If this method is chosen, the Board can skip to Tier 4.

<u>Sub-option 1:</u> If the annual TAC is greater than 212,500 mt, the difference between the annual TAC and 212,500 mt will be distributed such that the reduction fishery gets 50% of

the allocation (included in Virginia's quota) and the other 50% is distributed to jurisdictions based on bait landings during a timeframe chosen in Tier 4 (Table 3).

<u>Sub-option 2:</u> If the annual TAC is greater than 212,500 mt, the difference between the annual TAC and 212,500 mt will be distributed such that the reduction fishery gets 30% of the allocation (included in Virginia's quota) and the other 70% is distributed to jurisdictions based on bait landings during a timeframe chosen in Tier 4 (Table 4).

Option C: None of the Above

None of the allocation methods in Tier 1 are chosen and the Board can proceed to Tier 2.

Tier 2: Fleet Capacity, Fixed Minimum, or None of the Above

Option A: Fleet-Capacity Quota

Menhaden commercial TAC is divided based on the capacity of various gear types to harvest menhaden. Each fleet's fishery will be closed when 90% of the quota is reported to be caught (as indicated through SAFIS), including an allocation scenario in which a bait quota is further divided by fleet. This fishery closure does not apply to a fleet operating under a soft cap. If a fleet-capacity allocation method is chosen, a small-scale fishery set aside (Option E) in *Section 4.3.6 Incidental Catch and Small Scale Fisheries* does not apply.

Included in this allocation method is the option for a soft cap, which sets a target quota for a fleet but does not subject that fleet to a fishery closure. A rationale for the use of a soft cap is that it can relieve the administrative burden on states to implement timely quota reporting for small-scale gears which represent less than 6% of landings in the fishery. If a soft cap is chosen, states will continue to monitor landings by gear types in the small-capacity fleet; however, landings by the small capacity fleet do not need to be reported to SAFIS. Landings by gears subject to a soft cap will be reported to the Board as a part of the annual FMP Review (Section 5.3: Compliance Report). Should a gear type subject to a soft cap show a continued and significant increase in its proportion of landings relative to total landings in the fishery, the Board has the authority, through Adaptive Management (Section 4.6), to reduce an existing trip limit or re-assign that gear type to another fleet.

*Fleet allocation by jurisdiction cannot be shown due to issues with data confidentiality; however, it is possible for the Board to choose jurisdictional allocations (Option A in Tier 3) and then each state can further divide their quota by gear type. In addition, fleet landings by four regions cannot be shown due to confidentiality.

Sub-option 1: Two Fleets Based on Gear Type

Quota is divided between two fleets (Table 5) which are defined as:

- Small-Capacity Fleet: cast nets, traps, pots, haul seines, fyke nets, hook and line, trawls (excluding pair trawls), bag nets, hoop nets, hand lines, trammel nets, bait nets, pound nets, anchored/staked gill nets, drift gill nets, fishing weirs, and floating fish traps.
- Large-Capacity Fleet: purse seines and pair-trawls.

<u>Sub-option A:</u> All fleet quotas are hard caps, in which all fisheries within a fleet are closed when the quota is met.

<u>Sub-option B:</u> The small-capacity fleet operates on a soft cap, in which the fisheries within the small-capacity-fleet do not close if the quota is met. All gears in the small-capacity fleet operate under a 25,000 pound trip limit per day throughout the fishing year. The purpose of this trip limit is to provide an input control on the small-scale fleet given the fishery does not close if the quota is met. The large-capacity fleet operates under a hard cap, in which all fisheries within the large-capacity fleet are closed when 90% of the quota is reported to be caught. There is no trip limit for the large-capacity fleet. If this option is chosen, the management alternatives in *Section 4.3.6 Incidental Catch and Small Scale Fisheries* do not apply.

Sub-option 2: Three Fleets Based on Gear Type

The commercial TAC is divided between three fleets (Table 6) which are defined as:

- Small-Capacity Fleet: cast net, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, and bait nets.
- Medium-Capacity Fleet: pound nets, anchored/staked gill nets, drift gill nets, fishing weirs, floating fish traps, and trawls (excluding pair trawls).
- Large-Capacity Fleet: pair trawls and purse seines.

<u>Sub-option A:</u> All fleet quotas are hard caps, in which all fisheries within a fleet are closed when the quota is met.

<u>Sub-option B:</u> The small-capacity fleet operates on a soft cap, in which the fisheries within the small-capacity fleet do not close if the quota is met. Gears in the small-capacity fleet operate under a 10,000 pound trip limit per day throughout the fishing year. The purpose of this trip limit is to provide an input control on the small-scale fleet given the fishery does not close if the quota is met. The large-capacity and medium capacity fleet quotas are hard caps, in which all fisheries within each fleet are closed when 90% of the quota is reported to be caught. There is no trip limit for the medium or large capacity fleets.

Option B: Jurisdiction Allocation with Minimum Base Allocation.

Under this option, all jurisdictions are allocated a fixed minimum amount of quota, including jurisdictions which have not previously been allocated quota. Should a jurisdiction desire to forgo the fixed minimum quota it has been allocated, it may, on an annual basis, choose to decline its quota completely or maintain 10,000 pounds for bycatch purposes and decline the remainder of the quota. Quota which is relinquished by the states will be redistributed to the other jurisdictions based on historic landings during an allocation timeframe chosen in Tier 4. Should a state choose to relinquish its annual quota, the Commission must be notified through the annual compliance report process.

*Given this allocation option implements a jurisdictional approach, the Board can proceed to Tier 4.

<u>Sub-option 1:</u> Each jurisdiction receives 0.5% of the coastwide TAC prior to the allocation being divided (Table 7). For reference 0.5% of 200,000 mt equals 2.2 million pounds and 8% of 200,000 mt (the sum of each jurisdictions 0.5%) equals 35.3 million pounds.

<u>Sub-option 2:</u> Each jurisdiction receives 1% of the coastwide TAC prior to the allocation being divided (Table 8). For reference 1% of 200,000 mt equals 4.4 million pounds and 16% of 200,000 mt (the sum of each jurisdictions 1%) equals 70.5 million pounds.

<u>Sub-option 3:</u> Each jurisdiction receives 2% of the coastwide TAC prior to the allocation being divided (Table 9). For reference 2% of a 200,000 mt TAC equals 8.8 million pounds and 32% of a 200,000 mt TAC (the sum of each jurisdictions 2%) equals 141.1 million pounds.

Option C: None of the Above

None of the allocation methods in Tier 2 are chosen and the Board can proceed to Tier 3.

Tier 3: Coastwide, Jurisdictional, or Regional Approach

Option A: Coastwide Allocation. Under this option the TAC is not subdivided by jurisdiction or region. All fisheries will operate within the allocation structure selected in Tiers 1 and 2. If Option C was selected in both Tiers 1 and 2, there will be one coastwide TAC for the entire commercial fishery and a timeframe does not need to be chosen in Tier 4.

<u>Option B: Jurisdictional Allocation.</u> The coastwide commercial Atlantic menhaden TAC will be divided among the Atlantic coast jurisdictions based on the allocation timeframe chosen in Tier 4 (Table 10).

Option C: Regional Allocation.

The coastwide commercial Atlantic menhaden TAC will be divided by region. The fishery in each region will be monitored through SAFIS and will be closed when 90% of the allocation is reached.

<u>Sub-option 1:</u> A three-region split will be used to divide the coastwide commercial TAC. The regions are defined as (1) New England, Maine through Connecticut, (2) Mid-Atlantic, New York through Delaware, and (3) South Atlantic, Maryland through Florida. Menhaden landed in a state are attributed to its respective region (Table 11).

<u>Sub-option 2:</u> A four-region split will be used to divide the coastwide commercial TAC. The regions are defined as (1) New England, Maine through Connecticut, (2) Mid-Atlantic, New York through Delaware, (3) Chesapeake Bay, Maryland through Virginia and (4) South Atlantic, North Carolina through Florida. Menhaden landed in a state are attributed to its respective region (Table 12).

Tier 4: Allocation Timeframe

Option A: 2009-2011 (status quo)

The quota allocation is based on the three-year average landings from 2009 to 2011.

Option B: 2012-2016 (5 years)

The quota allocation time frame is based on the five-year average landings from 2012 to 2016. This time frame includes the five most recent years of data and encompasses years prior to and after the implementation of a quota system. Total landings include transfers, bycatch, and landings under the episodic events program.

Option C: 1985-2016 (31 years)

The quota allocation time frame is based on average landings from 1985 to 2016. This time frame includes the longest range of years available with adequate landings data, and as such should capture more variability in landings. Bait landings going back to 1985 include more uncertainty, primarily due to voluntary reporting of bait landings in some states. Reduction fisheries in North Carolina, Florida, and Maine also existed during this time period, but have not been in operation since 2005, 1987, and 1993, respectively. Total landings include transfers, bycatch, and landings under the episodic events program.

<u>Sub-Option A:</u> Reduction landings from states which no longer have a reduction fishery do not count towards the state's average landings.

<u>Sub-Option B:</u> Reduction landings from states which no longer have a reduction fishery do count towards the state's average landings.

Option D: 1985-1995 (11 years)

The quota allocation time frame is based on the eleven-year average landings from 1985 to 1995. Bait landings from 1985 to 1995 include more uncertainty, primarily due to voluntary reporting of bait landings in some states. Reduction fisheries in North Carolina, Florida, and Maine also existed during this time period, but have not been in operation since 2005, 1987, and 1993, respectively.

<u>Sub-Option A:</u> Reduction landings from states which no longer have a reduction fishery do not count towards the state's average landings.

<u>Sub-Option B:</u> Reduction landings from states which no longer have a reduction fishery do count towards the state's average landings.

Option E: Weighted Allocation

The quota allocation time frame is based on a weighted average of total landings, using the 1985-1995 and 2012-2016 time frames. Each time frame is given a 50% weighting. This option takes into account a more historical time period and the most recent time period. All potential data concerns for the 1985 -1995 time period mentioned in Option D would still apply.

<u>Sub-Option A:</u> Reduction landings from states which no longer have a reduction fishery do not count towards the state's average landings.

<u>Sub-Option B:</u> Reduction landings from states which no longer have a reduction fishery do count towards the state's average landings.

Table 2: Disposition Allocation

Percent of menhaden commercial TAC allocated to the reduction and bait fisheries based on historic landings (Tier 1, Option A). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant.

(a) Allocations between the bait and reduction sector; includes all reduction landings

	Bait Quota	Reduction Quota
2009-2011	21.2%	78.8%
2012-2016	24.8%	75.2%
1985-2016	13.5%	86.5%
1985-1995	8.3%	91.7%
Weighted	14.1%	85.9%

(b) Allocations between the bait and reduction sector; only includes VA reduction landings. Three time periods are not shown due to confidentiality rules.

	Bait Quota	Reduction Quota
2009-2011	21.2%	78.8%
2012-2016	24.8%	75.2%
1985-2016		
1985-1995		
Weighted		

Table 3: Allocation Based on TAC Level (Sub-Option 1)

Percent of menhaden commercial TAC greater than 212,500 mt that is allocated to each jurisdiction based on historic bait landings (Tier 1, Option B, Sub-Option 1). Under this scenario, the Virginia reduction fishery gets 50% of the difference between the annual TAC and 212,500 mt (included in Virginia's percentage below) and the states bait fisheries are allocated the other 50%. These allocation percentages only apply if the annual TAC is greater than 212,500 mt. If the TAC is less than or equal to 212,500 mt, allocations are based on jurisdictional landings from 2009-2011 (Table 10).

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	TAC %
ME	0.04%	0.45%	0.22%	0.11%	0.32%
NH	0.00%	0.00%	0.01%	0.04%	0.01%
MA	1.99%	1.19%	1.99%	3.54%	2.09%
RI	0.05%	0.30%	2.16%	7.39%	3.02%
СТ	0.04%	0.02%	0.10%	0.12%	0.06%
NY	0.17%	0.51%	0.41%	0.57%	0.53%
NJ	26.66%	25.42%	19.17%	12.04%	20.29%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.03%	0.06%	0.06%	0.10%	0.08%
MD	3.57%	4.00%	3.60%	3.22%	3.70%
PRFC	1.47%	1.72%	3.66%	7.06%	3.77%
VA	64.76%	65.90%	66.65%	61.53%	64.22%
NC	1.17%	0.31%	1.55%	3.04%	1.36%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.05%	0.12%	0.42%	1.24%	0.55%

Table 4: Allocation Based on TAC Level (Sub-Option 2) Percent of menhaden commercial TAC greater than 212,500 mt that is allocated to each jurisdiction based on historic bait landings (Tier 1, Option B, Sub-Option 2). Under this scenario, the Virginia reduction fishery gets 30% of the difference between the annual TAC and 212,500 mt (included in Virginia's percentage below) and the state's bait fisheries are allocated the other 70%. These allocation percentages only apply if the annual TAC is greater than 212,500 mt. If the TAC is less than or equal to 212,500 mt, allocations are based on jurisdictional landings from 2009-2011 (Table 10).

	2009-2011 % TAC	2012-2016 % TAC	1985-2016 % TAC	1985-1995 % TAC	Weighted % TAC
ME	0.06%	0.62%	0.30%	0.16%	0.45%
NH	0.00%	0.00%	0.01%	0.05%	0.02%
MA	2.79%	1.67%	2.79%	4.96%	2.93%
RI	0.06%	0.42%	3.02%	10.34%	4.23%
СТ	0.06%	0.03%	0.14%	0.17%	0.09%
NY	0.24%	0.71%	0.58%	0.80%	0.74%
NJ	37.32%	35.58%	26.84%	16.86%	28.40%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.05%	0.09%	0.09%	0.14%	0.11%
MD	5.00%	5.61%	5.03%	4.51%	5.18%
PRFC	2.06%	2.41%	5.12%	9.88%	5.27%
VA	50.66%	52.26%	53.30%	46.14%	49.91%
NC	1.64%	0.44%	2.17%	4.25%	1.90%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.07%	0.17%	0.59%	1.74%	0.77%

Table 5: Fleet Capacity Quota – Two Fleet

Percent of menhaden commercial TAC allocated to the small and large capacity fleets based on historic landings (Tier 2, Option A, Sub-Option 1). Given Florida did not code landings by gear type prior to 1993, percent landings by gear type in 1993 and 1994 were used to estimate gear landings from 1988-1992. Florida reduction landings were available for 1985-1987. Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows bait landings by fleet and is to be used if a disposition quota (Tier 1, Option A) is further allocated by fleet.

(a) Allocations by two fleets; includes all historic reduction landings

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	96.22%	94.18%	96.17%	96.04%	95.37%
Small Capacity Quota	3.78%	5.82%	3.83%	3.96%	4.63%

(b) Allocations by two fleets; only includes VA reduction landings

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	96.22%	94.18%	95.83%	95.53%	95.00%
Small Capacity Quota	3.78%	5.82%	4.17%	4.47%	5.00%

(c) Bait allocations by two fleets. These percentages are to be used if a disposition quota is further allocated by fleet. It is important to note that these percentages further divide the bait allocation presented in Tables 2a and 2b.

	2009-	2012-	1985-	1985-	Weighted
	2011	2016	2016	1995	weigiiteu
Large Capacity Quota	82.1%	76.6%	72.2%	54.2%	68.1%
Small Capacity Quota	17.9%	23.4%	27.8%	45.8%	31.9%

Table 6: Fleet Capacity Quota – Three Fleet

Percent of menhaden commercial TAC allocated to the small, medium, and large capacity fleets based on historic landings (Tier 2, Option A, Sub-Option 2). Given Florida did not code landings by gear type prior to 1993, percent landings by gear type in 1993 and 1994 were used to estimate gear landings from 1988-1992. Florida reduction landings were available for 1985-1987. Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows bait landings by fleet and is to be used if a disposition quota (Tier 1, Option A) is further allocated by fleet.

(a) Allocations by three fleets; includes all historic reduction landings

	2009-	2012-	1985-	1985-	Waishtad
	2011	2016	2016	1995	Weighted
Large Capacity Quota	96.22%	94.18%	96.17%	96.04%	95.37%
Medium Capacity Quota	3.69%	5.56%	3.70%	3.86%	4.48%
Small Capacity	0.09%	0.26%	0.13%	0.09%	0.15%
Quota					

(b) Allocations by three fleets; only includes VA reduction landings

10 10 11 10 10						
	2009-	2012-	1985-	1985-	Weighted	
	2011	2016	2016	1995	weighted	
Large Capacity	96.22%	94.18%	95.83%	95.53%	95.00%	
Quota	90.2270	34.1070	93.8370	33.3370	93.00%	
Medium	3.69%	5.56%	4.03%	4.37%	4.83%	
Capacity Quota	3.09%	5.50%	4.05%	4.57/0	4.05/0	
Small Capacity	0.09%	0.26%	0.14%	0.10%	0.16%	
Quota	0.0976	0.20%	0.14%	0.10%	0.10%	

(c) Bait allocations by three fleets. These percentages are to be used if a disposition quota is further allocated by fleet. It is important to note that these percentages further divide the bait allocation presented in Tables 2a and 2b.

	2009-	2012-	1985-	1985-	Weighted	
	2011	2016 2016		1995	vveignteu	
Large Capacity Quota	82.1%	76.6%	72.2%	54.2%	68.1%	
Medium Capacity Quota	17.4%	22.4%	26.8%	44.7%	30.9%	
Small Capacity Quota	0.4%	1.0%	0.9%	1.1%	1.1%	

Table 7: Fixed Minimum Allocation – 0.5%

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 0.5% quota allocation (Tier 2, Option B, Sub-Option 1). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 0.5% fixed minimum quota; includes all historic reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Mainhead
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.52%	0.70%	1.32%	2.23%	1.68%
NH	0.50%	0.50%	0.50%	0.51%	0.50%
MA	1.28%	1.04%	1.01%	1.07%	1.06%
RI	0.52%	0.64%	1.05%	1.69%	1.31%
СТ	0.52%	0.51%	0.53%	0.52%	0.52%
NY	0.57%	0.73%	0.60%	0.59%	0.64%
NJ	10.89%	12.11%	5.38%	2.44%	5.93%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.51%	0.53%	0.52%	0.52%	0.52%
MD	1.89%	2.33%	1.42%	1.02%	1.49%
PRFC	1.07%	1.29%	1.43%	1.63%	1.51%
VA	78.77%	76.92%	76.63%	75.77%	76.19%
NC	0.96%	0.64%	7.43%	9.64%	6.39%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.52%	0.55%	0.69%	0.88%	0.76%

(b) Allocations with a 0.5% fixed minimum quota; includes only VA reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.52%	0.70%	0.56%	0.52%	0.59%
NH	0.50%	0.50%	0.50%	0.51%	0.50%
MA	1.28%	1.04%	1.05%	1.14%	1.10%
RI	0.52%	0.64%	1.10%	1.84%	1.37%
СТ	0.52%	0.51%	0.53%	0.52%	0.52%
NY	0.57%	0.73%	0.61%	0.60%	0.65%
NJ	10.89%	12.11%	5.81%	2.69%	6.36%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.51%	0.53%	0.52%	0.52%	0.52%
MD	1.89%	2.33%	1.50%	1.08%	1.57%
PRFC	1.07%	1.29%	1.51%	1.78%	1.59%
VA	78.77%	76.92%	83.26%	85.51%	82.16%
NC	0.96%	0.64%	0.93%	1.05%	0.89%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.52%	0.55%	0.62%	0.73%	0.66%

(c) Bait allocations with a 0.5% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011	2012-2016	1985-2016	1985-1995	Waightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.58%	1.32%	0.90%	0.71%	1.09%
NH	0.50%	0.50%	0.52%	0.57%	0.53%
MA	4.16%	2.69%	4.17%	7.02%	4.35%
RI	0.58%	1.05%	4.47%	14.09%	6.06%
СТ	0.57%	0.55%	0.69%	0.72%	0.61%
NY	0.81%	1.43%	1.26%	1.55%	1.48%
NJ	49.56%	47.27%	35.78%	22.66%	37.83%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.56%	0.62%	0.62%	0.68%	0.64%
MD	7.07%	7.87%	7.12%	6.42%	7.31%
PRFC	3.21%	3.66%	7.23%	13.49%	7.43%
VA	27.65%	29.75%	31.13%	21.71%	26.67%
NC	2.66%	1.08%	3.35%	6.09%	3.00%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.59%	0.72%	1.28%	2.79%	1.51%

Table 8: Fixed Minimum Allocation - 1%

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 1% quota allocation (Tier 2, Option B, Sub-Option 2). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 1% fixed minimum quota; includes all historic reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Maiabtad	
	TAC %	TAC %	TAC %	TAC %	Weighted	
ME	1.02%	1.19%	1.75%	2.58%	2.08%	
NH	1.00%	1.00%	1.00%	1.01%	1.00%	
MA	1.71%	1.50%	1.46%	1.52%	1.51%	
RI	1.02%	1.13%	1.50%	2.08%	1.74%	
СТ	1.01%	1.01%	1.02%	1.02%	1.02%	
NY	1.06%	1.21%	1.10%	1.08%	1.13%	
NJ	10.48%	11.60%	5.46%	2.77%	5.96%	
PA	1.00%	1.00%	1.00%	1.00%	1.00%	
DE	1.01%	1.03%	1.01%	1.01%	1.02%	
MD	2.27%	2.67%	1.84%	1.47%	1.91%	
PRFC	1.52%	1.72%	1.85%	2.04%	1.92%	
VA	72.46%	70.78%	70.51%	69.73%	70.11%	
NC	1.42%	1.13%	7.33%	9.35%	6.38%	
SC	1.00%	1.00%	1.00%	1.00%	1.00%	
GA	1.00%	1.00%	1.00%	1.00%	1.00%	
FL	1.02%	1.05%	1.17%	1.34%	1.24%	

(b) Allocations with a 1% fixed minimum quota; includes only VA reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Meighted
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	1.02%	1.19%	1.05%	1.02%	1.08%
NH	1.00%	1.00%	1.00%	1.01%	1.00%
MA	1.71%	1.50%	1.50%	1.59%	1.55%
RI	1.02%	1.13%	1.55%	2.22%	1.80%
СТ	1.01%	1.01%	1.03%	1.02%	1.02%
NY	1.06%	1.21%	1.10%	1.09%	1.14%
NJ	10.48%	11.60%	5.85%	3.00%	6.35%
PA	1.00%	1.00%	1.00%	1.00%	1.00%
DE	1.01%	1.03%	1.02%	1.02%	1.02%
MD	2.27%	2.67%	1.91%	1.53%	1.98%
PRFC	1.52%	1.72%	1.92%	2.17%	1.99%
VA	72.46%	70.78%	76.57%	78.62%	75.56%
NC	1.42%	1.13%	1.39%	1.50%	1.36%
SC	1.00%	1.00%	1.00%	1.00%	1.00%
GA	1.00%	1.00%	1.00%	1.00%	1.00%
FL	1.02%	1.05%	1.11%	1.21%	1.15%

(c) Bait allocations with a 1% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	1.07%	1.75%	1.36%	1.19%	1.54%
NH	1.00%	1.00%	1.02%	1.06%	1.02%
MA	4.34%	3.00%	4.35%	6.95%	4.51%
RI	1.08%	1.51%	4.63%	13.41%	6.07%
СТ	1.07%	1.04%	1.17%	1.20%	1.10%
NY	1.28%	1.85%	1.69%	1.96%	1.89%
NJ	45.79%	43.70%	33.21%	21.23%	35.08%
PA	1.00%	1.00%	1.00%	1.00%	1.00%
DE	1.05%	1.11%	1.11%	1.16%	1.13%
MD	6.99%	7.73%	7.04%	6.41%	7.22%
PRFC	3.48%	3.89%	7.14%	12.86%	7.33%
VA	25.79%	27.71%	28.96%	20.36%	24.89%
NC	2.97%	1.53%	3.60%	6.10%	3.28%
SC	1.00%	1.00%	1.00%	1.00%	1.00%
GA	1.00%	1.00%	1.00%	1.00%	1.00%
FL	1.08%	1.20%	1.71%	3.09%	1.93%

Table 9: Fixed Minimum Allocation - 2%

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 2% quota allocation (Tier 2, Option B, Sub-Option 3). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 2% fixed minimum quota; includes all historic reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.01%	2.15%	2.60%	3.28%	2.87%
NH	2.00%	2.00%	2.00%	2.00%	2.00%
MA	2.57%	2.40%	2.38%	2.42%	2.41%
RI	2.01%	2.10%	2.41%	2.88%	2.60%
СТ	2.01%	2.01%	2.02%	2.01%	2.01%
NY	2.05%	2.17%	2.08%	2.07%	2.10%
NJ	9.68%	10.58%	5.61%	3.43%	6.01%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.01%	2.02%	2.01%	2.01%	2.02%
MD	3.03%	3.35%	2.68%	2.38%	2.73%
PRFC	2.42%	2.58%	2.69%	2.84%	2.75%
VA	59.85%	58.49%	58.27%	57.64%	57.94%
NC	2.34%	2.11%	7.12%	8.76%	6.35%
SC	2.00%	2.00%	2.00%	2.00%	2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.01%	2.04%	2.14%	2.28%	2.19%

(b) Allocations with a 2% fixed minimum quota; includes only VA reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.01%	2.15%	2.04%	2.02%	2.07%
NH	2.00%	2.00%	2.00%	2.00%	2.00%
MA	2.57%	2.40%	2.41%	2.48%	2.45%
RI	2.01%	2.10%	2.44%	2.99%	2.64%
СТ	2.01%	2.01%	2.02%	2.02%	2.01%
NY	2.05%	2.17%	2.08%	2.08%	2.11%
NJ	9.68%	10.58%	5.93%	3.62%	6.33%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.01%	2.02%	2.01%	2.01%	2.02%
MD	3.03%	3.35%	2.74%	2.43%	2.79%
PRFC	2.42%	2.58%	2.75%	2.95%	2.80%
VA	59.85%	58.49%	63.17%	64.84%	62.36%
NC	2.34%	2.11%	2.32%	2.41%	2.29%
SC	2.00%	2.00%	2.00%	2.00%	2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.01%	2.04%	2.09%	2.17%	2.12%

(c) Bait allocations with a 2% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.06%	2.61%	2.29%	2.16%	2.43%
NH	2.00%	2.00%	2.01%	2.05%	2.02%
MA	4.71%	3.62%	4.71%	6.82%	4.84%
RI	2.06%	2.41%	4.93%	12.05%	6.11%
СТ	2.06%	2.03%	2.14%	2.17%	2.08%
NY	2.23%	2.69%	2.56%	2.78%	2.72%
NJ	38.26%	36.57%	28.08%	18.38%	29.59%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.04%	2.09%	2.09%	2.13%	2.10%
MD	6.85%	7.45%	6.89%	6.38%	7.04%
PRFC	4.00%	4.34%	6.97%	11.60%	7.12%
VA	22.07%	23.62%	24.64%	17.68%	21.34%
NC	3.59%	2.43%	4.11%	4.11% 6.13%	
SC	2.00%	2.00%	2.00% 2.00%		2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.06%	2.16%	2.58%	3.69%	2.75%

Table 10: Jurisdictional Allocation

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, including bycatch and episodic event landings (Tier 3, Option B). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by state and should be used if a disposition quota (Tier 1, Option A) is being further allocated by jurisdiction.

(a) Jurisdictional allocations, including all reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.02%	0.22%	0.89%	1.88%	1.28%
NH	0.00%	0.00%	0.00%	0.01%	0.00%
MA	0.84%	0.59%	0.55%	0.62%	0.61%
RI	0.02%	0.15%	0.60%	1.29%	0.88%
СТ	0.02%	0.01%	0.03%	0.02%	0.02%
NY	0.07%	0.25%	0.11%	0.10%	0.15%
NJ	11.29%	12.62%	5.31%	2.10%	5.90%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.01%	0.03%	0.02%	0.02%	0.02%
MD	1.51%	1.99%	1.00%	0.56%	1.08%
PRFC	0.62%	0.85%	1.01%	1.23%	1.10%
VA	85.08%	83.07%	82.75%	81.82%	82.27%
NC	0.50%	0.16%	7.53%	9.94%	6.40%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.02%	0.06%	0.20%	0.41%	0.28%

(b) Jurisdictional allocations, including just Virginia reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Moightod
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.02%	0.22%	0.06%	0.02%	0.10%
NH	0.00%	0.00%	0.00%	0.01%	0.00%
MA	0.84%	0.59%	0.60%	0.70%	0.66%
RI	0.02%	0.15%	0.65%	1.46%	0.95%
СТ	0.02%	0.01%	0.03%	0.02%	0.02%
NY	0.07%	0.25%	0.12%	0.11%	0.17%
NJ	11.29%	12.62%	5.77%	2.38%	6.37%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.01%	0.03%	0.02%	0.02%	0.02%
MD	1.51%	1.99%	1.08%	0.64%	1.16%
PRFC	0.62%	0.85%	1.10%	1.39%	1.18%
VA	85.08%	83.07%	89.96%	92.41%	88.77%
NC	0.50%	0.16%	0.47%	0.60%	0.43%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.02%	0.06%	0.13%	0.25%	0.17%

(c) Bait landings by state. These percentages should be used if disposition bait quota is further allocated by state. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	0.09%	0.89%	0.43%	0.23%	0.64%
NH	0.00%	0.00%	0.02%	0.07%	0.03%
MA	3.98%	2.38%	3.99%	7.08%	4.18%
RI	0.09%	0.60%	4.32%	14.78%	6.04%
СТ	0.08%	0.05%	0.20%	0.24%	0.12%
NY	0.34%	1.01%	0.82%	1.14%	1.06%
NJ	53.32%	50.83%	38.35%	24.09%	40.58%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.06%	0.13%	0.13%	0.20%	0.15%
MD	7.14%	8.01%	7.19%	6.44%	7.41%
PRFC	2.95%	3.44%	7.31%	14.11%	7.53%
VA	29.51%	31.80%	33.29%	23.05%	28.44%
NC	2.34%	0.63%	3.10%	6.07%	2.72%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.09%	0.24%	0.85%	2.49%	1.10%

Table 11: Regional Allocation – Three Regions

Percent of menhaden commercial TAC allocated to three regions based on historic landings, including bycatch and episodic event landings (Tier 3, Option C, Sub-Option 1). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by region and should be used if a dispositional bait quota (Tier 1, Option A) is being further allocated by jurisdiction. Table (d) shows the distribution of fleet landings by region and should be used if a fleet-capacity quota (Tier 2, Option A) is being further allocated by region. Table (e) shows the distribution of bait landings by fleet and region and should be used if a disposition quota (Tier 1, Option A) and a fleet allocation (Tier 2, Option A) have already been chosen.

(a) Three region allocations, including all historical reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Waightad	
	TAC %	TAC %	TAC %	TAC %	Weighted	
ME, NH, MA, RI, CT	0.90%	0.97%	2.07%	3.82%	2.79%	
NY, NJ, PA, DE	11.38%	12.90%	5.44%	2.22%	6.08%	
MD, PRFC, VA, NC, SC, GA, FL	87.73%	86.12%	92.49%	93.96%	91.13%	

(b) Three region allocations, only include VA reduction landings

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	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted		
ME, NH, MA, RI, CT	0.90%	0.97%	1.35%	2.21%	1.73%		
NY, NJ, PA, DE	11.38%	12.90%	5.92%	2.51%	6.56%		
MD, PRFC, VA, NC, SC, GA, FL	87.73%	86.12%	92.74%	95.28%	91.71%		

(c) Bait landings by region. These percentages are to be used if a disposition quota is further allocated by region. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011	2012-2016	1985-2016	1985-1995	Waightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME, NH, MA, RI, CT	4.24%	3.92%	8.96%	22.40%	11.01%
NY, NJ, PA, DE	53.72%	51.97%	39.30%	25.42%	41.79%
MD, PRFC, VA, NC, SC, GA, FL	42.03%	44.10%	51.74%	52.17%	47.20%

(d) Fleet landings by three regions. These percentages are to be used if fleet capacity quotas are further allocated by region. Some timeframes cannot be shown due to confidentiality rules. It is important to note that these percentages further divide the TAC already allocated to fleets in Tables 5 and 6.

Large Fleet - All Historic Reduction Landings (2 or 3 Fleet Options)							
	2009-2011	2012-2016	1985-2016	1985-1995	14/ - ! - l- 1 l		
	TAC %	TAC %	TAC %	TAC %	Weighted		
ME, NH, MA, RI, CT			2.08%				
NY, NJ, PA, DE			5.25%				
MD, PRFC, VA, NC, SC, GA, FL			92.67%				
Large Fleet	- VA Only Re	duction Landin	gs (2 or 3 Fleet	Options)			
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
ME, NH, MA, RI, CT			1.28%				
NY, NJ, PA, DE			5.73%				
MD, PRFC, VA, NC, SC, GA, FL			92.99%				
	Small F	leet (2 Fleet O	ption)				
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
	TAC %	TAC %	TAC %	TAC %	weighted		
ME, NH, MA, RI, CT	1.36%	1.42%	1.85%	2.13%	1.81%		
NY, NJ, PA, DE	5.38%	19.66%	10.27%	8.23%	13.42%		
MD, PRFC, VA, NC, SC, GA, FL	93.26%	78.92%	87.88%	89.64%	84.77%		
	Medium	Fleet (3 Fleet	Option)	<u>,</u>			
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
	TAC %	TAC %	TAC %	TAC %	Weighted		
ME, NH, MA, RI, CT	0.86%	1.31%	1.32%	1.72%	1.54%		
NY, NJ, PA, DE	5.07%	17.75%	9.53%	7.90%	12.32%		
MD, PRFC, VA, NC, SC, GA, FL	94.07%	80.93%	89.15%	90.39%	86.15%		
Small Fleet (3 Fleet Option)							
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
	TAC %	TAC %	TAC %	TAC %			
ME, NH, MA, RI, CT	21.33%	3.76%	17.26%	19.61%	9.85%		
NY, NJ, PA, DE	18.10%	60.32%	31.48%	22.21%	45.68%		
MD, PRFC, VA, NC, SC, GA, FL	60.57%	35.91%	51.26%	58.18%	44.47%		

(e) Bait landings by fleet and three regions. These percentages are to be used if a disposition quota is further allocated by fleet and region. Some timeframes cannot be shown due to confidentiality rules. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b and the fleets in Tables 5 and 6.

Large Fleet Bait (2 or 3 Fleet Options)							
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
ME, NH, MA, RI, CT			11.30%				
NY, NJ, PA, DE			50.62%				
MD, PRFC, VA, NC, SC, GA, FL			38.08%				
	Small Fle	et Bait (2 Fleet	Option)				
	2009-2011	2012-2016	1985-2016	1985-1995	Maichted		
	TAC %	TAC %	TAC %	TAC %	Weighted		
ME, NH, MA, RI, CT	1.36%	1.42%	1.85%	2.13%	1.81%		
NY, NJ, PA, DE	5.38%	19.66%	10.27%	8.23%	13.42%		
MD, PRFC, VA, NC, SC, GA, FL	93.26%	78.92%	87.88%	89.64%	84.77%		
	Medium Fl	eet Bait (3 Flee	et Option)				
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
	TAC %	TAC %	TAC %	TAC %	Weighted		
ME, NH, MA, RI, CT	0.86%	1.31%	1.32%	1.72%	1.54%		
NY, NJ, PA, DE	5.07%	17.75%	9.53%	7.90%	12.32%		
MD, PRFC, VA, NC, SC, GA, FL	94.07%	80.93%	89.15%	90.39%	86.15%		
Small Fleet Bait (3 Fleet Option)							
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted		
	TAC %	TAC %	TAC %	TAC %	weighted		
ME, NH, MA, RI, CT	21.33%	3.76%	17.26%	19.61%	9.85%		
NY, NJ, PA, DE	18.10%	60.32%	31.48%	22.21%	45.68%		
MD, PRFC, VA, NC, SC, GA, FL	60.57%	35.91%	51.26%	58.18%	44.47%		

Table 12: Regional Allocation – Four Regions

Percent of menhaden commercial TAC allocated to four regions based on historic landings, including bycatch and episodic event landings (Tier 3, Option C, Sub-Option 2). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by region and should be used if a disposition quota (Tier 1, Option A) is being further allocated by jurisdiction.

(a) Four region allocations, including all historical reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Waightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME, NH, MA, RI, CT	0.90%	0.97%	2.07%	3.82%	2.79%
NY, NJ, PA, DE	11.38%	12.90%	5.44%	2.22%	6.08%
MD, PRFC, VA	87.21%	85.91%	84.76%	83.61%	84.44%
NC, SC, GA, FL	0.52%	0.21%	7.74%	10.35%	6.69%

(b) Four region allocations, only including VA reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME, NH, MA, RI, CT	0.90%	0.97%	1.35%	2.21%	1.73%
NY, NJ, PA, DE	11.38%	12.90%	5.92%	2.51%	6.56%
MD, PRFC, VA	87.21%	85.91%	92.14%	94.43%	91.11%
NC, SC, GA, FL	0.52%	0.21%	0.59%	0.85%	0.60%

(c) Bait landings by region. These percentages are to be used if bait quota is further allocated by region. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011	2012-2016	1985-2016	1985-1995	Maightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME, NH, MA, RI, CT	4.24%	3.92%	8.96%	22.40%	11.01%
NY, NJ, PA, DE	53.72%	51.97%	39.30%	25.42%	41.79%
MD, PRFC, VA	39.60%	43.24%	47.80%	43.61%	43.38%
NC, SC, GA, FL	2.44%	0.86%	3.95%	8.57%	3.82%

4.3.2.1 Overage Payback

Any overage of a quota allocation is subtracted for that specific quota allocation in the subsequent year on a pound for pound basis. The exception to this rule is if a soft cap is implemented for a small-capacity fleet or if overage reconciliation (Options C) is adopted under *Section 4.3.3: Quota Transfers*. Overage determination is based on final allocations, including transfers if applicable. Overages will be subtracted from the subsequent year's quota following submission of state compliance reports. Should overages change as preliminary data is finalized, quotas will be re-adjusted accordingly.

4.3.2.2 Allocation Revisit Provision

Quota allocations will be revisited every three years following implementation of Amendment 3, or can be revisited at any time through the adaptive management process (Section 4.6).

4.3.3 Quota Transfers

The option to transfer quota only applies if the Board selects regional or state-based quotas, including state-specific quotas with a fixed minimum and an allocation strategy based on the TAC level. If a regional or state-based allocation option is not selected, no quota transfers are permitted.

All transfers require a donor region or state (giving the quota) and a receiving region or state (receiving the quota). Transfers cannot be greater than the amount of quota allocated to the donor region or state for that fishing year. In order to initiate a transfer, a member of each state agency involved must submit a signed letter to the Commission identifying the involved parties, the pounds of quota to be transferred, and justification for the transfer (i.e.: an expected quota overage, safe harbor landings, etc). Letters regarding regional quotas must indicate that all states in the region agree to the transfer and may be signed by multiple state agencies. The Executive Director, the ISFMP Director, and/or the FMP Coordinator will review all transfer requests. The transfer becomes final upon receipt of signed letters from the Commission to the donor and receiving parties. In the event that the donor or receiving member of a transaction subsequently wishes to change the amount of the transfer, both parties have to agree to the change and submit letters to the Commission which are signed by a member of the state agency. Parties participating in a quota transfer may add a provision which states that if the donor state or region incurs an overage in the current fishing year due to the transfer, the overage will be accommodated and paid back by the receiving state in the subsequent year.

If a region or state receives multiple requests to transfer quota at the same time, it is recommended that the state or region considers the requests in the order in which they were received. Transfer requests intended to resolve issues other than quota overages (i.e. safe harbor) may need to be addressed ahead of the order in which they were received.

Transfers do not permanently affect the region or state-specific shares of the coastwide quota, i.e., the region or state-specific shares remain fixed. Regions or states have the responsibility to

close the Atlantic menhaden commercial fishery in their jurisdiction once the quota (or a percentage thereof) is reached. Once quota has been transferred, the region or state receiving quota becomes responsible for any overages of their new quota (the receiving region or state's original quota plus any quota transferred). Overages will be deducted from the corresponding region or state's quota the following fishing season.

Option A: Quota Transfers Permitted

Two or more regions or states, under mutual agreement, may transfer or combine their Atlantic menhaden quota.

Option B: Quota Transfers Permitted with Accountability Measures for Overages

Two or more regions or states, under mutual agreement, may transfer or combine their Atlantic menhaden quota. If a state or region exceeds its quota allocation (comprised of the allocation distributed at the beginning of year plus the distribution of unused episodic set aside, if applicable) by more than 5% each year for two years in a row, it may not receive a quota transfer in the third year.

Option C: Quota Reconciliation

In a year where coastwide landings do not exceed the TAC but some states or regions exceed their allocation, state or region quota overages are automatically forgiven in their entirety. As a result, overages are not deducted from subsequent year's quota. The intent of this option is to streamline the quota transfer process as quota transfers are not needed to address quota overages. Quota transfers can still be made between two or more regions or states, under mutual agreement, to address concerns unrelated to quota overages.

If coastwide landings do exceed the TAC and state(s) or region(s) have a quota overage, regions or states which do not have a quota overage automatically have their unused quota transferred to a "common pool". This "common pool" quota is then equally re-distributed to states or regions with overages based on the number of parties with an overage (Table 13). If a state or region still has a quota overage remaining after the redistribution of the "common pool" quota, this remaining overage is deducted from a region or state's quota the subsequent year. Quota transfers cannot be made to address remaining quota overages after quota reconciliation.

Quota reconciliation will occur following the submission of state compliance reports. Quota rollovers are not permitted under quota reconciliation (*Section 4.3.4*).

Table 13: Process for re-distribution of "common pool" quota when the coastwide TAC is exceeded (Option C). The redistribution process can be repeated until all of the unused quota is distributed. For this example, the amount of available common pool quota is 100,000 lbs. Two rounds of common pool allocation are needed to distribute the full 100,000 lbs.

		Available Common Pool Quota Round 1: 100,000					
	Overage (lbs)	verage (lbs) Quota Allocated from Common Pool (lbs) Remaining Over					
Region/State 1	100,000	33,333	66,667				
Region/State2	50,000	33,333	16,667				
Region/State 3	10,000	33,333 (accept 10,000)	0				

		Available Common Pool Quota Round 2: 23,333					
	Overage (lbs)	erage (lbs) Quota Allocated from Common Pool (lbs) Remai					
Region/State 1	66,667	11,667	55,000				
Region/State 2	16,667	11,667	5,000				

Option D: Quota Reconciliation with Accountability Measures for Overages

In a year where coastwide landings do not exceed the TAC but some states or regions exceed their allocation, a portion of the state or region's quota overage is forgiven. The portion of the overage forgiven is dependent on the state or region's history of overages (Table 14). For example, if a state or region had an overage in the two previous years and has an overage in the third year, only 50% of a state or region's quota overage is forgiven in the third year. In contrast, if the state or region did not have an overage in the previous year but has an overage in the current year, 100% of the overage is forgiven. States or regions must pay back any remaining portion of the overage in the subsequent year. The intent of this option is to dissuade states or regions from habitually exceeding their quota. Quota transfers can still be made between two or more regions or states, under mutual agreement, to address concerns unrelated to quota overages; quota transfers cannot be made to address remaining quota overages after quota reconciliation.

Table 14: The percentage of overage forgiven based on the number of consecutive years a state or region has had an overage. For example, a state or region which had an overage in the previous year gets 75% of its quota overage in the current year forgiven. If a state or region exceeded its quota in the three previous consecutive years or more, it must pay back in full its overage.

Number of Previous	% of Overage
Consecutive Years of Overage	Forgiven
0	100%
1	75%
2	50%
3 or more	0%

If coastwide landings do exceed the TAC and state(s) or region(s) have a quota overage, regions or states which do not have a quota overage automatically have their unused quota transferred to a "common pool". This "common pool" quota is then equally re-distributed to states or regions with overages based on the number of parties with an overage (Table 15). The amount of redistributed common pool quota a state or region can receive is dependent on a state or region's history of overages and cannot exceed the percentages outlined in Table 14. For example, a state or region which had overages in the two previous years and has an overage in the third year cannot receive an amount of redistributed common pool quota greater than the 50% of their overage. This process can be repeated until all common pool quota is distributed. Any overage that remains after the redistribution of the common pool quota is deducted from a region or state's quota the subsequent year.

Quota reconciliation will occur following the submission of state compliance reports. Quota rollovers are not permitted under quota reconciliation (*Section 4.3.4*).

Table 15: Process for re-distribution of "common pool" quota when the coastwide TAC is exceeded and there are accountability measures for overages (Option D). The redistribution process can be repeated until either all 100,000 lbs of unused quota are distributed or each state reaches the maximum amount of quota it can accept due to a history of overages. In this example, there is 100,000 lbs of unused quota available for redistribution and it takes two rounds for each state to accept the maximum amount of quota it can receive.

	Available Common Pool Quota Round 1: 100,000								
	Overage (lbs)	# of Previous Years With an Overage	Max Quota that Can Be Accepted (lbs)	Quota Allocated from Common Pool (lbs)	Quota Accepted from Common Pool (lbs)	Remaining Overage			
Region/ State 1	100,000	2	50,000	33,333	33,333	66,667			
Region/ State2	50,000	0	50,000	33,333	33,333	16,667			
Region/ State 3	10,000	1	7,500	33,333	7,500	2,500*			

*The remaining overage is the amount that must be paid back based on the accountability measures outlined in Table 14.

	Available Common Pool Quota Round 2: 25,834							
	Overage (lbs)	# of Previous Years	Max Quota that Can	Quota Allocated from	Quota Accepted from	Remaining		
	Overage (lbs) With an Overage		Be Accepted (lbs)	Common Pool (lbs)	Common Pool (lbs)	Overage		
Region/	CC CC7		16 667	12.017	12.017	F2 7F0		
State 1	66,667	2	16,667	12,917	12,917	53,750		
Region/	16,667	0	16 667	12,917	12 017	3,750		
State2	10,007	U	16,667	12,917	12,917	3,750		

4.3.4 Quota Rollovers

The option for quota rollovers only applies if the stock is not overfished and overfishing is not occurring. Should the stock be overfished but overfishing is not occurring, or vice versa, quota rollovers are not permitted.

Any quota that is rolled over must be used in the subsequent fishing year. If the rolled over quota is not used, it cannot be carried into a second fishing year. Quota rollovers are applicable to all allocation methods described in *Section 4.3.2*. If a state or region based allocation is adopted, unused quota from a specific state or region is rolled over to that state or region. If a coastwide allocation is adopted, unused quota is rolled over into the subsequent year's TAC. If a fleet-capacity allocation is adopted and there is no further allocation by state or region, unused quota from a specific fleet is rolled over to that fleet. If a disposition allocation is adopted and there is no further allocation by state or region, unused quota from a specific sector (bait vs. reduction) is rolled over to that sector. Quota rollovers are not permitted if quota reconciliation is implemented (*Section 4.3.3 Options C and D*). Therefore, if a reconciliation option is selected, Option A in this section is selected by default. Unused quota allocated to set aside programs, such as the small-scale fishery set aside, the incidental catch fishery set aside, or the episodic events set aside, cannot be rolled over into the subsequent year.

As part of the Annual Compliance Report, jurisdictions must submit annual landings no later than April 1st of each year. Importantly, landings reported on April 1st are often preliminary and subject to change as data becomes finalized. As a result, landings from the previous year will be considered final on July 1st of the subsequent year and unused quota from the previous year will be rolled over on July 1st. This will minimize changes to the amount of quota rolled over and reduce the administrative burden of this program. ASMFC staff will alert jurisdictions each year on July 1st as to the amount of quota rolled over. Should a change to a state's landings be made after July 1st, it will be addressed in the subsequent fishing year.

Option A: Unused Quota May Not Be Rolled Over

Unused quota may not be rolled over from one fishing year to the next.

Option B: 100% Quota Rollover

Any unused portion of a quota allocation may be rolled over into the subsequent fishing year only. Unused quota received as part of a transfer may not be rolled over.

Option C: 10% Total Quota Rollover

Up to 10% of a quota allocation may be carried over into the subsequent fishing year only. For example, if a quota allocation is 1 million pounds, up to 100,000 pounds of unused quota may be rolled over into the subsequent fishing year. Unused quota received as part of a transfer may not be rolled over.

Option D: 5% Total Quota Rollover

Up to 5% of a quota allocation may be carried over into the subsequent fishing year only. For example, if a quota allocation is 1 million pounds, up to 50,000 pounds of unused quota may be rolled over into the subsequent fishing year. Unused quota received as part of a transfer may not be rolled over.

Option E: 50% Unused Quota Rollover

Up to 50% of the unused portion of a quota allocation may be rolled over into the subsequent fishing year only. For example, if a quota allocation is 1 million pounds and 600,000 pounds were harvested, up to 200,000 pounds of unused quota could be rolled over into the subsequent year. Unused quota received as part of a transfer may not be rolled over.

4.3.5 Incidental Catch and Small Scale Fisheries

The Board may establish provisions for small-scale gears and non-directed gears to allow for moderate harvest following the closure of the directed fishery, or may set aside a portion of the TAC for harvest throughout the fishing year. Tables 27 and 28 show landings under the current bycatch provision from 2013-2016. For the purposes of this Amendment, small-scale gears include cast nets, traps (excluding floating fish traps), pots, haul seines, fyke nets, hook and line, bag nets, hoop nets, hand lines, trammel nets, and bait nets. Non-directed gears include pound nets, anchored/stake gillnets, drift gill net, trawls, fishing weirs, fyke nets, and floating fish traps. Stationary multi-species gears are defined as pound nets, anchored/stake gill nets, fishing weirs, floating fish traps, and fyke nets.

Landings under the incidental catch provision will be reported to the Board as a part of the annual FMP Review (Section 5.3: Compliance Report). Should a specific gear type show a continued and significant increase in landings under the incidental catch provision, or it becomes clear that a non-directed gear type is directing on menhaden under the incidental catch provision, the Board has the authority, through Adaptive Management (Section 4.6), to alter the trip limit or remove that gear from the incidental catch provision.

Please note: if a fleet-based allocation method is chosen in *Section 4.3.2 Quota Allocation*, Option E: Small-Scale Fishery Set Aside does not apply. If a two-fleet allocation method with a soft cap for the small-capacity fleet is chosen in *Section 4.3.2 Quota Allocation*, the management alternatives in this section do not apply. If a three-fleet allocation method with a soft cap for the small-capacity fleet is chosen in *Section 4.3.2 Quota Allocation*, the management alternatives in this section would only apply to non-directed gear types.

Option A: Catch Limit for Non-Directed Gear Types

After a quota allocation is met for a given jurisdiction, region, disposition, or fleet, the fishery moves to an incidental catch fishery in which **non-directed gear types** may land up to 6,000 pounds of menhaden per trip per day. Two permitted individuals, working from the same vessel fishing stationary multi-species gear, are authorized to work together and land up to 12,000 pounds from a single vessel – limited to one vessel trip per day. A trip is based on a calendar day such that no vessel may land menhaden more than once in a single calendar day. The use of multiple carrier vessels per trip to offload any bycatch exceeding 6,000 pounds of Atlantic menhaden is prohibited. Incidental catch landings are reported by states to the Commission as a part of Annual Compliance Reports. Under this option, landings in the incidental catch fishery do not count towards the TAC.

Option B: Catch Limit for Small Scale Fisheries and Non-Directed Gear Types

After a quota allocation is met for a given jurisdiction, region, disposition, or fleet, the fishery moves to an incidental catch fishery in which **small-scale gears** and **non-directed gear types** may land up to 6,000 pounds of menhaden per trip per day. Two authorized individuals, working from the same vessel fishing stationary multi-species gear, are permitted to work together and land up to 12,000 pounds from a single vessel – limited to one vessel trip per day. A trip is based on a calendar day such that no vessel may land menhaden more than once in a single calendar day. The use of multiple carrier vessels per trip to offload any bycatch exceeding 6,000 pounds of Atlantic menhaden is prohibited. Incidental catch landings are reported by states to the Commission as a part of Annual Compliance Reports. Under this option, landings in the incidental catch fishery do not count towards the TAC.

Option C: Catch Cap and Trigger

After a quota allocation is met for a given jurisdiction, region, disposition, or fleet, the fishery moves to an incidental catch fishery in which **small-scale gears** and **non-directed gear types** may land up to 6,000 pounds of menhaden per trip per day. Two authorized individuals, working from the same vessel fishing stationary multi-species gear, are permitted to work together and land up to 12,000 pounds from a single vessel – limited to one vessel trip per day. A trip is based on a calendar day such that no vessel may land menhaden more than once in a single calendar day. The use of multiple carrier vessels per trip to offload any bycatch exceeding 6,000 pounds of Atlantic menhaden is prohibited.

A catch cap for the incidental catch fishery is set at 2% of the TAC. For 2017, this represents approximately 8.8 million pounds, which is 2.2 million pounds higher than the maximum bycatch landing of 6.6 million pounds in a single year between 2013 and 2016. Incidental catch landings are reported by states to the Commission as a part of Annual Compliance Reports. If reported incidental catch exceeds the Cap by more than 10% in a single year or exceeds the Cap two years in a row, regardless of the percent overage, management action is triggered by the Board to reduce incidental landings in the fishery. Under this option, landings in the incidental catch fishery do not count towards the TAC as the Cap is a threshold against which incidental catch landings are measured; the Cap is not a set aside.

Option D: Incidental Catch Fishery Set Aside

2% of the overall TAC is set aside for an incidental catch fishery, which occurs after a quota allocation is met for a given jurisdiction, region, disposition, or fleet. Under an incidental catch fishery, there is a 6,000 pound per trip per day menhaden allowance for **small-scale gears and non-directed gear types**. All landings by these gear types which occur after a quota allocation has been met are counted towards the set aside. Two authorized individuals, working from the same vessel fishing stationary multi-species gear, are permitted to work together and land up to 12,000 pounds from a single vessel – limited to one vessel trip per day. A trip is based on a calendar day such that no vessel may land menhaden more than once in a single calendar day. The use of multiple carrier vessels per trip to offload any bycatch exceeding 6,000 pounds of Atlantic menhaden is prohibited.

Landings made by small-scale fisheries and non-directed fisheries following the closure of the directed fishery are reported by states to the Commission as a part of Annual Compliance Reports. If the set aside is exceeded in a given year, the overage is deducted from the subsequent year's set aside. Should quota reconciliation be chosen in *Section 4.3.3*, overages of the incidental catch fishery set aside will be forgiven if the coastwide TAC is not exceeded; however, if the coastwide TAC is exceeded, "common pool" quota will not be distributed to the incidental catch fishery set aside and the overage will be paid back in full the following year. Unused quota from a region or state can be transferred to the set aside to reduce an overage. The percentage of TAC set aside for the incidental catch fishery can be altered under Adaptive Management (*Section 4.6*). Under this option, landings in the incidental catch fishery do count towards the TAC.

Option E: Small-Scale Fishery Set Aside

1% of the overall TAC is set aside for **small-scale gears**. Landings by small-scale fisheries are reported by states to the Commission as a part of annual Compliance Reports; landings do not need to be reported to SAFIS, should this reporting method be implemented. If the coastwide set aside is exceeded in a given year, the overage is deducted from the subsequent year's set aside. Should quota reconciliation be chosen in *Section 4.3.3*, overages of the small-scale fishery set aside will be forgiven if the coastwide TAC is not exceeded; however, if the coastwide TAC is exceeded, "common pool" quota will not be distributed to the small-scale fishery set aside and the overage will be paid back in full the following year. Unused quota from a region or state can be transferred to the set aside to reduce an overage.

There is no trip limit for small scale gears under this set aside; however, should a gear type show a significant and persistent increase in landings, the Board may implement a trip limit through Adaptive Management (*Section 4.6*). In addition, the percentage of TAC set aside for small-scale fisheries can by altered under Adaptive Management.

If a jurisdictional allocation method is chosen in *Section 4.3.2* and a state which only has landings by small-scale gears is allocated quota, that state may choose to add its jurisdictional quota to the small-scale fishery set aside. For example, if Florida, a state which exclusively has a cast net fishery, is allocated 0.5% of quota, the state may aggregate its state quota with the small-scale fishery set aside, making the set aside allocation 1.5%.

Landings by all other gear types' count towards the quota allocated to either states, regions, dispositions, or fleets. Once the respective quota allocation is met, the menhaden fishery is closed and no landings of menhaden are permitted by those gear types. Under this option, landings in the small scale fishery do count towards the TAC.

Option F: All Catch Included in TAC

All catch of menhaden, including incidental catch, counts towards the directed fishery TAC. Once the quota allocation for a specific state, region, disposition, or fleet is reached, the menhaden fishery is closed and no landings of menhaden are permitted by that state, region, disposition or fleet.

4.3.6 Episodic Events Set Aside Program

The Board may set aside a portion of the TAC for episodic events. Episodic events are defined by any instance in which a qualified state has reached its annual quota allocation available to them prior to September 1 and the state can prove the presence of unusually large amounts of menhaden in its state waters. The goal of the set aside is to add flexibility to the management of the species so that states can harvest menhaden during episodic events, reduce discards, and prevent fish kills. Eligibility to participate in the episodic events set aside program is reserved for the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and New York. Landings per year under the set aside can be found in Table 29.

4.3.6.1 TAC Set Aside

A percentage of the TAC is set aside for use in the episodic events program.

Option A: 1% of TAC is Set Aside (Status quo)

1% of the overall TAC is set aside for episodic events.

Option B: 3% of TAC is Set Aside

3% of the overall TAC is set aside for episodic events.

Option C: 0% of TAC is Set Aside

No portion of the overall TAC is set aside for episodic events. Under this option, there is no episodic events program.

4.3.6.2 Mandatory Provisions

In order for an eligible state to participate in the episodic events set aside program, states must implement the following provisions.

- 1. Participating states must implement daily trip level harvester reporting. Each state must track landings and submit weekly reports to ASMFC staff. Should several states be approved to participate in the episodic event set aside program, ASMFC staff may require more frequent reporting to ensure the set aside is not exceeded.
- 2. Episodic events harvest and landings must be restricted to state waters of the jurisdiction approved to participate in the set aside.
- 3. Participating states must implement a maximum daily trip limit no greater than 120,000 pounds/vessel. A daily trip is defined by a calendar day such that no vessel harvesting under the episodic events program may land menhaden twice in a single calendar day.

4.3.6.3 Declaring Participation

A state must apply to participate in the episodic events program prior to September 1st. In order to apply, a state must send a letter to the ASMFC Executive Director, ISFMP Director, and FMP Coordinator declaring interest in harvesting under the set aside. The letter must demonstrate the following:

- 1. The state has implemented the mandatory provisions stated in Section 4.3.6.2.
- 2. The applying state has fully harvested its annual quota allocation prior to September 1.
 - If a jurisdictional quota is implemented, a state must reach its quota prior to September 1.
 - If a coastwide quota is implemented, the coastwide quota must be reached prior to September 1.
 - If a regional quota is implemented, the regional quota in which the state participates must be reached prior to September 1. A state within a region may apply to participate without the other states/jurisdictions within its region applying.
 - If disposition quotas are implemented, the quota allocated to the bait sector must be reached prior to September 1.
 - If fleet capacity quotas are implemented, only gear types which have reached their quota prior to September 1 are eligible to harvest under the set aside program. A state must declare in their letter to ASMFC, prior to approval to participate, which gear types will be allowed to harvest under the set aside program. Gears under a soft cap are allowed to participate in the episodic event set aside so that they can fish under a higher trip limit; these landings will count towards the episodic set aside quota.
- 3. The state has unusually large amounts of menhaden in its state waters. This can be demonstrated through:
 - Surveys (aerial, seine) which indicate high biomass;
 - Landings reports which indicate an unusually high rate of menhaden harvest at the time of declaration into the set aside;
 - Or information highlighting the potential for fish kills, associated human health concerns, and the ability of harvest under the set aside to reduce or eliminate the fish kill.
- 4. The state has not declared *de minimis* status. If a qualifying state was previously granted *de minimis* status, it will lose that status and will need to collect biological data and catch and effort data for an adult index as required *by Section 3.5: Biological Data Collection Programs*.

Once the application letter is received by ASMFC staff, the PRT will review the state's compliance with the requirements of the episodic events set aside program. Once verified, ASMFC will send a letter notifying the state that it can harvest menhaden under the set aside. Only harvest that occurs on or after the date of the aforementioned notification letter, and prior to the states eligibility ending, will be considered episodic event set aside harvest. ASMFC staff will also notify the Board when any state is approved to harvest under the set aside.

4.3.6.4 Procedure for Unused Set Aside

If an episodic event is not triggered by September 1 in any state, the unused set aside quota will be rolled into the overall TAC on September 1 and redistributed based on the allocation method and timeframe selected in *Section 4.3.2*. If an episodic event is triggered, any unused

set aside as of October 31st of each year will be redistributed based on the allocation method and timeframe selected in *Section 4.3.2*.

4.3.6.5 Procedure for Set Aside Overages

If the episodic event set aside is exceeded, any overages will be deducted from the next year's episodic event set aside amount. Should quota reconciliation be chosen in *Section 4.3.3*, overages of the episodic events set aside program will be forgiven if the coastwide TAC is not exceeded; however, if the coastwide TAC is exceeded, "common pool" quota will not be distributed to the episodic events set aside and the overage will be paid back in full the following year. Unused quota from a region or state can be transferred to the set aside to reduce an overage.

4.3.7 Chesapeake Bay Reduction Fishery Cap

The Chesapeake Bay Reduction Fishery Cap limits allowable harvest from the Chesapeake Bay by the reduction fishery. The intent of the Cap is to prevent all of the reduction fishery harvest from occurring in the Chesapeake Bay, a critical nursery area for Atlantic menhaden. Harvest for reduction purposes shall be prohibited within the Chesapeake Bay when 100% of the cap is harvested from Chesapeake Bay, which is defined as areas shoreward of the Chesapeake Bay Bridge Tunnel. Harvest above the Cap in any given year will be deducted from the next year's allowable harvest. Should quota reconciliation be chosen in *Section 4.3.3*, it does not apply to the Chesapeake Bay Reduction Fishery Cap meaning overages are not forgiven if the coastwide TAC is not exceeded. Furthermore, unused quota from a region or state cannot be transferred to the Cap to reduce an overage. In recent years, reduction harvest in the Chesapeake Bay has consistently underperformed the 87,216 mt cap, with less than 45,000 mt harvest in 2014 and 2016 and less than 50,000 mt harvested in 2015.

Option A: Cap Set At 87,216 mt

The Chesapeake Bay Reduction Fishery Cap is maintained as 87,216 metric tons.

Sub-Option A: Limited Rollover of Unused Cap Permitted

A maximum of 10,976 metric tons of un-landed fish under the Cap can be rolled over into the subsequent year. Unused landings under the Cap cannot be rolled over for multiple years and, as a result, the Cap in a given year cannot exceed 98,192 metric tons.

Sub-Option B: No Rollover of Unused Cap Permitted

Any amount of un-landed fished under the Cap cannot be rolled over into the subsequent year. As a result, the Cap is a given year cannot exceed 87,216 metric tons.

Option B: Cap Set At 51,000 mt

The Chesapeake Bay Reduction Fishery Cap is reduced to 51,000 metric tons. This value represents an approximation of the five-year average of reduction harvest from the Chesapeake Bay between 2012 and 2016. An approximate value is used because reduction landings in the Chesapeake Bay are confidential.

Sub-Option A: Limited Rollover of Unused Cap Permitted

A maximum of 6,418 metric tons of un-landed fish under the Cap can be rolled over into the subsequent year. Unused landings under the Cap cannot be rolled over for multiple years and, as a result, the Cap is a given year cannot exceed 57,418 metric tons.

Sub-Option B: No Rollover of Unused Cap Permitted

Any amount of un-landed fish under the Cap cannot be rolled over into the subsequent year. As a result, the Cap in a given year cannot exceed 51,000 metric tons.

Option C: Remove the Cap

Under this option, there is no limit on harvest by the reduction fishery in the Chesapeake Bay.

4.4 HABITAT CONSERVATION AND RESTORATION RECOMMENDATIONS

In order to ensure the productivity of populations, each state should identify and protect critical nursery areas for Atlantic menhaden within its boundaries. Such efforts should inventory historical habitats, identify habitats presently used by menhaden, and impose or encourage measures to retain or increase the quantity and quality of Atlantic menhaden habitat.

4.4.1 Preservation of Existing Habitat

States should provide inventories and locations of critical Atlantic menhaden habitat to other state and federal regulatory agencies. Regulatory agencies should be advised on the types of threats to Atlantic menhaden populations and recommended measures that should be employed to avoid, minimize or eliminate any threat to current habitat extent or quality.

4.4.2 Habitat Restoration and Improvement

While Atlantic menhaden appear to be utilizing the bulk of their historic nursery areas, water quality in these areas should be maintained or improved, if impaired, to prevent hypoxic fish kills and minimize the threat of increased mortality due to disease and parasitism. Protection of wetlands will protect and improve menhaden habitat.

4.4.3 Avoidance of Incompatible Activities

Federal and state fishery management agencies should take steps to limit the introduction of compounds which are known, or suspected, to accumulate in any animal species' tissue and which pose a threat to human health or any animals' health.

Each state should establish windows of compatibility for activities known or suspected to adversely affect Atlantic menhaden life stages and their habitats, such as navigational dredging, inlet modifications, and dredged material disposal, and notify the appropriate construction or regulatory agencies in writing.

Projects involving water withdrawal from nursery habitats (e.g. power plants, irrigation, water

supply projects) should be scrutinized to ensure that adverse impacts resulting from larval/juvenile impingement, entrainment, and/or modification of flow, temperature and salinity regimes due to water removal, will not adversely impact estuarine dependent species, including Atlantic menhaden, especially early life stages.

Each state which contains Atlantic menhaden nursery areas within its jurisdiction should develop water use and flow regime guidelines which are protective of these nursery areas and which will ensure to the extent possible, the long-term health and sustainability of the stock.

4.4.4 Fishery Practices

The use of any fishing gear or practice which is documented by management agencies to have an unacceptable impact on Atlantic menhaden (e.g. habitat damage, bycatch mortality) should be prohibited within the effected essential habitats.

4.5 ALTERNATIVE STATE MANAGEMENT REGIMES

States are required to obtain prior approval from the Board of any changes to their management program for which a compliance requirement is in effect. Changes to non-compliance measures must be reported to the Board but may be implemented without prior Board approval. A state can request permission to implement an alternative management measure to any mandatory compliance measure only if that state can show, to the Board's satisfaction, that its alternative proposal will have the same conservation value as the measure contained in this amendment or any addenda prepared under Adaptive Management (*Section 4.6*). States submitting alternative proposals must demonstrate that the proposed action will not contribute to overfishing of the resource. All changes to a state's plan must be submitted in writing to the Board and to the Commission as part of the Annual Compliance Reports.

4.5.1 General Procedures

A state may submit a proposal for a change to its regulatory program or any mandatory compliance measure under this amendment to the Commission. Such changes shall be submitted to the Chair of the Plan Review Team (PRT), who shall distribute the proposal to appropriate groups, including the Board, the PRT, the TC, and the AP.

The PRT is responsible for gathering the comments of the TC and the AP. The PRT is also responsible for presenting these comments to the Board for decision.

The Board will decide whether to approve the state proposal for an alternative management program if it determines that it is consistent with the target fishing mortality rate applicable as well as the goals and objectives of this amendment.

In order to maintain consistency within a fishing season, new rules should be implemented prior to the start of the fishing season. Given the time needed for the TC, AP, and Board to

review the proposed regulations, as well as the time required by an individual state to promulgate new regulations, it may not be possible to implement new regulations for the ongoing fishing season. In this case, new regulations should be effective at the start of the following season after a determination to do so has been made.

4.5.2 Management Program Equivalency

The TC, under the direction of the PRT, will review any alternative state proposals under this section and provide its evaluation of the adequacy of such proposals to the Board. The PRT can also ask for reviews by the Law Enforcement Committee (LEC) or the AP.

4.5.3 De Minimis Fishery Guidelines

The ASMFC Interstate Fisheries Management Program Charter defines *de minimis* as "a situation in which, under the existing condition of the stock and scope of the fishery, the conservation and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by a Fishery Management Plan or amendment," (ASMFC 2016).

A state can apply annually for *de minimis* status if a state does not have a reduction fishery, following the procedure in *Section 4.5.3.2*. To be eligible for *de minimis* consideration in the bait fishery, a state must prove that its commercial bait landings in the most recent two years for which data are available did not exceed 1% of the coastwide bait landings.

4.5.3.1 Plan Requirements if De Minimis Status is Granted

If *de minimis* status is granted, the *de minimis* state is required to implement, at a minimum, the coastwide management requirements contained in *Section 4.0*. Additionally, all *de minimis* states except New Hampshire, Pennsylvania, South Carolina, and Georgia must adhere to timely quota monitoring as approved by the Board (*Section 3.1.2*).

States granted *de minimis* status are exempt from collecting biological data and the adult CPUE index data (*Section 3.5.1.2*).

If the coastwide fishery is closed for any reason through Emergency Procedures (Section 4.7), de minimis states must close their fisheries as well.

Any additional components of the FMP, which the Board determines necessary for a *de minimis* state to implement, can be defined at the time *de minimis* status is granted.

4.5.3.2 Procedure to Apply for De Minimis Status

States must specifically request *de minimis* status each year. Requests for *de minimis* status will be reviewed by the PRT as part of the annual FMP review process (*Section 5.3: Compliance Report*). Requests for *de minimis* must be submitted to the ASMFC Atlantic Menhaden FMP Coordinator as a part of the state's yearly compliance report. The request must contain the

following information: all available commercial landings data for the current and 2 previous full years of data, commercial regulations for the current year, and the proposed management measures the state plans to implement for the year *de minimis* status is requested. The FMP Coordinator will then forward the information to the PRT.

In determining whether or not a state meets the *de minimis* criteria, the PRT will consider the information provided with the request, the most recent available coastwide landings data, any information provided by the TC and SASC, and projections of future landings. The PRT will make a recommendation to the Board to either accept or deny the *de minimis* request. The Board will then review the PRT recommendation and either grant or deny the *de minimis* classification.

The Board must make a specific motion to grant a state *de minimis* status. By deeming a given state *de minimis*, the Board is recognizing that: the state has a minimal Atlantic menhaden fishery; there is little risk to the health of the menhaden stock if the state does not implement the full suite of management measures; and the overall burden of implementing the complete management and monitoring requirements of the FMP outweigh the conservation benefits of implementing those measures in that particular state.

If commercial landings in a *de minimis* state exceed the *de minimis* threshold, the state will lose its *de minimis* classification, will be ineligible for *de minimis* in the following year, and will be required to implement all provisions of the FMP. If the Board denies a state's *de minimis* request, the state will be required to implement all the provisions of the FMP. When a state rescinds or loses its *de minimis* status, the Board will set a compliance date by which the state must implement the required regulations.

4.6 ADAPTIVE MANAGEMENT

The Board may vary the requirements specified in this Amendment as a part of adaptive management in order to conserve the Atlantic menhaden resource. The elements that can be modified by adaptive management are listed in *Section 4.6.2*. The process under which adaptive management can occur is provided below.

4.6.1 General Procedures

The PRT will monitor the status of the fishery and the resource and report on that status to the Board annually or when directed to do so by the Board. The PRT will consult with TC, the SASC, and the AP in making such review and report.

The Board will review the report of the PRT, and may consult further with the TC, SASC, or AP. The Board may, based on the PRT report or on its own discretion, direct the PDT to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement the new provisions.

The PDT will prepare a draft addendum as directed by the Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The PDT will also request comment from federal agencies and the public at large. After a 30-day review period, staff, in consultation with the PDT, will summarize the comments received and prepare a final version of the addendum for the Board.

The Board shall review the final version of the addendum prepared by the PDT, and shall also consider the public comments received and the recommendations of the TC, LEC, and AP. The Board shall then decide whether to adopt, or revise and then adopt, the addendum.

Upon adoption of an addendum by the Board, states shall prepare plans to carry out the addendum, and submit them to the Board for approval according to the schedule contained in the addendum.

4.6.2 Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the Board:

- (1) Management areas and unit
- (2) Reference points, including an overfishing and overfished definition
- (3) Rebuilding targets and schedules
- (4) TAC specification
- (5) Quota allocation
- (6) Quota transfers
- (7) Quota rollovers
- (8) Episodic events set aside program
- (9) Small scale fishery set aside
- (10) Incidental catch fishery set aside
- (11) Incidental catch provision
- (12) De minimis specifications
- (13) Chesapeake Bay reduction fishery cap
- (14) Effort controls
- (15) Fishing year and/or seasons
- (16) Trip limits
- (17) Limited entry
- (18) Area closures
- (19) Fishery closures
- (20) Gears assigned to fleets
- (21) Gear restrictions including mesh sizes
- (22) Recreational fishery management measures
- (23) For-hire fishery management measures
- (24) Research set aside programs
- (25) Research or monitoring requirements

- (26) Frequency of stock assessments
- (27) Reporting requirements
- (28) Measures to reduce or monitor bycatch
- (29) Observer requirements
- (30) Recommendations to the Secretaries for complementary actions in federal jurisdictions
- (31) Any other management measures currently included in Amendment 3

4.7 EMERGENCY PROCEDURES

Emergency procedures may be used by the Board to require any emergency action that is not covered by, is an exception to, or a change to any provision in Amendment 3. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2016).

4.8 MANAGEMENT INSTITUTIONS

The management institutions for Atlantic menhaden shall be subject to the provisions of the ISFMP Charter (ASMFC 2016). The following is not intended to replace any or all of the provisions of the ISFMP Charter. All committee roles and responsibilities are included in detail in the ISFMP Charter and are only summarized here.

4.8.1 Atlantic States Marine Fisheries Commission and ISFMP Policy Board

The ASMFC (Commission) and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's fisheries management activities. The Commission must approve all fishery management plans and amendments, including Amendment 3. The ISFMP Policy Board reviews any non-compliance recommendations of the various Boards and, if it concurs, forwards them to the Commission for action.

4.8.2 Atlantic Menhaden Management Board

The Board was established under the provisions of the Commission's ISFMP Charter (Section Four; ASMFC 2016) and is generally responsible for carrying out all activities under this Amendment.

The Board establishes and oversees the activities of the PDT, PRT, TC, SASC, BERP Workgroup, and the AP. In addition, the Board makes changes to the management program under adaptive management, reviews state programs implementing the amendment, and approves alternative state programs through conservation equivalency. The Board reviews the status of state compliance with the management program annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP Policy Board under the terms of the ISFMP Charter.

4.8.3. Atlantic Menhaden Plan Development Team

The Plan Development Team (PDT) is composed of personnel from state and federal agencies who have scientific knowledge of Atlantic menhaden and management abilities. The PDT is responsible for preparing and developing management documents, including addenda and amendments, using the best scientific information available and the most current stock assessment information. The ASMFC FMP Coordinator chairs the PDT. The PDT will either disband or assume inactive status upon completion of Amendment 3.

4.8.4 Atlantic Menhaden Plan Review Team

The Plan Review Team (PRT) is composed of personnel from state and federal agencies who have scientific and management ability and knowledge of Atlantic menhaden. The PRT is responsible for providing annual advice concerning the implementation, review, monitoring, and enforcement of Amendment 3 once it has been adopted by the Commission. After final action on Amendment 3, the Board may elect to retain members of the PDT as members of the PRT, or appoint new members.

4.8.5 Atlantic Menhaden Technical Committee

The Atlantic Menhaden Technical Committee (TC) consists of representatives from state or federal agencies, Regional Fishery Management Councils, the Commission, a university, or other specialized personnel with scientific and technical expertise, and knowledge of the Atlantic menhaden fishery. The Board appoints the members of the TC and may authorize additional seats as it sees fit. The role of the TC is to assess the species' population, provide scientific advice concerning the implications of proposed or potential management alternatives, and respond to other scientific questions from the Board, PDT, or PRT. The SASC reports to the TC.

4.8.6 Atlantic Menhaden Stock Assessment Subcommittee

The Atlantic Menhaden Stock Assessment Subcommittee (SASC) is appointed and approved by the Board, with consultation from the Atlantic Menhaden TC, and consists of scientists with expertise in the assessment of the Atlantic menhaden population. Its role is to assess the Atlantic menhaden population and provide scientific advice concerning the implications of proposed or potential management alternatives, and to respond to other scientific questions from the Board, TC, PDT or PRT. The SASC reports to the TC.

4.8.7 Biological Ecological Reference Point Workgroup

The Biological Ecological Reference Point Workgroup (BERP Workgroup) is comprised of representatives from each technical committee for weakfish, striped bass, bluefish, and menhaden, in addition to state and federal biologists with expertise on multispecies modeling approaches. The intent of the BERP Workgroup is to assist the Commission with its multispecies

modeling efforts and facilitate the use of multispecies model results in management decisions. More specifically, the BERP Workgroup is tasked with identifying potential ecological reference points that account for Atlantic menhaden's role as a forage fish.

4.8.8 Atlantic Menhaden Advisory Panel

The Atlantic Menhaden Advisory Panel (AP) is established according to the Commission's Advisory Committee Charter. Members of the AP are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about Atlantic menhaden conservation and management. The AP provides the Board with advice directly concerning the Commission's Atlantic menhaden management program.

4.8.9 Federal Agencies

4.8.9.1 Management in the Exclusive Economic Zone

Management of Atlantic menhaden in the EEZ is within the jurisdiction of the three Regional Fishery Management Councils under the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). In the absence of a Council Fishery Management Plan, management is the responsibility of the National Marine Fisheries Service as mandated by the Atlantic Coastal Fishery Cooperative Management Act.

4.8.9.2 Federal Agency Participation in the Management Process

The Commission has accorded USFWS and NMFS voting status on the ISFMP Policy Board and the Atlantic Menhaden Management Board in accordance with the Commission's ISFMP Charter. The NMFS can also participate on the Atlantic Menhaden PDT, PRT, TC and SASC.

4.8.9.3 Consultation with Fishery Management Councils

At the time of adoption of Amendment 3, none of the Regional Fishery Management Councils had implemented a management plan for Atlantic menhaden, nor had they indicated an intent to develop a plan.

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

The quota management approach adopted can be implemented and monitored within the jurisdictions of the Atlantic states. Therefore, a specific recommendation to the Secretary for complimentary action in federal jurisdictions is unnecessary at this time. The Board may consider further recommendations to the Secretary if changes to Amendment 3 occur through the adaptive management process (Section 4.6).

4.10 COOPERATION WITH OTHER MANAGEMENT INSTITUTIONS

The Board will cooperate, when necessary, with other management institutions during the implementation of this amendment, including NMFS and the New England, Mid-Atlantic, and South Atlantic Fishery Management Council.

5.0 COMPLIANCE

The full implementation of the provisions included in this amendment is necessary for the management program to be equitable, efficient, and effective. States are expected to implement these measures faithfully under state laws. ASMFC will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan.

The Board sets forth specific elements that the Commission will consider in determining state compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fishery Management Program Charter (ASMFC 2016).

5.1 MANDATORY COMPLIANCE ELEMENTS FOR STATES

A state will be determined to be out of compliance with the provision of this fishery management plan according to the terms of Section Seven of the ISFMP Charter if:

- Its regulatory and management programs to implement Amendment 3 have not been approved by the Board; or
- It fails to meet any schedule required by Section 5.2, or any addendum prepared under adaptive management (Section 4.6); or
- It has failed to implement a change to its program when determined necessary by the Board; or
- It makes a change to its regulations required under *Section 4* or any addendum prepared under adaptive management (*Section 4.6*), without prior approval of the Board.

5.1.1 Regulatory Requirements

To be considered in compliance with this fishery management plan, all state programs must include a regime of restrictions on Atlantic menhaden fisheries consistent with the requirements of Section 3.1: Commercial Catch and Landings Programs; Section 3.5: Biological Data Collection Programs; and Section 4.3: Commercial Fishery Management Measures. A state may propose an alternative management program under Section 4.5: Alternative State Management Regimes, which, if approved by the Board, may be implemented as an alternative regulatory requirement for compliance.

States may begin to implement Amendment 3 after final approval by the Commission. Each state must submit its required Atlantic menhaden regulatory program to the Commission through ASMFC staff for approval by the Board. During the period between submission and Board approval of the state's program, a state may not adopt a less protective management program than contained in this Amendment or contained in current state law. The following lists the specific compliance criteria that a state/jurisdiction must implement in order to be in compliance with Amendment 3:

- Commercial fishery management measures as specified in Section 4.3 including the Total Allowable Catch (Section 4.3.1), Overage Payback (Section 4.3.2.1), Quota Allocation (Section 4.3.2), Quota Transfers (Section 4.3.3), Quota Rollovers (Section 4.3.4), Incidental Catch and Small-Scale Fishery Provision (Section 4.3.5), Episodic Events Set Aside (Section 4.3.6), and the Chesapeake Bay Reduction Fishery Harvest Cap (Section 4.3.7).
- Monitoring requirements as specified in Section 3.1
- Fishery dependent data collection programs as specified in Section 3.5.1
- All state programs must include law enforcement capabilities adequate for successful implementation of the compliance measures contained in this Amendment.
- There are no mandatory research requirements at this time; however, research requirements may be added in the future under Adaptive Management, Section 4.6.
- There are no mandatory habitat requirements in Amendment 3. See *Section 4.4* for habitat recommendations.

5.2 COMPLIANCE SCHEDULE

States must implement this Amendment according to the following schedule:

Month Day, 201X: Submission of state programs to implement Amendment 3 for

approval by the Board. Programs must be implemented upon

approval by the Board.

Month Day, 201X: States with approved management programs must implement

Amendment 3. States may begin implementing management

programs prior to this deadline if approved by the Board.

5.3 COMPLIANCE REPORTS

Each state must submit to the Commission an annual report concerning its Atlantic menhaden fisheries and management program for the previous year, no later than April 1st. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

The report shall cover:

 The previous calendar year's fishery and management program including mandatory reporting programs (including frequency of reporting and data elements collected), fishery dependent data collection, fishery independent data collection, regulations in

- effect, total harvest (including directed landings, incidental and small-scale fishery landings, landings under the episodic events program, and landings by gear type), *de minimis* requests, and future regulatory changes.
- The planned management program for the current calendar year summarizing regulations that will be in effect and monitoring programs that will be performed, highlighting any changes from the previous year.

5.4 PROCEDURES FOR DETERMINING COMPLIANCE

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section Seven (ASMFC 2016). In brief, all states are responsible for the full and effective implementation and enforcement of fishery management plans in areas subject to their jurisdiction. Written compliance reports as specified in the Amendment must be submitted annually by each state with a declared interest. Compliance with Amendment 3 will be reviewed at least annually; however, the Board, ISFMP Policy Board, or the Commission may request the PRT to conduct a review of state's implementation and compliance with Amendment 3 at any time.

The Board will review the written findings of the PRT within 60 days of receipt of a State's compliance report. Should the Board recommend to the Policy Board that a state be determined out of compliance, a rationale for the recommended noncompliance finding will be addressed in a report. The report will include the required measures of Amendment 3 that the state has not implemented or enforced, a statement of how failure to implement or enforce required measures jeopardizes Atlantic menhaden conservation, and the actions a state must take in order to comply with Amendment 3 requirements.

The ISFMP Policy Board will review any recommendation of noncompliance from the Board within 30 days. If it concurs with the recommendation, it shall recommend to the Commission that a state be found out of compliance.

The Commission shall consider any noncompliance recommendation from the ISFMP Policy Board within 30 days. Any state that is the subject of a recommendation for a noncompliance finding is given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the ISFMP Policy Board, it may determine that a state is not in compliance with Amendment 3, and specify the actions the state must take to come into compliance.

Any state that has been determined to be out of compliance may request that the Commission rescind its noncompliance findings, provided the state has revised its Atlantic menhaden conservation measures.

5.5. ANALYSIS OF THE ENFORCEABILITY OF PROPOSED MEASURES

All state programs must include law enforcement capabilities adequate for successfully implementing that state's Atlantic menhaden regulations. The LEC will monitor the adequacy of a state's enforcement activity.

6.0 RESEARCH NEEDS

The following list of research needs have been identified in order to enhance the state of knowledge of the Atlantic menhaden resource. Research recommendations are broken down into several categories: data; assessment methodology, habitat, and socio-economic. Each category is further broken down into recommendations that can be completed in the short term (within 5 years) and recommendations that will require a long term commitment (6+ years).

6.1 STOCK ASSESSMENT AND POPULATION DYNAMICS RESEARCH NEEDS

6.1.1 Annual Data Collection

Short Term:

- 1. Continue current level of sampling from bait fisheries, particularly in the mid-Atlantic and New England. Analyze sampling adequacy of the reduction fishery and work with industry and states to effectively sample areas outside of that fishery.
- 2. Conduct ageing validation study to confirm scale to otolith comparisons. Use archived scales to do radio isotope analysis.
- 3. Conduct a comprehensive fecundity study.
- 4. Place observers on boats to collect at-sea samples from purse-seine sets.
- 5. Investigate relationship between fish size and school size in order to address selectivity.
- 6. Investigate relationship between fish size and distance from shore.
- 7. Evaluate alternative fleet configurations for removal and catch-at-age data.
- 8. Investigate inter-annual variability in the maturity of menhaden via collection of annual samples along the Atlantic coast.

Long Term:

- 1. Develop a menhaden specific coastwide fishery independent index of adult abundance at age.
- 2. Conduct studies on spatial and temporal dynamics of spawning.
- 3. Conduct studies on the productivity of estuarine environments related to recruitment.
- 4. Investigate environmental covariates related to recruitment.
- 5. Validate multispecies/ecosystem model parameters through the development and implementation of stomach sampling program that will cover major menhaden predators along the Atlantic coast. Validation of prey preferences, size selectivity and spatial overlap is critically important to the appropriate use of such model results.

6.1.2 Assessment Methodology

Short Term:

- 1. Conduct Management Strategy Evaluation (MSE) on the various reference point options (single-species, multi-species) for menhaden.
- 2. Continue to develop an integrated length and age based model.
- 3. Continue to improve methods for incorporation of natural mortality.
- 4. Consider estimating (time-varying) growth within the assessment model.
- 5. Account for co-variation among parameters and inputs in future uncertainty analyses of the assessment model.
- 6. Examine the variance assumption and weighting factors of all the likelihood components in the model.

Long Term:

- 1. Develop a seasonal spatially-explicit model, once sufficient age-specific data on movement rates of menhaden are available.
- 2. Continue exploring the development of multispecies models that can take predator-prey interactions into account. This should inform and be linked to the development of assessment models that allow natural mortality to vary over time.
- 3. Evaluate the sensitivity of reference points to recent productivity trends.
- 4. Reconsider models that allow natural mortality to vary over time.
- 5. Collect age-specific data on movement rates of menhaden to develop regional abundance trends.
- 6. Investigate the effects of global climate change on distribution, movement, and behavior of menhaden.

6.2 HABITAT RESEARCH NEEDS

- 1. Study specific habitat requirements for all life history stages.
- 2. Develop habitat maps for all life history stages.
- 3. Identify migration routes of adults.
- 4. Study the effects of large-scale climatic events and the impacts on Atlantic menhaden.
- 5. Evaluate effects of habitat loss/degradation on Atlantic menhaden.

6.3 SOCIO-ECONOMIC RESEARCH NEEDS

- 1. Develop a mechanism for estimating or obtaining data for economic analysis on the reduction fishery, due to the confidential nature of the data.
- 2. Conduct studies to fully recognize the linkages between the menhaden fishery and the numerous other fisheries which it supports and sustains.
- 3. Conduct studies on the recreational component of the menhaden fishery to better understand what gear is being used, where it is being prosecuted, disposition of the catch, and who the users may be in terms of socioeconomic issues and other factors.

4. Analyze the social aspects of the non-consumptive sector, including components of the bird watching and whale watching industries, including where they live and what their particular interests are in menhaden.

7.0 PROTECTED SPECIES

In the fall of 1995, Commission member states, NMFS, and USFWS began discussing ways to improve implementation of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in state waters. Historically, these policies had been only minimally implemented and enforced in state waters (0-3 miles). In November 1995, the Commission, through its ISFMP Policy Board, approved an amendment to its ISFMP Charter (Section Six (b)(2)) requiring protected species/fishery interactions to be discussed in the Commission's fisheries management planning process. As a result, the Commission's fishery management plans describe impacts of state fisheries on certain marine mammals and endangered species, collectively termed "protected species". The following section outlines: (1) the federal legislation which guides protection of marine mammals and sea turtles, (2) the protected species with potential fishery interactions; (3) the specific types of fishery interaction; (4) population status of the affected protected species; and (5) potential impacts to Atlantic coast state and interstate fisheries.

7.1 MARINE MAMMAL PROTECTION ACT REQUIREMENTS

Since its passage in 1972, one of the underlying goals of the MMPA has been to reduce the incidental serious injury and mortality of marine mammals in the course of commercial fishing operations to insignificant levels approaching a zero mortality and zero serious injury rate. Under the 1994 Amendments, the Act requires NMFS to develop and implement a take reduction plan to assist in the recovery of, or prevent the depletion of, each strategic stock that interacts with a Category I or II fishery. A strategic stock is defined as a stock: (1) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR)¹ level; (2) which is declining and is likely to be listed under the Endangered Species Act (ESA) in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA. Category I and II fisheries are those that have frequent or occasional incidental mortality and serious injury of marine mammals, whereas Category III fisheries are those which have a remote likelihood of incidental mortality and serious injury to marine mammals. Each year NMFS publishes a List of Fisheries (LOF), which classifies commercial fisheries into one of these three categories.

Under 1994 mandates, the MMPA also requires fishermen in Category I and II fisheries to

¹ PBR is the number of human-caused deaths per year each stock can withstand and still reach an optimum population level. This is calculated by multiplying the minimum population estimate by the stock's net productivity rate and a recovery factor ranging from 0.1 for endangered species to 1.0 for healthy stocks.

register under the Marine Mammal Authorization Program (MMAP). The purpose of this is to provide an exception for commercial fishermen from the general taking prohibitions of the MMPA. All fishermen, regardless of the category of fishery in which they participate, must report all incidental injuries and mortalities caused by commercial fishing operations within 48 hours.

Section 101(a)(5)(E) of the MMPA allows for authorization of the incidental take of ESA-listed marine mammals in the course of commercial fishing operations if it is determined that: (1) incidental mortality and serious injury will have a negligible impact on the affected species or stock; (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and (3) where required under MMPA Section 118, a monitoring program has been established, vessels engaged in such fisheries are registered, and a take reduction plan has been developed or is being developed for such species or stock. MMPA Section 101(a)(5)(E) permits are not required for Category III fisheries, but any serious injury or mortality of a marine mammal must be reported.

7.2 ENDANGERED SPECIES ACT REQUIREMENTS

The taking of endangered sea turtles and marine mammals is prohibited and considered unlawful under Section 9(a)(1) of the ESA. In addition, NMFS or the USFWS may determine Section 4(d) protective regulations to be necessary and advisable to provide for the conservation of threatened species. There are several mechanisms established in the ESA which allow for exceptions to the prohibited take of protected species listed under the ESA. Section 10(a)(1)(A) of the ESA authorizes NMFS to allow the taking of listed species through the issuance of research permits, which allow ESA species to be taken for scientific purposes or to enhance the propagation and survival of the species. Section 10(a)(1)(B) authorizes NMFS to permit, under prescribed terms and conditions, any taking otherwise prohibited by Section 9(a)(1)(B) of the ESA if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. In recent years, some Atlantic state fisheries have obtained section 10(a)(1)(B) permits for state fisheries. Recent examples are at http://www.nmfs.noaa.gov/pr/permits/esa_review.htm#esa10a1b.

Section 7(a)(2) requires federal agencies to consult with NMFS to ensure that any action that is authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species. If, following completion of the consultation, an action is found to jeopardize the continued existence of any listed species or cause adverse modification to critical habitat of such species, reasonable and prudent alternatives need to be identified so that jeopardy or adverse modification to the species does not occur. Section (7)(o) provides the actual exemption from the take prohibitions established in Section 9(a)(1), which includes Incidental Take Statements that are provided at the end of consultation via the ESA Section 7 Biological Opinions.

7.3 PROTECTED SPECIES WITH POTENTIAL FISHERY INTERACTIONS

A number of protected species inhabit the management unit, which includes inshore and nearshore waters, for Atlantic Menhaden. Ten are classified as endangered or threatened under the ESA; the remainder are protected under provisions of the MMPA. The species found in coastal Northwest Atlantic waters are listed below.

Endangered

Right whale

Blue Whale

Fin whale

(Balaenoptera musculus)

(Balaenoptera physalus)

(Balaenoptera physalus)

(Dermochelys coriacea)

(Lepidochelys kempii)

Hawksbill turtle

(Eretmochelys imbricata)

Shortnose sturgeon

(Acipenser brevirostrum)

Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus)

Threatened

Loggerhead turtle (Caretta caretta)
North Atlantic Green turtle dps (Chelonia mydas)

MMPA

Includes all marine mammals above in addition to:

Minke whale (Balaenoptera acutorostrata)
Humpback whale (Megaptera novaeangliae)

Bottlenose dolphin (*Tursiops truncatus*)
Atlantic-white sided dolphin (*Lagenorhynchus acutus*)

Harbor seal (Phoca vitulina)
Grey seal (Halichoerus grypus)
Harp seal (Phoca groenlandica)
Harbor porpoise (Phocoena phocoena)

In the Northwest Atlantic waters, protected species utilize marine habitats for feeding, reproduction, nursery areas, and migratory corridors. For several stocks of marine mammals, including humpback whales, menhaden are an important prey species. Some species occupy the area year round while others use the region only seasonally or move intermittently nearshore, inshore, and offshore. Interactions may occur whenever fishing gear and marine mammals overlap spatially and temporally.

For sea turtles, the Atlantic seaboard provides important developmental habitat for post-pelagic juveniles, as well as foraging and nesting habitat for adults. The distribution and abundance of sea turtles along the Atlantic coast is related to geographic location and seasonal variations in water temperatures. Water temperatures dictate how early northward migrations begin each year and is a useful factor for assessing when turtles will be found in certain areas.

Interactions may occur whenever fishing gear and sea turtles overlap spatially and temporally.

7.3.1 Marine Mammals

Five marine mammal species are primarily known to co-occur with or become entangled in gear used by the Atlantic menhaden fishery. They include the Atlantic right whale, humpback whale, fin whale, coastal bottlenose dolphin, and harbor porpoise.

North Atlantic Right Whale

The North Atlantic right whale (*Eubalaena glacialis*) is among the most endangered large whale species in the world. Despite decades of conservation measures, the population remains at low numbers. In 2012, 440 individually recognized whales were known to be alive (Corkeron et al., 2016). Models using data collected through the mid-1990s indicated that if the conditions present at that time were to continue, western North Atlantic right whales would be extinct within 200 years (Caswell et al., 1999).

North Atlantic right whales have a wide distribution throughout the Atlantic Ocean but are generally found west of the Gulf Stream, from the southeast U.S. to Canada (Kenney, 2002; Waring et al., 2009). North Atlantic right whales frequent Stellwagen Bank, Jeffreys Ledge, the Bay of Fundy, and Browns Banks in the warmer months. The distribution of right whales in the summer and fall is linked to the distribution of zooplankton (Winn et al., 1986). Right whales feed by swimming continuously with their mouths open, filtering large amounts of water through their baleen and capturing zooplankton on the baleen's inner surface. Calving occurs in the winter months in coastal waters off of Georgia and Florida (Kraus et al., 1988). Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas to the winter calving grounds off the coast of Georgia and Florida.

The North Atlantic Right Whale is listed as endangered throughout its range. Ship strikes and fishing gear entanglements are the principal factors believed to be hindering recovery of western North Atlantic right whales population (NMFS, 2012). Data collected from 1970 through 1999 indicate that anthropogenic interactions in the form of ship strikes and gear entanglements were responsible 19 out of 45 reported right whale deaths (Knowlton and Kraus, 2001).

Humpback Whale

Humpback whales, known for their displays of breeching and bubble net feeding, can be found in all major oceans. In the western North Atlantic, humpback whales calve and mate in the West Indies and then migrate to northern feeding areas during the summer months. In the Gulf of Maine, sightings are most frequent from mid-March through November (CETAP, 1982). There they feed on a number of species of small schooling fish, particularly sand lance, mackerel, and Atlantic herring. Humpback whales have also been observed feeding on krill (Wynne and Schwartz, 1999).

In the western Atlantic Ocean, humpback whales have become increasingly more abundant.

The overall North Atlantic population, estimated from genetic tagging data collected by the Years of the North Atlantic Humpback (YONAH) project, was estimated to be 4,894 males and 2,804 females in the 1990's. As a result, the West Indies population of humpback whales, which migrates up to New England, was not considered at risk of extinction or likely to become threatened within the foreseeable future (81 FR 62259, September 8, 2016). While not listed as endangered or threatened, the major known sources of anthropogenic mortality and injury of humpback whales are commercial fishing gear entanglements and ship strikes.

Fin Whale

Fin whales inhabit a wide range of latitudes between 20 to 75 degrees north and 20 to 75 degrees south (Perry et al., 1999). Like right and humpback whales, fin whales are believed to use high latitude waters primarily for feeding, and low latitude waters for calving. However, evidence regarding the location of where fin whales primarily winter, calve, and mate is still scarce. Clark (1995) reported a general pattern of fin whale movements in the fall from the Labrador/Newfoundland region, south past Bermuda and into the West Indies, but also noted strandings along the U.S. Mid-Atlantic coast from October through January. This could suggest the possibility of an offshore calving area (Clark 1995; Hain et al. 1992). The predominant prey of fin whales varies greatly in different areas depending on what is locally available (IWC, 1992). In the western North Atlantic, fin whales feed on a variety of small schooling fish (e.g., herring, capelin, and sand lance) as well as squid and planktonic crustaceans (Wynne and Schwartz, 1999).

The fin whale is listed as endangered throughout its range. Like right whales and humpback whales, anthropogenic mortality of fin whales includes entanglement in commercial fishing gear and ship strikes (NMFS, 2011). Of 12 fin whale mortalities recorded between 2009 and 2013, nine were associated with vessel interactions (Waring et al., 2016). Experts believe that fin whales are struck by large vessels more frequently than any other cetacean (Laist et al., 2001).

Bottlenose Dolphin

Common bottlenose dolphins are found throughout the western Atlantic coast, with primary habitat along the U.S. ranging from New York through Florida. The distribution of the species changes seasonally, with a greater abundance of bottlenose dolphins found in the Mid-Atlantic waters in the summer (NMFS, 2008). In the winter, most bottlenose dolphins are found south of the Virginia-North Carolina border (NMFS, 2008). The species is often aggregated in groups, ranging up to 15 individuals inshore and even larger herds offshore. Bottlenose dolphins eat a variety of prey including invertebrates and fish.

On the Atlantic coast, five stocks of common bottlenose dolphins are considered depleted under the MMPA, meaning that the population stock is below its optimum sustainable level (Waring et al., 2016). The primary source of human-induced mortality is interactions with fishing gear, particularly coastal gillnets. Between 1995 and 2000, 12 bottlenose dolphin mortalities were reported in gillnets targeting dogfish, striped bass, Spanish mackerel, kingfish, and weakfish (NMFS, 2008). Four more mortalities were observed in 2003-2006 (NMFS, 2008).

In response, a Bottlenose Dolphin Take Reduction Plan was implemented in May 2006 to reduce the incidental mortality and serious injury of bottlenose dolphins in commercial fishing gear (71 FR 24776, April 26, 2006).

Harbor Porpoise

The harbor porpoise ranges from West Greenland to North Carolina. The southern-most stock of harbor porpoise is referred to as the Gulf of Maine/Bay of Fundy stock and spends its winters in the Mid-Atlantic region. Harbor porpoises are generally found in coastal and inshore waters, but will also travel to deeper, offshore waters. There are insufficient data to determine population trends for this species because harbor porpoises are widely dispersed in small groups, they spend little time at the surface, and their distribution varies from year to year depending on environmental conditions (NMFS, 2002). Shipboard line transect sighting surveys have been conducted to estimate population size of the harbor porpoise stock. The best estimate of abundance for the Gulf of Maine/Bay of Fundy harbor porpoise stock is 79,883 individuals from a 2011 survey (NMFS, 2016).

The Gulf of Maine harbor porpoise was proposed to be listed as threatened under the ESA on January 7, 1993, but NMFS determined this listing was not warranted (NMFS, 1999). NMFS removed this stock from the ESA candidate species list in 2001. The primary threat to the harbor porpoise is incidental catch in fishing gear, such as gillnets and trawls. The Harbor Porpoise Take Reduction Plan was implemented to reduce incidental mortality and serious injury in gillnet fisheries in the Gulf of Maine and mid-Atlantic.

7.3.1.1 Gear Interactions with Marine Mammals

Marine mammal interactions have been documented in the primary fisheries that target menhaden, including the purse seine, pound net, and gillnet fisheries, and in those fisheries for which menhaden is bycatch, including trawl, haul seine, pound net and gillnet fisheries. The bycatch reports included below do not represent a complete list but rather available records. It should be noted that without an observer program for many of these fisheries, actual numbers of interactions are difficult to obtain.

Purse Seine

The U.S. mid-Atlantic menhaden purse seine fishery is currently listed as a Category II fishery while the Gulf of Maine menhaden purse seine fishery is listed as a Category III fishery (82 FR 3655, January 12, 2017).

Historically, Atlantic menhaden purse seine fishermen reported an annual incidental take of one to five coastal bottlenose dolphins (NMFS, 1991). This information comes from reports required under a small take exemption issued under the then Section 101(a)(4) of the MMPA. The Atlantic purse seine fishery reported the lethal incidental take of one minke whale in 1990 (NMFS, 1993); however, the target species of the purse seine (i.e. tuna or menhaden) is unknown. In addition, an incidental take of a humpback whale in the mid-Atlantic menhaden purse seine fishery was reported in 2001 (66 FR 6545, January 22. 2001); however, in 2005 humpback whales were removed from the list species killed or injured in the fishery because an

interaction had not been reported in subsequent years. In 2006, the mid-Atlantic menhaden purse seine fishery was elevated from a Category III fishery to a Category II fishery (71 FR 48802, August 22, 2006). This change was made after interactions with bottlenose dolphins in other purse seine fisheries, such as those in the Gulf of Mexico. This required the fishery to comply with registration requirements, applicable take reduction plan requirements, and observer coverage. Limited observer coverage has occurred in the fishery since 2008.

Pound Nets

The Virginia pound net fishery is listed as a Category II fishery in the 2017 LOF due to documented interactions with bottlenose dolphins (82 FR 3655, January 12, 2017). Between 2004 and 2008, there were 17 bottlenose dolphins killed in pound net gear and 3 bottlenose dolphins were released alive (76 FR 37716, June 28, 2011). There is no formal observer coverage for the Virginia pound net fishery but there has been sporadic monitoring by the Northeast Fishery Observer Program. All other Atlantic coast pound net fisheries are listed as a Category III fishery.

Gillnets

The mid-Atlantic gillnet fishery is listed as a Category I fishery in the 2017 LOF (82 FR 3655, January 12, 2017). The fishery was originally listed as a Category II fishery but in 2003, it was elevated to a Category I fishery after stranding and observer data documented the incidental mortality and serious injury of bottlenose dolphins (68 FR 41725, July 15, 2003). Other species with documented interactions include the harbor porpoise, common dolphin, harbor seal, harp seal, long-finned pilot whale, short-finned pilot whale, and white-sided dolphin; however, since gillnet fisheries target many species, not all incidents may have occurred while harvesting menhaden. Between 1995 and 2013, observer coverage has ranged from 1% to 5%.

The Chesapeake Bay inshore gillnet, the North Carolina inshore gillnet, the northeast anchored float gillnet, the northeast drift gillnet, and the southeast Atlantic gillnet fisheries are all listed as Category II fisheries in the 2017 LOF (82 FR 3655, January 12, 2017). The primary species reported interacting with these gears is the bottlenose dolphin; however, the harbor seal, humpback whale, and white-sided dolphin have been documented in the northeast anchored float gillnet. Both the Chesapeake Bay inshore gillnet and the North Carolina inshore gillnet fisheries were elevated from a Category III fishery to a Category II fishery in the 2006 and 2001 LOFs, respectively (66 FR 42780, August 15, 2001; 71 FR 48802, August 22, 2006).

The Delaware River inshore gillnet, the Long Island Sound inshore gillnet, the southeast Atlantic inshore gillnet, and the Rhode Island/Southern Massachusetts/New York Bight inshore gillnet fisheries are listed as Category III fisheries in the 2017 LOF (82 FR 3655, January 12, 2017). There have been no documented interactions with marine mammals in the past five years with the exception of the southeast Atlantic inshore gillnet fishery which has documented an interaction with a bottlenose dolphin.

Haul/Beach Seine

The Mid-Atlantic haul/beach seine fishery is listed as a Category II fishery in the 2017 LOF due

to interactions with coastal bottlenose dolphin (82 FR 3655, January 12, 2017). NMFS has recorded one observed take of a bottlenose dolphin in this fishery in 1998 (Waring and Quintal 2000). Harbor porpoise was removed from the list of species killed or injured in the Mid-Atlantic haul/beach seine fishery due to no other interactions between 1999 and 2003. The fishery was observed from 1998-2001 but there has been limited observer coverage since 2001.

Fyke Net, Floating Fish Trap, Fish Weir

Floating fish traps, northeast and Mid-Atlantic fyke nets, and fish weirs are listed as a Category III fishery in the 2017 LOF (82 FR 3655, January 12, 2017). There are no documented interactions between marine mammals in the northeast/mid-Atlantic fyke net fishery nor the floating fish trap fisheries. In the Mid-Atlantic mixed species weir fishery there have been documented interactions with bottlenose dolphins.

Trawls

The mid-Atlantic mid-water trawl fishery is listed as a Category II fishery in the 2017 LOF (82 FR 3655, January 12, 2017). In 2001, the mid-Atlantic mid-water trawl fishery was elevated to Category I based on mortality and injury of common dolphins and pilot whales. In 2007, the fishery was down-graded to a Category II fishery due to reductions in the interactions with common dolphins and pilot whales (72 FR 14466, March 28, 2007). The mid-Atlantic mid-water trawl fishery continues to be listed as a Category II fishery due to interactions with white-sided dolphins. Interactions with other species include the gray seal and the harbor seal. Observer coverage in the fishery has ranged from 0% to 13.33% between 1997 and 2008.

The northeast mid-water trawl fishery is also listed as a Category II fishery in the 2017 LOF (82 FR 3655, January 12, 2017). The fishery has had documented interactions with the common dolphin, gray seal, harbor seal, long-finned pilot whale, short-finned pilot whales, and minke whale. Importantly, not all mid-water trawls target menhaden as this is the primary gear used in the northeast groundfish fisheries. Observer coverage in the fishery has ranged from 0% to 19.9% between 1997 and 2008.

Cast Net

Currently, cast net is listed as a Category III fishery in the 2017 LOF (82 FR 3655, January 12, 2017). There are no documented marine mammal species incidentally injured or killed in the cast net fishery.

Traps/Pots

The Atlantic mixed species trap/pot fishery is listed as a Category II fishery in the 2017 LOF (82 FR 3655, January 12, 2017). The gear is primarily involved in entanglement events with species such as the fin whale and the humpback whale. Historically, the minke whale and the harbor porpoise were also listed as species injured or killed by the Atlantic mixed species trap/pot fishery but these species were removed in 2005 because interactions had not been documented in recent years. There is no observer program for this fishery.

7.3.2 Sea Turtles

All sea turtles that occur in U.S. waters are listed as either endangered or threatened under the ESA. Five sea turtle species occur along the U.S. Atlantic coast, namely the loggerhead (*Caretta caretta*), Kemp's Ridley (*Lepidochelys kempi*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*).

Loggerhead Turtle

The loggerhead turtle is the most abundant species of sea turtle in U.S. waters, commonly occurring throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. This species is found in a wide range of habitats throughout the temperate and tropical regions of the globe, including the open ocean, continental shelves, bays, lagoons, and estuaries (NMFS, 2013). NMFS and USFWS have identified five nesting sub-populations along the northwest Atlantic Ocean. They include 1) southern Florida through Georgia; 2) Florida through Key West; 3) the Dry Tortugas; 4) the northern Gulf of Mexico; 5) and the greater Caribbean (76 FR 58867, September 22, 2011). Nesting sites along the coast of the U.S. primarily occur from Virginia through Alabama (76 FR 58867, September 22, 2011). The activity of the loggerhead is limited by temperature, with loggerhead turtles not appearing in the Gulf of Maine before June and generally leaving by mid-September. Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks. Under certain conditions they also feed on finfish, particularly if they are easy to catch (*e.g.*, caught in gillnets or inside pound nets where the fish are accessible to turtles).

The northwest Atlantic population of loggerhead turtles is listed as threatened under ESA. Threats to the population include destruction of nesting habitat as the result of development and erosion, sand dredging, fishing practices, and marine pollution (76 FR 58867, September 22, 2011).

Kemp's Ridley

Kemp's ridley sea turtles are found throughout the Gulf of Mexico and North Atlantic coast; however their only major nesting site is in Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). Juvenile Kemp's ridleys use northeastern and mid-Atlantic waters of the U.S. Atlantic coastline as primary developmental habitat, with shallow coastal embayments serving as important foraging grounds during the summer months. Juvenile ridleys migrate south as water temperatures cool, and are predominantly found in shallow coastal embayments along the Gulf Coast during the fall and winter months. Kemp's ridleys can be found from New England to Florida, and are the second most abundant sea turtle in Virginia and Maryland waters (Keinath *et al.* 1987; Musick and Limpus, 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick, 1985; Bellmund *et al.*, 1987; Keinath *et al.*, 1987; Musick and Limpus, 1997). These turtles primarily feed on crabs, but also consume mollusks, shrimp, and fish (Bjorndal, 1997).

Kemp's ridley are listed as endangered primarily as the result of the destruction of habitat, particularly nesting habitat in Mexico, bycatch in fisheries, the harvesting of eggs and nesting

turtles, and vessel collisions.

Green Turtle

Green turtles are distributed throughout the world's oceans, primarily between the northern and southern 20° isotherms (Hirth, 1971). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida, with documented nests also along the Gulf coast of Florida and the Florida Panhandle. While nesting activity is important in determining population distributions, the availability and location of foraging grounds also plays an important role in their spatial distribution. Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach and are primarily omnivorous (Bjorndal, 1985). At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to an herbivorous diet (Bjorndal, 1997). Post-pelagic green turtles feed primarily on sea grasses and benthic algae (Bjorndal ,1985). Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, such as the Indian River Lagoon (Ehrhart et al., 1986). Along the Atlantic coast, green turtles can be found from Florida up to Massachusetts.

Green turtles are listed as threatened along the North Atlantic. Threats to the North Atlantic population of green turtles includes the degradation of nesting beaches due to coastal development, the degradation of forage habitat due to pollution, the illegal harvest of green turtles and their eggs, entanglement in fishing gear such as gillnets, trawls, longlines, and traps, vessel strikes, and the persistence of an often lethal disease known as fibropapillomatosis (81 FR 20057, May 6, 2016).

Leatherback Turtle

The leatherback is the largest living turtle and its range is farther than any other sea turtle species (NMFS, 2013). Leatherback turtles are often found in association with jellyfish, with the species primarily feeding on Cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas). While these turtles are predominantly found in the open ocean, they do occur in coastal water bodies such as Cape Cod Bay and Narragansett Bay, particularly the fall. The most significant nesting in the U.S. occurs in southeast Florida (NMFS, 2013).

The leatherback turtle is listed as endangered throughout its range. Primary causes of this population decline include the degradation of nesting beaches as the result of coastal development and beach sand mining, the poaching of eggs on nesting beaches, increased human pollution in pelagic waters, the presence of disease and parasites, and the entanglement of leatherbacks in active and abandoned fishing gear (NMFS, 2013).

Hawksbill Turtle

The hawksbill turtle is found throughout the world's oceans, primarily between 30°N and 30°S latitude. In the continental U.S., hawksbill turtles commonly occur in southern Florida and the Gulf of Mexico, with a preferred habitat being coral reefs and other hard bottom habitats (NMFS, 2007). Nesting sites in the Atlantic are typically found in Mexico, Puerto Rico, and the U.S. Virgin Islands (NMFS, 2007). During their juvenile life stage, hawksbill turtles occupy the

pelagic environment, floating with algal mats in the Atlantic (NMFS 2007). The diet of hawksbill turtles primarily consists of sponges, invertebrates, and algae (NMFS 2007).

The hawksbill turtle is listed as endangered throughout its range. Primary threats to the population include loss of coral reef habitat, the illegal harvest of eggs and nesting females, increased recreational and commercial use of beaches, and the incidental capture of hawksbill turtles in fishing gear (NMFS 2007).

7.3.2.1 Potential Impacts of Menhaden Fishery on Sea Turtles

The Atlantic seaboard provides important developmental habitat for post-pelagic juveniles, as well as foraging and nesting habitat for adult sea turtles. The distribution and abundance of sea turtles along the Atlantic coast is related to geographic location and seasonal variations in water temperatures. Water temperatures dictate how early northward migration begins each year and is a useful factor for assessing when turtles will be found in certain areas. Moderate to high abundances of sea turtles have been observed both offshore and nearshore when water temperatures are greater than or equal to 21° C. As a result, sea turtles do not usually appear on the summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. As water temperatures decline below 11° C, abundance declines and turtles typically move from cold inshore waters in the late fall to warmer waters in the Gulf Stream, generally south of Cape Hatteras, North Carolina.

The effect of water temperature on the distribution of sea turtles is important in assessing possible interactions with the menhaden fishery. Menhaden are also affected by water temperatures and similarly migrate north in the spring and south in the fall. Thus, the menhaden purse seine fishery exhibits seasonal changes, with the fishery ramping up off North Carolina in April and extending into New England in June. Observer data indicates minimal interaction between these purse seines and sea turtles. From September 1978 through early 1980, approximately 40 sea days were observed for fish sampling aboard menhaden purse seiners fishing from Maine south to North Carolina. No sea turtles were recorded as bycatch (S. Epperly, NMFS SEFSC, pers. comm.). Other gears used to catch menhaden include trawls, fixed nets, gillnets, haul/beach seines, pound nets, and cast nets. Several states have indicated that sea turtles have been incidentally captured in menhaden fixed nets and trawls, but not seine nets (ASMFC, Atlantic Coastal Fisheries Characterization Database, unpubl. data). An observer program for protected species has not been established for the menhaden fishery. However, under the ESA Annual Determination to Implement Sea Turtle Observer Requirement (80 FR 14319, April 18, 2015), two fisheries that target menhaden are included. These include the Chesapeake Bay Inshore Gillnet Fishery and Mid-Atlantic menhaden purse seine fishery,

7.3.3 Atlantic Sturgeon

The Atlantic sturgeon is an ancient anadromous fish that can live up to 60 years. Historically, sturgeon were found from Canada through Florida; however, the species currently extends through Georgia (ASMFC 1998). As adults, Atlantic sturgeon live in the ocean and migrate from the south Atlantic in the winter to New England waters in the summer (ASMFC 1998). Precise

spawning locations of sturgeon are not known but it is thought that they prefer hard substrates such as rock or clay (Gilbert, 1989). As juveniles, sturgeon reside in brackish water near river mouths before moving into the coastal ocean waters. The diet of this species is primarily composed of mussels, shrimp, and small fish (ASMFC 1998).

Since 1998, there has been a moratorium on the harvest of Atlantic Sturgeon in both state and federal waters; however, the population has continued to decline and, in 2012, Atlantic sturgeon became listed under the ESA. The listing identifies five distinct population segments, which include the Gulf of Maine, the New York Bight, the Chesapeake Bay, Carolina, and the South Atlantic (77 FR 5914 and 77 FR 5880, February 6, 2012). All population segments are listed as endangered except for the Gulf of Maine population, which is listed as threatened. Primary threats to the species include historic overfishing, the bycatch of sturgeon in other fisheries, habitat destruction from dredging, dams, and development, and vessel strikes (77 FR 5914; 77 FR 5880).

Impacts on the Atlantic sturgeon population as a result of the menhaden fishery would likely occur through bycatch in gear types such as gillnets, pound nets, and purse seines. There has been no reported or observed bycatch of Atlantic sturgeon in the menhaden gillnet fisheries (77 FR 5880). Furthermore, some states have implemented measures to reduce the bycatch of sturgeon by restricting the use of gillnet gear in coastal waters and instituting seasonal closures for anchored or staked gillnets when sturgeon may be present (77 FR 5880). As a result, impacts to the sturgeon population from the menhaden fishery are thought to be limited.

7.3.4 Seabirds

Like marine mammals, seabirds are vulnerable to entanglement in commercial fishing gear. Under the Migratory Bird Treaty Act, it is unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory birds except as permitted by regulation (16 U.S.C. 703). Given that an interaction has not been quantified in the Atlantic menhaden fishery, impacts to seabirds are not considered to be significant. Endangered and threatened bird species, such as the piping plover, are unlikely to be impacted by the gear types employed in the menhaden fishery. Other human activities such as coastal development, habitat degradation and destruction, and the presence of organochlorine contaminants are considered to be the major threats to some seabird populations.

7.4 PROPOSED FEDERAL REGULATIONS/ACTIONS PERTAINING TO THE RELEVANT PROTECTED SPECIES

In May 2016, NMFS proposed areas of Atlantic Sturgeon critical habitat along the Atlantic coast. The proposed critical habitat primarily consisted of rivers including the Penobscot River in Maine, the Hudson River in New York, the Potomac River in Maryland, and the Neuse River in North Carolina (81 FR 36077; 81 FR 35701). Comments on the proposal were accepted through the fall of 2016; however, a final rule has not yet been released.

7.5 POTENTIAL IMPACTS TO ATLANTIC COASTAL STATE AND INTERSTATE FISHERIES

There are several take reduction teams, whose management actions have potential impacts to coastal menhaden fisheries. The Northeast sink and Mid-Atlantic coastal gillnet fisheries are the two fisheries regulated by the Harbor Porpoise Take Reduction Plan (50 CFR 229.33 and 229.34). Amongst other measures, the plan uses time area closures in combination with pingers in Northeast waters, and time area closures along with gear modifications for both small and large mesh gillnets in mid-Atlantic waters. Although the plan predominately impacts the dogfish and monkfish fisheries due to higher porpoise bycatch rates, other gillnet fisheries are also affected.

The Atlantic Large Whale Take Reduction Plan (50 CFR 229.32) addresses the incidental bycatch of large baleen whales, primarily the northern right whale and the humpback whale, in several fisheries including the Northeast sink gillnet and Mid-Atlantic coastal gillnet. Amongst other measures, the plan closes right whale critical habitat areas to specific types of fishing gear during specific seasons, and modifies fishing gear and practices. The Atlantic Large Whale Take Reduction Team continues to identify ways to reduce possible interactions between large whales and commercial gear. In 2014 and 2015, the Atlantic Large Whale Take Reduction Plan was modified to reduce the number of vertical lines associated with trap/pot fisheries and required expanded gear markings for gillnets and traps in Jeffrey's Ledge and Jordan Basin (79 FR 35686, June 27, 2014; 80 FR 30367, May 28, 2015).

The Bottlenose Dolphin Take Reduction Team first convened in 2001 to discuss incidental catch of coastal bottlenose dolphins in Category I and II fisheries. In 2006, a Bottlenose Dolphin Take Reduction Plan was established, which created gear regulations for the mid-Atlantic coastal gillnet fishery, the Virginia pound net fishery, the mid-Atlantic beach seine fishery, and the North Carolina inshore gillnet fishery, among others. Specifically, the plan established mesh sizes for the gill net fisheries and prohibited night fishing for some regions and gear types (71 FR 24776, April 26, 2006).

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9.0 TABLES

Table 16: Atlantic menhaden total commercial landings by jurisdiction (in pounds). This includes directed landings, landings under the bycatch allowance, and episodic events landings.

	ME	NH	MA	RI	СТ	NY	NJ	DE	MD	PFRC	VA	NC	SC	GA	FL
1985	С	С	3,039,625	8,388,046	234,800	901,800	2,879,766	176,135	5,372,193	16,768,889	620,119,243	97,738,403	С	-	7,579,674
1986	С	С	3,411,000	10,389,187	254,400	399,650	2,453,593	С	5,449,350	10,971,973	445,664,204	66,377,931	9,952	-	7,997,973
1987	С	С	1,215,175	13,609,224	94,900	206,795	2,563,163	22,034	5,793,683	13,120,698	622,989,111	55,498,571	С	-	2,776,777
1988	С	С	8,047,320	15,583,437	175,200	504,100	1,984,045	127,713	6,430,164	13,231,368	565,962,962	73,715,713	С	-	1,026,228
1989	С	С	1,459,402	19,033,173	148,500	449,100	2,854,361	104,382	6,166,236	8,334,174	590,581,595	66,756,288	С	-	1,372,959
1990	5,744,597	264,500	1,709,605	17,102,650	96,706	649,710	9,041,459	167,116	1,662,275	4,523,776	699,320,699	72,231,989	-	-	2,636,497
1991	С	С	12,798,310	5,090,375	96,300	650,150	16,597,402	278,774	3,540,179	5,376,264	638,130,543	110,528,754	С	-	2,062,983
1992	С	С	13,499,450	2,849,359	91,200	1,131,701	27,470,906	131,033	1,777,088	5,061,565	566,222,504	57,515,712	С	-	2,788,592
1993	С	С	1,211,569	5,146,280	195,827	1,048,993	28,296,741	164,406	2,326,613	7,884,001	622,024,284	64,711,384	С	-	2,584,766
1994	-		351,251	533,800	60,128	961,474	38,176,201	78,672	2,369,071	6,680,937	502,576,593	73,853,901	-	-	1,387,012
1995	-		2,910,613	5,873,315	255,264	1,087,978	36,572,507	101,388	4,264,754	7,002,818	691,212,717	58,374,046	-	-	687,944
1996	-		8,500	802	82,851	11,135	35,516,726	100,063	3,906,808	5,111,423	579,027,717	56,583,873	-	-	294,936
1997	С	С	238,500	5,750	72,329	553,953	38,118,579	55,733	3,457,237	5,757,370	494,098,429	56,295,597	С	-	408,492
1998	С	С	121,200	400	338,817	430,084	33,287,641	58,048	2,933,818	3,980,738	513,869,130	97,473,775	С	-	301,566
1999	-		292,800	2,330	30,298	242,886	27,753,567	78,551	4,460,534	4,860,883	374,934,651	57,434,540	-	-	288,144
2000	-		72,600	320,000	14,423	565,800	31,266,780	47,995	3,935,307	5,023,374	358,228,939	42,034,812	-	-	260,710
2001	-		144,600	-	38,865	576,426	26,375,573	53,257	3,970,243	3,329,035	484,517,820	57,261,488	-	-	179,951
2002	-		301,500	5,750	1,138,788	444,739	24,716,412	80,261	4,023,389	3,122,050	362,633,153	55,600,503	-	-	55,304
2003	-		218,255	62	46,515	384,875	17,080,463	43,193	3,163,252	2,438,790	372,479,419	68,444,122	-	-	35,810
2004	С	С	-	39,232	33,210	543,481	20,678,813	75,635	5,369,952	5,411,043	394,093,117	48,318,743	С	-	21,220
2005	-		2,177,724	14,453	30,636	871,081	17,574,826	120,658	10,635,776	4,759,905	370,689,041	50,987,985	-	-	39,404
2006	-		2,524,255	15,524	866,235	811,934	21,290,309	111,405	6,841,296	3,413,517	369,912,280	12,846,438	-	-	157,117
2007	С	С	5,543,805	8,948	90,254	483,557	37,202,485	81,850	11,210,764	5,036,906	416,447,111	1,134,167	С	-	71,373
2008	С	С	14,131,256	269,288	104,881	410,121	38,210,688	72,970	8,153,008	4,820,645	344,813,285	645,231	С	-	60,098
2009	166,942	33	6,719,048	107,548	170,907	330,496	33,329,177	69,476	7,756,192	3,191,905	349,413,370	2,124,733	-	-	52,800
2010	С	С	4,973,857	78,149	42,489	394,556	50,497,253	51,933	6,903,300	2,790,728	430,527,995	1,299,130	С	-	76,593
2011	56,000		116,151	83,899	26,929	279,117	74,324,485	70,326	6,505,890	2,759,597	411,802,254	3,529,967	-	-	146,534
2012	С	С	1,648,395	106,606	37,454	258,271	85,457,890	140,375	13,746,098	5,892,228	386,545,236	538,783	С	-	126,141
2013	-		2,314,888	99,821	26,463	1,187,525	39,819,342	125,909	7,074,727	3,295,295	315,724,384	454,172	-	-	224,872
2014	-		2,226,294	500,903	36,552	825,549	41,449,670	161,524	7,005,271	3,175,893	324,209,381	917,375	-	-	220,587
2015	С	С	2,932,828	2,060,381	87,472	1,468,165	47,810,037	150,542	7,551,430	2,739,035	351,281,666	896,919	С	-	377,729
2016	4,548,566	-	3,069,433	317,328	66,957	1,439,173	45,826,473	75,238	5,635,694	2,504,823	335,641,958	397,725	-	-	272,425

Table 17: Bait and reduction landings from 1985-2016 in thousands of metric tons.

	Reduction Landings	Bait Landings
	(1000 mt)	(1000 mt)
1985	306.7	26.6
1986	238.0	21.6
1987	327.0	25.5
1988	309.3	43.8
1989	322.0	31.5
1990	401.2	28.1
1991	381.4	29.7
1992	297.6	33.8
1993	320.6	23.4
1994	260.0	25.6
1995	339.9	28.4
1996	292.9	21.7
1997	259.1	24.2
1998	245.9	38.4
1999	171.2	34.8
2000	167.2	33.5
2001	233.7	35.3
2002	174.0	36.2
2003	166.1	33.2
2004	183.4	34.0
2005	146.9	38.4
2006	157.4	27.2
2007	174.5	42.1
2008	141.1	47.6
2009	143.8	39.2
2010	183.1	42.7
2011	174.0	52.6
2012	160.6	63.7
2013	131.0	37.0
2014	131.1	41.8
2015	143.5	45.9
2016	137.4	44.4

Table 18: Timeline for BERP Workgroup development of menhaden-specific ecosystem reference points.

ICICICIICC	reference points.				
		Review steele-henderson multi-species model			
2016	Summer	Evaluate data needs of model			
2010		Review preliminary methodology of statistical catch-at-age and production models			
	Fall	Review results of Ecopath with Ecosim model			
	Winter	Review multi-species statistical catch at age model			
	vviiitei	Evaluate data needs of model			
	Summer	Review multi-species production model			
2017	Summer	Evaluate data needs of model			
		Review finalized modeling plan and candidate models			
	Fall	Decide which candidate models will be included for ERP development and peer review			
		Discuss data requirements of the models and data sources			
	Winter	Data Workshop #1			
		Review data sources for the multi-species models			
2018		Develop criteria for inclusion of data in models			
2018	Summer	Data Workshop #2			
		Approve data sources of multi-species models			
		Discuss standardization of data across sources			
		Assessment Workshop #1			
	Winter	Review base run results from multi-species models			
		Discuss sensitivity runs for models			
		Assessment Workshop #2			
2019	Spring	Review final model results of multi-species models			
		Summarize findings and recommendations			
	Summer	Write stock assessment report			
	Fall	Peer Review Workshop			
	ı alı	Independent review of multi-species models and single-species BAM model			

Table 19: Current reporting requirements in the menhaden commercial fishery per state.

State	Dealer Reporting	Harvester Reporting	g Notes			
ME	monthly	monthly/daily	Harvesters landing greater than 6,000 lbs must report daily during episodic event			
NH	weekly	monthly	Exempt from timely reporting. Implemented weekly, trip level reporting for state dealers.			
MA	weekly monthly/daily		Harvesters landing greater than 6,000 lbs must report daily			
RI	twice weekly	quarterly/daily	Harvesters using purse seines must report daily			
CT	weekly/monthly	monthly	No directed fisheries for Atlantic menhaden			
NY	Weekly	monthly	Capability to require weekly harvester reporting if needed			
NJ	weekly monthly		All menhaden sold or bartered must be done through a licensed dealer			
DE	— monthly/daily		Harvesters landing menhaden report daily using IVR			
MD	monthly monthly/daily		PN harvest is reported daily, while other harvest is reported monthly.			
PRFC	– weekly		Trip level harvester reports submitted weekly. When 70% of quota is estimated to be reached, then pound netters must call in weekly report of daily catch.			
VA	-	monthly/weekly/daily	Purse seines submit weekly reports until 97% of quota, then daily reports. Monthly for all other gears until 90% of quota, then reporting every 10 days.			
NC	monthly (co	mbined reports)	Single trip ticket with dealer and harvester information submitted monthly. Larger dealers (>50,000 lbs of landings annually) can report electronically, updated daily.			
SC	monthly (co	mbined reports)	Exempt from timely reporting. Single trip ticket with dealer and harvester information.			
GA	monthly (co	mbined reports)	Exempt from timely reporting. Single trip ticket with dealer and harvester information.			
FL	monthly/weekly	(combined reports)	Monthly until 50% fill of quota triggers implementation of weekly.			

Table 20: ACCSP data elements, and descriptions, for commercial harvester reporting.

DATA ELEMENT	DESCRIPTION			
Form Type/Version Number	Version identification number for the ACCSP reporting form			
Reporting Form Series Number	Individual number for each reporting form (ie: trip ticket number)			
Trip Start Date	Date trip started			
Vessel Identifier	Unique vessel ID such as US Coast Guard documentation or state registration number			
Individual Fisherman Identifier	Identified unique to a fisherman			
Dealer Identification	Identifier for the dealer at point of transaction			
Unloading Date	Date of the landing at dealer			
Trip Number	Sequential number representing the number of a trip taken in a single day by either a vessel or individual			
Species	Genus and species for each species landed, sold, released, or discarded			
Quantity	Amount that is landed, sold, released, or discarded			
Units of Measure	Landed units			
Disposition	Fate of catch			
Ex-vessel Value or Price	Dollar value or price for each species that is landed or sold			
County or Port Landed	Location within a state where the product was landed			
State Landed	State where the product was landed or unloaded			
Gear	Types(s) of gear used to catch the landed species			
Quantity of Gear	Amound of gear employed			
Number of Sets	Total number of sets or tows of gear during a trip			
Fishing Time				
110111116 1111116	Total amount of time that the gear is in the water			
Days/Hours at Sea	Total amount of time that the gear is in the water Time from the start of the trip to the return to the dock			
	Time from the start of the trip to the return to the			
Days/Hours at Sea	Time from the start of the trip to the return to the dock			
Days/Hours at Sea Number of Crew	Time from the start of the trip to the return to the dock Number of crew, including the Captain			

Table 21: ACCSP standard measurements of gear quantity, fishing time, and sets for commercial harvester reporting.

TYPE OF GEAR	QUANTITY	FISHING TIME	# SETS	
Pound nets, traps and pots	# of traps, pots, or pound nets fished	Total soak time for each pot, trap, or pound net	•	
Trawls	# of trawls towed	Total tow time of each trawl	# of tows	
Gill Nets	Float line length for string	Total soak time	# of strings/hauls	
Nests/cast nets	# of pieces of apparatus	Search time	# of hauls/throws	
Hook and line	# of lines	Total soak time	n/a	
Purse seines	Length of floatline	Total search time	# of sets	
Hand gear	# of lines	Total soak time	n/a	

Table 22: Number of ten fish samples from the reduction fishery landings at Reedville, VA from 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
# 10 fish	270	277	283	227	222	262	212	200	256	251
samples	379	2//	283	327	323	263	213	208	256	251

Table 23: Number of ten fish samples required and collected by each jurisdiction in the bait fishery in 2016. Number of samples required is based on total bait landings in that jurisdiction.

State	#10-fish samples required	#10-fish samples collected	Gear/Comments
ME	7	9	purse seine
MA	5	7	purse seine (2), cast net (5)
RI	0	5	floating fish trap
СТ	0	1	gill nets
NY	2	9	seines
NJ	69	113	purse seine (100), and other gears (13)
DE	0	5	drift gill net
MD	13	19	pound net
PRFC	6	9	pound net
VA	74	82	pound net (16), gill net (64), haul seine (2)
NC	1	6	gillnet, seine
Total	177	265	

Table 24: Fishery independent surveys used in the juvenile abundance index, the northern adult index, and the southern adult index as a part of the 2015 Stock Assessment.

Index	Survey
	Rhode Island Trawl Survey
	Connecticut Seine Survey
	Connecticut Thames River Survey
	Connecticut Long Island Sound Trawl Survey
	New York Peconic Bay Trawl Survey
	New York Western Long Island Sound Seine Survey
	New Jersey Ocean Trawl Survey
Juvenile Abundance Index	New Jersey Juvenile Striped Bass Seine Survey
Juvernie Abundance muex	Delaware Bay Juvenile 16ft Trawl Survey
	Delaware Inland Bay Juvenile Trawl Survey
	Maryland Juvenile Striped Bass Seine Survey
	Maryland Coastal Trawl Survey
	Virginia Striped Bass Seine Survey
	VIMS Juvenile Trawl Survey
	South Carolina Electrofishing Survey
	Georgia Trawl Survey
	Connecticut Long Island Sound Trawl Survey
	New Jersey Ocean Trawl Survey
	Delaware Bay Juvenile 16ft Trawl Survey
Northern Adult Index	Delaware Bay Juvenile 30ft Trawl Survey
	Chesapeake Bay Fishery-Independent Multispecies Survey
	ChesMMAP
	VIMS Juvenile Trawl Survey
Southern Adult Index	Georgia Trawl Survey
Southern Adult Index	SEAMAP Trawl Survey

Table 25. Summary of ad-hoc approaches used by Fishery Management Councils to set harvest limits in data poor situations.

Council	Species group	Multiplier	Comments
New England	Atlantic herring	1	Not OF, OF not occurring
New England	Red crab	1	Based on stock status
Caribbean		0.85	Used to set ABC and ACL
New England	Groundfish	0.75	
Pacific		0.75	Used to set ABC
Pacific	Groundfish	0.5	Used to set OY
Pacific	Coastal pelagics	0.25	Used to set ABC

Table 26. The method table showing possible actions for determining ABC based on different fishery impact categories and expert opinion. Taken from the workshop report of the 2nd National SSC meeting (from ORCS, 2011).

Historical Catch	Expert Judgment	Possible Action
Nil, not targeted	Inconceivable that catch could be affecting stock	Not in fishery, Ecosystem Component; SDC not required
Small	Catch is enough to warrant including stock in the fishery and tracking, but not enough to be of concern	Set ABC and ACL above historical catch; Set ACT at historical catch level. Allow increase in ACT if accompanied by cooperative research and close monitoring.
Moderate	Possible that any increase in catch could be overfishing	ABC/ACL = f(catch, vulnerability) So caps current fishery
Moderately high	Overfishing or overfished may already be occurring, but no assessment to quantify	Set provisional OFL = f(catch, vulnerability); Set ABC/ACL below OFL to begin stock rebuilding

ABC = Acceptable Biological Catch

ACL = Annual Catch Limit

ACT = Annual Catch Target

OFL = Overfishing Level

Table 27: Total number of bycatch trips by year from 2013-2016 separated into 1,000 pound landings bins

						% of Total Trips
Bins (LBS)	2013 Trips	2014 Trips	2015 Trips	2016 Trips	Total Trips	2013-2016
1-1000	1,875	3,673	3,163	1,450	10,161	69%
1001-2000	252	517	582	148	1,499	10%
2001-3000	148	318	316	73	855	6%
3001-4000	110	190	139	48	487	3%
4001-5000	131	206	132	48	517	4%
5001-6000	158	265	196	108	727	5%
6000+	130	109	140	33	412	3%
Total	2,804	5,278	4,668	1,908	14,658	

Table 28: Average landings under the bycatch allowance from 2013–2016 by gear type (stationary and mobile) and jurisdiction. Highlighted cells represent the gear type with the highest landings within a jurisdiction. (C) = confidential landings, and (-) = no landings. Total confidential landings are 183,747 pounds (i.e., the sum of all C's in the table below). Note that sum of pounds and percent of total columns do not include confidential data.

State/Jurisdiction	ME	RI	СТ	NY	NJ	DE	MD	PRFC	VA	FL	Sum Ibs (NonConf)	% of Total
Stationary Gears While Fishing												
Pound net	-	47,907	-	96,176	С	1	1,974,979	688,428	112,609	-	2,920,097	61.62%
Anchored/stake gill net	-	С	913	0	79,850	23,227	19,722	1,704	966,832	С	1,092,248	23.05%
Pots	-	-	-	С	-	U	C	-	-	С	-	0.00%
Fyke nets	-	-	-	-	С	-	С	26	77	-	103	0.00%
Mobile Gears While Fishing											-	
Cast Net	-	С	-	152,669	С	1	С	-	-	150,585	303,253	6.40%
Drift Gill net	-	-		24,443	83,697	53,381	12,061	-	62,189	-	235,771	4.98%
Purse Seine	С	-	•		-	-	1		-	-	-	0.00%
Seines Haul/Beach	-	- (-	177,173	-	Y	U	35	3,840	-	181,048	3.82%
Trawl	-	С	C	6,565	С	1	1	1	-	-	6,565	0.14%
Hook & Line	-	С	Ŋ	-	-	1	С	-	-	С	-	0.00%
Sum lbs (NonConf)	-	47,907	913	457,025	163,547	76,608	2,006,762	690,193	1,145,547	150,585	4,739,085	
% of Total	0.00%	1.01%		9.64%	3.45%	1.62%	42.34%	14.56%	24.17%	3.18%		

Table 29: Episodic event set aside for 2013-2016 and the percent used by participating states.

Year	Set Aside (lbs)	Landed (lbs)	% Used	Participating State	Unused Set Aside Reallocated (lbs)
2013	3,765,491				
2014	3,765,491	295,000	8%	RI	3,470,491
2015	4,142,040	1,883,292	45%	RI	2,258,748
2016	4,142,040	3,810,145	92%	ME, RI, NY	331,895



10.0 FIGURES

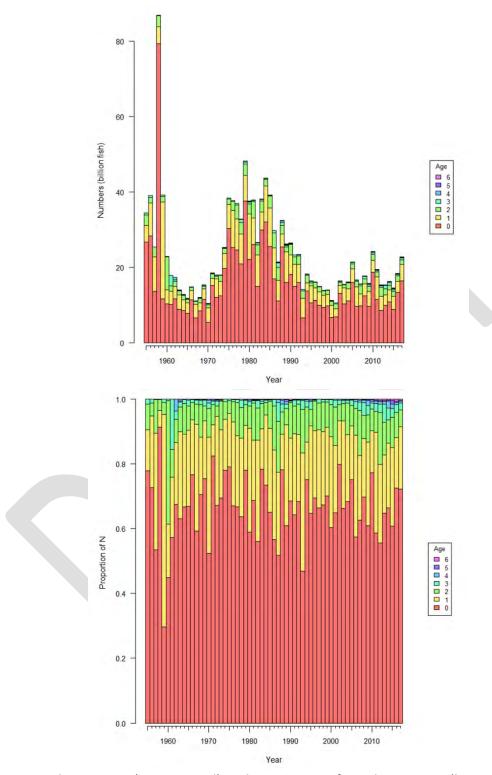


Figure 2. Numbers at age (upper panel) and proportion of numbers at age (lower panel) estimated from the base run of the BAM for ages 0-6+ during the time period 1955-2016. (Source: 2017 Stock Assessment)

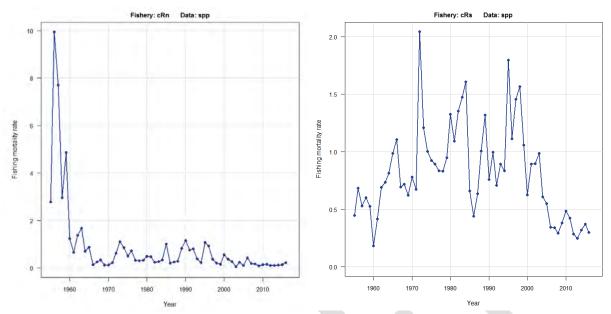


Figure 3. Fishing mortality rate for the northern commercial reduction fishery (left) and southern commercial reduction fishery (right) from 1955- 2016. The northern region is defined as waters north of Machipongo Inlet, VA and the southern region is comprised of waters south of Machipongo Inlet, VA. (Source: 2017 Stock Assessment)

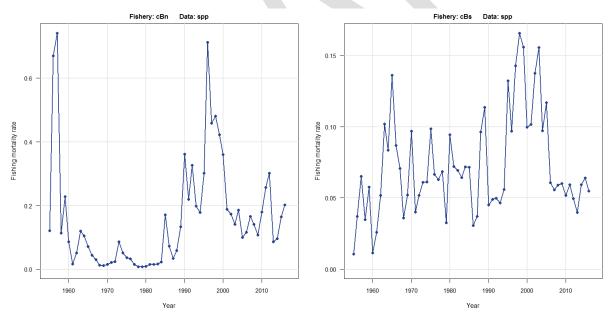


Figure 4. Fishing mortality rate for the northern commercial bait fishery (left) and the southern commercial bait fishery (right) from 1955-2016. The northern region is defined as waters north of Machipongo Inlet, VA and the southern region is comprised of waters south of Machipongo Inlet, VA. (Source: 2017 Stock Assessment)

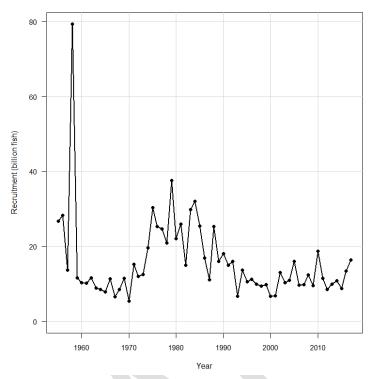


Figure 5. Number of recruits in billions of fish predicted from the base run of BAM for 1955-2016. (Source: 2017 Stock Assessment)

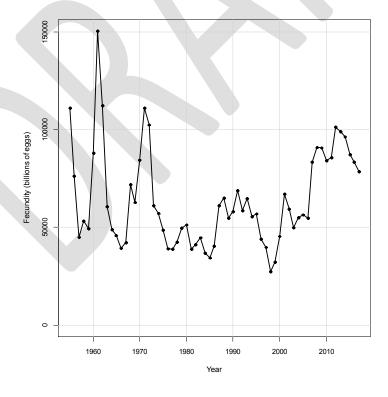


Figure 6. Fecundity in billions of eggs over time, 1955-2017, with the last year being a projection based on 2016 mortality. (Source: 2017 Stock Assessment)

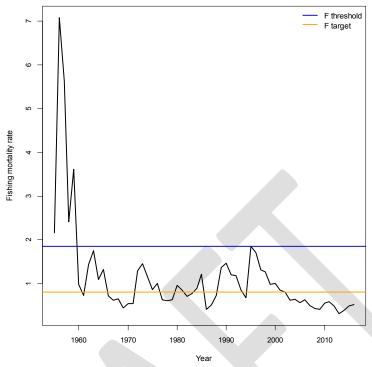


Figure 7: Atlantic menhaden fishing mortality (ages 2-4) from 1955-2016. The yellow line is the target ($F_{36\%}$) and the blue line is the threshold ($F_{21\%}$). Results of this figure show that overfishing is not occurring as fishing mortality is below the target. (Source: 2017 Stock Assessment)

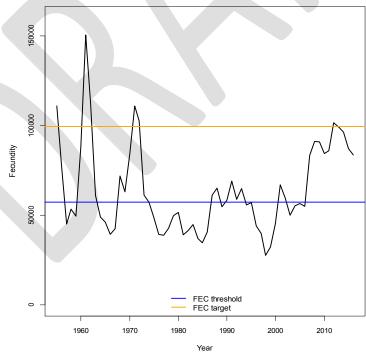


Figure 8: Atlantic menhaden fecundity (in billions of eggs) from 1955 -2016. The yellow line is the target ($FEC_{36\%}$) and the blue line is the threshold ($FEC_{21\%}$). Results of this figure show the stock is not overfished as the fecundity is well above the threshold. (Source: 2017 Stock Assessment)

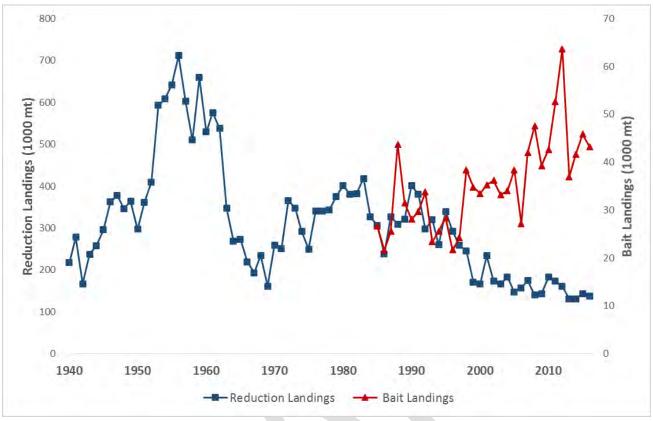


Figure 9: Landings from the reduction purse seine fishery (1940–2016) and bait fishery (1985–2016) for Atlantic menhaden. Note there are two different scales on the y-axes.

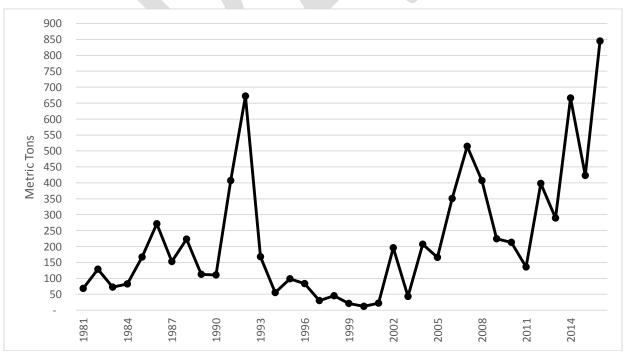


Figure 10: Recreational harvest of Atlantic menhaden from 1981-2016. Note: 2016 recreational landings are preliminary. (Source: MRIP).



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Biological Ecological Reference Points Workgroup

DATE: July 14, 2017

SUBJECT: Interim Reference Points Calculations

The Biological Ecological Reference Points Workgroup (WG) was tasked by the Atlantic Menhaden Management Board (Board) to calculate the interim reference points. The Board is considering these reference points through Amendment 3, while the models for ecological reference points are in development. The WG met with members of the Lenfest Forage Fish Task Force to make sure that these interim reference points are properly calculated and congruent with the intention of Pikitch et al. (2012). The WG developed a list of questions that were distributed to the Task Force prior to the call. The WG discussed the recommendations generated from these questions during two subsequent calls to come to consensus on how to calculate these reference points. All calculations were done using the latest results from the 2017 Stock Assessment Update. To make all reference points comparable, F values will be reported below as biomass-weighted averages over the entire population. So for instance, the reference points from the 2017 stock assessment update presented below represent the same level of fishing pressure, but the values differ from the mean F values over ages 2-4 you may be accustomed to seeing. Options below are labeled identically to draft Amendment 3 for consistency and for comparison current F and B levels from the 2017 stock assessment are provided. The WG has a number of comments and caveats regarding the calculation of these reference points which are found at the conclusion of this document.

Description	Reference Point	B-weighted F
Single species target and threshold from 2017	F=F _{FEC21%}	1.164
assessment update (Options A/B)	F=F _{FEC36%}	0.408
Hockey-stick harvest control rule Pikitch et al. 2012	F _{threshold} (F=0.5M)	0.367
(Option C)	F_{target}	0.041
B75% rule of thumb/F _{B75%} & F _{B40%} target and threshold	F=F75%B ₀	0.160
(Options D/E)	F=F40%B ₀	1.493

Current levels from 2017 stock assessment					
F ₂₀₁₆ 0.204					
B ₂₀₁₆ 46.7% B ₀					

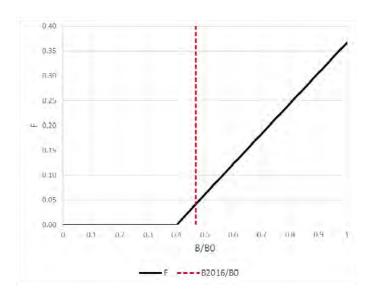
Option A/B: Single species reference points from 2017 Stock Assessment Update (F=F_{FEC36%}, F=F_{FEC21%})

These reference points were calculated as per the 2017 stock assessment update, but in order to be comparable to the biomass-weighted interim reference points, the biomass-weighted average F have been provided instead of the geometric mean over ages 2-4.

Option	B-weighted F		
F=F _{FEC21%} (Threshold)	1.164		
F=F _{FEC36%} (Target)	0.408		

Option C: Pikitch et al (2012) A hockey-stick control rule where F does not exceed half of M and fishing is prohibited if biomass falls below 40% unfished biomass

To calculate a target F for the next fishing season, Pikitch et al. (2012) recommends management actions for species in the "intermediate information tier" (previously determined for Atlantic menhaden by the WG, 2015) in the form of applying a hockey stick harvest control rule with $B_{LIM} \ge 0.4B_0$ (B_0 = unfished biomass) and $F \le 0.5$ * M. In this scenario, fishing would be prohibited when biomass levels fall below 40 percent of unfished biomass. When biomass is greater than 40 percent of unfished biomass, the fishing mortality would not exceed half the natural mortality rate and would depend on how large the population is relative to B_0 . To calculate F target rates at $40\%B_0 < B < B_0$, a straight line was fitted between F=0 at $40\%B_0$ and F=0.5M at $100\%B_0$, shown in black in the figure below. The red-hashed line represents the ratio of current biomass to B_0 from the 2017 Stock Assessment Update (B_{2016} = 46.7% B_0 , above B_{LIM}) and intersects the black line at F=0.041. This makes the F target in this scenario equal to 0.041. As of 2016, the terminal year of the 2017 Stock Assessment Update, F(2016)=0.204 which is above this target, but less than the threshold of 0.5M (0.367).



Option	B-weighted F _{threshold}	2016 F _{target}
F=0.5M	0.367	0.041

Option D: The 75% rule of thumb which specifies that a species be managed to 75% unfished biomass Option E: An F target of 75% unfished biomass and threshold of 40% unfished biomass

For Options D and E, the F reference points that achieve specific percentages of unfished biomass, we use biomass per-recruit calculations from the assessment model to estimate biomass-weighted F rates that achieve 40% and 75% unfished biomass per recruit. This produces a full F that can be translated to a biomass-weighted average F for comparison with the F=0.5 M reference points. For comparison of reference points, the equilibrium biomass-at-age under that level of F is used to weight the full F.

Option	B-weighted F		
F=F75%B ₀	0.160		
F=F40%B ₀	1.493		

For Option D, the fishing mortality rate which achieves the 75% unfished biomass is F=0.160. As of 2016, the terminal year of the 2017 Stock Assessment Update, F(2016)=0.204 which is above this reference point. In addition, $B_{2016}=46.7\%B_0$, below $75\%B_0$.

For Option E, the F-target which achieves 75% unfished biomass is 0.160 and the F-threshold which achieves 40% unfished biomass is 1.493. As noted above, F(2016)=0.204, which is above the target but below the threshold.

Workgroup Conclusions on Interim Reference Points

- Even after consultation of the WG with the author and coauthors of Pikitch et al (2012), it was not readily apparent to either group how best to translate reference points derived from an Ecopath-with-Ecosim meta-analysis to an age-structured single species framework. This is a novel application rather than standard practice.
- The WG has concerns about the use of reference points that preserve a certain proportion of total biomass instead of spawning stock biomass or fecundity, because they may result in a level of spawning potential well below the FEC limit. For menhaden, age 0 and 1 represent a significant proportion of the total biomass, but do not contribute to the spawning population, and are not targeted by the fishery. Therefore, the level of fishing pressure that reduces total biomass to 40%B₀ is higher than almost anything seen in the history of the fishery and results in almost total loss of spawning adults.
- Although biomass-weighted Fs allow comparison across different types of reference points, they
 are averaged across the entire population, including the unexploited biomass of ages 0 and 1.
 This means that the population average F is lower than the F experienced by the most heavily
 exploited age groups, even for values of fully recruited F which would be considered
 unachievable or unrealistically high in an age-structured framework.
- The ecosystem models used in Pikitch et al. (2012) to develop biomass and fishing mortality reference points assumed constant selectivity over the entire population or over all adult size classes for the forage groups. The Atlantic Menhaden BAM model uses a dome-shaped selectivity where the oldest age classes are less vulnerable to the fishery than the middle age classes. Thus, the ecosystem models used in Pikitch et al. (2012) make fundamentally different assumptions about the behavior of the fisheries and the effects of fishing on forage fish populations than the BAM assessment.



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Plan Development Team

DATE: July 12, 2017

SUBJECT: New York's Proposal to Recalibrate Menhaden Landings

On April 11th, ASMFC staff received a proposal from New York to re-calibrate the state's menhaden landings. The intent of this proposal is to address either non-existent or inconsistent reporting of menhaden landings in New York prior to 2013. The proposal compares landings from 2013-2016 (when reporting was mandatory and enforced) to 2009-2012 (when reporting was not enforced) and then scales historic landings by the difference.

The Plan Development Team (PDT) met via conference call on April 26th and May 22nd to review this proposal. On the April 26th call, the PDT developed several questions for New York to better understand the methods used in the proposal and investigate other changes which may over occurred in the fishery between 2009-2012 and 2013-2016. On the May 22nd call, the PDT reviewed the response from New York to these questions and crafted the following evaluation of the proposal.

Overall, the PDT feels the methods used by New York to recalibrate their menhaden landings are appropriate. The response letter from New York includes recalibrated landings which do not include purse seine landings. Given purse seiners were required to report landings to the state prior to 2009, the PDT feels this second recalibration is more appropriate. In addition, the PDT has a higher level of comfort with the calibration based on the comparison of landings between the two time periods (the lower multiplier of 2.9) as opposed to the calibration based on the comparison of the number of trips (the higher multiplier of 4.62). Members of the PDT noted that the number of trips per year can be more variable, thus lending landings to be a better comparison of the 2009-2012 and the 2013-2016 New York menhaden fishery.

Importantly, the PDT does note some concerns for the Board to consider. The first is that there does appear to be an increase in the abundance of menhaden in the mid-Atlantic and New England states in the past couple of years. This higher abundance could contribute to the higher landings reported by New York in 2013-2016. Moreover, the increase in abundance of menhaden in New York waters, as opposed to the increase in reporting, may explain the higher landings in New York. Secondly, the PDT notes that there may be some challenges applying the recalibrated New York landings to the fleet-capacity allocation method given the recalibrated landings are not broken down by gear type. Should the Board use these recalibrated landings, assumptions will have to be made on how this higher estimate of landings is divided among the

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various gear types. Finally, the PDT notes that approving this proposal does set a precedent and may invite other states with inconsistent reporting to recalibrate their own landings; however, the time to react to other proposals is quite limited. Other proposals to recalibrate state landings cannot be considered after the August Board meeting given allocation percentages in Draft Amendment 3 cannot change during the public comment process.

For reference, a series of allocation tables which include New York's recalibrated landings are included below. The table numbers correspond to the table numbers in Draft Amendment 3. Given New York's recalibrated landings were not divided by gear type, landings by gear type as reported in the state's compliance report were used to divide the recalibrated landings by gear type.

Table 2: Disposition Allocation

Percent of menhaden commercial TAC allocated to the reduction and bait fisheries based on historic landings (Tier 1, Option A). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant.

(a) Allocations between the bait and reduction sector; includes all reduction landings

	Bait Quota	Reduction Quota
2009-2011	21.3%	78.7%
2012-2016	24.8%	75.2%
1985-2016	13.7%	86.3%
1985-1995	8.5%	91.5%
Weighted	14.2%	85.8%

(b) Allocations between the bait and reduction sector; only includes VA reduction landings. Three timeframes are not shown due to confidentiality.

	Bait Quota	Reduction Quota
2009-2011	21.3%	78.7%
2012-2016	24.8%	75.2%
1985-2016		
1985-1995		
Weighted		

Table 3: Allocation Based on TAC Level (Sub-Option 1)

Percent of menhaden commercial TAC greater than 212,500 mt that is allocated to each jurisdiction based on historic bait landings (Tier 1, Option B, Sub-Option 1). Under this scenario, the Virginia reduction fishery gets 50% of the difference between the annual TAC and 212,500 mt (included in Virginia's percentage below) and the states bait fisheries are allocated the other 50%. These allocation percentages only apply if the annual TAC is greater than 212,500 mt. If the TAC is less than or equal to 212,500 mt, allocations are based on jurisdictional landings from 2009-2011 (Table 10).

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	TAC %
ME	0.04%	0.45%	0.21%	0.11%	0.32%
NH	0.00%	0.00%	0.01%	0.04%	0.01%
MA	1.98%	1.19%	1.97%	3.47%	2.07%
RI	0.05%	0.30%	2.13%	7.23%	2.99%
СТ	0.04%	0.02%	0.10%	0.12%	0.06%
NY	0.49%	0.55%	0.99%	1.62%	0.97%
NJ	26.49%	25.39%	18.95%	11.79%	20.11%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.03%	0.06%	0.06%	0.10%	0.08%
MD	3.55%	4.00%	3.55%	3.15%	3.67%
PRFC	1.46%	1.72%	3.61%	6.91%	3.73%
VA	64.66%	65.88%	66.45%	61.28%	64.10%
NC	1.16%	0.31%	1.53%	2.97%	1.35%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.05%	0.12%	0.42%	1.22%	0.55%

Table 4: Allocation Based on TAC Level (Sub-Option 2) Percent of menhaden commercial TAC greater than 212,500 mt that is allocated to each jurisdiction based on historic bait landings (Tier 1, Option B, Sub-Option 2). Under this scenario, the Virginia reduction fishery gets 30% of the difference between the annual TAC and 212,500 mt (included in Virginia's percentage below) and the state's bait fisheries are allocated the other 70%. These allocation percentages only apply if the annual TAC is greater than 212,500 mt. If the TAC is less than or equal to 212,500 mt, allocations are based on jurisdictional landings from 2009-2011 (Table 10).

	2009-2011 % TAC	2012-2016 % TAC	1985-2016 % TAC	1985-1995 % TAC	Weighted % TAC
ME	0.06%	0.62%	0.30%	0.16%	0.44%
NH	0.00%	0.00%	0.01%	0.05%	0.02%
MA	2.77%	1.66%	2.76%	4.85%	2.90%
RI	0.06%	0.42%	2.99%	10.12%	4.19%
ст	0.06%	0.03%	0.14%	0.17%	0.09%
NY	0.68%	0.77%	1.38%	2.26%	1.35%
NJ	37.09%	35.55%	26.53%	16.51%	28.15%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.04%	0.09%	0.09%	0.13%	0.11%
MD	4.96%	5.60%	4.98%	4.41%	5.14%
PRFC	2.05%	2.40%	5.06%	9.67%	5.23%
VA	50.53%	52.24%	53.03%	45.79%	49.73%
NC	1.63%	0.44%	2.14%	4.16%	1.88%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.06%	0.17%	0.59%	1.70%	0.76%

Table 5: Fleet Capacity Quota – Two Fleet

Percent of menhaden commercial TAC allocated to the small and large capacity fleets based on historic landings (Tier 2, Option A, Sub-Option 1). Given Florida did not code landings by gear type prior to 1993, percent landings by gear type in 1993 and 1994 were used to estimate gear landings from 1988-1992. Florida reduction landings were available for 1985-1987. Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows bait landings by fleet and is to be used if a disposition quota (Tier 1, Option A) is further allocated by fleet.

(a) Allocations by two fleets; includes all historic reduction landings

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	96.08%	94.16%	96.01%	95.86%	95.25%
Small Capacity Quota	3.92%	5.84%	3.99%	4.14%	4.75%

(b) Allocations by two fleets; only includes VA reduction landings

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	96.08%	94.16%	95.66%	95.32%	94.87%
Small Capacity Quota	3.92%	5.84%	4.34%	4.68%	5.13%

(c) Bait allocations by two fleets. These percentages are to be used if a disposition quota is further allocated by fleet. It is important to note that these percentages further divide the bait allocation presented in Tables 2a and 2b.

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	81.6%	76.5%	71.4%	53.1%	67.5%
Small Capacity Quota	18.4%	23.5%	28.6%	46.9%	32.5%

Table 6: Fleet Capacity Quota – Three Fleet

Percent of menhaden commercial TAC allocated to the small, medium, and large capacity fleets based on historic landings (Tier 2, Option A, Sub-Option 2). Given Florida did not code landings by gear type prior to 1993, percent landings by gear type in 1993 and 1994 were used to estimate gear landings from 1988-1992. Florida reduction landings were available for 1985-1987. Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows bait landings by fleet and is to be used if a disposition quota (Tier 1, Option A) is further allocated by fleet.

(a) Allocations by three fleets; includes all historic reduction landings

	2009-	2012-	1985-	1985-	Weighted
	2011	2016	2016	1995	
Large Capacity	96.08%	94.16%	96.01%	95.86%	95.25%
Quota	30.0070	50,0			
Medium	3.79%	5.57%	3.82%	4.01%	4.57%
Capacity Quota	3.7370	3.3770	3.02/0	3.82/0 4.01/0	
Small Capacity	0.12%	0.27%	0.17%	0.13%	0.18%
Quota	0.12/0	0.2770	0.1770	0.1370	0.16%

(b) Allocations by three fleets; only includes VA reduction landings

	2009-	2012-	1985-	1985-	Weighted
	2011	2016	2016	1995	weignted
Large Capacity	96.08%	94.16%	95.66%	95.32%	94.87%
Quota	90.0870	34.10% 33.00	93.00%	33.3270	34.8770
Medium	3.79%	5.57%	4.15%	4.53%	4.94%
Capacity Quota	3.73/0	3.37%	4.13/0	4.33/0	4.54/0
Small Capacity	0.12%	0.27%	0.19%	0.15%	0.19%
Quota	0.12%	0.27%	0.19%	0.15%	0.19%

(c) Bait allocations by three fleets. These percentages are to be used if a disposition quota is further allocated by fleet. It is important to note that these percentages further divide the bait allocation presented in Tables 2a and 2b.

	2009- 2011	2012- 2016	1985- 2016	1985- 1995	Weighted
Large Capacity Quota	81.6%	76.5%	71.4%	53.1%	67.5%
Medium Capacity Quota	17.8%	22.4%	27.4%	45.5%	31.3%
Small Capacity Quota	0.6%	1.1%	1.2%	1.5%	1.2%

Table 7: Fixed Minimum Allocation

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 0.5% quota allocation (Tier 2, Option B, Sub-Option 1). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 0.5% fixed minimum quota; includes all historic reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Meightod
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.52%	0.70%	1.32%	2.23%	1.68%
NH	0.50%	0.50%	0.50%	0.51%	0.50%
MA	1.27%	1.04%	1.01%	1.07%	1.06%
RI	0.52%	0.64%	1.05%	1.69%	1.31%
СТ	0.52%	0.51%	0.53%	0.52%	0.52%
NY	0.69%	0.75%	0.75%	0.76%	0.76%
NJ	10.87%	12.11%	5.38%	2.43%	5.92%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.51%	0.53%	0.52%	0.52%	0.52%
MD	1.89%	2.33%	1.41%	1.02%	1.49%
PRFC	1.07%	1.28%	1.43%	1.63%	1.51%
VA	78.66%	76.91%	76.50%	75.63%	76.09%
NC	0.96%	0.64%	7.42%	9.62%	6.38%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.52%	0.55%	0.69%	0.88%	0.76%

(b) Allocations with a 0.5% fixed minimum quota; includes only VA reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	weignted
ME	0.52%	0.70%	0.56%	0.52%	0.59%
NH	0.50%	0.50%	0.50%	0.51%	0.50%
MA	1.27%	1.04%	1.05%	1.14%	1.10%
RI	0.52%	0.64%	1.10%	1.84%	1.37%
СТ	0.52%	0.51%	0.53%	0.52%	0.52%
NY	0.69%	0.75%	0.78%	0.80%	0.78%
NJ	10.87%	12.11%	5.80%	2.68%	6.35%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.51%	0.53%	0.52%	0.52%	0.52%
MD	1.89%	2.33%	1.49%	1.08%	1.57%
PRFC	1.07%	1.28%	1.51%	1.78%	1.59%
VA	78.66%	76.91%	83.12%	85.33%	82.05%
NC	0.96%	0.64%	0.93%	1.05%	0.89%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.52%	0.55%	0.62%	0.73%	0.66%

(c) Bait allocations with a 0.5% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	0.58%	1.32%	0.89%	0.71%	1.08%
NH	0.50%	0.50%	0.52%	0.57%	0.53%
MA	4.14%	2.69%	4.12%	6.88%	4.32%
RI	0.58%	1.05%	4.42%	13.81%	6.01%
СТ	0.57%	0.55%	0.69%	0.72%	0.61%
NY	1.40%	1.52%	2.32%	3.47%	2.28%
NJ	49.24%	47.22%	35.37%	22.19%	37.50%
PA	0.50%	0.50%	0.50%	0.50%	0.50%
DE	0.56%	0.62%	0.62%	0.68%	0.64%
MD	7.02%	7.86%	7.04%	6.30%	7.25%
PRFC	3.19%	3.66%	7.15%	13.21%	7.37%
VA	27.48%	29.72%	30.77%	21.26%	26.44%
NC	2.64%	1.08%	3.32%	5.97%	2.98%
SC	0.50%	0.50%	0.50%	0.50%	0.50%
GA	0.50%	0.50%	0.50%	0.50%	0.50%
FL	0.59%	0.72%	1.27%	2.74%	1.50%

Table 8: Fixed Minimum Allocation -1%

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 1% quota allocation (Tier 2, Option B, Sub-Option 2). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 1% fixed minimum quota; includes all historic reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Waightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	1.02%	1.19%	1.74%	2.58%	2.07%
NH	1.00%	1.00%	1.00%	1.01%	1.00%
MA	1.71%	1.50%	1.46%	1.52%	1.51%
RI	1.02%	1.13%	1.50%	2.08%	1.74%
СТ	1.01%	1.01%	1.02%	1.02%	1.02%
NY	1.17%	1.23%	1.23%	1.24%	1.24%
NJ	10.47%	11.60%	5.45%	2.76%	5.95%
PA	1.00%	1.00%	1.00%	1.00%	1.00%
DE	1.01%	1.03%	1.01%	1.01%	1.02%
MD	2.27%	2.67%	1.84%	1.47%	1.90%
PRFC	1.52%	1.72%	1.85%	2.03%	1.92%
VA	72.37%	70.76%	70.39%	69.60%	70.02%
NC	1.42%	1.13%	7.32%	9.33%	6.37%
SC	1.00%	1.00%	1.00%	1.00%	1.00%
GA	1.00%	1.00%	1.00%	1.00%	1.00%
FL	1.02%	1.05%	1.17%	1.34%	1.24%

(b) Allocations with a 1% fixed minimum quota; includes only VA reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	Weigiiteu
ME	1.02%	1.19%	1.05%	1.02%	1.08%
NH	1.00%	1.00%	1.00%	1.01%	1.00%
MA	1.71%	1.50%	1.50%	1.59%	1.55%
RI	1.02%	1.13%	1.54%	2.22%	1.80%
СТ	1.01%	1.01%	1.03%	1.02%	1.02%
NY	1.17%	1.23%	1.25%	1.27%	1.26%
NJ	10.47%	11.60%	5.84%	2.99%	6.34%
PA	1.00%	1.00%	1.00%	1.00%	1.00%
DE	1.01%	1.03%	1.02%	1.02%	1.02%
MD	2.27%	2.67%	1.91%	1.53%	1.98%
PRFC	1.52%	1.72%	1.92%	2.17%	1.99%
VA	72.37%	70.76%	76.43%	78.46%	75.46%
NC	1.42%	1.13%	1.39%	1.50%	1.36%
SC	1.00%	1.00%	1.00%	1.00%	1.00%
GA	1.00%	1.00%	1.00%	1.00%	1.00%
FL	1.02%	1.05%	1.11%	1.21%	1.15%

(c) Bait allocations with a 1% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	1.07%	1.75%	1.36%	1.19%	1.53%
NH	1.00%	1.00%	1.02%	1.06%	1.02%
MA	4.32%	3.00%	4.31%	6.82%	4.48%
RI	1.08%	1.51%	4.58%	13.15%	6.03%
СТ	1.07%	1.04%	1.17%	1.20%	1.10%
NY	1.82%	1.93%	2.66%	3.72%	2.62%
NJ	45.50%	43.66%	32.84%	20.81%	34.78%
PA	1.00%	1.00%	1.00%	1.00%	1.00%
DE	1.05%	1.11%	1.11%	1.16%	1.13%
MD	6.96%	7.72%	6.97%	6.30%	7.17%
PRFC	3.46%	3.88%	7.07%	12.61%	7.27%
VA	25.63%	27.68%	28.64%	19.95%	24.68%
NC	2.96%	1.53%	3.57%	5.99%	3.26%
SC	1.00%	1.00%	1.00%	1.00%	1.00%
GA	1.00%	1.00%	1.00%	1.00%	1.00%
FL	1.08%	1.20%	1.70%	3.05%	1.92%

Table 9: Fixed Minimum Allocation – 2%

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, with each jurisdiction receiving, at a minimum, a 2% quota allocation (Tier 2, Option B, Sub-Option 3). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) only includes bait landings and is to be used if the disposition allocation method (Tier 1, Option A) is combined with a fixed minimum approach.

(a) Allocations with a 2% fixed minimum quota; includes all historic reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.01%	2.15%	2.60%	3.28%	2.87%
NH	2.00%	2.00%	2.00%	2.00%	2.00%
MA	2.57%	2.40%	2.37%	2.42%	2.41%
RI	2.01%	2.10%	2.41%	2.88%	2.60%
СТ	2.01%	2.01%	2.02%	2.01%	2.01%
NY	2.14%	2.19%	2.19%	2.20%	2.19%
NJ	9.67%	10.58%	5.60%	3.43%	6.01%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.01%	2.02%	2.01%	2.01%	2.02%
MD	3.03%	3.35%	2.68%	2.38%	2.73%
PRFC	2.42%	2.58%	2.69%	2.84%	2.74%
VA	59.77%	58.47%	58.18%	57.53%	57.87%
NC	2.34%	2.11%	7.11%	8.74%	6.35%
SC	2.00%	2.00%	2.00%	2.00%	2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.01%	2.04%	2.14%	2.28%	2.19%

(b) Allocations with a 2% fixed minimum quota; includes only VA reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.01%	2.15%	2.04%	2.02%	2.07%
NH	2.00%	2.00%	2.00%	2.00%	2.00%
MA	2.57%	2.40%	2.41%	2.47%	2.45%
RI	2.01%	2.10%	2.44%	2.99%	2.64%
СТ	2.01%	2.01%	2.02%	2.02%	2.01%
NY	2.14%	2.19%	2.20%	2.22%	2.21%
NJ	9.67%	10.58%	5.92%	3.61%	6.33%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.01%	2.02%	2.01%	2.01%	2.02%
MD	3.03%	3.35%	2.73%	2.43%	2.79%
PRFC	2.42%	2.58%	2.75%	2.95%	2.80%
VA	59.77%	58.47%	63.06%	64.70%	62.28%
NC	2.34%	2.11%	2.32%	2.41%	2.29%
SC	2.00%	2.00%	2.00%	2.00%	2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.01%	2.04%	2.09%	2.17%	2.12%

(c) Bait allocations with a 2% fixed minimum quota; to be used if the bait sector is further allocated using the fixed minimum approach. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	2.06%	2.61%	2.29%	2.15%	2.43%
NH	2.00%	2.00%	2.01%	2.05%	2.02%
MA	4.69%	3.62%	4.68%	6.71%	4.82%
RI	2.06%	2.41%	4.90%	11.84%	6.07%
СТ	2.05%	2.03%	2.14%	2.16%	2.08%
NY	2.66%	2.75%	3.34%	4.20%	3.31%
NJ	38.03%	36.53%	27.77%	18.03%	29.35%
PA	2.00%	2.00%	2.00%	2.00%	2.00%
DE	2.04%	2.09%	2.09%	2.13%	2.10%
MD	6.82%	7.44%	6.83%	6.29%	6.99%
PRFC	3.99%	4.34%	6.91%	11.39%	7.08%
VA	21.94%	23.60%	24.37%	17.34%	21.17%
NC	3.58%	2.43%	4.08%	6.04%	3.83%
SC	2.00%	2.00%	2.00%	2.00%	2.00%
GA	2.00%	2.00%	2.00%	2.00%	2.00%
FL	2.06%	2.16%	2.57%	3.66%	2.74%

Table 10: Jurisdictional Allocation

Percent of menhaden commercial TAC allocated to each jurisdiction based on historic landings, including bycatch and episodic event landings (Tier 3, Option B). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by state and should be used if a disposition quota (Tier 1, Option A) is being further allocated by jurisdiction.

(a) Jurisdictional allocations, including all reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Maightad
	TAC %	TAC %	TAC %	TAC %	Weighted
ME	0.02%	0.22%	0.89%	1.88%	1.28%
NH	0.00%	0.00%	0.00%	0.01%	0.00%
MA	0.84%	0.59%	0.55%	0.62%	0.61%
RI	0.02%	0.15%	0.60%	1.29%	0.88%
СТ	0.02%	0.01%	0.03%	0.02%	0.02%
NY	0.21%	0.27%	0.28%	0.29%	0.28%
NJ	11.27%	12.62%	5.30%	2.10%	5.90%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.01%	0.03%	0.02%	0.02%	0.02%
MD	1.51%	1.99%	0.99%	0.56%	1.08%
PRFC	0.62%	0.85%	1.01%	1.23%	1.09%
VA	84.96%	83.05%	82.61%	81.66%	82.16%
NC	0.50%	0.16%	7.52%	9.92%	6.39%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.02%	0.06%	0.20%	0.41%	0.28%

(b) Jurisdictional allocations, including just Virginia reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted	
	TAC %	TAC %	TAC %	TAC %	vveignteu	
ME	0.02%	0.22%	0.06%	0.02%	0.10%	
NH	0.00%	0.00%	0.00%	0.01%	0.00%	
MA	0.84%	0.59%	0.60%	0.70%	0.66%	
RI	0.02%	0.15%	0.65%	1.46%	0.95%	
СТ	0.02%	0.01%	0.03%	0.02%	0.02%	
NY	0.21%	0.27%	0.30%	0.33%	0.31%	
NJ	11.27%	12.62%	5.76%	2.37%	6.36%	
PA	0.00%	0.00%	0.00%	0.00%	0.00%	
DE	0.01%	0.03%	0.02%	0.02%	0.02%	
MD	1.51%	1.99%	1.08%	0.63%	1.16%	
PRFC	0.62%	0.85%	1.10%	1.39%	1.18%	
VA	84.96%	83.05%	89.80%	92.21%	88.64%	
NC	0.50%	0.16%	0.47%	0.60%	0.43%	
SC	0.00%	0.00%	0.00%	0.00%	0.00%	
GA	0.00%	0.00%	0.00%	0.00%	0.00%	
FL	0.02%	0.06%	0.13%	0.25%	0.17%	

(c) Bait landings by state. These percentages should be used if disposition bait quota is further allocated by state. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME	0.09%	0.89%	0.43%	0.22%	0.63%
NH	0.00%	0.00%	0.02%	0.07%	0.03%
MA	3.96%	2.38%	3.94%	6.93%	4.15%
RI	0.09%	0.60%	4.27%	14.46%	5.99%
СТ	0.08%	0.05%	0.20%	0.24%	0.12%
NY	0.97%	1.11%	1.98%	3.23%	1.93%
NJ	52.98%	50.78%	37.90%	23.58%	40.22%
PA	0.00%	0.00%	0.00%	0.00%	0.00%
DE	0.06%	0.13%	0.13%	0.19%	0.15%
MD	7.09%	8.00%	7.11%	6.30%	7.34%
PRFC	2.93%	3.43%	7.23%	13.82%	7.47%
VA	29.33%	31.76%	32.90%	22.56%	28.19%
NC	2.33%	0.63%	3.06%	5.94%	2.69%
SC	0.00%	0.00%	0.00%	0.00%	0.00%
GA	0.00%	0.00%	0.00%	0.00%	0.00%
FL	0.09%	0.24%	0.84%	2.44%	1.09%

Table 11: Regional Allocation – Three Regions

Percent of menhaden commercial TAC allocated to three regions based on historic landings, including bycatch and episodic event landings (Tier 3, Option C, Sub-Option 1). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by region and should be used if a dispositional bait quota (Tier 1, Option A) is being further allocated by jurisdiction. Table (d) shows the distribution of fleet landings by region and should be used if a fleet-capacity quota (Tier 2, Option A) is being further allocated by region. Table (e) shows the distribution of bait landings by fleet and region and should be used if a disposition quota (Tier 1, Option A) and a fleet allocation (Tier 2, Option A) have already been chosen.

(a) Three region allocations, including all historical reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME, NH, MA, RI, CT	0.90%	0.97%	2.06%	3.81%	2.79%
NY, NJ, PA, DE	11.50%	12.92%	5.60%	2.41%	6.20%
MD, PRFC, VA, NC, SC, GA, FL	87.61%	86.10%	92.34%	93.78%	91.01%

(b) Three region allocations, only include VA reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME, NH, MA, RI, CT	0.90%	0.97%	1.35%	2.21%	1.73%
NY, NJ, PA, DE	11.50%	12.92%	6.08%	2.72%	6.69%
MD, PRFC, VA, NC, SC, GA, FL	87.61%	86.10%	92.57%	95.08%	91.58%

(c) Bait landings by region. These percentages are to be used if a disposition quota is further allocated by region. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	weighted
ME, NH, MA, RI, CT	4.21%	3.92%	8.85%	21.93%	10.91%
NY, NJ, PA, DE	54.02%	52.02%	40.01%	27.00%	42.30%
MD, PRFC, VA, NC, SC, GA, FL	41.77%	44.06%	51.14%	51.07%	46.78%

(d) Fleet landings by three regions. These percentages are to be used if fleet capacity quotas are further allocated by region. It is important to note that these percentages further divide the TAC already allocated to fleets in Tables 5 and 6.

Large Fleet -	Large Fleet - All Historic Reduction Landings (2 or 3 Fleet Options)								
	2009-2011	2012-2016	1985-2016	1985-1995	14/ - ! - l- 1l				
	TAC %	TAC %	TAC %	TAC %	Weighted				
ME, NH, MA, RI, CT			2.08%						
NY, NJ, PA, DE			5.25%						
MD, PRFC, VA, NC, SC, GA, FL			92.67%						
Large Fleet	- VA Only Re	duction Landin	gs (2 or 3 Fleet	Options)					
	2009-2011	2012-2016	1985-2016	1985-1995	Waightad				
	TAC %	TAC %	TAC %	TAC %	Weighted				
ME, NH, MA, RI, CT			1.28%						
NY, NJ, PA, DE			5.73%						
MD, PRFC, VA, NC, SC, GA, FL			92.99%						
	Small Fleet (2 Fleet Option)								
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	weighted				
ME, NH, MA, RI, CT	1.31%	1.42%	1.78%	2.03%	1.76%				
NY, NJ, PA, DE	8.67%	19.98%	13.93%	12.41%	15.77%				
MD, PRFC, VA, NC, SC, GA, FL	90.02%	78.60%	84.29%	85.55%	82.47%				
	Medium	Fleet (3 Fleet	Option)						
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	weighted				
ME, NH, MA, RI, CT	0.84%	1.31%	1.28%	1.65%	1.50%				
NY, NJ, PA, DE	7.68%	17.96%	12.39%	11.36%	14.26%				
MD, PRFC, VA, NC, SC, GA, FL	91.48%	80.73%	86.33%	86.99%	84.24%				
Small Fleet (3 Fleet Option)									
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	Weighted				
ME, NH, MA, RI, CT	15.88%	3.63%	12.99%	13.87%	8.33%				
NY, NJ, PA, DE	39.04%	61.78%	48.42%	44.97%	54.05%				
MD, PRFC, VA, NC, SC, GA, FL	45.09%	34.60%	38.59%	41.16%	37.61%				

(e) Bait landings by fleet and three regions. These percentages are to be used if a disposition quota is further allocated by fleet and region. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b and the fleets in Tables 5 and 6.

	Large Fleet Bait (2 or 3 Fleet Options)								
	2009-2011	2012-2016	1985-2016	1985-1995	\Maiahtad				
	TAC %	TAC %	TAC %	TAC %	Weighted				
ME, NH, MA, RI, CT			11.30%						
NY, NJ, PA, DE			50.62%						
MD, PRFC, VA, NC, SC, GA, FL			38.08%						
	Small F	leet (2 Fleet O	ption)						
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	weighted				
ME, NH, MA, RI, CT	1.31%	1.42%	1.78%	2.03%	1.76%				
NY, NJ, PA, DE	8.67%	19.98%	13.93%	12.41%	15.77%				
MD, PRFC, VA, NC, SC, GA, FL	90.02%	78.60%	84.29%	85.55%	82.47%				
	Medium	Fleet (3 Fleet	Option)						
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	weighted				
ME, NH, MA, RI, CT	0.84%	1.31%	1.28%	1.65%	1.50%				
NY, NJ, PA, DE	7.68%	17.96%	12.39%	11.36%	14.26%				
MD, PRFC, VA, NC, SC, GA, FL	91.48%	80.73%	86.33%	86.99%	84.24%				
Small Fleet (3 Fleet Option)									
	2009-2011	2012-2016	1985-2016	1985-1995	Weighted				
	TAC %	TAC %	TAC %	TAC %	weighted				
ME, NH, MA, RI, CT	15.88%	3.63%	12.99%	13.87%	8.33%				
NY, NJ, PA, DE	39.04%	61.78%	48.42%	44.97%	54.05%				

Table 12: Regional Allocation – Four Regions

Percent of menhaden commercial TAC allocated to four regions based on historic landings, including bycatch and episodic event landings (Tier 3, Option C, Sub-Option 2). Table (a) is based on total reduction landings from all states which had, or have, a reduction fishery. Table (b) only includes reduction landings from Virginia, the sole Atlantic coast state which still has an active reduction plant. Table (c) shows the distribution of bait landings by region and should be used if a disposition quota (Tier 1, Option A) is being further allocated by jurisdiction. Table (d) shows the distribution of fleet landings by region and should be used if a fleet-capacity quota (Tier 2, Option A) is being further allocated by region. Table (e) shows the distribution of bait landings by fleet and region and should be used if a disposition quota (Tier 1, Option A) and a fleet allocation (Tier 2, Option A) have already been chosen.

(a) Four region allocations, including all historical reduction landings

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	weignted
ME, NH, MA, RI, CT	0.90%	0.97%	2.06%	3.81%	2.79%
NY, NJ, PA, DE	11.50%	12.92%	5.60%	2.41%	6.20%
MD, PRFC, VA	87.09%	85.89%	84.62%	83.46%	84.34%
NC, SC, GA, FL	0.52%	0.21%	7.72%	10.33%	6.68%

(b) Four region allocations, only including VA reduction landings

	2009-2011 TAC %	2012-2016 TAC %	1985-2016 TAC %	1985-1995 TAC %	Weighted
ME, NH, MA, RI, CT	0.90%	0.97%	1.35%	2.21%	1.73%
NY, NJ, PA, DE	11.50%	12.92%	6.08%	2.72%	6.69%
MD, PRFC, VA	87.09%	85.89%	91.98%	94.23%	90.98%
NC, SC, GA, FL	0.52%	0.21%	0.59%	0.84%	0.60%

(c) Bait landings by region. These percentages are to be used if bait quota is further allocated by region. It is important to note that these percentages further divide the TAC already allocated to the bait sector in Tables 2a and 2b.

	2009-2011	2012-2016	1985-2016	1985-1995	Weighted
	TAC %	TAC %	TAC %	TAC %	
ME, NH, MA, RI, CT	4.21%	3.92%	8.85%	21.93%	10.91%
NY, NJ, PA, DE	53.72%	52.02%	40.01%	27.00%	42.30%
MD, PRFC, VA	39.60%	43.20%	47.24%	42.68%	43.00%
NC, SC, GA, FL	2.44%	0.86%	3.90%	8.38%	3.78%

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New York Menhaden Landings Recalibration

Historically, New York supported a large and active Atlantic menhaden processing fishery. The importance of this fishery diminished during the early to mid-1900s and the last processing plant ceased operations in 1969. From 1950-1969, menhaden harvest in New York averaged over 70 million pounds a year. From 1970 to present the menhaden fishery in New York has primarily been for local bait.

Many permit types in New York allow for the harvest of menhaden, although the only permit type requiring mandatory reporting of menhaden landings prior to 2009 was the menhaden purse seine license. New York implemented mandatory reporting on state trip reports for all permit holders between 2009 and 2011. However, compliance monitoring was not performed until 2013 due to staffing and funding constraints. In addition, discussions with permit holders post compliance monitoring indicated that many were unaware menhaden bait harvest needed to be reported. Thus, the validity of New York's menhaden landings history is of concern due to the significant under reporting of landings prior to 2013.

A previous effort to establish a more accurate landings history in New York occurred in 2013. Letters were sent to permit holders eligible to harvest menhaden between 2009 and 2012 requesting verifiable proof of landings during that time. Acceptable proof of landings included dated receipts, log book records, or trip reports that were not submitted to the state. Only five people were able to provide verifiable landings. While this process helped collect some of the missing information in our landings history, it still left New York with historical harvest data that does not represent the totality of our menhaden fishery during that time.

The current allocation system employed in Amendment 2 divides the TAC to each state/jurisdiction based on average landings between 2009 and 2011. This provides New York 0.055% of the TAC. The current allocation options proposed in the Public Information Document for Amendment 3 cover the time period during which New York's menhaden landings history is incomplete (1985-2012) and when our landings have been constrained by quotas and harvest limits (2013-2016) implemented in Amendment 2. The use of this information to set future quotas will continue to negatively impact New York menhaden fishers by setting quota limits well below true historical harvest levels in New York.

In order to provide a better estimate of our landings history, we compared landings and effort in the years prior to our compliance program (2009-2012) to post initiation of the program (2013-2016) (Table 1). The average annual menhaden reported landings were 315,610 lbs in 2009 - 2012, while average annual reported landings were 1,230,027 lbs in 2013 - 2016. The average yearly number of reported trips taken to harvest menhaden was 162 in 2009-2012, and 912 in 2013-2016. These values were used to determine the amount that reported landings and effort increased after compliance measures were in place.

Average Annual Landings		Average An	nual Number of Trips
2009-2012 315,610		2009-2012	162
2013-2016	1,230,027	2013-2016	912
Increase	2.90	Increase	4.62

Table 1. Average annual landings and effort pre (2009-2012) and post (2013-2016) initiation of New York's compliance program.



It was then assumed that during the years in which reporting was poor, prior to the beginning of our compliance program, landings were severely underreported. The landings multiplier (2.9) is assumed to be a low estimate of how much higher New York's landings were in the past, given that our landings in 2013-2016 occurred under Amendment 2 quotas/trip limits. In the same way, during 1985-2012 when there were no restrictions on menhaden harvest, it is probable that effort was at least 462% higher than reported based upon reporting levels from 2013-2016. For this reason, the effort multiplier (4.62) serves as a higher estimate of where New York's landings may have been during this time period. We present three time series of recalibrated landings in New York from 1985-2012; a low adjusted estimate (2.9 times our current landings), a higher adjusted estimate (4.62 times our current landings), and an average of the two (3.76 times our current landings), in order to account for the unreported landings during this time period (Table 2). In all three cases, these multipliers are still confounded by the limitations imposed by Amendment 2 and may represent underestimates.

	NY	Adjusted Landings	Adjusted Landings	Adjusted Landings
	Landings	(Low-2.9)	(Higher-4.62)	(Average-3.76)
1985	901,800	2,612,786	4,167,178	3,389,982
1986	399,650	1,157,906	1,846,765	1,502,335
1987	206,795	599,147	955,590	777,369
1988	504,100	1,460,529	2,329,424	1,894,976
1989	449,100	1,301,178	2,075,271	1,688,224
1990	649,710	1,882,405	3,002,281	2,442,343
1991	650,150	1,883,680	3,004,314	2,443,997
1992	1,131,701	3,278,878	5,229,540	4,254,209
1993	1,048,993	3,039,248	4,847,350	3,943,299
1994	961,474	2,785,679	4,442,928	3,614,304
1995	1,087,978	3,152,199	5,027,498	4,089,848
1996	11,135	32,261	51,454	41,858
1997	553,953	1,604,968	2,559,792	2,082,380
1998	430,084	1,246,083	1,987,399	1,616,741
1999	242,886	703,714	1,122,365	913,040
2000	565,800	1,639,293	2,614,537	2,126,915
2001	576,426	1,670,079	2,663,639	2,166,859
2002	444,739	1,288,543	2,055,119	1,671,831
2003	384,875	1,115,099	1,778,490	1,446,794
2004	543,481	1,574,628	2,511,401	2,043,015
2005	871,081	2,523,783	4,025,226	3,274,505
2006	811,934	2,352,417	3,751,911	3,052,164
2007	483,557	1,401,010	2,234,495	1,817,753
2008	410,121	1,188,244	1,895,151	1,541,697
2009	330,496	957,546	1,527,207	1,242,377
2010	394,556	1,143,147	1,823,226	1,483,186
2011	279,117	808,686	1,289,787	1,049,236
2012	258,271	748,289	1,193,459	970,874
2013	1,187,525	1,187,525	1,187,525	1,187,525
2014	825,549	825,549	825,549	825,549
2015	1,467,861	1,467,861	1,467,861	1,467,861
2016	1,439,173	1,439,173	1,439,173	1,439,173
Average	640,752	1,564,735	2,404,153	1,984,444

Table 2. Current landings in New York and the values adjusted by the low, higher, and average multipliers.

In table 3, we show what our initial Amendment 2 quota would have been under each of the adjusted landings scenarios. In all cases, the quota New York would have received is more in line with our average total harvest of 1,230,027 pounds between 2013 and 2016. This is especially true for the higher and average scenarios, where our quota would have been 1,237,392 pounds, and 1,006,613 pounds respectively.

	Low Adjusted Landings	Higher Adjusted Landings	Average Adjusted Landings
2009-2011 Average Landings	969,793	1,546,740	1,258,267
20% Reduction (Amendment 2)	193,959	309,348	251,653
Quota	775,834	1,237,392	1,006,613

Table 3. New York's Initial Amendment 2 quota based on the low, higher, and average adjusted landings.

We believe that these scenarios provide a more realistic representation of the historical menhaden landings in New York, given the limitations of historical reporting.

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Answers to PDT Questions- NY Menhaden Landings Recalibration

The analysis notes that prior to 2009, purse seine landings were reported to the state.
Were purse seine landings included in the re-calibration of NY's menhaden landings? If
they were, the PDT recommends that the re-calibration only be done on non-purse seine
landings.

Although there was a law in place requiring purse seine vessels to report menhaden catches to the state, there was no enforcement of this requirement prior to 2013 as was the case for all other licenses eligible to harvest menhaden. There was a single record of a purse seine catch that was reported to NOAA fisheries in 2003. This was included in the original analysis but has been removed prior to running the analysis a second time.

	Adjusted Landings (Low-2.9)	Adjusted Landings (Higher-4.62)	Adjusted Landings (Average-3.76)
1985	2,612,786	4,167,178	3,389,982
1986	1,157,906	1,846,765	1,502,335
1987	599,147	955,590	777,369
1988	1,460,529	2,329,424	1,894,976
1989	1,301,178	2,075,271	1,688,224
1990	1,882,405	3,002,281	2,442,343
1991	1,883,680	3,004,314	2,443,997
1992	3,278,878	5,229,540	4,254,209
1993	3,039,248	4,847,350	3,943,299
1994	2,785,679	4,442,928	3,614,304
1995	3,152,199	5,027,498	4,089,848
1996	32,261	51,454	41,858
1997	1,604,968	2,559,792	2,082,380
1998	1,246,083	1,987,399	1,616,741
1999	703,714	1,122,365	913,040
2000	1,639,293	2,614,537	2,126,915
2001	1,670,079	2,663,639	2,166,859
2002	1,288,543	2,055,119	1,671,831
2003	939,018	1,442,444	1,190,731
2004	1,574,628	2,511,401	2,043,015
2005	2,523,783	4,025,226	3,274,505



2006	2,352,417	3,751,911	3,052,164
2007	1,401,010	2,234,495	1,817,753
2008	1,188,244	1,895,151	1,541,697
2009	957,546	1,527,207	1,242,377
2010	1,143,147	1,823,226	1,483,186
2011	808,686	1,289,787	1,049,236
2012	748,289	1,193,459	970,874
2013	1,187,525	1,187,525	1,187,525
2014	825,549	825,549	825,549
2015	1,467,861	1,467,861	1,467,861
2016	1,439,173	1,439,173	1,439,173
Average	1,559,233	2,393,652	1,976,442

2. What percentage of NY's landings are by purse seines?

In all years from 1985-2016, except for 2003, purse seine landings account for 0% of the menhaden landings in New York. In 2003, they accounted for 24% of the total landings.

3. For the 2009-2012 and the 2013-2016 timeframes, can you provide a breakdown of average landings by gear type and average number of participants in the fishery. The PDT is interested in seeing what other changes might of occurred in the NY menhaden fishery between the two timeframes.

The table below includes average landings by gear type in the two timeframes. Confidential landings are displayed with a "C". The total value of all confidential landings is 14,380 lbs.

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Year	Cast Nets	Fixed Nets	Gill Nets	Hook and Line	Pots and Traps	Seines	Trawls	Not Coded
2009-2012	84,302	С	220,136	С		С	1,293	900
2013-2016	348,155	272,073	196,286	С	С	405,049	5,230	3

New York has a number of different permits that allow a fisher to harvest menhaden. This makes it difficult to determine the exact number of participants in the fishery over the years. It is further complicated by the fact that reporting was poor prior to 2013. In the table below we display the average number of permit holders that could have harvested menhaden and the average number in reporting compliance during the two timeframes.

Year	Average # of Permit Holders	Average % in Compliance
2009-2012	1144	39.4
2013-2016	1130	85.2



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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Advisory Panel

DATE: June 27, 2017

SUBJECT: AP Recommendations on Draft Amendment 3 and 2018 Fishery Specifications

The Advisory Panel (AP) met via conference call on June 26, 2017 to formulate comments on Draft Amendment 3 and provide recommendations on 2018 fishery specifications. Panel members in attendance represented commercial harvesters, recreational anglers, and conservation coalition members. The following is a summary of the conference call.

AP Attendance

Donald Swanson (NH)

Patrick Paquette (MA)

David Sikorski (MD)

Dave Monti (RI)

Meghan Lapp (RI)

Melissa Dearborn (NY)

Jeff Kaelin (NJ, Chair)

Leonard Voss (DE)

David Sikorski (MD)

Jeff Deem (VA)

James Kellum (VA)

Peter Himchak (VA)

Ken Hinman (Non-trad)

Draft Amendment 3

AP members were asked to provide feedback on the content of Draft Amendment 3, including the variety of options presented and clarity of the document. Preferred management alternatives were not discussed as there will be a separate meeting for this during the Draft Amendment 3 public comment period.

Reference Points

- The AP recommended that stock projections be developed for the interim reference point options presented in Draft Amendment 3. They noted that it is difficult to translate the various reference point options into a TAC.
- The AP also recommended that the methods used by the BERP Workgroup to develop
 the interim reference point values be provided to the public. ASMFC staff noted that a
 memo outlining methods used by the BERP Workgroup is being developed and will be
 included in meeting materials.

TAC and Allocation Methods

Overall, the AP supported the wider range of options developed for the indecision clause (Section 4.3.1.2) but recommended that a fourth option be developed (Option D) which specifies that the same management plan used in the previous year (including the TAC) be carried over into the subsequent year. Those who recommended this option commented that under the current options (Options A through C), the industry is punished for the Board's inability to set a TAC.

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- One AP member asked if, under Option C in Section 4.3.1.2: Indecision Clause (this option specifies that the current TAC is carried over to the subsequent year but there is no episodic events program or incidental catch provision), the 1% typically set aside for the episodic events program would be re-distributed or if current allocations would remain the same, meaning only 99% of the TAC would be allocated. Staff indicated the PDT would work to address this question ahead of the August Board meeting.
- One AP member commented that several of the allocation methods in Draft
 Amendment 3, such as the fleet capacity option, may promote a race to fish. The AP
 member recommended the Board consider this effect when reviewing the allocation
 methods.

Other Commercial Management Measures

- One AP member asked that the language describing the quota reconciliation options in Section 4.3.3: Quota Transfers be clarified, particularly in terms of what happens when coastwide landings are above or below the TAC. Staff indicated the PDT will work to clarify this language ahead of the August Board meeting.
- One AP member asked that a greater variety of options be developed for the various set aside programs, including the episodic event set aside (Section 4.3.6), the small-scale fishery set aside (Section 4.3.5), and the incidental catch set aside (Section 4.3.5). Specifically, the AP member asked that a range of options be developed to explore what percentage of the TAC should be set aside in each program. Currently, only the episodic events program includes a range of options on the percentage of TAC set aside. This AP member recommended that options for the episodic set aside be expanded to include 1%, 1.5%, 2%, 2.5%, and 3% and options for the small-scale set aside include 1%, 1.5%, and 2%.
- One AP member recommended that the redistribution of quota from various programs be done on the same date. Currently, unused episodic events quota is redistributed on November 1st and unused quota rollovers occur on July 1st.
- Two AP members asked that a research set aside program be established through Draft Amendment 3, with options that allow for up to 3% of the TAC to be used for scientific purposes. One AP member noted that, while Draft Amendment 3 allows the Board to establish a research set aside in the future, there are on-going projects which could benefit from a set aside today.
- One AP member recommended that the start of the fishing year be changed from
 January 1st to May 1st. The AP member noted that rolling over unused quota on July 1st
 and redistributing unused episodic event set aside quota on November 1st is too late as
 his state's fishery has already ended for the year. If the fishery started on May 1st, this
 redistributed quota could be used to harvest menhaden in the early spring.

2018 Fishery Specifications

The AP reviewed the TC memo on stock projections and was asked to provide recommendations to the Board on 2018 fishery specifications. The AP was split in its recommendation to the Board and, as a result, the range of AP recommendations is provided below.

- Six AP members did not support any increase in the TAC. Two AP members noted that menhaden are still expanding to their former geographic range and the Board should not increase the TAC until menhaden fully return to the Gulf of Maine. Four others noted that the Board is close to completing Amendment 3, which has the potential to change the reference points and allocation methods used to manage the stock. Given this imminent action, the Board should maintain status quo. These AP members also noted the importance of considering ecosystem reference points given menhaden's important role as forage fish.
- Four AP members recommended an increase in the TAC for 2018. One AP member recommended that the TAC be increased to 240,000 mt, but noted that at 314,500 mt there is only a 50% risk of exceeding the fishing mortality target. He commented that, from a federal Council perspective, the 314,500 mt TAC is still conservative given the regional Councils have a policy under Magnuson Stevens Act that allows for a 50% risk of exceeding the overfishing limit (OFL) when setting quotas. Another AP member recommended the TAC be increased to 288,500 mt as the projections indicate there is minimal risk of exceeding the fishing mortality threshold. Another AP member commented that the TAC should be, at a minimum, increased to 212,500 mt which represents status quo landings between 2009 and 2011. Finally, one AP member noted that the Board has taken a very precautionary approach to the management of menhaden and the projections, which are based on robust estimates of natural mortality, indicate minimal risk of exceeding the current reference points.



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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Technical Committee

DATE: June 30, 2017

SUBJECT: Projection Runs for 2018 Fishery Specifications

Projections

Monte Carlo Bootstrap (MCB) runs of the base run of the Beaufort Assessment Model (BAM) were used as the basis for the projections (see Appendix D of 2015 assessment for projection methodology). Projections were run for four years (2017-2020).

Actual landings for the four fleets, north and south as well as reduction and bait, for 2017 were the same in all runs and were 200,000 mt. Constant landings from 2018 to 2020 were allocated to the bait and reduction fishery in the northern and southern regions using the proportions established in Amendment 2 and used by the state of Virginia.

The TC explored nine separate projection runs as requested by the Board. The projections explored a range of TAC levels from status quo to catch levels up to 40% higher than the current TAC. In addition, there were several runs looking at the probability of the fishing mortality rate being below the F target, as specified in the 2017 Stock Assessment Update. Specifically, projections were run using the following TAC scenarios:

- 1) 200,000 mt = current TAC (status quo)
- 2) 210,000 mt = if Board implemented a 5% increase to the current TAC
- 3) 220,000 mt = if Board implemented a 10% increase to the current TAC
- 4) 240,000 mt = if Board implemented a 20% increase to the current TAC
- 5) 260,000 mt = if Board implemented a 30% increase to the current TAC
- 6) 280,000 mt = if Board implemented a 40% increase to the current TAC
- 7) TAC that has a 50% probability of being below F target in 2018
- 8) TAC that has a 55% probability of being below F target in 2018
- 9) TAC that has a 60% probability of being below F target in 2018

Projections 1-6

Results in the table below indicate a percent risk of exceeding the F_{target} (Table 1) or the $F_{threshold}$ (Table 2) under the various projected TAC levels for 2018-2020.

Table 1. Percent risk of exceeding the F_{target} for a given TAC scenario.

	TAC (mt)	2018	2019	2020
	200,000	9.5%	0.5%	0%
Percent Risk	210,000	12%	1.5%	0%
of exceeding	220,000	15.5%	3.5%	0%
F _{target}	240,000	22.5%	9.5%	2.5%
	260,000	29.5%	20.5%	10.5%
	280,000	37.5%	33%	29%

Table 2. Percent risk of exceeding the F_{threshold} for a given TAC scenario.

	TAC (mt)	2018	2019	2020
	200,000	0%	0%	0%
Percent Risk	210,000	0%	0%	0%
of exceeding F _{threshold} (Overfishing)	220,000	0%	0%	0%
	240,000	0.5%	0%	0%
(Overnstillig)	260,000	1.5%	0%	0%
	280,000	2.5%	0%	0%

Projection 7

The TAC that resulted in a 50% probability of being below the F target in 2018 was 314,500 mt (Table 3).

Table 3. Percent risk of a 314,500 mt TAC exceeding F_{target} or F_{threshold} in 2018.

	2018
Percent risk of exceeding F _{target}	50%
Percent Risk of exceeding F _{threshold}	5%

Projection 8

The TAC that resulted in a 55% probability of being below the F target in 2018 was 288,500 mt (Table 4).

Table 4. Percent risk of a 288,500 mt TAC exceeding F_{target} or F_{threshold} in 2018.

	2018
Percent risk of exceeding F _{target}	45%
Percent Risk of exceeding F _{threshold}	3%

Projection 9

The TAC that resulted in a 60% probability of being below the F target in 2018 was 286,000 mt (Table 5).

Table 5. Percent risk of a 286,000 mt TAC exceeding F_{target} or F_{threshold} in 2018.

	2018
Percent risk of exceeding F _{target}	40%
Percent Risk of exceeding F _{threshold}	3%

Uncertainty in Projections

Projections should be interpreted in light of the model assumptions and key aspects of the data. Some major considerations are the following:

- In general, projections of fish stocks are highly uncertain, particularly over the long-term (e.g., beyond three years). The projection for any year should be considered a range of values rather than a single point.
- Although the projections include many major sources of uncertainty, they do not include structural (model) uncertainty. That is, projection results are conditional on one set of functional forms used to describe population dynamics, selectivity, recruitment, etc.
- Fisheries were assumed to continue fishing at their estimated current proportions of total
 effort (for bait and reduction fisheries), using the estimated current selectivity patterns.
 New management regulations that alter those proportions or selectivities would likely
 affect projection results.
- All of the projections assume that the probability of the size of a recruitment event in any
 projection year is equivalent to the probability of such recruitment being observed during
 the years modeled in the stock assessment. If future recruitment is characterized by runs of
 large or small year classes, possibly due to environmental or ecological conditions, stock
 trajectories may be affected.
- Projections apply the Baranov catch equation to relate F and landings using a one-year time step, as in the assessment. The catch equation implicitly assumes that mortality occurs throughout the year. This assumption is violated when seasonal closures are in effect, introducing additional and unquantified uncertainty into the projection results.

Table 6. Allocation (in pounds) to states/jurisdiction under the different potential TAC scenarios using Amendment 2 allocation percentages after 1% of the TAC has been set aside for Episodic Events. This table contains potential TACs associated with the constant harvest projection runs 1 through 6.

Metric Tons	200,000	210,000	220,000	240,000	260,000	280,000
Pounds	440,924,524	462,970,750	485,016,976	529,109,429	573,201,881	617,294,334
After Set Aside	436,515,279	458,341,043	480,166,807	523,818,335	567,469,862	611,121,390
ME	171,882	180,477	189,071	206,259	223,447	240,635
NH	131	138	144	157	170	184
MA	3,660,454	3,843,476	4,026,499	4,392,544	4,758,590	5,124,635
RI	78,195	82,105	86,015	93,834	101,654	109,473
СТ	76,152	79,960	83,767	91,383	98,998	106,613
NY	242,032	254,134	266,235	290,439	314,642	338,845
NJ	48,853,880	51,296,574	53,739,268	58,624,656	63,510,044	68,395,432
DE	57,646	60,529	63,411	69,176	74,940	80,705
MD	5,991,662	6,291,246	6,590,829	7,189,995	7,789,161	8,388,327
PRFC	2,709,809	2,845,300	2,980,790	3,251,771	3,522,752	3,793,733
VA	372,443,990	391,066,190	409,688,389	446,932,788	484,177,187	521,421,586
NC	2,150,995	2,258,545	2,366,095	2,581,194	2,796,294	3,011,393
SC	-	-	-	-	-	-
GA		-	-		-	-
FL	78,449	82,371	86,294	94,139	101,983	109,828

Table 7. Allocation (in pounds) to states/jurisdiction using Amendment 2 allocation percentages after 1% of the TAC has been set aside for Episodic Events for the scenarios with 50%, 55%, and 60% probabilities of being below F target in 2017.

Percentage	50%	55%	60%
Metric Tons 314,500		288,500	286,000
Pounds	693,353,814	636,033,626	630,522,069
After Set Aside	686,420,276	629,673,290	624,216,849
ME	270,285	247,940	245,792
NH	206	189	187
MA	5,756,063	5,280,204	5,234,449
RI	122,962	112,797	111,819
СТ	119,749	109,850	108,898
NY	380,596	349,131	346,106
NJ	76,822,726	70,471,722	69,861,048
DE	90,649	83,155	82,434
MD	9,421,889	8,642,973	8,568,077
PRFC	4,261,175	3,908,900	3,875,027
VA	585,668,174	537,250,456	532,594,906
NC	3,382,440	3,102,811	3,075,923
SC	-	-	-
GA	-	-	-
FL	123,361	113,162	112,182

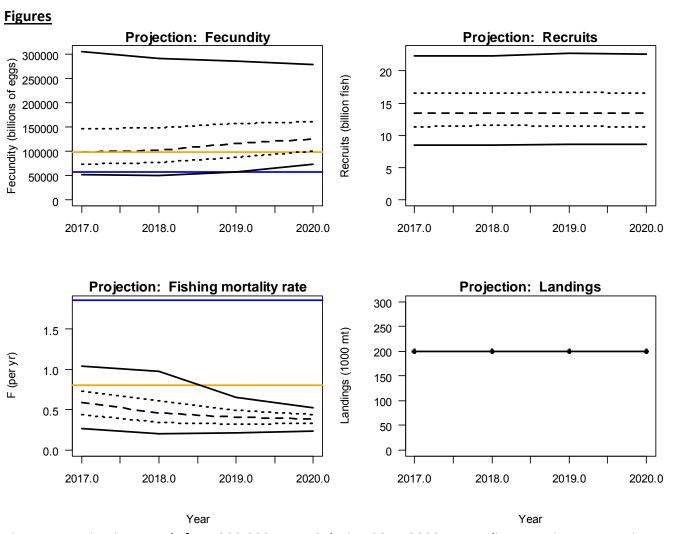


Figure 1. Projection panels for a 200,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

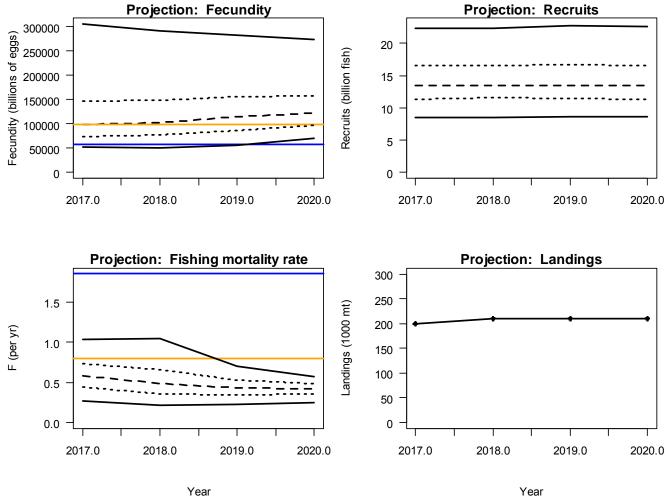


Figure 2. Projection panels for a 210,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

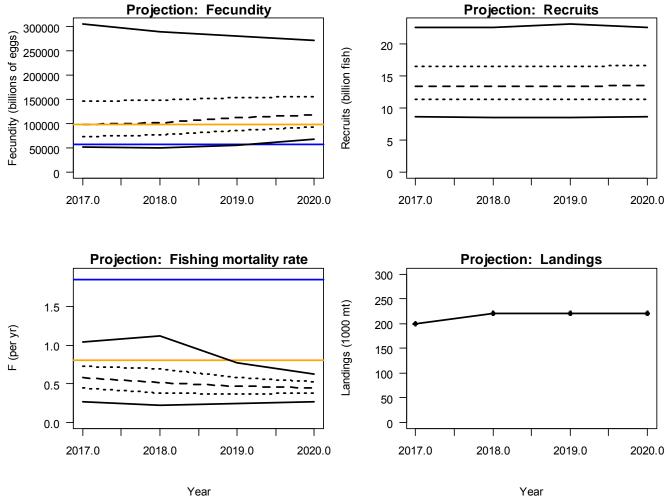


Figure 3. Projection panels for a 220,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

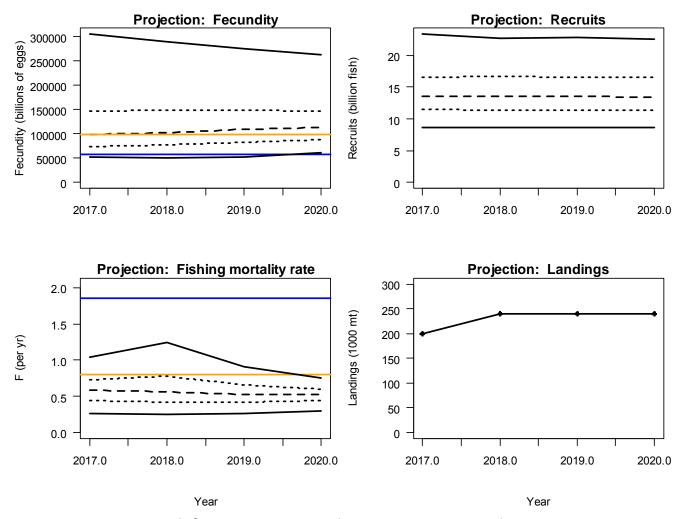


Figure 4. Projection panels for a 240,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

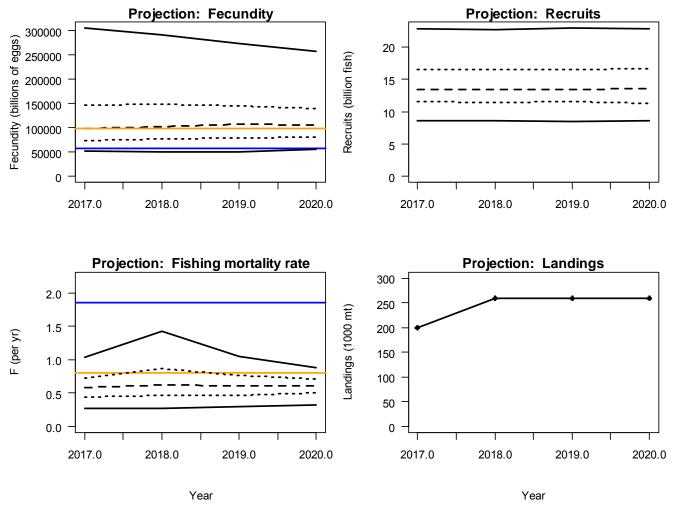


Figure 5. Projection panels for a 260,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

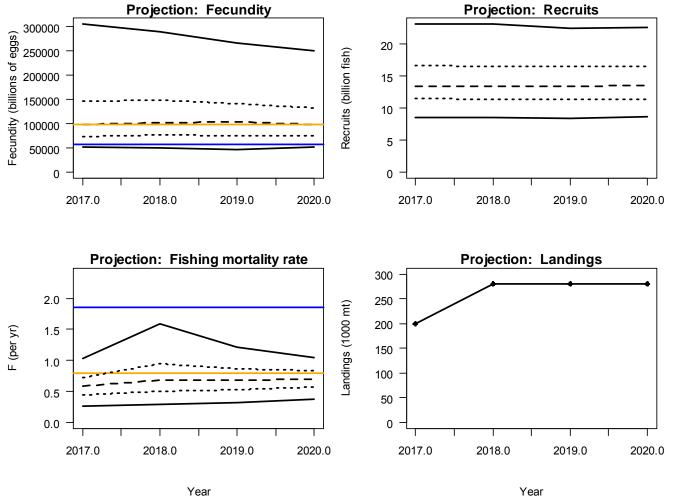


Figure 6. Projection panels for a 280,000 mt TAC during 2017-2020. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

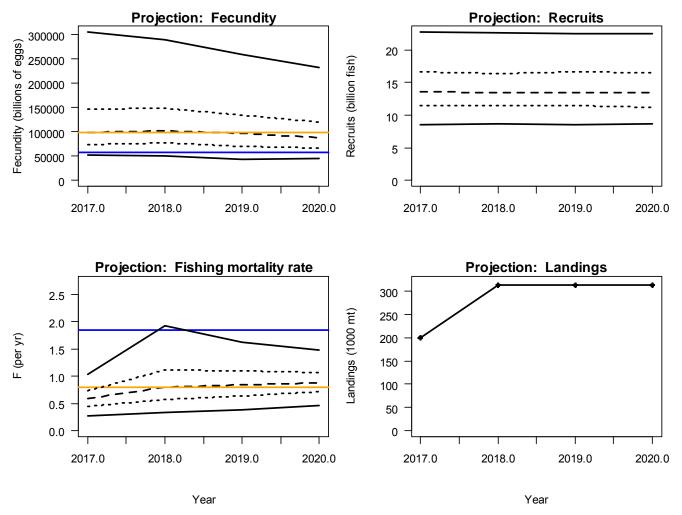


Figure 7. Projection panels for a 314,500 mt TAC in 2018 which results in a 50% probability of being below the F target in 2018. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

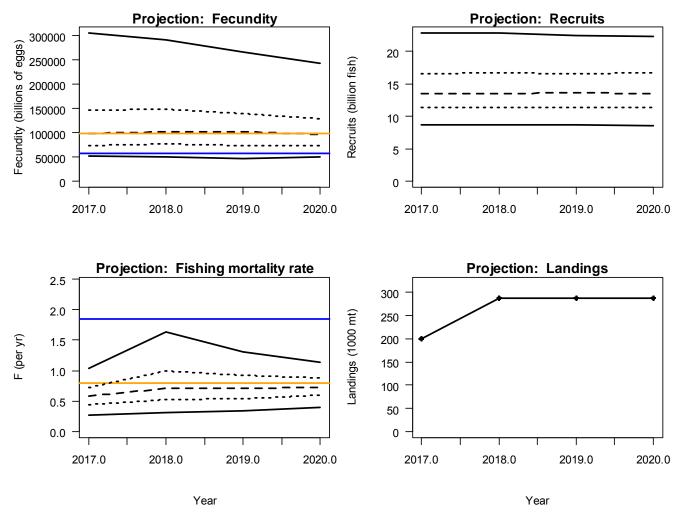


Figure 8. Projection panels for a 288,500 mt TAC in 2018, which results in a 55% probability of being below the F target in 2018. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

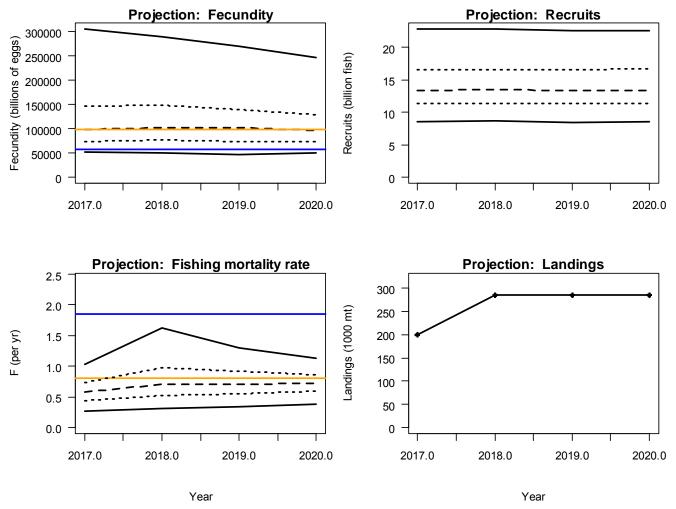


Figure 9. Projection panels for a 286,000 mt TAC in 2018, which results in a 60% probability of being below the F target in 2018. Fecundity, recruits, geometric mean fishing mortality (*F*) over ages-2 to -4, and landings over time based on constant landings for 2018 to 2020 and median recruitment with variability based on estimated deviations for each MCB run. The solid flat lines in the fishing mortality rate and fecundity panels are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run. The solid black lines are the 5 and 95% quantiles, the dotted lines are the 25 and 75% quantiles, and the dashed line is the median.

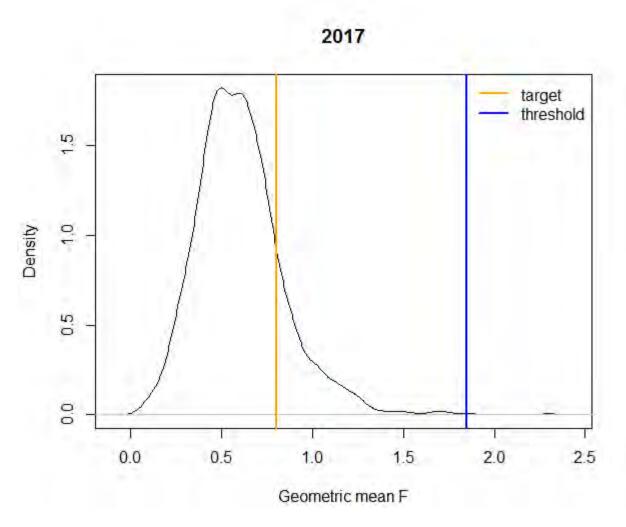


Figure 10: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under the 2017 200,000 mt TAC. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

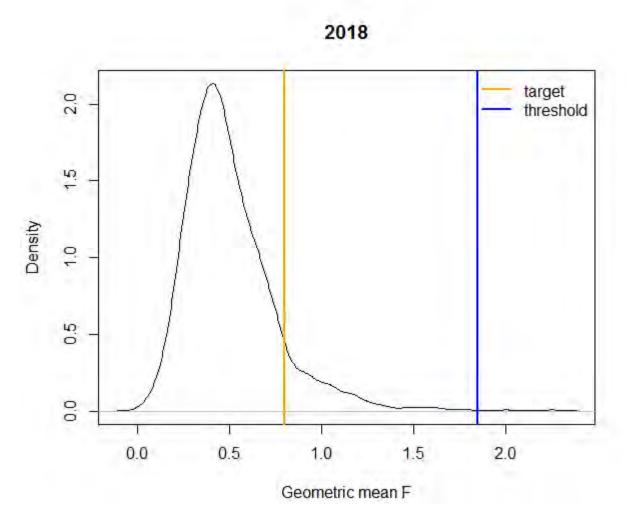


Figure 11: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 200,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

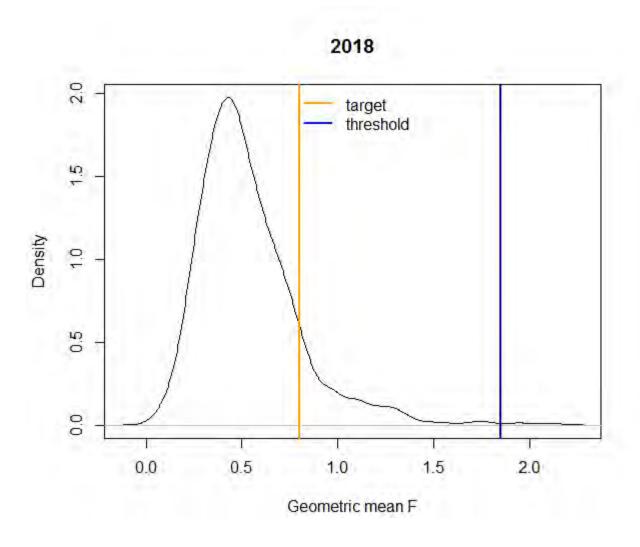


Figure 12: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 210,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

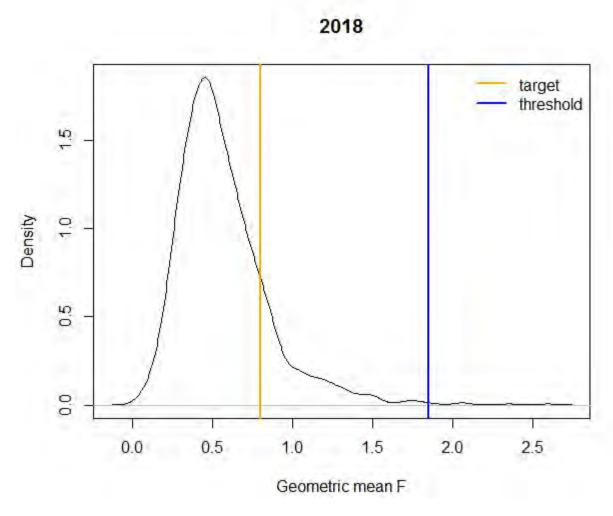


Figure 13: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 220,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

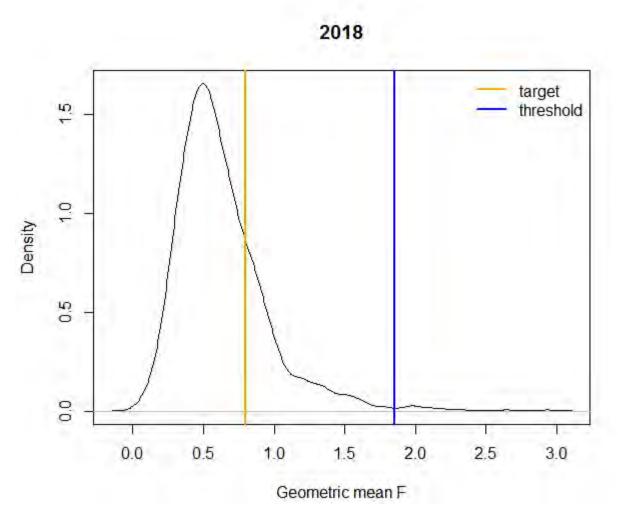


Figure 14: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 240,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

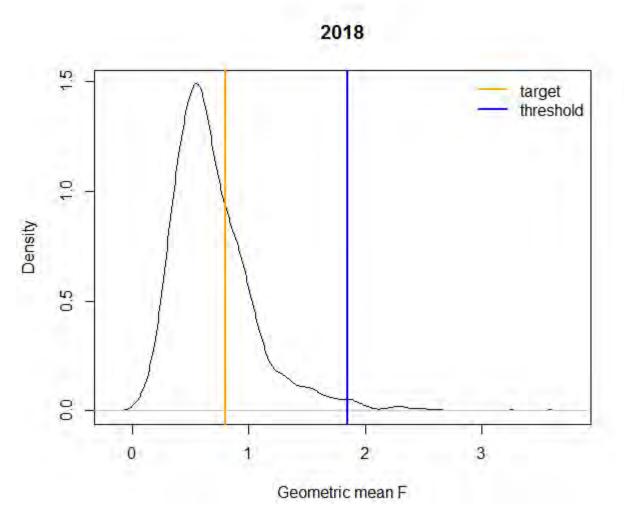


Figure 15: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 260,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

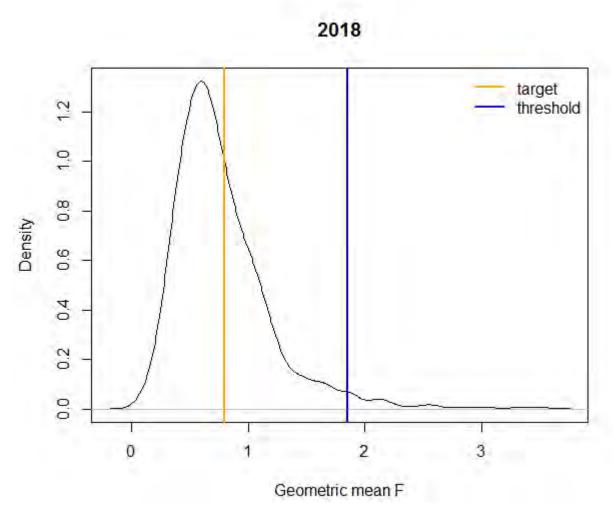


Figure 16: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 280,000 mt TAC in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

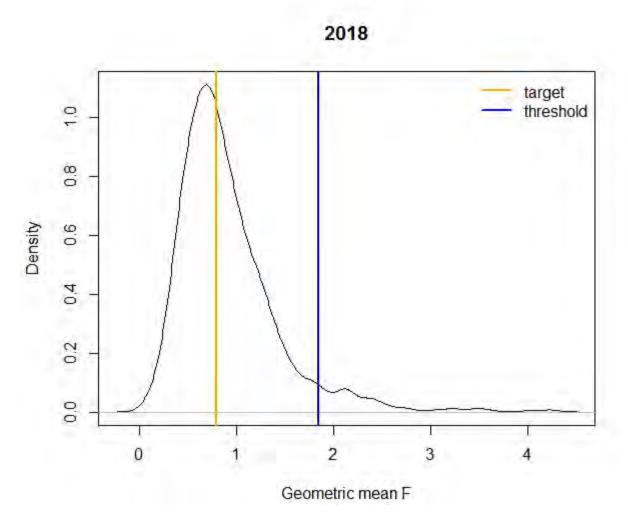


Figure 17: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 314,500 mt TAC, which is equivalent to a TAC which has a 50% probability of being below the F target in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

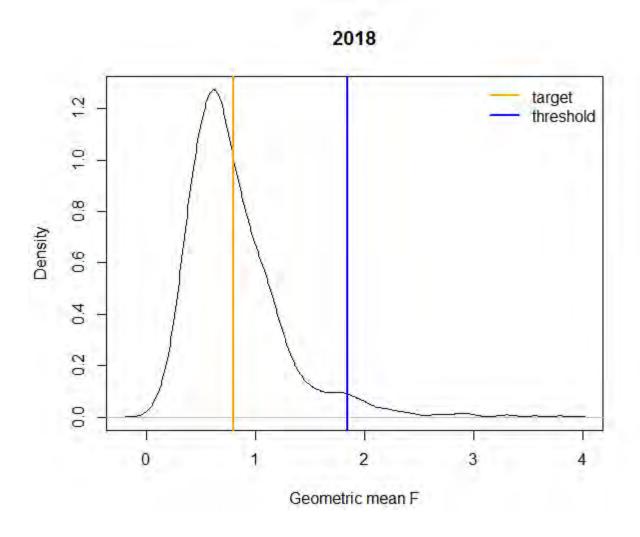


Figure 18: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 288,500 mt TAC, which is equivalent to a TAC which has a 55% probability of being below the F target in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.

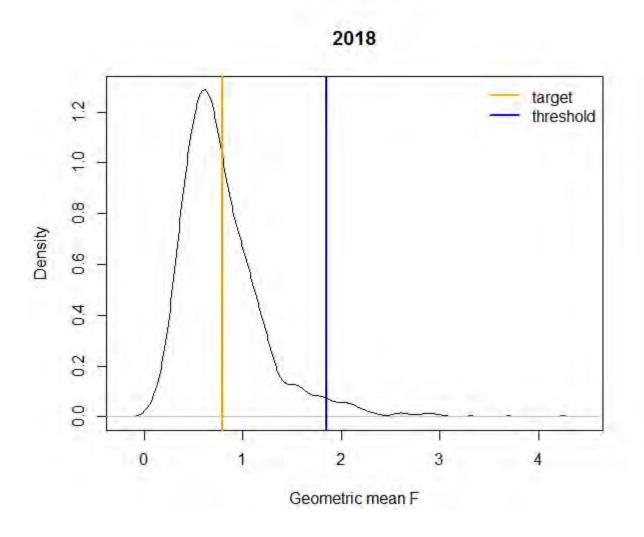


Figure 19: Density distribution of the geometric mean fishing mortality rate for ages 2-4 under a 286,000 mt TAC, which is equivalent to a TAC which has a 60% probability of being below the F target in 2018. The vertical lines are the threshold (blue) and target (orange) benchmark values recommended by the TC from the base run.



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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Megan Ware, FMP Coordinator

DATE: July 10, 2017

SUBJECT: 2017 Closure of Episodic Events Set Aside Program

The intent of this memo is to notify the Atlantic Menhaden Management Board (Board) that the 2017 episodic events fishery has closed and that the set aside was exceeded by 283,889 pounds.

The episodic events set aside quota for the 2017 fishing year was 4,409,245 pounds with the states of Maine, Rhode Island, and New York actively participating in the program. On Friday, June 30th, ASMFC staff notified the Board that roughly 80% of the episodic events set aside had been used. As a result, participating states were asked to close their episodic events fishery by 11:59pm on Wednesday, July 5th. Following final reporting of episodic events landings to ASMFC staff, a total of 4,693,134 pounds were landed under the set aside (Table 1). This represents 106% of the set aside, and an overage of 283,889 pounds. Per Technical Addendum I, overages in the episodic events set aside program are deducted from next year's set aside amount. Given all of the episodic events quota was harvested, there will be no distribution of unused set aside on November 1st.

Table 1: 2017 harvest under the episodic events program.

2017 Episodic Set Aside Quota	4,409,245 lbs
Harvest by ME, RI, and NY	4,693,134 lbs
Percent of Quota Harvested	106.4%
Set Aside Overage	283,889 lbs

Note: Due to confidentiality rules, harvest by the three participating states has been combined.

ISFMP Policy Board

August 3, 2017 8:00 - 11:15 a.m. Alexandria, Virginia

Draft Agenda

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

1.	Welcome/Call to Order (D. Grout)	8:00 a.m.
2.	 Board Consent (D. Grout) Approval of Agenda Approval of Proceedings from May 2017 	8:00 a.m.
3.	Public Comment	8:05 a.m.
4.	Update from the State Director's Meeting and Executive Committee (D. Grout)	8:15 a.m.
5.	Review and Consider New Jersey Appeal of Addendum XXVIII to the Summer Flounder Fishery Management Plan Final Action • Postponed Motion: <i>Move to postpone the New Jersey Appeal of the Summer Plan Final Action</i>	•
	Scup, and Black Sea Bass Addendum XXVIII until the Summer/August ISFMP Meeting. Motion by Mr. Nowalsky; Second by Mr. Keliher.	Policy Board
6.	Discuss the Secretary of Commerce Decision Regarding New Jersey Summer Flounder Recreational Measures	8:35 a.m.
7.	Review Annual Performance of the Stocks (<i>T. Kerns</i>)	9:20 a.m.
8.	Discuss New England Fishery Management Council Participation on the Atlantic Herring Section (<i>T. Kerns</i>) Possible Action	9:40 a.m.
9.	Review and Consider Approval of Standard Meeting Practices (<i>T. Kerns</i>) Action	10:00 a.m.
10.	Progress Update on the 2017 Sturgeon Benchmark Stock Assessment (K. Drew)	10:10 a.m.

The meeting will be held at the Westin, 400 Courthouse Square, Alexandria, Virginia; 703-253-8600

11. Review and Consider Approval of the Assessment Schedule (S. Madsen) Action 10:20 a.m.

12. Standing Committee Reports

10:30 a.m.

- Habitat and Artificial Reefs (L. Havel) Action
- Atlantic Coastal Fish Habitat Partnership (L. Havel)

13. Review Noncompliance Findings (if necessary) Action

10:50 a.m.

14. Other Business/Adjourn

10:55/11:15 a.m.

MEETING OVERVIEW

ISFMP Policy Board Meeting Thursday August 3, 2017 8:00-11:15 a.m. Alexandria, Virginia

Chair: Doug Grout (NH)	Vice Chair: Jim Gilmore (NY)	Previous Board Meeting:		
Assumed Chairmanship: 10/15		May 11, 2017		
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS,				
USFWS (19 votes)				

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 11, 2017
- **3. Public Comment** At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Executive Committee Report (8:15-8:25 a.m.)

Background

- The State Directors will meet on July 31, 2017
- The Executive Committee will meet on August, 2017

Presentations

D. Grout will provide an update of the two meetings

Board action for consideration at this meeting

none

5. Review and Consider New Jersey Appeal of Addendum XXXVIII to the Summer Flounder Fishery Management Plan (8:25-8:35 a.m.) Final Action

Background

- Summer Founder Addendum XXVIII was approved in February 2017 (**briefing materials**). The addendum established a regional management approach for the recreational summer flounder fishery in 2017.
- New Jersey is appealing the approval of the addendum (briefing materials).

- Following the Appeal Process (briefing materials), Commission leadership reviewed the appeal and determined the appeal should be considered by the ISFMP Policy Board under criterion 2, failure to follow process (briefing materials).
- The Board postponed the Appeal until the August Policy Board Meeting, until after the TC reviewed an alternative management program for the 2017 fishery.
- After the TC did not find the proposed NJ alternative measures to be equivalent to those in Addendum XXVIII, the Commission found NJ out of compliance and forwarded the recommendation of non-compliance to the Secretary of Commerce. On July 11, 2017, the Secretary of Commerce notified the Commission that he did not agree with the Commission's recommendation to find NJ out of compliance. The alternative measures proposed by NJ are currently in place for the 2017 summer flounder recreational fishery.

Presentations

 New Jersey will present their rationale for appealing the decision under criterion 2 and provide a suggested solution.

Board discussion for consideration at this meeting

- Postponed Board Motion: Move to postpone the New Jersey Appeal of the Summer Flounder, Scup, and Black Sea Bass Addendum XXVIII until the Summer/August ISFMP Policy Board Meeting. Motion by Mr. Nowalsky; Second by Mr. Keliher.
- Consider the Appeal of Addendum XXVIII to the Summer Flounder FMP

6. Discuss the Secretary of Commerce Decision Regarding New Jersey Summer Flounder Recreational Measures (8:35-9:20 a.m.)

Background

Commission found NJ out of compliance and forwarded the recommendation of non-compliance to the Secretary of Commerce for not implementing the measures in Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass FMP (Briefing Materials). On July 11, 2017, the Secretary of Commerce notified the Commission that he did not agree with the Commission's recommendation to find NJ out of compliance (Briefing Materials).

7. Review Annual Performance of the Stocks (9:20-9:40 a.m.)

Background

- As part of the ASMFC 2014-2018 Strategic Planning process, the Commission agreed to conduct more frequent reviews of stock status and rebuilding progress.
- The ASMFC's 2017 Action Plan tasks the Policy Board with conducting a review of stock rebuilding performance.

Presentations

• A presentation will be given on the stock rebuilding performance for species managed by the Commission by T. Kerns (**Briefing Materials**)

Board actions for consideration at this meeting

 Determine if the rebuilding performance for each species is consistent with the Commission Vision and Goals. • If the performance is not consistent with Vision and Goals, what action should be taken.

8. Discuss New England Fishery Management Council Participation on the Atlantic Herring Section (9:40-10:00 a.m.) Possible Action

Background

- The NEFMC has requested to participate on the Atlantic Herring Section.
- The Herring FMP is a complimentary FMP with the NEFMC.
- The Charter, as it is written, does not allow for Council participation by invitation on Sections. This is only a provision for Boards.

Presentations

• T. Kerns will present an overview of the guiding documents on the issue.

Board actions for consideration at this meeting

• Determine if Commission guiding documents should be changed to allow for Council participation on the Section.

9. Review and Consider Approval of Standard Meeting Practices (10:00-10:10 a.m.) Action

Background

- Following Commissioner training on meeting practices, the Policy Board directed staff to develop draft operating procedures to make Commission meetings more effective and efficient.
- The draft standard meeting practices were reviewed by the Executive Committee and recommended for consideration by the ISMFP Policy Board (**briefing materials**).

Presentations

• T. Kerns will present the SOPPs

Board action for consideration at this meeting

Approve the Standard Meeting Practices

10. Progress Update on the 2017 Sturgeon Benchmark Stock Assessment (10:10-10:20.m.)

Background

• The Benchmark stock assessment for sturgeon is schedule to undergo peer review in the fall of 2017.

Presentations

• K. Drew will present a progress report for the assessment

Board action for consideration at this meeting

None

11. Review and Consider Approval of the Assessment Schedule (10:20-10:30 a.m.) Action Background

• The ASC has recommendations to the ISFMP Policy Board regarding the ASMFC Stock Assessment Peer Review Schedule (**briefing materials**), including moving N. Shrimp to

the spring of 2018, moving Cobia up to 2019, and adding a summer flounder benchmark to 2018.

Presentations

• S. Madsen will review the stock assessment schedule

Board action for consideration at this meeting

• Approve the stock assessment schedule

12. Standing Committee Reports (10:30-10:50 a.m.) Action

Background

- The Habitat Committee met on May 2-3, 2017 (Briefing Materials)
- Analyzed results of state and federal SAV Policy questionnaire Working towards Goal 4 in 2017 Action Plan: SAV Policy update, Aquaculture document, Habitat Hotline, Species Habitat Factsheets
- Letter sent to DOI and new letter to DOI in draft form (Supplemental Materials)

The Artificial Reef Committee met on February 7 and 8 with the Gulf States Marine Fisheries Commission's Artificial Reef Committee

- ASMFC serving on steering committee for artificial reef symposium at AFS Meeting in Tampa, FL
- ASMFC leading the development of the SAFMC Artificial Reef EFH Policy

The Atlantic Coastal Fish Habitat Partnership met on May 4-5.

- They have completed their 5-year Conservation Strategic Plan and 2-year Action Plan
- Progress is being made on their Southeast Fish Habitat Prioritization Project
- In addition to operation funding, will be supporting the development of a new website and two conservation projects: one in Maine and one in North Carolina

Presentations

 An overview of Habitat Committee, Artificial Reef Committee and the ACFHP will be presented by L. Havel

Board action for consideration at this meeting

• Consider approval of second DOI letter.

13. Review Non-Compliance Findings, if Necessary Action

14. Other Business

15. Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ISFMP POLICY BOARD

The Westin Alexandria Alexandria, Virginia May 11, 2017

Draft Proceedings of the ISFMP Policy Board Meeting May 2017

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- 2. **Approval of Proceedings of February 2017** by Consent (Page 1).
- 3. Move to postpone the New Jersey appeal of the Summer flounder, Scup, and black Sea Bass Addendum XXVIII until the next ISFMP Policy Board Meeting (Page 6). Motion by Russ Allen; second by David Bush. Motion carried (Page 9).
- 4. Move on behalf of the American Lobster Board recommend the ISFMP Policy Board send a letter to NEFMC supporting the preferred alternatives developed by the NEFMC in their Deep Sea Coral Amendment (Page 10). Motion by David Borden on behalf of the American Lobster Board. Motion carried (Page 10).
- 5. Motion on behalf of the American Lobster Board recommend the ISFMP Policy Board send a letter to Department of Interior reiterating the Commissions previous letter to President Obama regarding what is now the NE Canyons and Seamounts Marine National Monument (Page 10). Motion by David Borden on behalf of the American Lobster Board. Motion carried (Page 11).
- 6. Motion on behalf of the American Lobster Board recommend the ISMFP Policy Board send a letter to NOAA recommending to fully adopt Addenda XXI and XXII (Page 11). Motion by David Borden on behalf of the American Lobster Board. Motion carried (Page 11).
- 7. Motion on behalf of the Atlantic Herring Section recommend the ISFMP Policy Board send a letter to NEFMC requesting participation in the oversight of the Research Set-Aside Program (Page 11). Motion by David Borden on behalf of the American Lobster Board. Motion carried (Page 12).

8. Main Motion

Move that the ISFMP Policy Board recommends the full Commission find the state of New Jersey be out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan if the State does not implement the following measures by May 21, 2017:

- Shore mode for Island Beach State Park only: 17-inch minimum size limit; 2-fish possession limit and 128-day open season.
- Delaware Bay only (west of the colregs line): 18-inch minimum size limit; 3-fish possession limit and 128-day open season.
- All other marine waters (east of the colregs line): 19-inch minimum size limit; 3-fish possession limit and 128-day open season

The implementation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP. (Page 35). Motion by David Pierce on behalf of the Summer Flounder, Scup and Black Sea Bass Board. Motion amended.

9. Motion to Amend

Move to amend to include "or equivalent measures as approved by the Summer Flounder Board". Motion by Robert Boyles; second by Andrew Shiels. Motion carries (12 in favor, 4 abstentions).

Main Motion as Amended

Move that the ISFMP Policy Board recommends the full Commission find the state of New Jersey be out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan if the State does not implement the following measures or equivalent measures as approved by the Summer Flounder Board by May 21, 2017:

- Shore mode for Island Beach State Park only: 17-inch minimum size limit; 2-fish possession limit and 128-day open season.
- Delaware Bay only (west of the colregs line): 18-inch minimum size limit; 3-fish possession limit and 128-day open season.
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The implementation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP.

Motion carried (13 in favor, 1 opposed, 2 abstentions) (Page 42).

10. Motion to Adjourn by consent (Page 43).

ATTENDANCE

Board Members

Dennis Abbott, NH, proxy for Sen. Watters (LA)

Doug Grout, NH (AA) Ritchie White, NH (GA) Raymond Kane, MA (GA) David Pierce, MA (AA)

Eric Reid, RI, proxy for Sen. Sosnowski (LA) Jason McNamee, RI, proxy for J. Coit (AA)

David Borden, RI (GA) Mark Alexander, CT (AA) James Gilmore, NY (AA) Emerson Hasbrouck, NY (GA)

Russ Allen, NJ, proxy for L. Herrighty (AA)

Tom Fote, NJ (GA)

Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)

Andy Shiels, PA, proxy for J. Arway (AA)

Roy Miller, DE (GA)

John Clark, DE, proxy for D. Saveikis (AA)

Craig Pugh, DE, proxy for Rep. Carson (LA)

David Blazer, MD (AA) Rachel Dean, MD (GA)

Ed O'Brien, MD, proxy for Del. Stein (LA)

John Bull, VA (AA)

Chris Batsavage, NC, proxy for B. Davis (AA) David Bush, NC, proxy for Rep. Steinburg (LA)

Robert Boyles, SC (AA) Malcolm Rhodes, SC (GA) Spud Woodward, GA (AA)

Pat Geer, GA, proxy for Rep. Nimmer (LA)

Rep. Thad Altman, FL (LA)

Jim Estes, FL, proxy for J. McCawley (AA)

Martin Gary, PRFC

Wilson Laney, proxy for Sherry White, USFWS

Kelly Denit, NMFS

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

Ex-Officio Members

Staff

Bob Beal Katie Drew
Toni Kerns Ashton Harp

Guests

The ISFMP Policy Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 11, 2017, and was called to order at 8:09 o'clock a.m. by Chairman Douglas E. Grout.

CALL TO ORDER

CHAIRMAN DOUGLAS E. GROUT: Good morning, this is a meeting of the ASMFC Policy Board, my name is Doug Grout; I'm Chair of the Commission. Everybody welcome, we had a very long night last night. Hopefully we'll be able to move things through fairly smoothly today. We have an agenda here.

There are a couple of letters that some of our Board's requested that the Policy Board consider moving forward.

APPROVAL OF AGENDA

CHAIRMAN GROUT: Because of some flight schedules, instead of taking it up under Other Business, I would like to insert motions from the Lobster Board after Item Number 5, and also a letter that the Herring Section has asked us to write immediately after the Lobster Board letters; again, between Items 5 and 6.

With that change are there any other changes or additions to the agenda that anybody would like to make? Seeing none; are there any objections to approving the agenda as modified? Seeing none; the agenda is approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN GROUT: Also in your meeting briefing materials, there are the proceedings from our February meeting.

Are there any modifications or additions to that? Seeing none; are there any objections from the Board to approving those minutes? Seeing none; I see the proceedings approved.

PUBLIC COMMENT

CHAIRMAN GROUT: Now we have the opportunity for public comment. This is public comment on things that are not on the agenda. I don't have anybody signed up for public comment. Is there anybody that wanted to make that comment?

EXECUTIVE COMMITTEE REPORT

CHAIRMAN GROUT: Seeing none; we will now move on to the Executive Committee Report.

Yesterday we met and you'll have to give me a minute to pull that up. At the Executive Committee yesterday, we approved the 2018 Proposed Budget. There was very little change between last year's budget and this year's budget. We also discussed an advisory panel white paper that was put together regarding advisory panel members serving on boards.

The option that we are going to bring forward to you at a future meeting is to modify our procedures; that once an AP member is assigned as either a board specific proxy or an ongoing proxy to a board, for which he serves as an advisor, the new proxy must step down from the AP as a state appointed new member.

Again, we'll bring this forward to you at the August meeting for your consideration, as a modification to our process. Also, we had a discussion about our technical committee meeting weeks. Originally this was something that was set up to make things more efficient for our technical committee members that are on multiple technical committee memberships. We're going to move forward with actually; apparently we had gotten to a point where we're using more webinars. There was some concern that technical committee members were reserving three weeks out of the year, and then they would end up not meeting.

There was some concern about whether this was still the most efficient and effective way to handle things. What the Executive Committee

decided to do was to do a poll of the technical committee members, to see if this is still a valuable tool for them; something that would help them out.

Then we're also going to try and have each board Chair and Plan Coordinator put together like a two to three meeting outlook of what we're thinking is going to happen with these particular boards; to sort of give us an idea whether we need to have the technical committee meet during those periods.

Other than that we also had an overview from Bob on some of the budget items that are going through the house, I mean through Congress right now. Finally, we did a performance review of Bob Beal and his efforts here. I'm pleased to say that we think that he's done an outstanding job, and we hope that he will continue on with us for many years to come; that being said; are there any questions about my report here?

REVIEW AND CONSIDER THE NEW JERSEY APPEAL OF ADDENDUM XXVIII TO THE SUMMER FLOUNDER FISHERIES MANAGEMENT PLAN

CHAIRMAN GROUT: Okay, thank you very much and now we'll move on to Agenda Item Number 5, and this is to Review and Consider the New Jersey Appeal of Addendum XXVIII to the Summer Flounder Fisheries Management Plan. The way we're going to handle this is Toni is going to give an overview of the appeal, and then our response letter to the state of New Jersey.

Then we will give Bob Martin an opportunity, about 15 minutes to present the appeal to the Board for consideration. Then we will have Board discussion about it. With the appeal there will be a requested action from New Jersey. I'll turn it over to Toni, who will give an overview of our process and the appeal.

MS. TONI KERNS: In your briefing materials there were a couple of pieces that go along with

this, first was Addendum XXVIII, which is the document that New Jersey is appealing for the Summer Flounder, Scup and Black Sea Bass Board. There is also the description of the Commission's appeal process, the letter from New Jersey appealing the Addendum, the response letter from the Commission leadership to the New Jersey's letter.

Then earlier this week I e-mailed out to the Policy Board a response letter from the state of New Jersey to the Commission's leadership letter. Those are all of your supporting documents to this. The Commission's appeal process states that once the Commission receives an appeal we have 15 days for the Commission leadership to review that appeal, and determine the merits of whether or not that appeal should be brought forward to the ISFMP Policy Board for their consideration.

Commission leadership in this case is made up of the current Chair and Vice-Chair as well as the past Chair. Any appeal that comes before the ISFMP Policy Board must be justified with one of the following criteria. The decision is not consistent with the FMP. It doesn't follow our There is insufficient, inaccurate, process. incorrect or application of the technical information. The historical landings period is not adequately addressed and the management actions resulting in unforeseen circumstances or impacts. The state of New Jersey is appealing the Summer Flounder, Scup, Black Sea Bass Addendum XXVIII. This addendum was approved for public comment in December of It is addressing the 2017 summer flounder recreational fishery for the coast.

The document itself looked at a decrease in the 2017 recreational harvest limit to account for the declining status of the stock. The spawning stock biomass has been declining for summer flounder, and there was a 30 percent reduction required in the overall quota; from 2016 to 2017. The addendum proposed measures to meet the 2017 RHL.

This document was taken out for public comment over the winter. After we went out for public comment, the working group that pulled together this document noticed that there was an error in the document. It was found prior to the February Board meeting, and that error was e-mailed out to the Summer Flounder, Scup and Black Sea Bass Board before the meeting.

The Chairman recognized the error that was in the document at the meeting; and I'll discuss how he went through that. But it was recognized prior to the approval of the document. The document was approved in February; with an implementation date of March 1st. All states were to let the Commission know of their regulations by that date; and the date in which their regulations would actually be implemented in their home state.

New Jersey sent us a letter appealing on several appeal criterions. The first criterion that I am going to go through is their Criteria 2, The Failure to Follow Process. The one bullet that Commission leadership found that there was a justification to bring this appeal forward to the Policy Board was on inaccuracies in the draft addendum that was subject to public comment.

New Jersey did correctly identify that there was an error in the text, which was found prior to the 2017 meeting when the document was approved. Information on the area, which was described in the calculation of the specific measures as specified in the revised addendum language memo, was actually sent to the Board prior to the meeting.

The Chair noted the error and its late correction at the start of the meeting; and suggested that the Board proceed with its consideration of the draft, since the tables that were taken out for public comment, which included the actual example measures that would be implemented in each of the states, were correct.

No Board member objected to moving forward with the process. Also importantly, the actual option that was approved in the final version of the addendum did not have any errors in it. Moving on, there were a series of other claims that New Jersey appealed. All of those claims were rejected by leadership to bring forward to the Policy Board to be considered; and I'll go through all of those now.

There are two criteria's under failure to follow process. One is failure to include the enhanced opportunity of the shore fishing permit in the draft addendum; as well as failure to consider public comment. New Jersey's appeal letter is correct in observing that the draft addendum did not discuss the Shore Mode Program itself. However, staff notified the state that the Shore Mode Program could still be included under the addendum at the joint meeting with the Mid-Atlantic Council in December of 2016. That is prior to the document being taken out for public comment. This was consistent with how we move forward with the Shore Mode Program in the previous year. It also was not included in the actual draft addendum or final addendum document.

Secondly, there was a failure to properly consider public comment as one of the appeal criterion. Leadership rejected that claim that the Commission did not properly consider public comment. The Board was presented an overview of the comment; detailed information regarding each of the hearings was included in the briefing materials for members of the Board to review prior to the meeting.

There was adequate opportunity for a public comment; and the Board did have the benefit of that comment before making its decision. The next criteria were insufficient, inaccurate or incorrect appeal of the technical information; specifically their ability and untimeliness of the MRIP data is not appropriate for yearly management approach.

Leadership also rejected this claim. When considering final action on the addendum, the Commission fully acknowledges and takes into account uncertainty in MRIP harvest estimates. It recognizes that there are confidence intervals around those MRIP estimates that constrain our ability to precisely project impacts of differing management measures.

The Commission is constrained in its ability to address this variability; given that summer flounder is jointly managed with the Mid-Atlantic Council and it falls under the Magnuson-Stevens Conservation Act for management. One of the mandates of Magnuson is that there is an establishment of an annual recreational harvest limit, and an associated management measures that seek to constrain us to this RHL.

In considering the 2016 harvest estimate, relative to the 2017 RHL, the Commission determined that a reduction was needed to constrain coastwide harvest. This determination was based on 2016 MRIP harvest estimate; and the harvest estimates have been deemed the best available science for recreational harvest at this time.

Until there is another data source, or until interpretation of federal law changes, the Commission is obligated to use the previous year's MRIP dataset to set the following year's measures. Then the last criteria, which was also rejected by the leadership for review of the appeal for the ISFMP Policy Board was Criteria 5, management actions resulting in unforeseen circumstances or impacts to increases in the fishery resource waste.

There were four bullets that they considered; disproportionate removal of large breeding females, unfairness and inequity among member states, failure to consider economic and social impacts, and compliance and data collection issues. None of these issues were considered by leadership as unforeseen circumstance or impact.

To the contrary, each of these factors was actually considered and discussed by the Board at either the December, 2016 joint meeting as they were developing and initiating the draft addendum. That was with compliance issues, data collection issues as well at Commission's 2017 winter meeting, where we discussed social and economic impacts thoroughly; and were also included in briefing materials for both of those meetings. I'm not going to get into all of the details. But there is a lot of information on each of those points in the letter. Yesterday the Summer Flounder Board met for a little while. At that Board meeting the Board recommended that the ISFMP Policy Board find New Jersey out of compliance for failing to implement the measures of Draft Addendum XXVIII. After they did that, New Jersey brought forward an alternative set of measures management that could considered conservation equivalent to the ones that are in Draft Addendum XXVIII.

The Board tasked the TC to review those measures, and then they will meet back again to hear the Technical Committee's comments and consider those management measures; as soon as we can get the TC together, and then we'll have a Board conference call to do so. That is where we stand as of right now. I'll take any questions.

CHAIRMAN GROUT: Any questions for Toni? Seeing none; I would now like to turn this over to Bob Martin from New Jersey, if you would like to come up to the microphone and present your justification for the appeal, and a remedy.

MR. BOB MARTIN: Thank you, Mr. Chairman, for the opportunity to speak to the Commission this morning. Before I discuss the question of New Jersey's appeal, I would like to discuss New Jersey's proposed revised management plan for summer flounder. I want to first thank the Management Board for considering our proposal last night.

I would also like to thank NOAA Fisheries for their willingness to listen and consider additional ideas around our quotas. Although we would have preferred to have our proposal approved last night, we understand and respect the Board's desire to follow established processes. We look forward to the Technical Committee's review of our proposal.

We will certainly provide the Committee with any and all information they need to ensure that our proposal substantially achieves the conservation equivalency. We all share the same goals, have a long term, thriving fluke stock and secondly, lowering the total mortality of harvested and discarded fish.

Our proposal meets these goals. As I shared with the Commission in February, and as the management committee heard yesterday, the Option 5 will have a devastating impact on the state of New Jersey. This is why we have worked hard to come up with an acceptable alternative. In New Jersey, if anglers are limited to a 19 inch fish, the impact on New Jersey will be severe.

According to recent analysis done by the economists at Montclair State University, Option 5 could cost the State's economy as much as 750 million dollars. It will also destroy thousands of jobs. I would be glad to share the results of that study with the Commission once it has been finalized and peer reviewed.

In addition, setting the size limit at 19 inches will have an unintended consequence of driving down recruitment rates. That is because 90 percent of the 19 inch fish off New Jersey's waters are females; capable of breeding. The last thing any of us want is to target the females responsible for increasing recruitment.

We want to insure the health of our summer flounder stock this summer and for years to come. For clarity's sake, I would like to review New Jersey's proposed alternative to the ASMFCs Option 5. While we appreciate the traditional approach is to focus on harvest reductions, our approach also considers the reduction of total fish mortality. We are proposing 104-day season instead of the 128-day season. This is a significant concession by the state of New Jersey; and we are also proposing limits on both fish and on the number of bag limits.

An 18-inch fish with a bag limit of three in coastal waters, a 17-inch fish with a bag limit of three in Delaware waters, and a 16-inch fish with a bag limit of two as part of the shore-based enhanced fishing opportunity program at Island Beach State Park. The season will begin on May 25, and will end on September 5.

We also believe we can reduce the dead discard rate from 10 percent where it is today, to at least 8 percent in New Jersey in the future. To achieve this we initiate a targeted public education campaign. We will leverage the resources that NOAA has created as part of its Fish Smart campaign. The state will invest significant resources to work diligently with anglers to drive down the dead discard rate.

I should also point out that even by just setting the size limit at 18 inches versus 19 inches, our proposal will reduce the overall mortality in fluke fishery by reducing the number of discards. As a result, we will reduce the total mortality of both harvested and discarded fish by nearly 300,000 when you compare that to the 2016 quotas and for Option 5 by almost 200,000 fewer fish.

While we achieve at least the 8 percent dead discards, there will be 400,000 fewer dead fish than in the 2016 quotas, and about 250,000 fewer than under Option 5. New Jersey's option with the significant reduction in the length of the season to 104-days, the 18-inch fish, the bag limit of three, will cut the harvest by 23 percent.

With an 8 percent discards, we reduce the total dead discards, compared to 2016, by 30

percent. Reducing total mortality is our goal we all share; especially the recreational fishing industry in the state of New Jersey and our proposal achieves that. Mr. Chairman, once again I appreciate the Commission's consideration of our proposal.

I am confident that when the Technical Committee reviews the science and the analytics behind our proposal, they will agree that it achieves the conservation equivalency. Our experts at New Jersey Marine Fisheries are confident that our proposal achieves what we stated on the conservation equivalency; and we consulted with NOAA Fisheries to ensure that we're meeting basic thresholds of conservation equivalency before bringing this up to this group.

Given the fact that the Technical Committee still has to review our proposal, and the final Commission approval has been pushed off to next week, New Jersey wishes to table our appeal pending the final outcome. I'm sure you can appreciate the need for New Jersey to keep all its options on the table until this matter is concluded.

Should our proposal be approved, we will immediately withdraw our appeal. Mr. Chairman, I would like again to express my thanks to the Summer Flounder Management Board and to the Commission and to NOAA for considering our alternative to Option 5 for the coming season. The state of New Jersey remains strongly committed to the prudent management of our fisheries. We look forward to continuing to work with you closely in achieving these goals. Thank you, Mr. Chairman.

CHAIRMAN GROUT: Thank you, Mr. Martin, is there anybody on the Board that has any questions for Mr. Martin? Okay seeing none; I believe I heard that your suggested remedy right now for today would be a motion to table. Russ.

MR. RUSS ALLEN: Yes, I would like to move to table New Jersey's appeal of Addendum XXVIII to the Summer Flounder, Scup and Black Sea Bass FMP until after the next Summer Flounder, Scup and Black Sea Bass Management Board meeting. I'll go slower if I have to.

CHAIRMAN GROUT: We'll wait until that gets up on the board before I ask for a second, but thank you very much for that motion. Russ, Bob Beal, we had a question about the process here with this.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Russ, I think in your motion you mentioned that you wanted to postpone this until the next Summer Flounder Board meeting. Should it be the Policy Board meeting; since that is the group that handles the appeals? I know you want to have the Tech Committee review and then the Summer Flounder Board meeting; but if the decision is to withdraw that it would essentially be withdrawing from the Policy Board.

MR. ALLEN: However you think it's best, Bob.

EXECUTIVE DIRECTOR BEAL: Policy Board probably would be better.

CHAIRMAN GROUT: You're comfortable with that and is that a postpone motion or a table motion?

EXECUTIVE DIRECTOR BEAL: I think technically it is a motion to postpone until time certain. But we can get wrapped up in parliamentary stuff pretty quickly. I think the move to postpone is probably more appropriate.

CHAIRMAN GROUT: Are you comfortable with that?

MR. ALLEN: Yes I'm comfortable with that.

CHAIRMAN GROUT: Is there a second to this motion? David. Is there any discussion on the motion? Ritchie White.

MR. RITCHIE WHITE: I guess just to try to understand this. I'm trying to understand the timing and what regulations go into effect at what times. If the conservation equivalency either is or is not approved by the Technical Committee, at that point New Jersey will be putting in some regulation.

I guess what is that regulation? Then the Policy Board, unless there is a special Policy Board meeting, then that is going to be August. What is the regulation that goes into effect? If the Technical Committee does not approve the conservation equivalency, what does New Jersey propose to have for regulations that would go into effect within the next few weeks or whenever that time period ends that the Technical Committee decides and August? Then whatever is determined in August, how fast can New Jersey react to any changes that would be done at the August Board? I'm trying to get a sense of how much fishing is going to occur under what regulations?

MR. ALLEN: We expect that the Technical Committee will approve, or at least give it the okay for the Board, and then it is up to the Board to decide what to do after that. I don't have any qualms in that. I think it will go through, because we've done a lot of work to get it to that point. With that said, we plan to have our regulations in place next week; with those regulations.

Knowing that the Board might not be able to get together before then and approve that. But at least we would have that piece in place already. The notice that we have to do is already done. The Commissioner has already said he will sign it. He just talked about it. We can have that done by next week. No matter when the Board decides on anything, we have to have that in place before May 21st, because that is when the old regulations start up. We have to have that done next week, so that will be done.

Then the season doesn't start in this until May 25th, so it gives the Board some more time to whether or not they approve it. Then we would have a whole other thought process to worry about, whether the Board approves it or not. I think that answers your question. We're doing everything we can to make sure this works. You know we're putting a lot of time into it.

CHAIRMAN GROUT: Follow up.

MR. WHITE: I understand that part. Are you suggesting that there be a special Policy Board meeting then, or the August meeting? Those regulations would stay in effect until August, even if the Technical Committee does not approve them. Is that?

MR. ALLEN: Me and Ritchie can have this talk outside. The reason I said in the beginning to the Board meeting itself was because that is where the process should end; obviously, once that's approved. I don't think it will be disapproved. I think it will be approved then that will be that. It's more of a process type thing we're talking about now; as far as the appeal goes.

If everything goes as we expect, the appeal is gone. It will be a moot point anymore, so I don't think I need to worry about that. It will come up at the August Board meeting, and we can just table it forever or however the process in Roberts Rules is to do that. We don't expect the appeal to be going forward any more. I think we're going to all be pretty happy on how this all works out; once the Technical Committee gets this, reviews it, and sees exactly what we did.

Peter Clark did most of the work, but Jeff Brust, who is really respected around this table as an assessment scientist, has really gone through this. He is the one to make sure all the numbers were right. We've had people check it, we've had people that are outside our agency check it; in the DEP that are research scientists that do this work.

We're pretty confident everything should move forward pretty well. Like I said, we're willing to do whatever it takes. However the process takes us we will do it. We would love to just say goodbye to it today if we could, but obviously we have to wait and make sure the Summer Flounder, Black Sea Bass, Scup Board agrees with us.

EXECUTIVE DIRECTOR BEAL: I know some of the states obviously were not sitting in on the Summer Flounder Board, luckily for them at eight-thirty or so last night. But there was a noncompliance finding motion forwarded to this Policy Board that is going to be addressed later in this meeting. I think we're starting to wrap up potential noncompliance finding with the appeal.

The appeal, as Russ mentioned is a procedural issue that is handled by the Policy Board. The next Policy Board will take place in August. I think controlling the comfort level of the Board, as to when New Jersey is going to implement what regulations, and if noncompliance letters should be sent to NOAA Fisheries. I think that discussion is part of the later agenda item on noncompliance. I think we have to keep noncompliance and the appeal a little bit separate.

CHAIRMAN GROUT: I agree. Robert.

MR. ROBERT H. BOYLES, JR.: Bob said what I was going to suggest.

CHAIRMAN GROUT: Eric Reid.

MR. ERIC REID: I really appreciate all the effort that New Jersey has made, as well as the Commission on this issue. My question is for New Jersey. They talked about a substantial amount of outreach to make this work for the state, and for the Commission I suppose. Some of it was on fish handling.

My question to New Jersey is, is that something you are going to go forward with now, which

would be to your advantage? I understand a lot of it has to do with the outcome of this whole thing. But just to gauge New Jersey's commitment, are they going to go ahead and do the portion of their public outreach that is applicable at this moment?

CHAIRMAN GROUT: Russ, do you have a response?

MR. ALLEN: Sure. Actually, we're going to have an update call with our constituents this afternoon. That is where it will start, because we've committed to that. We've already talked to all of them, and they're all onboard on moving this forward. That is JCAA, RFA, United Boatmen, all our constituent groups and JOA; you know everybody that is involved in New Jersey Fisheries is already onboard with this.

We're planning on putting out PSAs, brochures, short videos that can be popped up on phones. We're doing the whole works; and it starts today, as soon as we get done with this and move it forward. Because we are going to talk to them again and say this is what we're doing. It's a regardless of what happens in anything else that is going to happen regardless. That is where we're going to be.

MR. THOMAS P. FOTE: I think this is an example, not just for what we do in summer flounder, but we should do it with a bunch of species. We did this years ago on bluefish, when we were doing a catch and release, and we did it on striped bass. But it fell by the wayside how do we do catch and release. NMFSS has been pushing it for years under the Skillful Angler Program, if I'm right, and other programs have been doing it. Maybe this should be part of every plan that we put out is basically do this type of communication to our constituents when it comes to hook and release mortality. When we start killing more fish for hook and release mortality than we do taking home to eat that is a problem. We need to figure out a good way of reducing it. This is a start to that problem.

CHAIRMAN GROUT: Chris Batsavage.

MR. CHRIS BATSAVAGE: I appreciate New Jersey's attempt to help anglers learn better ways to release fish safely, and I agree with Tom; it is something that should be done with a lot of species, not just summer flounder. A question I have is with something like this there is usually kind of a learning education process, just as far as better handling practices.

Despite putting out all the education outreach stuff, these people don't just learn it overnight; especially during the summertime, I suspect there will be more than just the hardcore anglers. You're going to have a lot of traveling, vacationing anglers who maybe aren't as avid as a lot of the constituents that you reach out to. The question is are you concerned that you may not have the realized benefits the first year of this initiative, compared to what you might see a few years later; trying to get this information out.

MR. ALLEN: It is a great question, Chris. We've already, as Commissioner Martin said, we did a survey in a month, and had 26,000 responses. We sent out to 130,000 anglers, and we got 26,000 responses that quick. Some of the major questions in there were about fish handling and things of that nature.

I made a mistake when I replied to Eric before that we're starting it today. We actually started it already, to get it in people's heads to do that. The goal is to make sure all our for-hire fleet is onboard with this, and they will have that. I mean that is probably where the biggest amount of discard mortality is in the first place.

They're onboard, and they're going to make sure that we have brochures to hand out to everybody that comes on. That's where you're talking about the people just coming in for a weekend or something like that. We're going to have it at bait and tackle shops, where everybody else is going, so the brochures will be there. It will be part of our guides.

We have our digest coming out in a few weeks that is going to have an article in there talking about fish handling techniques; and that is sitting there at every bait and tackle shop up and down New Jersey coast. We're doing all that work already. We've also committed to when we were discussing this with NOAA, talking about having a survey done at different points within the season; to see if anybody is getting this information and to make sure it's working.

I think we're going to do everything we need to do. If someone has a suggestion on how to make this even better, just remember that the 10 percent is an average of different studies. It was 7 to 16 percent, I think if memory serves me correctly for the stock assessment. It was averaged out to 10. We may even bring that further down than 8 percent. But I think just a 2 percent drop is tremendous in the amount of fish it saves.

MR. ADAM NOWALSKY: I'll just also add, Chris that while the proposal talks about decreasing discards specifically in New Jersey, these are public information documents that will be available. We would sincerely hope that other jurisdictions would take them, distribute them, make them available, promote them, and imagine if we could take that information through this initiative that starts in New Jersey, and reduce the discards by 2 percent up and down the entire coast. Imagine the benefit we could generate at that point.

CHAIRMAN GROUT: Further discussion on this motion? Seeing none; do you need time to caucus on this? I'll give you 30 seconds to caucus. Okay, are you ready to vote? All those jurisdictions in favor raise your hand. Any opposed any abstentions, any null votes; the motion carries 17 to 0 to 0 to 0. Thank you very much, and now we are on to the Lobster Board. We have motions for the Policy Board to consider three letters, I believe it is or two letters, two. David Borden, Chair.

AMERICAN LOBSTER BOARD RECOMMENDATIONS REGARDING THE DEEP SEA CORAL AMENDMENT

MR. DAVID V.D. BORDEN: Mr. Chairman, do you want me to make the motion first or just provide some background first for context?

CHAIRMAN GROUT: Why don't you make each motion one at a time, and then make a little context for each one.

MR. BORDEN: On behalf of the American Lobster Board, recommend the ISFMP Policy Board send a letter supporting the preferred alternatives developed by the New England Regional Fishery Management Council in their Deep Sea Coral Amendment.

CHAIRMAN GROUT: Rationale.

MR. BORDEN: Okay so the rationale here and I'll try to keep this simple in the interest of time. The New England Council has been developing a Deep Sea Coral Amendment for some time. That amendment is not in the final stages of development. The Council authorized it to go out to public hearing with preferred alternatives; the timing of all that is that the public hearings will be taking place in the next month.

The Council intends to finalize its position on the amendment, and submit it to NOAA at the end of June or July. The importance here is that this really is our last opportunity to influence that process. A number of us around the table, including the Commission Chairman, have participated in that process. The Council adopted preferred alternatives, and they were overwhelmingly endorsed by the members of the Council.

As your representative on that Board, I voted for all of the preferred alternatives; as I think most of the New England Council representatives on the Commission did. All this is a suggestion that we send a letter that the

Commission Chair be authorized to send a letter to the New England Council Chairman, essentially advocating the preferred alternatives that were identified by the Committee.

CHAIRMAN GROUT: Any questions on the Board? Mark.

MR. MARK ALEXANDER: Just one comment. The first sentence I think should be amended to indicate that the letter is going to the Council. It doesn't say who it's going to.

CHAIRMAN GROUT: Are you okay with that? Okay. This was a motion by the Board, so it doesn't need a second. Are there any objections to this motion? Seeing none; that motion is passed, next.

AMERICAN LOBSTER BOARD RECOMMENDATIONS REGARDING NEW ENGLAND CANYON AND SEAMOUNT NATIONAL MONUMENT

MR. BORDEN: The second motion is on behalf of the American Lobster Management Board; recommend that the ISFMP Policy Board send a letter to Department of Interior reiterating the Commission's previous letter to President Obama regarding what is now the New England Canyon and Seamount National Monument. On behalf of the Board I make that motion.

CHAIRMAN GROUT: The motion doesn't need a second. Could you speak to the motion?

MR. BORDEN: Okay, so the canyon issue is obviously related to the coral issue. These are quite lengthy issues. Just by way of background I'll remind everybody that President Obama declared I think 4,500 square miles of territory in the Atlantic, five canyons, as part of a national monument under the 1906 Antiquities Act.

The Commission attempted previously to affect that determination, and submitted a letter in which they recommended that the monument boundaries be set at 900 meters and seaward from that. The reason for that was an attempt by the Commission to hold the fisheries resources that are being prosecuted in that area harmless from the effects of the monument.

President Trump now has signed an Executive Order, which essentially directs the Department of Interior to review all of the monuments, which includes the monument that I just referenced. That solicitation is going to be in the Federal Register, I think next week. Megan has a copy of the solicitation; which we'll circulate to the entire Commission.

There is a 60-day comment period, as with the previous issue. We have a limited period of time to respond to this. The suggestion from the Lobster Board is basically to submit, authorize the Chair to submit a letter. The key provisions of the letter will be to endorse managing marine resources in the monument area via the Magnuson and Council process.

It will talk about the need for transparency in the process, and it will also fold in the recommendations that you just authorized on establishing a management boundary at 600 meters; similar to the New England Council position. I'm happy to take questions.

CHAIRMAN GROUT: Any questions for the Board? Seeing none; are there any objections to sending this letter? Seeing none; the motion is approved. Item Number 3.

AMERICAN LOBSTER BOARD RECOMMENDATIONS REGARDING ADOPTION OF ADDENDA XXI AND XXII

MR. BORDEN: Okay final issue and this will be quick. On behalf of the Lobster Management Board, recommend that the ISFMP Policy Board send a letter to NOAA recommending full adoption of Addenda XXI and XXII.

CHAIRMAN GROUT: Motion from the Board does not need a second. Would you like to speak to this?

MR. BORDEN: Okay, the background here is there were two provisions of those addenda that the National Marine Fisheries Service decided to not or at least temporarily not implement in those provisions related to a declining trap cap for Area 3, and trap banking for Area 2. The trap cap proposal in Area 3, under the current regulations offshore boats are entitled to fish up to, I think it is 1,945 traps. The provision in the addendum is basically to lower that cap over time — five years. The provision was endorsed by the offshore lobster industry. It has the benefit of reducing vertical lines in the water; which are a concern in terms of protected species.

NOAA wanted to delay action on it until they saw the final action from the Lobster Board, which have been taken. This is nothing more than a restatement of our policy and a request that they implement both of those provisions; which have already been adopted by the Commission.

CHAIRMAN GROUT: Any discussion on this motion? Seeing none; is there any objection to approving this motion? The motion is approved, thank you. We now have a letter from the Herring Section that I'll turn to Herring Section Chair, Ritchie White to bring forward.

ATLANTIC HERRING SECTION RECOMMENDATIONS REGARDING PARTICIPATION IN THE OVERSIGHT OF THE RESEARCH SET-ASIDE PROGRAM

MR. WHITE: I'll read the motion and then speak to it a little bit. On behalf of the Atlantic Herring Section, recommend the ISFMP Policy Board send a letter to New England Fisheries Management Council requesting participation in the oversight of the Research Set-Aside Program.

CHAIRMAN GROUT: By the Section, it doesn't need a second.

MR. WHITE: The Section is aware of and approves of the amount of harvest that is part of the Research Set-Aside. The Section though does not participate in how that is prosecuted, and there is concern about when it is harvested and where it is harvested; because in the past there has been some gear conflict issues. The Section would like to be involved in how this fishery is prosecuted, so that is the basis.

CHAIRMAN GROUT: Any questions for Ritchie White? Seeing none; is there any objection from the Board to passing this motion? Seeing none; the motion is approved.

UPDATE ON THE CLIMATE CHANGE WORKING GROUP

CHAIRMAN GROUT: Now we'll move on to Agenda Item Number 6. This is an update on the Climate Change Working Group. I'm going to be Toni Kerns.

Just as the Chair of the group, I will tell you that we had a very long and fruitful meeting on Monday morning and we are still in the process of fleshing out our white paper. We probably are going to need a meeting or webinar to finalize it. But our intent is to have something for you, the Policy Board to consider; either at the summer or the fall meeting.

I think it will contain a number of tools that many of the management boards could use to adapt their management; at least to consider for adapting their management in the face of any changes that they see in these species, due to climate change, any questions?

REVIEW AND DISCUSS 2017 COMMISSIONER'S SURVEY RESULTS

CHAIRMAN GROUT: Seeing none; we'll now move on to Item Number 7, and this is to Review and Discuss 2017 Commissioner's

Survey Results. Deke Tompkins is going to present the results.

MR. DEKE TOMPKINS: We have our 2017 Commissioners Survey results. Thank you to the 26 people who filled out the survey this year. We are down from the mid-30s the past two years, so a little bit less participation. As you can see across the board there was a decrease in satisfaction on 14 of the 15 questions. The top three questions with the biggest drop in satisfaction you can see here. That was satisfaction with cooperation between commissioners to achieve our vision, satisfaction with Commission's ability to manage rebuilt stocks, and comfort level with reacting to new information and adapting to meet the Commission goals. Then from the written comment section there were some themes that emerged. These are somewhat listed in the order that they appeared by Climate change and impacts frequency. appeared throughout all the questions, pretty much.

Scarcity of fiscal resources, issues with data, and then a big theme was individual states promoting their interest over the coast as a whole. There were a lot of requests for more socioeconomic analyses; and I think this week is a pretty good example of the meeting week agendas being very full. With that I'll take any questions.

CHAIRMAN GROUT: Any questions? John Clark.

MR. JOHN CLARK: Thank you, Deke. I was just curious. With the questions where you had the big drops, I wonder how closely related they are to decisions the Board has just taken before the survey came out. I was looking at that big drop, and I am wondering if that had anything to do with the flounder; and the managing of the rebuilt stocks.

MR. TOMPKINS: The survey was open from March 14 through April 7. I think you can read into the time how you like. I am not saying if it

was taken at a different time it may have been different, but.

MR. CLARK: This year in particular, I just think the whole process with flounder, for example, was such that I think a lot of people were unhappy with it, and might have colored their answers on that question in particular; because of course flounder was considered rebuilt very recently.

CHAIRMAN GROUT: Yes, I saw two issues here, one the rather thin participation in this and that can affect things; especially where we're talking roughly a third of the commissioners did not respond to this. Whether those commissioners respond could affect things minimally or considerably. I encourage in the future that you take the time and it usually only takes about half an hour to really spend some time working on this.

The other thing that I had noticed here, and it may relate to what John and Deke were saying as reasons is we had most of these questions were kind of flat, during the period 2010 to 2013, and then suddenly we had this bump up in '14 and '15. It seemed like we were doing real good, we had made some improvements. Then we've seen some modest declines, but then we have the sharp decline right now. It could be a result of specific actions that have been taken over this past year. David Borden.

MR. BORDEN: Just a question, not a question on the survey. Do you want the discussion to be integrated with the presentation, or do you want the discussion to follow? In other words, are we in just questions at this point?

CHAIRMAN GROUT: In this case I would have both questions and discussion at this point.

MR. BORDEN: I would like to just make the point actually; I've discussed this point with the Chairman. I actually think dissatisfaction is rising. I think that this is a real reflection on the process; and so that everybody understands it, I

have the utmost respect for the process, the staff, and all the commissioners here. I'm not criticizing anyone. Having been involved in this process for a number of years, and being out of it for almost ten years and then coming back into it recently, I just don't see personally that we have a sustainable model at this point. The reason I say that, if you look at the way we're making decisions. I'm specifically talking about the recreational fisheries.

We're doing these annual specification packages that are almost invariably at the last minute. We get the information at the last minute; we put tremendous pressure on our own staff. We put tremendous pressure on all the stock assessment people to do the work. As a result of that the information we're getting is good. I think it's accurate.

But the decision process doesn't really have a lot of time to deal with this. What we end up with is this cycle where we are kind of yo-yoing the regulations on an annual basis. What I view is that we have to figure out a way to smooth the decisions out; and take a little bit longer timeframe. In other words, and I don't have the answer to it, I would point out.

But if we had a system where we had two-year specifications for recreational measures instead of one, then it would take a lot of that urgency out of it. I would also point out from having worked in a state agency. Having the state agencies have to deal with these types of issues and communicate the hundreds of thousands, millions of constituents at the last minute, is really undesirable.

None of the state agencies like to do this at the last minute. If you're on the opposite side of the issue, if you're on the recipient side of the issue, you don't want to be a member of the party charterboat trying to schedule bookings, and not know what the regulations are. I think my answer to it, as I said I don't have the answer to it.

But I think the way forward to kind of reverse this trend, because I think it is going to accelerate, personally. I think at some point we need a really directed discussion by the Commissioners on how we do business; and maybe come up with some new models on how to deal with these issues.

CHAIRMAN GROUT: I certainly see your point, and the only question I would have for the Board; is this really something specific to the Fluke, Black Sea Bass, Scup Board? As I see other species, important recreational species that we manage like bluefish, striped bass. We do try to keep regulations fairly consistent over the years. It seems like it is very much, from my perspective tied to that Board is that your feeling? Then I'll move on to the other.

MR. BORDEN: That actually, I think is a good point that you raised. Some of our species I think work well. But I don't think we can apply all of the same rules to those. We may need different rules for specific species; and deal with them accordingly.

CHAIRMAN GROUT: Dave Pierce and then Tom Fote and then Dennis Abbott.

DR. DAVID PIERCE: Granted when I filled out this questionnaire my responses were colored by what was happening with discussions about recreational fisheries management. Overall the Commission is doing a very good job, and for the most part my ratings were very positive. However, relative to the summary of all of the finding, I really don't know how to interpret these finding regarding we're less satisfied now than we were a couple of years ago or last year. I don't know how to interpret this; because if you look at the Y axis, the differences in the ratings are so small. We're not looking at a change in rating from like 8 to 4, we're looking at very small changes frankly, and these are small changes that came about perhaps because different people took the survey this year versus last year.

There are a lot of unknowns in this particular assessment of our performance. I would much rather just focus on the comments that people actually took the time to write. That is where we'll gain some insight as to how we're doing now versus the year before and the year before that. Again, like the commission progress, the first one, questions 1 and questions 2, and I looked that we dropped from 8.1 to 7.6 from 2016 to 2017.

Frankly that has no influence on me whatsoever. I can't interpret that but I don't conclude that we've made less progress; based upon this analysis. Again, if we've made less progress, each and every one of us will make that decision as a personal perspective; depending upon how things have gone for us.

MR. TOM FOTE: It is interesting I'm following Dave, because let's look at what happened last night on black sea bass; and this is where it comes into play. There is a reason that we're supposed to take cuts, because it was overage in the region. A motion was put on the table and voted on with people not understanding how that worked out.

The states that actually were being penalized were states that did not go over. The person making the motion took no hit whatsoever. Some of the states in that black sea bass, like New Jersey, are going to lose a 10 fish, go from 15 fish to 5 fish; and that state gets no cuts at all, because they have no season during the end.

There was none of that part of the decision process explaining how this is going to affect the states equally in that region. Basically, one state got the short end of the stick, and two others got penalized; when maybe they weren't the problem. I don't know what Connecticut was; I don't know where Rhode Island was. But we got penalized for what happened in the winter season.

Where one of the states has increased its catch, it took no herring whatsoever and was quick to make the motion to do that. That is when we see that it is not fairly being distributed. If we were taking the survey after that vote last night, yes I would have been really mad; because most of the time on Black Sea Bass, Summer Flounder, and Scup, I blame because it is a cooperative plan and we're stuck with a lot of decisions that we can't affect like on sea bass.

We're forced to make cuts because it is a joint plan. But when we do things on this one that does conservation equivalency, and makes decisions like this at the spur of the moment, without all the members understanding. This other state is voting for it, because they figure well we'll get it done; because they don't want to be impacted.

But they unfairly treated New Jersey, because we took a 10 fish cut when we weren't the problem. We caused none of the problem, we weren't over last year. We could understand why we would be upset over this; and not feel like we're being treated fairly at the Commission level. If it was basically going on this now, you would assume that; if I had basically filled out a survey.

MR. DENNIS ABBOTT: If you could put up the overall graph that you had. I do agree with Dave Borden that there is a negative trend with things going on. But again that graph makes it look worse than it is, because it only runs from 6.6 to 8.4. We're really seeing a change from 8.25 to 7.5, so three-quarters of a number. Yes there is some diminishment of things in people's mind.

I also find that the participation is really disappointing at this point, where you've roughly got about half of the people. You know 26 out of 45 plus PRFC, whatever it is they've added, Potomac River. There could have been however many more participants. If we want to blame it on Black Sea Bass and Scup, about six

of our states don't even participate in those species.

I don't think we should lay it on to those factors. We also don't know who the 26 were that filled out the survey. We don't really have a good snapshot, in my opinion, of where we are. I was wondering. I think it might be curious, at least to me, if in a future survey that we broke it down by maybe the LGAs and state directors; to see if there is any correlation between what the LGAs think and what the state directors think.

I think that would be interesting. It would still be a blind survey, but I would like to have consideration of breaking it down that way. Maybe the LGAs are expressing a lot more disappointment. Maybe it is the opposite. I don't know the answer to that. But it would be an interesting answer. Another thing that factors in here is you can look from year to year.

But if you look around the table, there are a lot of faces that change. I've been here for 21 years; and there are only less than a handful of people that have been here that long. Some people on their first, second, third year, and surely they view things differently than other people like Dave Borden said.

He's watched the goings on with the Commission for many more years than I have. Anyway, I think we have to not take this survey with a grain of salt. We really need to do something to improve our participation and give this survey a lot of thought; because it can be very helpful.

CHAIRMAN BORDEN: Ritchie White.

MR. WHITE: I agree with Dave. I think, Dave, you're on to something. I think that it's not just summer flounder. I think striped bass is another example. I don't mean what we just went through this week, because a number of years ago when the population was lower, the New England states pushed very hard to try to

lower mortality; because they wanted to see more fish.

I think it is an expectation of the anglers, knowing that we can react more quickly than the Council or the Service. We're viewed as an entity that can change things if they don't like it. I think that is a strength for us. I think in this instance that it can be a weakness as well. How we kind of switch that I don't know.

But I like Dave bringing it up, and I think it's something we ought to investigate further; because it does create more staff time and expense, when we're quickly reacting to anglers that are upset with what's going on. I think it is an important issue, and I think we ought to address it somehow.

MR. NOWALSKY: I hear a comment of not sure who filled out the survey. I'm willing to go on the record and say I filled out the survey. I am also willing to say that when you look at some of the major themes, including self-interest. When you look at some of the downtrends in the graphs, I'm willing to say that I'm an element of it.

While I certainly haven't been here as long as many of you, I have certainly been here more long than some. To that end, when I think about the public constituency literally in tears at the public microphone last night, over a species that is perhaps in the best biological shape of any we manage in black sea bass.

We have some very hard decisions we have to make. American lobster, weakfish, winter flounder, northern shrimp, they are hard decisions; because there are factors impacting our ability to manage these species that quite frankly are out of our control. Then we take a species like black sea bass, where we're simply making bad decisions.

There is no other way around it. They are simply bad decisions. We can try to dress up the graph and say, well it is only a small range.

But out of the time series there, the reality is that number of the overall satisfaction is the second lowest in the time series. When we look at those three other major question areas, one of those is the second lowest in the time series, two of the other ones are the lowest in the time series.

When we have boards making decisions, 11 member boards making decisions that are negatively impacting only two of the states on the board primarily, we have a real problem with ourselves. We have a real problem with our public perception; and that problem is real, and we need to do something about it.

We just got done talking about the New Jersey appeal. There is certainly a lot that went on behind the scenes. I know a lot of questions about the process, a lot of people concerned about the fact that New Jersey had to go to NOAA Fisheries first; in terms of trying to get some relief on this.

I know a lot of people here with military backgrounds. You respect the chain of command. That is not something to be taken lightly; to break that chain of command. But when it lets you down, you have no choice but to go outside of it; no choice, and on that particular issue that is only the tip of the iceberg.

If we do not react in a positive manner, it is only the beginning. I have confidence in all of us as individuals to make good decisions. I hope that we can find a way to make better decisions; and I agree with the element that certainly these recreational issues are one of the largest that are holding us back.

MR. FOTE: When only 26 people respond, I think, of course I estimate on surveys it is the people that care and the people that are involved. We have 45 commissioners; there weren't 45 commissioners at this meeting. A lot of people don't show up, some of the

proxies do show up. But some people didn't show up altogether.

There are not a lot sitting at the table, there wasn't a lot sitting at the table from other states yesterday. The people that put most of time to fill out surveys are the people that are involved in the process and want their comments made. I don't look at the 26 as a bad number. I mean when we just did a survey of 130,000 anglers, we say we got 26,000. When you get 20 percent of the people you survey, and that is what my background is in marketing management. That is a good response. When you get 26 out of 45 that is a good response; because they are the people that are actively involved and they care and they basically took the time to write the survey.

I did fill out the survey, and mine was similar comments to what Adam just said. I mean there are some real problems that have come out in the last couple of years that we're not dealing with certain things in a fair and equitable manner; and we just see that. Also, I think because you have new commissioners.

Now some of us have been around a long time, understands the ups and downs of the commission; and we look at it and realize where we started from, when LGAs didn't even have a seat at the table. There were five members of a board deciding what we were doing. We've come a long way, and maybe we're just getting a little complacent in the way we handle things and make motions too late at night on things we aren't really looking at what we're doing.

MR. JASON McNAMEE: Okay time for a little optimism. Relatively new to this part of the process, and no plans on going anywhere any time soon, so I need to have hope and optimism for this process. I think there is reason to be. David Borden talked about a new model. We're developing those new models; things like our risk and uncertainty policy that we're working on. That is a way forward here.

That is a way we're going to be able to structure our decision process in a better way; to have a little more guidance, so we're not rudderless as we're moving along here. The pain and the challenges that we faced with our recreational fisheries this year, sometimes you need a kick in the pants to move in the right direction. I think we got that this year, and again I'm optimistic. We've got an RFP that came out from the Mid-Atlantic looking at new techniques for how we manage some of our recreational fisheries.

I think you've got a lot of good ideas coming out of your technical committees for better ways of doing business in recreational fisheries and others. I think this was a challenging meeting week. But we've set up ourselves to be optimistic and to be successful moving forward. We just need to be able to embrace those changes and try those new techniques.

MR. GILMORE: Just a quick note, and I didn't say it yesterday, but it is kind of along the lines of Adam's comments. It is something I learned many years ago. One of my early mentors said, and it applies to a lot of management situations. It's, "We should serve the resource not the rule, the regulation or the process."

I think a lot of the survey has maybe gotten to that point. I think both in this, and also not to beat up on anybody, but the federal government. We are serving the process, the rules too much; we are not serving the resource, the fishery, the people, the stocks or whatever. It's really something we need to get out of this box, and that is where we need to go in the future.

I think the survey will go back up if we can figure out a way to stop being concerned about what the number is; as opposed to what's actually going on in the resource. I leave that out for everyone that if that helps, I think as a mantra for the future, we really need to get back to that simple thing that I learned over 30 years ago. We need to serve the resource not the process.

CHAIRMAN GROUT: I'm going to take one more comment on this, as we do need to move on. Dave Borden.

MR. BORDEN: I'll make it brief. Just so everyone understands, I'm not a pessimist. I'm just the opposite, a complete optimist. I just point out that in my view strong organizations are constantly reviewing the way they do business; and figuring out better ways to do it. We have a lot of wonderful intellect in this room, and I'm sure we can improve on almost everything we do.

CHAIRMAN GROUT: Since I said one last comment, I've had two more hands; and I'm going to hold firm to two more comments and that's it. No more. Bob, I'm sorry, you're out; Ray Kane and then Russ.

MR. RAYMOND W. KANE: Yes, good morning Commission members. This is a "come to Jesus moment." This is my second meeting, so I did not fill out the survey. But I'm a little betwixt at this point at my first formal commission meeting we had a representative from the Academy of Science come in and talk to us about MRIP.

It was a fluid conversation. Not many questions do I recall were asked of her, and she went on to tell us that MRIP, it's a good system. It needs to be tweaked. Yet in the follow up meeting I heard a lot of dissatisfaction with MRIP once again. As a newly appointed commissioner, I'm a little lost here; because when she was here doing the presentation, she wasn't charged with the questions that I hear often around this table at other meetings.

I happen to have a strong belief in the National Academy of Science. I know they helped us out years ago with the inland bluefin tuna. I'm a little lost in this process. We bring somebody in, they take the time, we schedule hours for a particular meeting. The representative gets up and walks away, and then we're back to the

same old gripe once again about how MRIP is not really working.

More or less from the years I've been coming to these meetings, commercial fisheries have been in compliance; from what I could gather at this table. It's always the recreational fishery we're having an issue with. Once again, let's have a "come to Jesus moment" here, and either we're going to accept MRIP and hopefully Jason working with MRIP. We'll be able to improve the process so we can function better as a commission.

MR. ALLEN: You know just to alleviate some of the concerns that are around this table. Just know that in the past few years Brandon Muffley filled out that survey, and you know he's a nice guy; and I got to do it this year after taking over his job. It might have had a little bit to do with some of those numbers, so thank you.

CHAIRMAN GROUT: Okay Bob.

EXECUTIVE DIRECTOR BEAL: I'll be quick. You know one of the things that popped up there that hasn't been talked about is agendas during meeting weeks and workload; and a number of things that are trying to be accomplished during individual meeting week. I think that feeds off of this annual cycle and the needed, quick reactions to recreational data, frankly in our joint management plans. Those are the ones that are the trickiest. That workload during meeting week translates into staff burden, burden on the technical committees, and burden across the whole range of folks that are involved in the commission process.

As we move forward I think, sort of reviewing that pace and the number of assessments and the frequency of reaction to new information is probably one of the foundations that we need to have. I think moving up and down, whipsawing regulations is probably the worst thing we can do. But some of the federal cycles right now require us to do that. Any way we

can get out of that frequent cycle, I think alleviates pressure across all of our commission system, as well as generates a lot of predictability for the industries that we manage.

CHAIRMAN GROUT: I think this survey has done exactly what it's intended to be, by the discussion we've had here. It's given us a chance to have some self-reflection. I think that points out the importance of trying to take the time to fill out this survey. I appreciate the people that do take the time.

I appreciate all the comments that we've had here during this discussion about this. It just shows you the importance of this, and we will continue to do this; so thank you again. We've got a couple of ideas and thoughts that maybe we can move forward with in the future, to try and address some of these issues.

COMMITTEE REPORT ON SAFE HARBOR LANDINGS

CHAIRMAN GROUT: The next agenda item is something that was brought up by the Vice-Chairman here, Mr. Gilmore, concerning safe harbor landings; and Toni is going to start out with a little overview about this. Then I'll turn it over to Jim to move forward with some possible action.

MS. KERNS: Earlier this week I also e-mailed the Draft Guiding Principles for Quota Transfers Related to Safe Harbor document out to the Policy Board, as well as the couple I think were passed around for folks to either share or have of their own. A group of commissioners and two Law Enforcement Committee members had a conference call to talk about what the states are doing, in terms of what they call safe harbor and then as well as how they deal with quota transfers that are associated with safe harbor.

We put together this informational document. This is a draft, it is just that an informational document for states that may be considering a policy regarding safe harbor landings; due to safe harbor circumstances. This is not a policy or requirement to states to implement in any way. Safe harbor, so there were three states that actually have policies in place right now regarding safe harbor.

When I pulled together this document, I utilized those three states documents; and tried to combine them together to give some general information. Safe harbor provisions are that a port will not reject any deserving, damaged or needful vessel. The guidance that those states had put together, as well as for this, is not intended to disregard other circumstances that may prevent a vessel from entering into a state port.

Vessels seek refuge may be subject to inspection by the host environmental police, to make sure there is compliance with all the laws and regulations for that state. Vessels seek safe harbor under the following circumstances, in many cases mechanical breakdown, unsafe weather conditions, loss of essential equipment, as well as medical emergencies. In several cases the states will define what unsafe weather conditions may be; in terms of the wind speed and wave height. I tried to determine what the actual specific heights are associated with. It sort of aligns with gale force, but not 100 percent and we can't find any other reason why it's there.

When vessels come into port they are asked to identify a series of criteria that are listed in the document, including like the vessels name, permit numbers, the description of the problem, time of arrival, the amount and type of fish that are onboard, and a callback number of some sort of method of contact.

Vessels without a license to land in a state after it has sought safe harbor, should not be allowed to offload fish; unless it is determined necessary to stay in port for a period which would result in the fish becoming unmarketable. I think this is the key, very important fact here that states think about when they are creating these policies.

In many cases it seems like in discussions with law enforcement committee that sometimes a vessel will come in to claim safe harbor; which may or may not actually be safe harbor reasons, it's really that they are just trying to offload some fish so they don't have to go home to their home state.

In thinking about new rules, you really want to think about making sure you're describing when a vessel would be allowed to offload, and when they wouldn't be allowed to offload. Vessels should not be allowed to offload fish, unless they have been authorized to do so from the host state.

The host state should communicate with the vessel's home state to discuss quota transfers prior to allowing offloading; to make sure that it is going to be approved by the home state. Things that you are going to want to talk about is determining what that home state's trip limit is for that vessel, who would cover any overages if the vessels actually contains more than the trip limit that you're going to allow for the offloading.

What type of necessary documentation you're going to need to complete the transfer between the two states; as well as a pack-out slip to confirm the landings of the vessel for the home state that is going to be transferring quota back to your state. There are a variety of regulations that the different states are doing; in terms of the actual offloading and landing.

Some states will only allow vessels that have sought safe harbor to land their states trip limit; while other states will allow them to land the home states trip limit, as long as that home state will then transfer the quota to their state. Some states will give away to charity any fish that are beyond the host state's trip limit; so the fish are forfeited.

Authorization to offloading is limited according to a willingness of the vessel's home state to accept the fish under that state's fish allocation. Then some states actually do not grant permission for vessels to land quota in another state due to weather conditions. But they do allow for other safe harbor provisions.

There are a series of regulations that are out there that you should consider. Again, this document is for recommendations. When I did discuss this with the Law Enforcement Committee, who met earlier this week, there was mixed reviews about whether or not the commission should even have an informational document from them. There were a couple of members that just felt as though enforcement was communicating with their home states, and said this isn't necessary; but that was about it.

MR. GILMORE: Thanks for the Workgroup, and Toni in particular for all the work she did on this. Just on that last note. I think just Toni covered most of everything I was going to say. But just let me put a couple extra points on it. That issue, and if you weren't at the annual meeting when we raised this, was because we've lost court actions because we went in without any kind of a written document, the guidance policy or whatever you want to call it.

Essentially that commonsense or reasonable accommodation by law enforcement, and even our staff, didn't work; you know judges just dismissed it. From that we essentially came up with something for New York, and then we figured it would be a similar situation in a lot of the states. You do not want to walk into court, particularly if you've got a bad situation like this with, we're good guys and we're trying to manage our resources.

This again is I can't emphasize it enough; this isn't a policy. This is simply a guidance we came up with. There are a lot of commonalities among the states in terms of these issues. If it's a weather condition or whatever we probably just wanted to offer this up, so that if an

individual state wants to develop something more formally, this is more of a template or a base document that you can use.

If you want to be consistent with the rest of the state, which I think would make a lot of sense with a lot of the other states. I think it gives it more strength. In particular, even if you don't want to have something, we have a document that you can refer to that if you do go into some formal court thing or whatever; you can say well the commission at least has guides that we would follow. That is a document you can refer to.

This does not say that this cannot be modified. Every state is going to have unique circumstances, so this base document can be taken and things can be added to it or taken away from it; depending upon that circumstance. But at least having that template, that base document, seemed to be a good idea. With that I think we'll take questions.

CHAIRMAN GROUT: Dave Pierce, do you have questions or comments on this and then Jason?

DR. PIERCE: Yes, just a comment. I appreciate New York's initiative on this. The Subcommittee's work is much appreciated, as well. Dan and I are in the midst of working with our law enforcement agency to come up with a safe harbor policy; something that can be used to assist law enforcement that all of us deal with.

The request that we frequently get during the winter time especially, when bad weather arises and fishermen fishing on Georges Bank, for example, and the northern edge of Georges Bank catching summer flounder, have to steam all the way to North Carolina to offload their fish; which is a bit foolish, but nevertheless that's the way the rules are. Weather gets bad, the engine breaks down, and they need safe harbor. This is good guidance, and we'll use it as we move forward with our law enforcement

agents to come up with a way in which we can effectively deal with all of these requests for safe harbor.

MR. McNAMEE: I totally agree with everything that Jim said. I think this is a really good idea. I thought I would offer one nuanced point. What we have found is that first communication about transferring quota, things of that nature. We found it to be more effective if it is actually the vessel captain or owner that makes that communication.

While I agree that in the end it has to be the state agency to state agency that does all the formal logistics; that initial contact I think is more effective coming from the vessel captain or owner that came into port. I just want to make sure that the guidance document, if folks were to agree with that is flexible enough to accommodate all of the communications; and have to be just between the state agency to state agency.

MS. KERNS: Jason, is that the vessel captain contacts the home state to see if they will be willing to transfer quota to another state?

MR. McNAMEE: That's correct.

MR. BATSAVAGE: I think having these guidance principals is helpful for all the states to kind of craft their policies that work best for them. We're the one state that doesn't allow vessels to land our quota in another state due to weather, for a couple reasons; the main one is industries desire to have those boats return to North Carolina if at all possible, but also in the past, vessels taking advantage of the weather situation.

That's probably the most challenging thing, as far as the guiding principles are the criteria. I think what is given here is a good example of what can be used. It is just kind of really hard to pinpoint all the reasons why weather could play a role or not; as far as returning to the home state. The thing that is still kind of tough

to separate out is vessels seeking safe harbor for safety purposes versus the second step; which is coming in and hoping to land fish in another state, due to the circumstances listed.

I'm still kind of struggling to try to figure out how to kind of separate. You know the first part where it's like; port will not reject any deserving, damaged or needful vessel from the circumstances, which are kind of more of circumstances for requesting permission for landing quota in another state, or something like that.

But anyways, I think this is good. I think the more we do this the more we learn; and North Carolina and Virginia have been doing this for a long time. Just when you think you've kind of seen every situation that can occur, something new pops up. Treating these guiding principles sort of as a living document, if we see things collectively the states that aren't quite working out the way we thought; I guess we can always have the opportunity to revisit this.

CHAIRMAN GROUT: Ritchie White and then David Blazer.

MR. WHITE: Not having followed this, I don't believe it is an issue in New Hampshire; at least I'm not aware of it. I guess I'm kind of surprised that it's not automatically doesn't go to the home port state. I mean here you have a vessel that is regulated and is operating under the regulations of a state that is unloading in another state; obviously due in most part to circumstance out of their control. But I think it is creating a problem for the host state that really should be taken care of by the home port state. I think it ought to be an automatic transfer. You shouldn't have to ask, it ought to be automatic.

If problems arise in the regard that they're taking advantage of this, then the home port state needs to figure that out not the host state. I guess I'm just kind of surprised that it is unfolding this way. As I said, new to it and just

getting educated on it, but it just seems backwards to me.

MR. DAVID BLAZER: Jim, thank you and Toni and the Workgroup. It is good to see something in writing that gives us a little bit of guidance; because we've had this issue come up a couple times in our state. We have one small port on the coast in Ocean City. We could get significant storms that will shoal up and cause our inlet to close down for a little while.

We have used this after a significant nor'easter where we've got shoaling in our inlet; but we've got boats that are out there. That's been the one case where we've used that. We look forward to having these guidelines in, but we'll make it kind of state specific and work through that. It is good to have something; I appreciate all your work. Thank you, Jim.

CHAIRMAN GROUT: David Bush.

MR. DAVID E. BUSH, JR.: I think that knowledge sharing and sort of cross-loading this information to each of the states is great. The bottom bullet down there is one thing that I think is pretty valid. I understand that this puts vessels in certain situations, and part of that is on the vessel captain as well; but the states should have a right to say no, when they feel that they need to be able to say no.

If you make this an across-the-board thing, or it's automatic. Any of you all that have ever been out on a boat knows how easy it is to have a situation, and it looks legitimate. It doesn't take a rocket scientist to create a situation and save you days of steaming and thousands of gallons of fuel. I'm not saying that everyone is like that. I work for those guys. But at the same time, the landings flexibility that we discussed yesterday is most flexible under its current situation. That flexibility has to be able to go from 100 to 0 at the will of the home state.

CHAIRMAN GROUT: Okay, thank you that was a good discussion; the only thing that I heard was a potential recommendation to make the first contact on the onus of the boat captain that would differ with that. Are there any objections to making that change to this nonbinding policy guidance? Okay, we'll see that change and then I would like to ask Toni how we would propose to just make our commissioners consistently aware of this guidance document; should they wish to use it in developing their own states guidance document.

MS. KERNS: I think there are two, well there are many options I guess we could do, but two that really come to mind. One, I can e-mail it to the Policy Board and then you guys have it. Obviously that means that you have to remember that you have it as you go forward to creating these documents.

We could also put it on the web page, under the ISFMP Policy Board, and just make sure that it is very, very clear that it is an informational document; but on the header that it is not policy or a requirement in any shape or way. I would probably put on there, also include that individual states create their own safe harbor, transfer, landings policies themselves; and the commission does not do that.

MR. GILMORE: I would prefer Option B. I think that is probably the best way to go about doing it, because that way it is available and it is on those front pages with all the other, sort of guidance documents. Just a quick comment on the underlying theme to both Chris and David's comments was that there was going to be two bars.

The safe harbor is kind of a low bar, the transfer and everything that is a much higher bar. The theme is that you're going back to your home state; we're just trying to keep you from having a real safe issue with your crew. Then again that would be my suggestion was the website. CHAIRMAN GROUT: Okay any further discussion on this? Okay thank you very much, good discussion on this and thank you for developing the working group that did that. That is excellent.

UPDATE ON MRIP TRANSITION OF THE FISHING EFFORT SURVEY AND APAIS

CHAIRMAN GROUT: The next item agenda is MRIP and the transition of the Fishing Effort Survey to, and APAIS, excuse me. We have Dave Van Voorhees here from NOAA Fisheries; he's got a little presentation. Welcome, Dave!

MR. DAVE VAN VOORHEES: I just want to say I appreciate having the opportunity to address the Policy Board today; and answer your questions that you may have after the presentation. I'm the Chief of the Fisheries Statistics Division in the Office of Science and Technology in NOAA Fisheries Headquarters.

We do have responsibility for administering the Marine Recreational Information Program for our Office Director, Ned Sear. I'll be giving you an update today; largely focusing on the transition that we're making from Legacy Survey Designs to very improved survey designs for recreational fisherman.

Most of you know that we do two surveys to estimate catch, typically for recreational fishing. We'll do one survey that is focused on estimating the number of fishing trips that anglers are taking; we call that our effort survey. It is usually done off sight, either through telephone survey methods or mail survey methods.

We also do another survey that is an on-sight survey called our Access Point Angler Intercept Survey; to get information on what people are catching through direct observations of what they've actually brought back to the dock, and asking them also to report what they caught and released at sea.

That information is used to estimate the average number of fish caught per angler fishing trip for all species that anglers are catching. We then have two estimates, basically, an estimate of total number of trips and an estimate of the average catch per trip; and by multiplying the two together, and we can estimate the total catch for any given species in the recreational fishery.

In the Marine Recreational Information Program we've accomplished a lot over the years since 2008. As you know, we established the program after having initial review by the National Academies of our recreational fishery surveys across the nation; everything that we were operating and funding, including some surveys run by state agencies. We've worked together with all of our state agency partners, commission partners, interstate partners to move the program forward to address the recommendations that came out of that review. We established a National Saltwater Angler Registry that is continuing to be improved. But I must say the success of that effort has been largely dependent on the states really stepping up, and providing registration and licensing programs that met requirements for the Federal Registry.

We've also developed improved estimation methods for our on-sight survey that properly took into account the complex sampling design of that survey; and we used that to re-estimate catches back through 2004, and developed a calibration for earlier years. Later we developed an improved sampling design for that on sight survey; which I'll say a little bit more about today.

Then we also developed a new mail survey design; as an improvement over the Legacy Telephone Survey, based on the digit dialing that we've done for many years. We have that ready to implement, but I'll be telling you more about the plan for how we're going forward to implement that mail survey.

More recently, we've been working with our partners to develop regional implementation plans that identify what needs to be done moving forward within each region, what all the partners want to accomplish in terms of improved survey designs, and what we want to implement moving forward.

Those are in progress at the moment. We've also been working on developing a new strategic plan for the program; which is now posted on our website for feedback and input from everybody. Please go and review that and let us know if you see any reasons for changes. We had a second review done by the National Academies that you heard about; Dr. Cynthia Jones came here. She is the Co-Chair of the committee that reviewed the program; and addressed you at your last meeting.

That review I'll say a little bit about; in particular for the later part of the presentation. The National Academies Review basically pointed out that the collection of recreational fishery data is extremely difficult. It is not easy; so advanced survey methods and complex statistical analyses are needed.

I think one comment that Dr. Jones made was that it is actually more complicated than rocket science. I think that's just a humorous way of pointing out that it isn't easy to design and conduct these surveys; to get what we're trying to accomplish. We did get positive feedback from a National Academies review.

I'm not going to dwell on that. I will focus more specifically on the two major surveys that we're transitioning to. But additional challenges do remain for us; and there are a number of recommendations in the report from the National Academies, of things we can do to further improve on the very improved designs we've already developed.

I'm going to talk about first of all the Access Point Angler Intercept Survey. National Academies said that the new design we've developed, the new estimation and sampling designs for that survey, are substantial improvement over what we used for MRFSS in earlier years. We've greatly reduced the potential for bias in that survey; by having strict adherence to formal probability sampling protocols, limiting decision making by samplers that can no longer decide when to go to a site or when to leave a site to go to another site. There are more strict protocols in place. We've also expanded temporal coverage; so we're getting intercepts of trips returning throughout the day, not just during the peak activity period of the day, but trips returning at night time as well as off-peak-daytime hours.

The site time assignments are actually completed without rescheduling, because we have a sampling approach that's making sure we're taking into account the constraints of the folks that are actually doing the survey. Very importantly, now on the Atlantic coast we have all the data collection for the survey being conducted by state agency personnel and ACCSP. We're very happy with the way that is going.

The new fishing effort survey that we've developed is actually a mail survey design; to replace the Legacy Survey of the random digit dialing telephone survey that we did for many years since 1981, the beginning of MRFSS. The National Academies pointed out that the methodologies that we're using for that approach are major improvements over the legacy approach.

I just want to point out the major reasons why we see it as a better way to go is that we get much better coverage. Through our mail survey approach we can reach households that still have landline phones and answer that phone. But we could also reach households that only have cell phones and only answer cell phones; even though they might have a landline phone.

We get higher response rates from mail surveys now. The response rates we're getting are in the order of 40 percent. The random digit dialing telephone surveys now get response rates below 10 percent. We have a much better chance of reaching people who fish, because we're taking advantage of the National Salt Water Angler Registry that has been developed.

We're using that so that we can actually sample households that have addresses that are in the registry; at a higher level than households that don't have, license holders basically. In the pilot studies we conducted, leading up to the development of this design, we also found that we got very different estimates of the number of trips that anglers were taking.

They are considerably higher than what we got from the coastal household telephone survey. As we transition to new surveys, improved surveys, it is very important that we take into account that we could be causing a major disruption to stock assessments and the management process. As you know, stock assessments and fisheries management rely heavily on having comparable time series of recreational catch statistics.

If you changed your new methodology and proven methodology, it is likely that you will get consistently different estimates from the new method than what you got from the old method. It is important to develop a calibration; a way to be able to convert from the old currency to the new currency, so we can actually revise historical estimates to match what we're going to get with the new survey designs moving forward.

That gives you a comparable time series of information for assessments and management. We need to do this not only to account for the new mail survey that we're going to implement, the fishing effort survey, but also to take into account the changes we made in the Access Point Angler Intercept Survey to improve that. To do it we thought we needed to work together with all of our partners; to plan a transition for how we're going to actually

implement and account for the changes that come from the new surveys. In order to do that we reached out to all our partners, we got representatives from regional offices and science centers, from the councils, from the interstate commissions, and from a number of state agencies to form a transition team. That team has developed a plan for how we're actually going forward to implement the new surveys; and it will ensure that the new numbers are incorporated into assessments and management in a timely fashion, accounting for the important changes.

This gives you an idea what the schedule looks like that the team developed. We set up a three-year benchmarking period for doing the Legacy Telephone Survey, continuing that of course, alongside of the new mail survey that we developed. That is from 2015 through 2017. In 2017 we're actually moving forward to evaluate a calibration model that's been developed for the transition from the phone survey to the mail survey.

That is going to be peer reviewed in a workshop that we scheduled for the last week of June; and the model is actually going to be shared with the transition team within the next few weeks. We're hoping if the model is approved by the peer review that we will be able to go forward and use the model to actually produce revised effort statistics; based on the first two years of the side-by-side data.

That will give everybody a chance to look at what the changes will look like; as we move forward into 2018. Later in 2017, we're also going to complete evaluation of a calibration model to account for the changes in the intercept survey. That model will then be peer reviewed early in 2018; so that when we have final numbers for 2017, we will be able to use both calibration models to re-estimate historical catch and effort, and have those revised numbers available for folks doing assessments by the middle of 2018.

I just wanted to make a quick mention of other work that we're doing; because everything I've talked about up to this point is focused largely on how we estimate effort and catch for private boat fishing, and shore fishing. The new mail survey is not going to be used to estimate forhire trips, charterboat headboat trips.

We have other surveys that focus on the forhire sector. We are doing work in MRIP to look for improved ways to do data collection for the for-hire fishery. The ultimate goal is to develop and certify designs for electronic trip reporting programs; because we know that in three of the regions at least, Gulf, South Atlantic, Mid-Atlantic there is a lot of interest in moving in that direction.

We've been funding studies that are using a number of very important components; electronic reporting, but also methods for very good compliance monitoring, to make sure everybody is actually participating. Finally, a very important component is dockside sampling that can be used for validation of the self-reported data.

That is going to be a move away from what we're currently doing; which is just the for-hire telephone survey that we're using to estimate number of trips for charterboat anglers and the Northeast Vessel Trip Reports are also used in our effort estimates. Finally, the Access Point Angler Intercept Survey is used to estimate the average catch. This last slide is just to give you an idea of other things we're working on.

I think in the interest of moving things along, because you're already kind of late on your schedule; I'm not going to go through this slide in detail. But I'll just leave it up there, and I'll be glad to take any questions people may have.

CHAIRMAN GROUT: Any questions for Dave? Oh boy, well I'll start in this side of the room and we'll go around. John.

MR. CLARK: Thank you for the update, Dave. We heard at the last meeting the National Academies review of the MRIP. The survey is obviously a great design, and yet if you had been here yesterday you would have heard just heaped on criticism of the results that are actually coming out of it. Do you have any way of plans to some way maybe groundtruth some of the numbers you get out of this; because a lot of the numbers do seem to defy belief?

MR. VAN VOORHEES: Well the surveys we're doing do have limitations. One of the important recommendations that came out of the National Academies review was they really thought we should take a close look with all of our partners at whether or not the MRIP design is sufficient to manage recreational fisheries the way people want to manage the recreational fishery.

Now that can vary. Different people have different ideas about how best to manage it. But what they focused on in particular was if people are trying to manage the recreational fishery in season, similar to what's done for the commercial fishery; then the survey designs we're working with may not be adequate to support that. That is what they're recommending us to take a close look at. If people actually want to manage fisheries in that way, I'm not saying that is the way that everybody really wants to do it.

Then we need to take a closer look at some alternative methodologies for managing the fisheries. It is extremely, as I think most of you understand, it's extremely complex to be able to produce recreational catch statistics similar to what we do for commercial fishing; because we can't census everybody. We don't have a way if we tried to require them to report everything. We don't have a way of checking up on everybody that is adequate to make sure that we're actually getting complete reporting.

CHAIRMAN GROUT: Roy Miller.

MR. ROY MILLER: Nice to see you again, Dave. Refusal rates have been historically a problem in our state; particularly with the for-hire sector. I'm curious if there has been any moves to attempt to overcome that particular obstacle among some of the for-hire captains; that refuse either to allow surveyors on their vessel or refuse to cooperate with the surveys altogether.

MR. VAN VOORHEES: Certainly I'm aware, Roy, of that issue; and have personally dealt with it in the past, in Lewes, actually. I made a visit down there years ago. It is difficult sometimes to be able to seek the cooperation that we need to get really good data from the surveys. But we do continue to look at that and try to improve our communications; to get out and talk to the folks, you know go out of the box and actually pay visits.

I think that is something that is duly noted. I think we should follow up on the issues in Delaware. I would like to talk some more with you about that.

CHAIRMAN GROUT: David Bush.

MR. BUSH: Thank you for the presentation. A quick question for you, up and down the coast there are mixed reviews as to obviously not just MRIP, but recreational reporting and some way to gather that data. You know you have recreational fishermen that are, sure I'll put an application on my cell phone, report every time I go out; and some guys, they don't need to know what I'm doing. You do get a mixed review. But given the possibility of whether it is voluntary or state-led programs to provide recreational data in some form or another.

I understand that there would be a calibration issue; trying to convert it into something useful to MRIP. But I wonder if you could maybe just briefly tell us where that sort of stands. Then the second question I think was kind of already asked, and that's when you get these two intercepts that equate to catching more than

the biomass on the planet has, what are we going to do with that?

MR. VAN VOORHEES: There are two questions there. I'm going to try the first one and then come to the second one. I think Dr. Jones actually addressed that first question somewhat when she was here at the last meeting. It certainly is possible to design a data collection program that has folks reporting through cell phone applications on the trips.

The key is to make sure that everybody that is participating in the program is actually reporting everything they do. You don't want to just get the positive trips and not the negative trips; because then you'll estimate average catches way too high. It is also difficult, because of the sheer number of people participating in the private boat fishery.

For example, if you try the census type of approach that would be extremely difficult to manage to make sure everybody is actually in compliance. You can however develop a sampling approach, where if you recruit a panel through a probability sampling approach and you have that panel reporting everything that they're doing.

That certainly has potential. Now the key there is you need to know how to weight the data that you're getting from a representative sample of the population; in order to estimate what's going on in the total population. If you don't have a probability sampling approach, you can't be sure you have a good cross section in your panel.

If it's just a volunteer panel, you might get volunteers that are better at fishing than the non-volunteers; and you might end up overestimating your catches as a result of that. It is certainly possible. But it's going to be extremely difficult to develop a system for private boat fishing for shore fishing that actually meets the standards for statistical

surveys, and so you can be sure you're producing unbiased estimates.

We are supporting projects; MRIP is supporting some pilot studies that have been testing out a use of cell phone applications for reporting. There was actually one study done in Florida that compared data being captured through cell phone applications with data collected in the MRIP Intercept Survey in Florida; for some regions of the state.

Your second question was getting at how to deal with these numbers for; I think what you're looking at is low activity time periods, for example, November/December period. We had a number that most of you know about for black sea bass in Wave 6 of 2016 that was much higher than what we saw in the earlier years for that same time period. We looked very closely into the data; to see if anything was done incorrectly, in terms of sampling procedures, also to look at the data itself to see if any of the values were out of range of what would be believable for an angler fishing trip.

We weren't really able to find anything that is incorrect that would have necessarily caused an error in estimation. But I want to point out, it is very important to recognize that in low activity periods that is very difficult for a survey designed to produce a really precise estimate. On the intercept survey, we have a lot of intercept assignments that are occurring; but many of them are not succeeding in intercepting any trips, because nobody was coming back on that day at that site.

The sample we do get of angler trips is smaller for those low activities time periods than it is for more active time periods. The effective sample size being small causes us to have an estimate that can be quite variable from year to year. Some years its' high, some years it's low. The real value is probably somewhere in between; or maybe we occasionally hit it right on the mark.

But that's a problem; in terms of a sampling survey is the effective sample size. On the effort side is the same problem, because we're contacting a lot of households to find out how many trips people took in the household; but there are a lot of households during those low activity periods that don't have anybody reporting trips.

The hits we do have are the ones we have to rely on to provide data to produce our estimates; so the effort estimates can also fluctuate from year to year in this low activity time periods. But as you look towards the middle of the year, the much more active time period there is a lot less room for variability in the estimates; because we have much larger effective sample sizes.

CHAIRMAN GROUT: Andrew Shiels.

MR. ANDREW L. SHIELS: Yes, thank you for the presentation. Just a quick question, do you have an estimate of the participation rate in the National Angler Registry; especially on the east coast?

MR. VAN VOORHEES: I think what you're getting at is do we actually have everybody registered, right? I think the answer to that question is it varies a lot from state to state; based on what we've seen so far from the mail survey that we're conducting alongside of the current phone survey. I don't really have numbers I can share with your right now; but I can just tell you it does vary quite a bit.

In some states it looks like the suggestion that we may be missing as much as 40 percent of the participants, just based on the registry alone. Other states it is less than that. I think there is still work to be done to improve our registry; working together with our partners to find ways to get folks registered, who may not be required to pay for a license. But we want to at least get them in the registry; so we can have the ability to survey them at a higher level than folks that aren't participating in the fishery.

CHAIRMAN GROUT: Jim Gilmore.

MR. GILMORE: Dave, I would like to thank you. I think you have the hardest job in NOAA Fisheries, quite frankly; because I know this is probably one of the most difficult things. That rocket science analogy I think is correct. You get beat up a lot, but just I know you guys are trying your hardest to do this; and MRIP isn't a four letter word in the bad sense. Hopefully we'll get to it.

Just an issue and it is more of a comment is that in the ideal world if we had done this thing, we would have developed it, tested it, modified it and then rolled it out. But of course because of the circumstance it was rolled out; and we're testing it, modifying it, live. The problem comes down to be the anomalies.

Right now, thanks for getting on the phone with us a couple weeks ago on black sea bass; because that pretty much explained it. Again, I applaud you guys; you're doing a great job. But we're in that mode where the operation was a success; but the patient died is the bigger problem. Those anomalies come out, and what happens is you know what happened yesterday.

We've got this number that is suspect, but because of the fear that well that is a number NOAA Fisheries is coming down with the hammer with draconian measures; we did what yesterday was, I think an extreme over reaction on black sea bass of what we're doing. We're reacting to that and that is causing a problem.

As we move forward, we really need some judgment or whatever; some kind of way to deal with that; because again, we just I think impacted a fishery dramatically that did not have to happen, simply because it is a work in progress, and those anomalies are really killing us. Whatever you and John and everybody else can do to try to get us to deal with that as we move forward to smooth that out, I think would be a big help.

MR. VAN VOORHEES: Well Jim, thanks for the kinds words; but I certainly understand how difficult it is to manage recreational fisheries, and especially to try to do it with estimates in some cases aren't very precise for some stocks. It is a multipurpose survey that we're doing. We're trying to cover everything.

We're trying to get the best estimates we can for all different species that are being caught. We're also in this situation where the managers have to manage fisheries with annual catch limits; and you have to use whatever number is available. We're trying to do the best we can to provide good numbers; but in some cases the estimates we provide for some stocks are not very precise.

They are going to be subject to questions; you know because we don't have enough data on that particular stock to actually produce a really strong, highly defensible, precise estimate. The other problem we have as I alluded to earlier is that at an annual level we can do a good job of getting precise estimates for different stocks that are being managed; many stocks.

But when you get down to the two-month wave level and you're tracking wave by wave as you go through the year. That becomes much more difficult. You know where high activity waves, those wave level estimates are generally pretty precise; but the low activity waves early in the year, late in the season, if you're just looking at that one two-month period. That estimate is not going to be as precise as what we get at the annual level, or what we get for the high activity waves. That I think we need to be taking into consideration; in terms of how we use the numbers. I think we're looking to put together a workshop; probably this fall, working with several of the councils and ASMFC, to start taking a closer look at how we deal with imprecise estimates for the recreational fishery and how that matches up with a management strategy. Looking for other ways to improve the precision of estimates by using data maybe for more than one year for some stocks, instead of relying just on the current year data. A number of other alternatives are going to be explored.

CHAIRMAN GROUT: Mark Alexander.

MR. ALEXANDER: David, I'm glad you're here. It is always nice to hear what you have to say, and I always enjoy your explanations for things. I have two questions. The first is, a moment ago you answered a question regarding a mobile application and the importance of differentiating or accounting for positive and negative trips. In the fishing effort survey, the mail survey, how do you account for or confirm that people that have had a trip in the previous wave were more or less apt to report or respond to the survey than people that did not have a positive trip?

MR. VAN VOORHEES: Yes that is very important, I'm glad you brought that up; because one of the major things we were focused on in developing the new mail survey was this potential for what we call a non-response bias. The people who respond to the survey could be different than the people who don't respond to the survey.

If you have that situation that can create a bias in your estimates; because we're surveying basically through a mail approach, we're surveying households. We're trying to find out for all the households that receive the mail survey, get trip data for all the residence of that household for the last two months.

It is very important that the people who didn't take any fishing trips also fill out and return the questionnaire; otherwise we're going to overestimate the number of trips being taken by all households. The way the questionnaire is actually designed, we include questions that are not about fishing; they are about weather, other aspects of NOAA, you know unrelated to fishing.

The whole idea was to try to make the questionnaire more salient to people who don't

fish, so that they would actually respond to questions and send the questionnaire back. We also have on there a place for people to record salt water fishing trips if they took any. But that is just a portion of the total questionnaire.

That was done to try to improve the response rates for people that didn't fish, as well as people that did fish. We also did follow up studies, which we call follow up non-response surveys; where you basically take the addresses that didn't respond and send them another questionnaire, with a larger incentive.

We normally include a two-dollar incentive with the mail survey, a larger incentive and easier ways to respond through phone or mail. Those follow up studies did not show a non-response bias. We were able to compare those who did not respond initially with those who did respond; and did not see a statistically significant difference. But we have had a strong recommendation from the National Academies Review to continue to do those non-response follow ups as a standard part of the survey. We are going to be doing that when we rely on the mail survey starting in 2018.

MR. ALEXANDER: My other question was, in our discussion yesterday with Fluke, Scup and Sea Bass; there was a statement that the VTR data is folded into the estimates at the end of the year. That was a little vague to me. I wasn't sure what end of the year meant. Is that data accounted for or used prior to the release of the preliminary data or between the release of the preliminary and the final data?

MR. VAN VOORHEES: This is an area we're looking to improve; working together with our partners in GARFO or the Regional Office to conduct the VTR program. What we currently do is we use the VTR effort data to improve our effort estimates for the charterboats and the headboats. We haven't traditionally been able to get that data complete until the end of the year.

What we've done is in the preliminary estimates we're just relying on the for-hire telephone survey data to estimate effort for all boats; federally permitted as well as state registered boats. Then at the end of the year when the VTR data was available and considered to be pretty complete.

We then incorporated that integrated it with our for-hire survey data, so that we could get a separate estimate for the federally permitted boats that came from the VTRs for their trips. Then the non-federally permitted boats we relied on the for-hire telephone survey data to estimate those trips. That is why the estimates change a bit between preliminary and final for the charterboats and the headboats. We haven't used the catch data from the VTRs.

The decision we made years ago was to continue to rely on the actual intercepts where there is direct observations by a sampler of the catch that is being brought back to the dock. But what we're moving towards doing is getting the VTR data on a bimonthly basis, so we can incorporate the VTR data into the preliminary estimates; so there won't be as much of a change between preliminary and final estimates at the end of the year.

CHAIRMAN GROUT: Adam Nowalsky.

MR. NOWALSKY: Thanks for being here today, the presentation, as a member of the recreational community who has made a number of inquiries to the SNT Office, never found your staff to be anything other than completely professional and helpful in all inquiries; and appreciate that.

When management saw the transition from MRFSS to MRIP a number of years ago, I'm not sure if promises are the right term, but I'll certainly say expectations or hopes with regards to timeliness of when the data might be presented; with regards to possibly getting information on a monthly basis as opposed to every two month wave basis.

Certainly the expectation was confidence intervals. We certainly haven't been able to get any of that on paper, in practice; that's not to say the numbers aren't actually more accurate. But a lot of those management expectations and hopes to improve how we use the data haven't been met. As a result of that earlier this morning we had discussion about our commissioner survey in recent years, some declines in expectations, largely driven by recreational problems; which are in large part how we use the data. You touched on some of that in your presentation. I think that slowed down management's willingness to revise the management process; and how we react to the recreational data. I think we gave it a chance; and realized we still have a way to go. My concern now is four or five years after the fact of bringing MRIP online, we're bringing all these re-estimations to the table.

My concern is management is going to latch onto it for another four or five years and say, let's give it a chance now; as opposed to really looking at our practices and how we deal with it. Could you maybe compare what expectations management have relative to these re-estimations, compared to what the expectations were from the MRFSS/MRIP transition; and what your thoughts are about how management should really be changing how we use the data versus just expecting data is going to fix all our problems.

MR. VAN VOORHEES: There are a few questions there I'm going to take a shot at and then if I miss something, please let me know and I'll try to respond if I missed any of the questions there. One thing I want to point out. The National Academies Review actually made a recommendation that we strongly reconsider the recall period that we're using for our effort surveys; which has been a two-month interval ever since 1981.

We're certainly aware that there is interest in getting more timely numbers. We actually have MRIP funded a timeliness workshop a few years ago that looked at this at the ways we can actually move things up; to have updates during the season more frequently than every two months, and to shorten the time interval between when the data is actually collected and when we produce the estimates.

We are trying to improve in that direction; and we actually have a pilot study we've conducted with the new mail survey that uses a one-month recall rather than two months. We're still in the process of evaluating the results of that. National Academies wasn't aware of that pilot study, but we think it is a pretty strong indication that we can go to monthly estimates; it's going to be somewhat of a resource issue, in terms of funding available.

But it is certainly doable. We think we're getting results that are very consistent with what we're getting currently with the two-month interval. That will be a concern, because if you've got different estimates from monthly than what you get from bimonthly, it might be a need for another calibration.

We think it looks pretty positive that we could actually go to monthly with the mail survey; and get results that are consistent with what we're getting bimonthly. As far as settling for what we have now. You know I think I certainly hear that. We always need to be looking to advance forward; that was strongly endorsed by the National Academies. We want to continue to do research for ways to improve our surveys moving forward.

One good example is, it was actually recommended in the National Academies review, is looking at going from a mail response approach to allowing people to respond to something they receive in the mail by reporting it through a website; where we could actually ask more questions. It would be cheaper. You could get a faster response than waiting for something to come back in the snail mail. We think that is going to be highly likely that we'll be able to go in that direction in the near

future; but the expert consultants we're working with are saying we're not quite ready for that yet, because there are still a lot of people that would not respond if they had to do it through a website. I think that's probably people in my generation and older; to a large extent. But I think as we get out of the picture, I think that type of approach may be more feasible. That is just an example, but we always need to be looking for other ways to collect the data to improve.

You know for the for-hire sector going to electronic reporting programs, making sure that we have a good design for how that is actually set up; so that we can be sure we're getting unbiased estimates. It's going to be more expensive. We'll have to find the resources to do it; but if people want to go there, I mean we can look at that. We can do different approaches. I think a lot of it is resource dependent. The precision issues that you brought up, you know how do we get tighter confidence intervals on the estimates? It is largely how much data we collect.

It is how much we can afford to collect. The surveys that we're doing now are actually more expensive than they were ten years ago. There are minimum pay rates for the samplers that entered into the picture several years ago, and have really increased the cost. Yes, we need to work together and continue to look for ways to improve; and get the resources needed to actually support new approaches.

CHAIRMAN GROUT: David Pierce, and then I have one other question after this. Then we'll move on.

DR. PIERCE: Thank you, David, thank you for your insights. I appreciate that. I also appreciate your focusing on the imprecise estimates of the MRIP. Fortunately, this Commission appears to be going in a direction that is very consistent with what you just mentioned; and that is instead of our being wedded to point estimates of harvest, we're

looking at the range around those point estimates; the PSE.

If we're within the range that is good enough; at least we seem to be going in that direction. We've already moved in that direction with one species, and I hope we continue to go in that way. Wave 6, black sea bass, it's been said it's an anomaly. I don't think it is based upon what I've seen.

I would like at some time for an official statement from MRIP regarding that particular wave. Was it anomalous or is it really an estimate that we should be using; because it is ruling the day now, and I think it will rule the day as we move forward into the rest of 2017 going into '18. It has tremendous implications for what happens in 2018.

With that said; the Technical Committee gave a presentation yesterday, and they indicated that they had a problem with the MRIP information; specific to their evaluating black sea bass and the actual numbers for the different waves, New York being obviously in the crosshairs. The reports given to us said, and this is from the Technical Committee.

It should be noted that there are several components to how the Marine Recreational Information Program developed the 2016 harvest estimates that remain unclear to the TC, specifically the weighting of intercepts, harvest by mode, and how the proportional standard error is calculated. Requests have been made to MRIP staff to further explain how the harvest estimates regenerated with many of those questions remaining unanswered. That is a great concern. Now, what can be done for the Technical Committee's concerns to be addressed; so that they actually can get under the hood to help us better understand the MRIP findings, such as the proportional standard error? How was it calculated? All of this really plays into the very difficult management decisions we have to make. I know you're doing the best job you can possibly do. That is

evident from all the responses. What can we do to get this kind of information that the Technical Committee requires for our benefit?

MR. VAN VOORHEES: David, you already have a lot of information on our website about how the surveys are done, how the estimation is done. However, we have been working very hard on upgrading that to make sure that we have good descriptions of the new methods; the improvements we've implemented over the last few years.

John Foster just reported to me this week that we're close to having that completed; and it will be reviewed, obviously, to make sure that everything is clear in there. But we're going to be posting that on our website, I think within the next few months. That new documentation would be available for any of the folks on the technical side to look at; to understand how they could replicate, basically what we're producing, in terms of estimates.

DR. PIERCE: Thank you very much, but beyond going to the website, there are actually, I really don't know I'm asking the question. Who talks? Who are the people who can actually communicate with the Technical Committee and so there can be a good discussion personto-person as opposed to going to a website, and wandering through the website trying to find the answers to these questions?

MR. VAN VOORHEES: Yes, well I have a Branch Chief for my recreational branch now; as of last June. John Foster is my Branch Chief for the recreational branch, and he's really our expert; in terms of the statistical side of things. We have several other statisticians, on the staff who also are expert in this. I think we can certainly set something up where John could come and meet with whoever is interested in digging into the details; we would be glad to do that.

CHAIRMAN GROUT: Okay thank you, I have one question, and it relates, if you could have the

slide put up on the transition; which is the primary purpose of your discussion here today. I need to have that put up so that I can read it; because I don't have your presentation. The intent is that with the new effort estimate survey that we would be discontinuing the coastal household survey, telephone survey, by 2018 is it?

My question here is that clearly that there is a process that has been developed here for transitioning to it, and incorporating the new estimates from the for-hire, using the for-hire and the new APAIS into our assessments. Because we have clearly as of 2018 we are going to be using those revised estimates, which are going to more than likely increase the recreational catches of some species.

Those are the estimates we're going to use to monitor whether we're in the ACLs. My question is, is the plan here still intended to have these estimates incorporated into the stock assessments; and have significant recreational catches by 2018, and in time for council's to potentially modify their specifications before the 2018 estimates are used to calculate or to determine whether they're within the ACL? Is that clear?

MS. KERNS: I think I'm going to start for Dave. I'm on the Transition Team, and I don't want to force David into like when are we putting information into assessments; because that is not necessarily Dave's role. Dave's role is to provide us with the data that we're going to put into the assessments in a timely fashion.

If we do meet these milestones and these calibration workshops occur in a timely fashion; and we get the data out. Then we can start to incorporate the information into the assessments as they come up. For example, striped bass assessment will be coming up in 2018, and we are going to be right on the line of when that data becomes available and when we need it; like drop dead moment need it for the assessment to be able to incorporate it in.

We're going to do the best that we can, as long as that data become available when they're ready. Dave has said that he's going to try to provide us with some information so that we can start to see how we think the model may need to be tweaked; or how indices might need to be adjusted, so we can do some of that work ahead of time.

In terms of when all the other assessments will be occurring, especially for assessments that are jointly managed like summer flounder, scup and black sea bass. We do those assessments in cooperation with those schedules anyway, incorporated into the NRCC Review; and that assessment schedule is looking at the Mid-Atlantic Council, New England Council, and the Commission's assessment needs.

We have put time on the docket for recreational species in the fall of 2018, because we knew that these data would not be available until summertime. It takes time to make changes to the assessments themselves; in some cases life frequency indices may need to be adjusted, they may need to be adjusted throughout the time series, and that is not a small task to undertake.

Depending on how many changes need to be made into the model depends on how long it takes us to get it out and then given to use for peer review. There are also calibrations, and Dave you can correct me if I'm wrong here. But in order to adjust the data back to the old methods; so that if we haven't made changes to the ACLs and the AMS yet, we can still go back and compare the data so we're comparing apples to apples and not apples to bananas, so that we're able to manage appropriately with the numbers that we have available to us.

MR. VAN VOORHEES: Very good, Toni. That's right. Doug, you had asked. We definitely will not be doing the telephone survey in 2018. We'll just be doing a mail survey at that point. I think it is safe to say we will probably have a difficult time getting O and B to actually

approve continuing to do a random digit dialing household survey.

We had to convince them it was necessary to do it over the last three years for this benchmark that we're doing; to go to the new mail survey. As Toni pointed out, the estimates we're producing from the mail survey will be able to be converted into the same currency as what we would have gotten with the telephone survey; based on the same calibration model that we're using.

CHAIRMAN GROUT: Thank you very much, Dave for your very informative talk. I appreciate this effort. Obviously we've been going through some difficult challenges in managing our species, and the data that comes out of MRIP is very important to our management. I appreciate the efforts to try and improve it, and transition to the new methods here that will hopefully provide us with better information with which to manage. We are going to do a little reorganization because of the lateness of the hour in our agenda items. We are going to skip over at this point Items 10 through 13.

REVIEW OF NON-COMPLIANCE FINDINGS

CHAIRMAN GROUT: We're going to go directly to Non-Compliance Findings. We have a motion that was put together by the Fluke, Black Sea Bass and Scup Board. Since our Chairman is not here and our Vice-Chairman is not here, I'm going to ask Dave Pierce, the original maker of the motion to bring that motion forward from the Board.

DR. PIERCE: This motion is in the form of a template, with standard language for non-compliance rulings; so we can modify it obviously to deal with the specific issue pertaining to non-compliance. I will read it into the record. I would move on behalf of the Sumer Flounder, Scup and Black Sea Bass Board.

Recommend the ISFMP Policy Board find the state of New Jersey be out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan; if the State does not implement the following measures by May 21, 2017.

Shore mode for Island Beach State Park only: 17-inch minimum size limit, 2-fish possession limit and 128-day open season. Delaware Bay only (west of the colregs line): 18-inch minimum size limit, 3-fish possession limit and 128-day open season. All other marine waters (east of the colregs line): 19-inch minimum size limit, 3-fish possession limit and 128-day open season.

The implantation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP.

CHAIRMAN GROUT: This is a motion by the Board so it does not need a second. Is there any discussion on this motion? I would first like to recognize Robert Boyles, and then I'll go to further discussion.

MR. BOYLES: Give me just a second, I'm sorry. Mr. Chairman, this is the list of items that need to occur; in order for New Jersey to come back to be in compliance, is that correct?

CHAIRMAN GROUT: This was the original motion that was made by the Board prior to New Jersey putting forward their conservation equivalency proposal that the Board is currently in the process of getting technical evaluation on. This is the original motion; based on what came out on the original addendum.

MR. BOYLES: Okay, apologies, Mr. Chairman. Thank you for that. If that's the case, and I understand that New Jersey does have a proposal that will be considered. Does this motion need to be modified slightly?

CHAIRMAN GROUT: I believe it should; to somehow take into consideration the potential for their conservation equivalency proposal being used to bring them back into compliance, depending on the Board evaluation.

MR. BOYLES: Mr. Chairman, then I would offer a motion to slightly modify; with the words, if the state does not implement the following measures or those approved by the Board.

MS. KERNS: Robert, can you see that last line on that page?

MR. BOYLES: Hang on. I can see that now. I'm sorry, Mr. Chairman, but I would make that motion to add those words; to recognize that there is a conservation equivalency proposal that state of New Jersey has suggested.

CHAIRMAN GROUT: Is there a second to this motion to amend? Andrew Shiels has seconded; and I'll read it in to the record, just so that we have this official wording in here. Then we'll take discussion on the motion to amend; and then also the main motion. The motion to amend to include; or equivalent measures, and that was made by Mr. Boyles and seconded by Mr. Shiels. Now we'll have discussion on the motion. I believe we had Adam Nowalsky.

MR. NOWALSKY: The other element of the original motion I think that there is discussion here, is the date element by May 21st. In all likelihood that Board meeting, the Board meeting may not occur by that timeframe. I don't know if staff has an idea; if they've been erasing other things in their calendar and writing new things in, if they have any input on when that occur, if we need to put something

relative to some other occurrence as opposed to that fixed date in the motion.

CHAIRMAN GROUT: I believe our Executive Director can give an outline of the process of an out-of-compliance motion that may be able to address some of your concerns with this.

EXECUTIVE DIRECTOR BEAL: Adam, I guess the thinking of, or my interpretation of the thinking of the Summer Flounder Board yesterday, was that they wanted to ensure that New Jersey was going to take action by the 21st; because as it stands now with nothing else on the books, as of May 21st, the New Jersey regulations revert to 2016 and they would have a size limit that is smaller than what's required by the addendum and a bag limit that's higher.

But now we've started down this road of conservation equivalency. I guess the question now becomes for the Board, does the Board still want staff to submit a letter on May 21st, or does the Board want to have some of the Technical Committee review and Summer Flounder Board subsequent review play out before letters are sent?

It is really up to this group; because if we send a letter on the 21st, are we sending a letter because the regulations that are in place are the 2016 regulations or are they the new conservation equivalency regulations that have not been reviewed and approved? Those are kind of two different things, right.

It is a process question for the group, and I think there are two paths. One is they can maintain the 21st, because that is what we know right now; or they can make an assumption about how New Jersey is going to progress with their conservation equivalency proposal, and defer transmission of letters until those next steps have played out. I can't decide for the Policy Board obviously on what you want. But those seem to be the two options in front of the group right now; you know either setting the date now or setting a process that

will essentially put New Jersey on notice that the intention is to find them out of compliance if they haven't implemented the appropriate regulations after the Technical Committee and Board process.

CHAIRMAN GROUT: Follow up, Adam and then I have Kelly Denit.

MR. NOWALSKY: Perhaps maybe we quickly dispense with this motion, which I think there is likely support for around the table. We get that original motion back up on the screen, and decide what other changes might need to be made.

CHAIRMAN GROUT: Discussion on this amendment to the main motion? David Bush.

MR. BUSH: The only thing I see maybe is the motion to amend to include or equivalent measures. Those equivalent measures would be determined by whom, according to this amendment? It does not state. Maybe it might be appropriate to state it.

CHAIRMAN GROUT: Specifically add some words about or equivalent measures that are approved by the Summer Flounder Board. Is the seconder okay with that?

MR. SHIELS: Yes.

CHAIRMAN GROUT: Okay, further discussion on the motion to amend. Kelly.

MS. KELLY DENIT: I think just before we move forward with looking at this motion, I wanted to clarify a little bit on the process perspective. I think right now we're in a very challenging situation with a lot of moving parts. We're attempting to craft a noncompliance finding sort of proactively in a certain way; in terms of we don't actually know what the Technical Committee is going to say.

We don't yet know what the species board is going to do with that information. Therefore, it

is a little bit, from a process perspective, it is challenging for the Board to find noncompliance in advance of actually having those decisions. Historically when we've done noncompliance findings it's generally been with an assumption that a state is not putting in place any measures.

In this particular case, we've heard very clearly from New Jersey that they are going to put in place measures next week; and it remains to be seen whether those measures will be conservationally equivalent or not. I think from our perspective, while these amendments potentially help, I think we may find ourselves in a situation where the Board would have to take an additional action following the results of the TC review and the species management board decision to actually move forward a noncompliance finding to the agency.

Just while I have the floor, I just would remind folks that there are two prongs to the noncompliance finding when it comes to the agency. The first is whether they failed to implement the measures as articulated by the Commission, and the second is whether those measures are necessary for the conservation of the fishery. I think the TC review will play an important part in the Commission's decision making and therefore the rationale that it might put forward to the agency of whether those measures are in fact necessary for the conservation of the fishery. Because we're now working under an assumption that New Jersey is going to implement the proposal they've put forward; and not the status quo, which might be two very different questions and two very different results, in terms of looking at the need for the conservation for the fishery. I just wanted to put that out there for consideration of the Board as they're looking at this amendment and then the main motion as a whole.

CHAIRMAN GROUT: I would like to see, and I'll take your comment here, Robert in a minute. Maybe if we work on this motion, decide where

we want to add this particular amendment to the noncompliance finding. Then potentially if there are other modifications that the Board feels need to be put in to clarify exactly when any noncompliance determination would come out, we can take that up in subsequent amendments to the motion.

Is there any objection to taking up this motion and then dispensing with this motion either up or down, and then taking any subsequent modifications to deal with the exact timing of any potential noncompliance finding? Okay, do you need time to caucus? It seems like there are only a couple of delegations. We don't have a full delegation. But I'll give you 30 seconds to caucus on this particular amendment.

Are you ready to vote? All those in favor of this amendment to the noncompliance finding, please raise your right hand, all opposed, any abstentions, any null votes? Okay this motion to amend has passed 12 to 0 to 4 to 0. Now are there any other amendments to the main motion that any Board member would like to make? Adam. I hit the wrong button, you're on.

MR. NOWALSKY: Mike Luisi had a lot of success with that technique last meeting with me. Again, I'll just come back to my last comment that I don't think the date at this time is the appropriate path forward for this Board. I think it needs to be something relative to the pending actions that we know are in play.

I would leave it up to the rest of the Board to determine what that is. I would offer that the right time sensitive criteria right now is that this finding would come forth after the Summer Flounder Board, should they decide that New Jersey's alternative proposal was not accepted.

CHAIRMAN GROUT: Did you catch that motion?

MR. NOWALSKY: I am not going to make a motion on this matter. I'm just putting that out there for Board consideration.

CHAIRMAN GROUT: Okay then Robert, I believe you had your hand up.

MR. BOYLES: Just a point of clarification. I'm not on the Summer Flounder Board. May 21st is when the recreational season begins. Is that correct?

MR. ALLEN: That's the date when our current regulations would allow the fishery to start. The proposal is May 25th.

MR. BOYLES: Mr. Chairman, I guess what I'm struggling with is that again, pardon my ignorance, not being on the Board. There is an addendum that's been accepted by the Board that stipulates what the measures will be necessary for the conservation of this fishery. We don't meet again until August, in person. I'm respectful and understand that New Jersey has tried diligently to find a way to enact equivalency; with respect to the management measures. But the Board has spoken and I think here we are I recognize we're in a process situation.

But I think the date is correct, in my understanding of the way this fishery is prosecuted; that as of this date that if those measures are not implemented, it's either a yes or a no, they're compliant or they're not. Am I reading that correctly?

CHAIRMAN GROUT: I believe so, but I will turn to our Executive Director for any additional.

EXECUTIVE DIRECTOR BEAL: Mr. Chairman, is it okay if I answer the question with a question to the Service?

CHAIRMAN GROUT: Sure.

EXECUTIVE DIRECTOR BEAL: I guess the timing Robert, may be, Jersey stated their intention is to implement the conservation equivalency regulations next week some time. By the 21st those new conservation equivalency regulations will be in place. But the Technical Committee

will not have reviewed those, and the Board will not have approved those potentially.

The question to the Service would be, if they received a letter from us on the 21st that New Jersey is out of compliance with Addendum XXVIII, but New Jersey does have some regulations that are potentially equivalent; what does that do to the review in that interim time period?

MS. DENIT: That is what I was very inarticulately trying to say earlier. We're in the situation where we don't yet know whether the conservation equivalency is real or not. Therefore, this sort of prospective, it might be cool but it might not, noncompliance finding is an issue. I think what we would need is for the TC to do their review.

The species board makes a decision based on that TC input. Either they accept New Jersey's proposal or not. From there that species management board would then make a decision based on the outcome of that decision; are they in compliance or are they not. Then that would then come to the Policy Board at a later date.

EXECUTIVE DIRECTOR BEAL: I like to think what options does the group have moving forward? I think one of them is just maintain May 21st. That is the hard line. New Jersey's regulations aren't consistent and we don't know if they're equivalent or not. We'll send a letter to NOAA Fisheries and then they start processing.

That's Option 1; Option 2 might be the noncompliance letters would not be submitted until after the Summer Flounder Board acts. The noncompliance finding would be contingent on a specific outcome of the Summer Flounder Board. It is sort of delegating this decision until Summer Flounder Board acts.

The third option is the more cumbersome one, but maybe processed more consistent; which is we would have to get Summer Flounder Board, Policy Board and Business Session back together after the decision. Those options are in order of sort of workload for the commissioners and staff to pull that off. But those seem to be the three actions moving forward. I'm not suggesting any is better than the other. But that is what seems to be in front of the Board.

CHAIRMAN GROUT: Andrew Shiels.

MR. SHIELS: I don't know who can answer this question, given the conversation. But the inquiring mind over here wants to know, on May 22nd, none of these other things have happened just because of time and logistics. But on May 22nd, what do the anglers of New Jersey need to know is the regulation that is in place?

Is it what was in place for 2016? Is it this particular set of regulations, or it is the hopefully adopted by next week conservation equivalency regulations? Which of the three sets of regulations do the anglers in New Jersey need to follow on May 22nd? That would be my question traveling to the shore.

CHAIRMAN GROUT: I think the state of New Jersey has made it pretty clear that on the 22nd that it's going to be the conservation equivalency regulations. Unless you think that is something different Russ, then I think we could move on.

MR. ALLEN: Don't bother coming down to the shore on the 22nd, because it will be closed, so you'll be good. We're planning on putting in the alternative proposal regulatory action next week so that's in place; so we're good to the 25th. You know until we open the season at that point.

CHAIRMAN GROUT: I know I've got a couple hands here and I recognize that. But is there a way that we could craft an amendment to the motion that would somehow incorporate; the noncompliance finding would not be sent until if the Summer Flounder Board found that

conservation equivalent proposal by New Jersey is not conservationally equivalent?

Can we do that? Because then it would be contingent upon that without us having to get together again with the Policy Board on this. If that is one of the ways that the Board would be willing to move forward, can we take a two minute recess to come up with that wording? Does anybody see any objection to having that noncompliance finding not be sent until after the Summer Flounder Board meets and makes a decision, and if they make a decision that the proposal is not conservationally equivalent? Robert Boyles, no?

MR. BOYLES: I would object, sir.

CHAIRMAN GROUT: You would object to that?

MR. BOYLES: Yes.

CHAIRMAN GROUT: Okay, so how should we move forward? All right, we have a motion on the board then and we'll have discussion on this particular motion and we'll make a vote on it. David Pierce, you had your hand up?

DR. PIERCE: Just, I'm comfortable with the motion that is on the screen, you know with the dates. Nothing is going to happen to New Jersey anyways. After it has further discussion about the outcome. New Jersey's regulations will be in place, the ones that they will be setting fairly soon. They will be in place for a while. This letter gets sent to New Jersey; all right they've got it. They know what the situation is. Then it's highly likely, if not definite that the Service will know whether or not they have done these things, whether or not the TC has approved it, whether or not the Board has approved it.

I see no problem with the May 21st date. It really is in the National Marine Fisheries Service lap. They'll wait until the outcome of the Technical Committee and our board decisions; which I suspect will be made by May 21. I think

that is what we said we would try to do. The TC would meet very quickly.

Then the Board on a conference call would address the finding of the Technical Committee. It seems to be reasonable enough. We don't want to go back to the Policy Board again. We are here today. We are making this decision. These are the conditions. New Jersey knows. I've said enough on this matter. I felt very comfortable with the motion.

CHAIRMAN GROUT: David Bush, you had your hand up and then Robert Boyles.

MR. BUSH: Just very briefly. I understand there is a consistency in policy issues. I'm not a math magician here either, but I know that on the 22nd no one will be fishing; so that means less harvest than 2-17 inch fish, which in my mind is at least conservationally equivalent until the 25th, just a thought.

MR. BOYLES: I would like to explain myself. I agree with Dr. Pierce. If I recall, the last noncompliance finding this Board dealt with was Delaware eels, I believe. I'll look to John. I believe the remedy the Service was able to offer Delaware, for them to rectify and to come into compliance was quite lengthy. I want to be clear.

I certainly support my friends in New Jersey, want this to work. But I think we've got a process, and at risk of being labeled a Pharisee, I think we have to recognize and honor that process to be internally consistent with the way this Board has acted for decades; with respect to the Atlantic Coastal Act. I want to be clear with my colleagues and friends in New Jersey.

But I agree with Dr. Pierce. I think there is time enough, with moving forward with the motion as amended, as it is stated now on the board that it would be my prayer that this work out well. But I think we have to recognize that there is a process that this group has adhered to for years; and I just wanted to explain that.

MR. NOWALSKY: One question and then based on that a comment. Is there any possibility that the Summer Flounder Board is going to convene next Thursday or Friday?

MS. KERNS: Kirby did a poll of the TC. I gave them from Tuesday to Friday; based on the fact that Russ told me he hoped that the proposal would come to us on Friday from New Jersey, so the TC could have one day to review in the timeframe. As soon as I know what day the TC is going to meet, I am hoping it will be the earlier portion of the week, and we have begged your TC members to be flexible and available as soon as possible.

If you could convey that to your staff that would be wonderful and as soon as I have that date I will send a poll right out to the Board and we'll include the very next day after the TC has met. Your availability will be subject to that as a Board that we will do our best. There is a possibility.

MR. NOWALSKY: Allowing for that possibility. That would address the situation at that point. New Jersey will have measures in place. If those are the measures that are approved by the Board, we've addressed the situation. If not, then on Monday morning the Board will be sending a letter of noncompliance to the Secretary. That is my understanding at this point.

CHAIRMAN GROUT: Bob, isn't it that we have 10 days after that to send it?

EXECUTIVE DIRECTOR BEAL: Yes. The Executive Director has 10 business days discretion or time to write a letter following the date certain established by the Full Commission.

CHAIRMAN GROUT: Yes, Adam.

MR. NOWALSKY: Does the Board need to tell the Director to utilize that discretion to not send the letter at that point? You have 10 days discretion. How is the decision made at that point? Because we will not, if we do not have the Summer Flounder convene by May 21st, which is by the end of next week.

May 21st is next Sunday. Then we will be out of compliance and this motion would go into effect. With that 10 day discretion, are we giving that discretion over or do we need some other formal action by this Board? Do we add it to the motion that says we provide discretion within that further director to not send it?

CHAIRMAN GROUT: Do you think, Bob that you would need a direct order to use that discretion from this Board or would you feel comfortable in using that discretion to its full advantage?

EXECUTIVE DIRECTOR BEAL: My job gets a lot easier if I know what the will of the Policy Board is. I'm happy to wait 10 days after the 21st, if that's what the will of the group is.

CHAIRMAN GROUT: Further discussion on this motion? Kelly.

MS. DENIT: The 10 days are from the decision of the Board and the Commission, which if you move forward with the path that you're on, would be today; it convenes from today. I'm a little bit confused about how there would be a further delay. I guess maybe that's more of a question. Maybe I misunderstood that last exchange.

Then the second point before folks are voting on this motion is, for the reasons I mentioned before. It's possible that if you sent us a letter based on this that we would send it back to you asking for further information, on how this is hitting the threshold of the necessary measures for the fishery; when you at this point are making a decision not knowing whether the proposal is conservationally equivalent or not.

CHAIRMAN GROUT: My interpretation in our discussion with staff was that because it says the 21st there that is when the formal

determination gets put into place. At that point there is a 10 day period. Wilson.

DR. WILSON LANEY: I know that having the 21st date in there is problematic. But does it solve anything if someone were to make a motion to just postpone action on this motion until after the Summer Flounder Board makes its decision? No. I see Toni shaking her head.

CHAIRMAN GROUT: I think, and I can hear from the rest of the Board the concern is that the next time that we're going to meet is in the summer; further discussion on this motion. All right, I'll give you a minute to caucus on this and then we'll take the vote. While you're caucusing Bob wants to bring up another point.

EXECUTIVE DIRECTOR BEAL: Just procedurally. What really we may need to tweak the wording at the beginning of this, but really what's happening here is the Policy Board is recommending to the Full Commission that they take this action later on today. This isn't a final action; it's got one more step at the Business Session in a few minutes, hopefully.

CHAIRMAN GROUT: Can we tweak that little language, just to make sure we have it moving forward? I agree with you. Okay are we ready to vote? All those in favor of this motion raise your right hand, keep them up. Hands down, all those opposed to the motion, any abstentions, and any null votes? The motion carries 13 to 1 to 2.

Given that we are an hour behind schedule, and we still have a Business Session to take up this particular motion. We're going to take all the other items that we had on this agenda, essentially Agenda Items 10 through 13, and we're going to defer them to the August Policy Board.

ADJOURNMENT

CHAIRMAN GROUT: Is there anything else that needs to come before this Policy Board? Seeing

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none; this meeting is adjourned, and we will go directly into the Business Session.

(Whereupon the meeting was adjourned at 11:27 o'clock a.m. on May 11, 2017.)

Mr. Douglas E. Grout, Chair Atlantic States Marine Fisheries Commission 1050 N. Highland Street, Suite 200 A-N Arlington, Virginia 22201

Dear Mr. Grout:

The New Jersey Commissioners of the Atlantic States Marine Fisheries Commission (ASMFC) hereby formally appeal the February 2, 2017 approval by the Summer Flounder, Scup and Black Sea Bass Management Board (Board) of Addendum XXVIII (Addendum) to the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (FMP). More specifically, New Jersey is appealing the Board's approval of Option 5 under regional management in the Addendum and the specific management measures set forth under Option 5. This decision mandates a one-inch size increase to New Jersey's current recreational summer flounder minimum size limit and decreases the possession limit from five fish to three fish. New Jersey brings this appeal pursuant to the Appeals Process approved by the Interstate Fisheries Management Program (ISFMP) Policy Board (Appeals Process).

New Jersey has previously and repeatedly expressed concerns regarding the Addendum and exhausted all options to gain relief at the Board level. During the drafting of the Addendum and prior to the ASMFC meeting of February 2, 2017, New Jersey's ASMFC Commissioners contacted Commissioners from other member states to discuss our concerns with the options set forth in the Addendum. The Commissioner of New Jersey's Department of Environmental Protection testified before the Board at the ASMFC meeting of February 2, 2017 to express New Jersey's apprehension about the science and the impact these decisions would have on the economic health of the recreational fishing industry in New Jersey and on the health of the summer flounder fishery. At that same meeting, New Jersey voted against Option 5 of the Addendum and unsuccessfully moved to postpone the Addendum.

Since the ASMFC approved Option 5 from the Addendum, and with New Jersey's administrative options exhausted, New Jersey now files this appeal based on the criteria in the Appeals Process

and the ISFMP Charter. First, this appeal demonstrates that the Board's current decision, as well as previous quota limits to the commercial sector, will result in specific adverse impacts to New Jersey's recreational summer flounder industry and the overall summer flounder fishery industry that ASMFC is charged with protecting. Second, this appeal shows that the Board did not properly apply technical information in using Marine Recreational Statistical Program (MRIP) harvest estimates and failed to consider the biological impact of increased size limits on the fishery. Finally, this appeal outlines how the Board failed to follow proper process in reaching its decision on the Addendum.

Specifically, this appeal addresses the following criteria:

- Criteria 5: Management actions resulting in unforeseen circumstances/impacts
 - o Increase in Fishery Resource Waste
 - o Disproportionate Removal of Larger Breeding Females
 - o Unfairness & Inequity Among Member States
 - o Failure to Consider Economic and Social Impacts
 - o Compliance and Data Collection Issues
- Criteria 3: Insufficient/inaccurate/incorrect application of technical information
 - Variability and Untimeliness of MRIP Data Not Appropriate for Yearly
 Management Approach
- Criteria 2: "Failure to follow process"
 - o Inaccuracies in Draft Addendum XXVIII Subject to Public Comment
 - Failure to Include Enhanced Opportunity Shore Fishing Program in Draft Addendum XXVIII
 - o Failure to Properly Consider Public Comments\

Criteria 5: Management actions resulting in unforeseen circumstances/impacts

The Board's recent management actions will likely cause a number of unforeseen adverse impacts to the State of New Jersey. The most critical is the increase in discard mortality, which when coupled with the decrease in harvest, will result in more dead discards than actual harvest. Moreover, the increased minimum size limit has the effect of targeting larger female breeding

stock, which may have a negative impact on the flounder fishery recruitment. The Addendum's minimum size requirements also unfairly affect New Jersey compared to other states because the summer flounder in New Jersey waters are smaller than that of our northern counterparts. Thus, the management measures selected in the Addendum will have more damaging economic and social impacts upon New Jersey's coastal communities. Finally, the Addendum will create additional compliance and enforcement difficulties and data collection problems by continuing to erode anglers' trust in regulatory entities.

Increase in Fishery Resource Waste

Section 6(a)(4) of the ISFMP Charter states that "management measures shall be designed to minimize waste of fishery resources." The Charter's requirement is consistent with National Standard 9 of the Magnuson-Stevens Act (Act), which requires that "[c]onservation and management measures shall, (a) to the extent practicable, minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." [16 U.S.C. 1851(a)(9).] Contrary to these mandates, the Addendum requires New Jersey to increase the minimum size to 19 inches in the recreational fishery which, based upon the 10 percent mortality rate for discards used by ASFMC and MAFMC, will increase recreational discard mortality to such an extent that the discard mortality will actually be higher than the harvest mortality.

These findings are based on New Jersey's analysis of MRIP data and New Jersey Volunteer Angler Survey (VAS) data. A brief description of the calculations is provided below. Data and a full analysis will be presented to the Policy Board if warranted.

In 2008, the New Jersey VAS was implemented to supplement and complement data collected by the MRIP survey. The VAS is open access and conducted entirely online on a volunteer basis. Data collected include information on the fishing trip (*e.g.* wave, mode, area, number of anglers), catch (species, number caught, number released), and lengths of both harvested and released fish. The VAS collects specific information from anglers on the lengths of harvested and discarded fish from all modes, while discard lengths are not as broadly sampled by the MRIP. Accordingly, New Jersey analyzed the length data provided by VAS participants to determine the overall length frequency of reported summer flounder catch (harvest plus

discards). The data was then used to estimate statistics relative to the proposed 19-inch minimum sizes.

The data shows that by increasing the minimum catch size from 18 inches to 19 inches, more flounder will not meet the minimum harvest size requirements. Those fish that do not meet the minimum harvest size cannot be kept and must be discarded. Since there will be more fish discarded, and applying a 10 percent mortality rate of discards, more fish will die after being returned to the water. Indeed, the VAS length frequency data show that increasing the summer flounder minimum catch size from 18 inches to 19 inches would result in discard mortality that is 16.6 percent greater than harvest mortality using 2016 data. In other words, at a 19-inch minimum size, the number of undersized (discarded) fish that die after being returned to the water will be greater than the number of fish that will be harvested. This will be the first time in New Jersey history that more summer flounder will die as a result of being discarded than will be harvested by anglers. This is not sound fishery management.

The results of the VAS analysis carry enormous implications, so a similar analysis was conducted using MRIP data to test the veracity of the results. A query of summer flounder catch and length frequency in New Jersey shows that dead discards exceed harvest by nearly 20 percent under a 19-inch minimum size limit using 2016 data. The percentage by which dead discards exceeds harvest using 2016 MRIP data is consistent with the analysis of 2016 New Jersey VAS data.

These analyses assume no changes to fishing effort with the increased size limit. However, common sense dictates, and our initial discussions with members of the private boat and shore angler communities, along with boat captains, indicate that an increased minimum size limit will result in increased fishing effort due to private boat and shore anglers taking more and/or longer trips in an attempt to harvest legal-sized fish. Increased fishing effort, in turn, equates to additional discards, resulting in even higher discard mortality than projected.

These results have severe negative implications for recreational summer flounder management in New Jersey. Discard mortality that exceeds harvest is not acceptable from a fishery management standpoint and will not be well received by the recreational fishing sector. In addition, increasing the minimum size limit of summer flounder to 19-inches is inconsistent not only with the

ISFMP's standard of minimizing fishery waste, but also with the mandate of National Standard 9 of the Act to minimize bycatch. Under the proposed quota, for anglers to catch a legal-sized fish, they will need to throw back more fish. Since the size limit was increased to 18-inches in 2014, the discard rate in New Jersey has been at least 89 percent.

New Jersey is actively exploring how it can reduce the mortality rate for discards through a combination of education, encouraging the use of hooks that cause less damage to the fish, and other methods that would help to ensure that those fish that do not meet the minimum size have a better chance of survival when returned to the water. By reducing the mortality rate, New Jersey aims to achieve compliance by reducing the overall take of summer flounder.

The issue of regulatory discards has been discussed at length at the Technical Committee and at the Management Board for several years. It was originally included in the Comprehensive Summer Flounder Amendment that was initiated in December 2013 and went out to Scoping Hearings in September 2014. Recreational regulatory discards was one of the most frequently raised issues during the scoping process and at the 14 scoping hearings held along the Atlantic coast. Two hearings were held in New Jersey with as many as 100 members of the public in attendance.

Since that time, however, the Board determined that the comprehensive amendment was too burdensome to decide all at once, and projected that final action and implementation on such an undertaking would not occur until 2020. Therefore, in order to set a more realistic date for action, the Council and Board voted to reduce the scope of the comprehensive amendment and limit the focus to commercial issues.

New Jersey's Mid-Atlantic Fishery Management Council (MAFMC) members and NJ ASMFC Commissioners opposed this decision. In fact, at the February 15, 2017 joint meeting of the Council and Board, New Jersey's Commissioners moved to initiate an Addendum to address summer flounder recreational issues. Our motion, however, did not receive the support of the Board. The Board's inaction signaled to stakeholders that these recreational issues, especially high regulatory discards, are not one of the Board's priorities, contrary to the public's interest.

Disproportionate Removal of Larger Breeding Females

Section 6(a)(1) of the ISFMP Charter states that "management measures shall be designed to . . . maintain over time, abundant, self-sustaining stocks of coastal fishery resources." But the increased minimum size limits could have the opposite effect because the larger size limits promote the harvest of female summer flounder. New Jersey has documented the fact that the larger summer flounder tend to be females, that 90 percent of the summer flounder that are at least 19 inches in length are breeding females, and that the larger the female the more eggs she carries. Thus, the Board's decision to increase the minimum size limit for New Jersey waters will likely have the unintended consequence of removing the most productive egg-bearing females from the fishery. Indeed, removing breeding females from the fishery may very well explain the lack of recruitment in recent years.

Over the past several years, at every summer flounder public hearing and in numerous written public comments that have been submitted to ASMFC during the Addendum process, anglers have voiced grave concerns regarding high size limits and their impact on the increased harvest of larger females. The consequences of this measure to the breeding females in the fishery should not be disregarded.

Unfairness & Inequity Among Member States

Second, New Jersey is unfairly and inequitably impacted by the current management measures. Section 6(a)(7) of the ISFMP Charter states that an FMP should "allow internal flexibility within states to achieve its objectives while implemented and administered by the states" and that "[f]ishery resources shall be fairly and equitably allocated or assigned among the states." This section is consistent with National Standard 4 of the Act, which requires that fishing privileges be allocated in a way that is "fair and equitable to all . . . fishermen." [16 U.S.C. 1851(a)(4)]

The Board has generally recognized that fish size in state waters varies from north to south and has established minimum size limits accordingly. For example, North Carolina generally has always had a smaller minimum size limit than Massachusetts. Length frequency data from several sources, including MRIP and the NMFS Trawl Survey, show that summer flounder off

the coast of New Jersey are smaller than summer flounder in New York and Connecticut waters, our regional counterparts. Yet despite these differences, New Jersey has been forced by the ASMFC to manage summer flounder as part of a region with New York and Connecticut, thus preventing New Jersey from proceeding with conservation equivalency on terms specific to New Jersey. Instead, New Jersey is forced to abide by whatever management measures New York and Connecticut have determined is best for their anglers without any consideration of the impact on New Jersey anglers. The inequity to New Jersey is a violation of ISFMP standards and National Standard 4.

Failure to Consider Economic and Social Impacts

The Addendum will result in serious and lasting impacts on New Jersey's economy. The fishing industry in New Jersey supports 65,000 jobs and creates \$2.5 billion in economic activity. Of that, the recreational fishing industry accounts for 20,000 jobs and contributes \$1.5 billion to New Jersey's economy. Given the size of New Jersey's fishing industries, it is surprising that neither analysis nor consideration of economic or social impacts was considered in the Addendum, particularly because Section 6(a) and Section 6(b)(1)(v)D of the ISFMP Charter clearly state that social and economic impacts must be taken into account in fishery management programs.

New Jersey has serious concerns about the severe impact that the approved measures could cause to a fishery that is a mainstay for our shore economy during the summer months. The increasingly stringent summer flounder management measures have resulted in a continued economic slowdown. Already reeling from the devastating effects of Superstorm Sandy, each year after the 2012 and 2014 restrictions, recreational fishing trips for summer flounder dropped by 19 percent and 20 percent respectively. Overall, from 2012 through 2015, recreational fishing trips for summer flounder in New Jersey are down 24 percent. Closures of bait and tackle shops, boat rentals, marinas, and for-hire boats have already put these communities in jeopardy as a result of previous management measures since at least 2014. This subject, while raised numerous times by our constituents and staff during public comment, was not properly considered by the Board or ASMFC staff. Not only is the Addendum inconsistent with the ISFMP Charter, it is also inconsistent with National Standard 8 because it does not take into

account the importance of fishery resources to fishing communities using economic and social data.

Compliance and Data Collection Issues

Another unforeseen impact will be compliance difficulties. New Jersey anglers continue to struggle with ever-changing regulations that make it more difficult for them to comply and more difficult for the state to enforce these increasingly stringent regulations. One of the fundamental principles in enacting laws or promulgating regulations is that they be reasonable and that those being regulated can be reasonably expected to follow them. New Jersey's anglers are already suffering the effects of earlier reductions, and our many discussions with those in the recreational fishing industry indicate that they feel the reduction called for in 2017 are unjust and that New Jersey is being singled out unfairly. This recent Board decision will only increase the likelihood that the new regulations will encourage non-compliance so as to avoid what the industry sees as unjust, unfair, and punitive quotas.

A bias that continues to corrupt MRIP data collection must also be taken into account when considering this data. More and more anglers and for-hire captains are deliberately avoiding New Jersey's Access Point Angler Intercept Survey (APAIS) field interviewers. Their avoidance arises from their distrust that ASMFC, MAFMC, and NMFS will use this data against them to continue to destroy their industry. As discussed above, the economic impacts of the ASMFC decision could devastate our fishing and tourism communities this upcoming fishing season. The social impacts will be long-term and make trusting the process very difficult for the State of New Jersey.

Criteria 3: Insufficient/inaccurate/incorrect application of technical information

New Jersey appeals under Criteria 3 based on the Board's improper use of MRIP on a year-to-year basis to set the Recreational Harvest Limit (RHL). MRIP data is unsuitable as a year-to-year management tool for summer flounder because of its variability and untimely collection.

Variability and Untimeliness of MRIP Data Not Appropriate for Yearly Management Approach

The major technical flaw in setting the RHL relates to the use of MRIP data on a year-to-year basis. As explained below, MRIP data was not intended to serve as the basis for yearly quota

management decisions or as the basis for yearly changes to particular management measures. Indeed, MRIP annual harvest estimates, in numbers of fish, are not used on a year-to-year basis for most species under the Commission's management.

The recreational fishery for summer flounder is managed on a "target quota" basis. The commercial sector is allocated 60 percent of the overall coastwide Acceptable Biological Catch (ABC) for summer flounder while the remaining 40 percent is allocated to the recreational sector. Council staff calculates the RHL by factoring in management uncertainty and discards from previous years. The summer flounder management regions, as identified in Addenda XXV and XXVIII, then develop management measures that can "reasonably be expected" to constrain recreational harvest to the RHL.

To establish these measures, MRIP data is used in two ways. The first is to determine the projected harvest estimate for the previous year to measure the effectiveness of management measures in that year. The second is to project forward into the future to set the RHLs for the coming year. However, the use of MRIP data both to set the RHL and to select management measures has historically been deemed impractical by managers and technical experts. This view reflects the limitations of producing timely landing estimates in an attempt to manage the recreational fishery based on a real-time quota and due to the variability from year to year. Data from the MRIP recreational fishery survey are known to be highly variable from year to year due to extremely small (i.e. statistically insignificant) sample sizes. This can produce estimates of harvest that fluctuate despite unchanged management measures.

The variability and timeliness of MRIP data undermine both the accuracy of the data and the confidence anglers put in it. This variability is apparent on a coastwide basis where harvest varies by as much as 50 percent on an annual basis with no change in management measures. In New Jersey, fluctuations in estimated harvest were apparent during the 2014, 2015, and 2016 fishing years. Even though the size and bag limit remained the same for those three years, the recreational harvest limit and the landing estimates varied significantly, both increasing and decreasing for no apparent reason other than gross variability.

To illustrate, from 2012 to 2016 in New Jersey, the recreational expanded harvest estimate ranged from a minimum of 497,482 in 2015 to a maximum of 1,244,432 in 2013. By simply

utilizing a yearly MRIP estimate, the variability associated with this estimate is being ignored. If instead a mean was calculated over the five-year period, the expanded harvest estimate would be 927,090, with a 95% Confidence Interval (CI) from 526,840 to 1,237,527. The 95% CI over the five-year period was very large, ranging from close to the minimum yearly estimate to close to the maximum yearly estimate. When the 95% CI has this wide a range, this suggests that the variability of the estimate was high between years and that there is low confidence in yearly estimates.

In addition to its high variability, MRIP data is not appropriate to use as a yearly measure in setting the RHL because it is not collected in a timely manner. The current timeline of summer flounder management dictates that the Technical Committee (TC) and the MAFMC Monitoring Committee (MC) must begin crafting measures for the following year's fishing season during November of the current year, using preliminary MRIP data for the months January through August and projected harvest of data for the months September through December. The projections are an average of data from the last three years for the months missing when the process begins.

Usually in February of the year for which fishery managers are trying to implement management measures, the TC and MC will receive a preliminary estimate for September and October. The TC will then revise the measures that have been crafted in reaction to the new "preliminary estimates." The ASMFC Board will also meet in February to make a management decision based on preliminary estimates and direct each state to implement the agreed upon measures.

The next feed of data, which is called "final" is usually delivered to the TC in April. Depending on the result of the final data feed, states will need to make adjustments yet again. The issues caused are obvious. Most, if not all states, including New Jersey, require several months to get regulatory changes made to fisheries regulations. The delay in the availability of these data does not allow the required time to make a thorough analysis, therefore management measures are often pushed through without possessing a complete understanding of past performance of measures from previous years.

As the ASMFC Technical Committee presented to the Board at the February 2, 2017 meeting, changing the management measures from year-to-year makes it very difficult to predict the

reliability and effectiveness of management measures put in place on an annual basis. Developing management measures that extend over a period of time, (for example three to five years or until a new benchmark assessment is developed) would result in a more efficient and accurate management structure than the current process and would allow for the anomalous variability of the MRIP estimates to be smoothed over time. Maintaining management measures over multiple years is the best way to react to the trends developed from the MRIP data. The fact that these data are used on an annual basis and not as a multi-year mean is misuse of the data that undermines decision-making.

Criteria 2: "Failure to follow process"

As explained below, the Board failed to follow the proper process to reach its decision in at least three ways. First, the revised Addendum released for public comment on December 23, 2016 differed from that presented to the Board for a vote on February 2, 2017. Second, the Addendum failed to include the Enhanced Opportunity Shore Fishing Program (Program) in the Addendum for public comment. These issues are substantive and go beyond technical corrections to the Addendum. Third, ASMFC failed to properly consider public opposition to the Addendum.

ASMFC's ISFMP Charter Section 6(c)(9) (iv), states, "Public comments will be evaluated and considered prior to deciding what modifications will be made to the draft FMP or amendment, or draft final FMP or amendment, and prior to approval of the FMP or amendment consistent with the public comment guidelines." Section 6(b)(3) also requires that the public have an opportunity to review and comment on addenda. The failure to fully and accurately present the Addendum for public comment prior to Board approval hampered the public's ability to assess and comment upon the recreational summer flounder options.

Inaccuracies in Draft Addendum XXVIII Subject to Public Comment

The Addendum was first released for public comment on December 22, 2016. A revised version of the Addendum was issued on December 23, 2016 with a public comment period open until January 19, 2017. Around January 17, 2017, ASMFC staff determined that there were significant errors in the Addendum. In light of these errors, the ASMFC Summer Flounder, Scup, Black Sea Bass Technical Committee (Technical Committee) met via conference call on January 19,

2017. The Technical Committee decided that three of the five options in the Addendum incorrectly explained the methods used to calculate the tables within the Addendum.

Specifically, the methods described for calculating Options 2-4 differed from the results presented in tables 2-4. Once the Technical Committee had identified these errors, the narrative text was altered to capture the intent of the Addendum and correspond to the tables in the Addendum. Additionally, certain percent reductions in the tables were adjusted at this time due to the mathematical errors found within the original calculations.

Because of the errors in the Addendum, ASMFC should have released, but did not release, an updated version for public comment so that the public would not be misled during the comment period. Instead, on the evening of January 27, 2017, ASMFC staff sent an e-mail to the Board, just five days before the Board meeting where final action was to occur, highlighting the discrepancies in the methods and tables of Options 2-4. ASMFC staff then presented the options with the adjusted language and tables for the first time to the public at the ASMFC Board meeting on February 2, 2017. Since this substantive revision took place well after the public comment period ended on January 19, 2017, the public had no meaningful opportunity to comment on the correct version of these options in violation of Section 6(b)(3) of the ISFMP Charter.

Failure to Include Enhanced Opportunity Shore Fishing Program in Draft Addendum XXVIII

Neither the draft nor the final Addendum contained any reference to the Program for the New York, Connecticut, New Jersey Region (Region). The Program allows specific shore-based access sites a smaller minimum size limit than the rest of the Region. However, this issue was not discussed at the February 2, 2017 Board meeting or during the deliberations to the motions that were eventually approved. Moreover, the status of the Program was not confirmed until receipt of a February 28, 2017 email from the ASMFC Plan Coordinator where he clarified that the size limit for the Program would be 17 inches. The failure to establish criteria for public comment on this subject prior to a final approval is contrary to proper public comment procedures established in ASMFC's ISFMP Charter Section 6(c)(9) (iv).

ASMFC held eight public hearings on the proposed addendum from Virginia through Massachusetts. ASMFC held a Public Hearing on the Addendum on January 5, 2017 in Galloway Township, New Jersey with at least 120 members of the public in attendance. A combined total of 103 members of the public attended the other seven hearings held in the other states. At the February 2, 2017 Board meeting, ASMFC staff provided a summary of the comments received during the public comment period. The summary from the New Jersey public hearing included only the following statement: "All in attendance were against all options offered in the draft addendum." The summary table of all written public comments from all the states (ASMFC Winter Meeting, page 69 of the Board Supplemental materials), which staff presented at the Board meeting, showed overwhelming support to continue the 2016 measures and remain at status quo – far more support than was expressed for any of the five options presented in the Addendum. Based on the overwhelming public support for status quo expressed during the public comment period, and at the February 2, 2017 Board meeting, ASMFC did not adequately consider public comment in selecting their position which is contrary to the ISFMP Charter as outlined above.

CONCLUSION

The issues raised in this appeal demonstrate that the Board should reconsider the Addendum and immediately address the problems associated with the matter at hand before moving forward. In light of the high discard mortality and associated detrimental effects of increasing the minimum size limitation, and the threat to the jobs of thousands of New Jerseyans and to the multi-million-dollar contribution recreational summer flounder fishing provides to the state's economy, the Board should consider applying the 2016 management measures for New Jersey. The State of New Jersey appreciates the opportunity to appeal this decision. New Jersey reserves its rights under the provision of the Appeals Process document which states that "upon completion of the appeals process, a state is not precluded from taking further action beyond the Commission process to seek relief." Thank you for your consideration of this appeal.

Sincerely,
The ASMFC Commissioners of New Jersey

Administrative Commissioner Larry Herrighty

Governor's Appointee Thomas P. Fote

Legislative Commissioner Assemblyman Sgt. Robert Andrzejczak



Atlantic States Marine Fisheries Commission

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Douglas E. Grout (NH), Chair

James J. Gilmore, Jr. (NY), Vice-Chair

Robert E. Beal, Executive Director

Vision: Sustainably Managing Atlantic Coastal Fisheries

April 14, 2017

Mr. Larry Herrighty Acting Director New Jersey Division of Fish and Wildlife P.O. Box 400 Trenton, New Jersey 08625-0400

Dear Mr. Herrighty,

This letter responds to the State of New Jersey's March 25, 2017 appeal of the Atlantic States Marine Fisheries Commission's (Commission) approval of Addendum XXVIII (Addendum) to the Summer Flounder Interstate Fishery Management Plan (FMP). On April 3, 2017, in accordance with the appeals process, a conference call of the Commission Chair Doug Grout, Vice-Chair Jim Gilmore, past Chair Robert Boyles (Leadership), and staff was convened to review the New Jersey's appeal. The purpose of the review was to assess the issues New Jersey proposes to raise in its appeal and to determine whether those issues are of the type and substantiality that warrants review by the full *Interstate Fisheries Management Program (ISFMP)* Policy Board.

During the call, it was determined the appeal did **not** meet the qualifying guidelines under appeal criterion five (unforeseen circumstances/impacts) and three (incorrect application of technical information), but **could be forwarded** to the ISFMP Policy Board for appeal consideration under criterion two (failure to follow process).

A. Claims Under Criterion Two: Failure to Follow Process

The appeal cited criterion two, "Failure to follow process." Under this criterion, the appeal states the Summer Flounder, Scup and Black Sea Bass Board (Board) did not follow proper process in three ways: (1) the content of the Draft Addendum that was released for public comment differed from what the Board considered for final approval, (2) the Addendum failed to include an option on the enhanced shore mode, and (3) the Commission failed to properly consider public comment. See letter from New Jersey Commissioners to ASMFC Chair Douglas E. Grout, pp. 11-13 (March 24, 2017).

New Jersey correctly notes that there was an error in the Draft Addendum's text which was found prior to the Commission's 2017 Winter Meeting. However, information on the error, which was in the description of the calculation of the measures as specified in the revised Addendum language memo (January 27, 2017), was sent to the Board prior to the meeting. The Board Chair noted the error (and its late correction) at the start of the meeting and suggested the Board proceed with its consideration of the Draft Addendum since the tables within public comment draft, which included example measures, were correct. No Board

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members objected to moving forward with the process. Importantly, the approved option did not contain any errors and was identical to what went out for public comment. At the same time, the fact that there was an error in the Draft Addendum warrants further scrutiny and discussion and – as noted below –Leadership concludes that an appeal as to this issue is justified under criterion two.

However, Leadership rejects the claim that the Commission did not properly consider public comment. The Board was presented an overview of the public comment. Detailed information regarding each of the hearings was included in the briefing materials for members of the Board to review prior to the meeting. In summary, there was an opportunity for public comment and the Board did have the benefit of that comment before reaching its decision. Leadership concludes that substantial grounds for an appeal are not present on this issue.

Natural resource managers are frequently obligated to make decisions that are not consistent with opinions of members of the public. In some cases, management objectives require the adoption of measures that some or most members of the public oppose, this does not mean the public comment was not considered. Here, the Board did consider public comment favoring other approaches, but concluded the measures adopted were nonetheless warranted; Leadership does not find a substantial basis for appeal as to this claim.

New Jersey's appeal letter is correct in observing that the Draft Addendum did not discuss the shore mode program. However, Commission staff notified the states that the shore mode program could still be conducted under the Addendum at the joint meeting with the Mid-Atlantic Fishery Management Council (MAFMC) in December 2016. This is consistent with the shore mode program process in the previous year. Here too, Leadership does not find a valid basis for appeal under the public comment criterion.

B. Claims Under Criterion Three: Application of Technical Information.

The appeal letter cites criterion three, "Insufficient/inaccurate/incorrect application of technical information." New Jersey points to what it regards as the variability and untimeliness of data generated from the Marine Recreational Information Program (MRIP) as not appropriate for yearly management approaches. See letter from New Jersey Commissioners to ASMFC Chair Douglas E. Grout, pp. 8-11 (March 24, 2017).

When considering final action on the Addendum, the Commission fully acknowledged and took into account the uncertainty in MRIP harvest estimates. In particular, it recognized that the confidence intervals around the MRIP harvest estimates constrain our ability to precisely project the impacts of differing management measures. The Commission is constrained in its ability to address this variability, given that summer flounder is jointly managed with the MAFMC and, therefore, falls under the mandates of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). One of these MSA mandates is the establishment of an annual recreational harvest limit (RHL) and associated management measures that seek to constrain harvest to this RHL.

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In considering the 2016 harvest estimate relative to the 2017 RHL the Commission determined a reduction in harvest was needed to constrain coastwide harvest to the 2017 RHL. This determination was based on the 2016 harvest estimate from MRIP. The MRIP harvest estimates have been determined to be the best available science for recreational harvest. Until there is another data source or until interpretation of the federal law changes, the Commission is obligated to use the previous year's MRIP data to set the following year's measures. Therefore, Leadership does not find an incorrect application of technical information, and could not justify an appeal on this issue.

C. Claims Under Criterion Five: Unforeseen Circumstances/Impacts.

New Jersey's appeal is partially based on appeal criterion five, "Management actions resulting in unforeseen circumstances/impacts." Under this criterion the appeal cites increased fishery waste, disproportionate removal of larger breeding females, unfairness and inequity among member states, failure to consider economic and social impacts, and compliance and data collection issues. See letter from New Jersey Commissioners to ASMFC Chair Douglas E. Grout, pp. 2-8 (March 24, 2017).

None of these issues, however, constitutes "unforeseen" circumstance or impact. To the contrary, each of these factors was considered and discussed by the Board at either the December 2016 joint meeting with the MAFMC (compliance and data collection issues), the Commission's 2017 Winter Meeting (economic and social impacts), or were included in briefing materials for either of those meetings.

The appeal cites unforeseen circumstances due to increased fishery waste, through discards and disproportionate removal of larger breeding females. Both of these latter concerns were addressed in the MAFMC's staff memo dated November 3, 2016. The Monitoring Committee (MC) concurred with the memo's concerns regarding high size limits and discards. But the MC had reservations in addressing those concerns with slot limits as was recommended by the staff, given the overfishing status of stock and the below-average recruitment of summer flounder observed for the past six years (2010-2015). Slot limits typically result in an increased number of total removals, resulting in increased fishing mortality. There may be concern that increasing the size limit may target more females due to life history characteristics. However, members of the MC have noted that while the proportion of females targeted by an increase in size limit may increase, the total number of females harvested and removed from the population should decrease. This decrease is because the number of fish available for harvest at 19 inches is less than the number at an 18 inch size limit. Therefore, we do expect that the selected management measure will have the intended effect of decreasing harvest for the long term gain of the resource. Given this discussion was summarized in the briefing materials as well as part of the Board deliberations at the joint Board and MAFMC meeting in December 2016, Leadership disagrees with New Jersey's position that these issues were unforeseen.

New Jersey's appeal also cites unforeseen consequences from the one-inch size limit increase specified in the Addendum that would be unfair and inequitably impact New Jersey fisherman. Based on analysis conducted by the Technical Committee, New Jersey's projected

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harvest reduction for 2017 under the prescribed measures in the Addendum is approximately 34%. The size limit increase approved in the Addendum distributed the burden of reducing harvest similarly to each state within the management unit, except North Carolina. The projected reductions in harvest due to the size limit increase in 2017 is similar for other states in the Mid-Atlantic region as well along the coast. In particular, New York's projected reduction is 33%, Rhode Island's projected reduction is 34%, and Massachusetts' projected reduction is 31%. This concern was raised by New Jersey at the 2017 Commission Winter Meeting. Given the Board's discussion of this issue and the similarity of the projected reductions, Leadership concludes that New Jersey's claim of unfairness or lack of equity among states is not an unforeseen circumstance justifying appeal to the ISFMP Policy Board.

Further, the appeal also cites unforeseen circumstances due to lack of consideration of economic or social impacts in the Addendum. During the call, Leadership discussed the Commission's practices regarding socioeconomic analyses and determined this Addendum was handled in a manner consistent with our established management process. Due to limited resources, the Commission rarely drafts full socioeconomic analyses for FMPs. However, this does not mean socioeconomic considerations are not part of the Commission's decision-making. In fact, public comment and Advisory Panel input during the public comment period noted concerns on this topic, and those concerns were presented to the Board. Each state delegation brings to the table an extensive knowledge of their fisheries, including the potential impacts of proposed management changes, economic and otherwise on those fisheries. Commissioners commonly highlight these impacts at board meetings prior to significant decisions, as was done with this Addendum. Also, the Commission relies on the public comment process to better understand socioeconomic impacts. Public and Advisory Panel comments noted these concerns and their comments were included in briefing materials for the 2017 Commission Winter Meeting.

As you are aware, the Addendum focuses on the reduction of harvest to address current levels of overfishing as indicated in the 2015 and 2016 stock assessment updates, which were presented to the Board and the MAFMC at previous meetings. These efforts are intended to immediately end overfishing and initiate rebuilding the economically and culturally important summer flounder population, which is on a decline. Board members were aware that, in the short term, a reduction in harvest could result in negative economic impacts to the for-hire sector and broader coastal businesses that support the summer flounder recreational fishery. Further, these potential impacts could affect not only New Jersey, but other states within the management unit. These sorts of impacts are always difficult; but they are, as here, sometimes necessary in service of management objectives to promote healthy and abundant stocks. Since Commissioners recognized and weighed these potential impacts to the states and industry, Leadership does not find the social and economic consequences of this Addendum as unforeseen.

Lastly, under unforeseen impacts, the appeal refers to certain compliance and data collection issues. The appeal raised the issue that management measures are continually changing. From 2014 to 2016 New Jersey maintained fairly consistent regulations with the exception of the New Jersey Delaware Bay fishery, which the state requested a lower size limit (17 inches

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for the Delaware Bay west of COLREGS line) and a reduced possession limit (from 5 to 4 fish for DE Bay west of COLREGS line) to be more closely aligned with Delaware. With the exception of this area-specific modification in 2016, coastal New Jersey has maintained the same minimum size limit (18 inches) and season length (128 days) for three years and same possession limit for four years. Additionally, for the three previous years New Jersey has a shore-based program at Island Beach State Park that allows for a lower size limit of 16 inches. This is a regional exception that New Jersey and Connecticut have been granted for the past three years and is allowed to continue in 2017 consistent with the provisions of the Addendum, which specify a one inch size limit increase. This demonstrates that measures have remained fairly consistent over recent years and changes have largely been driven by New Jersey interests.

Leadership acknowledges that changes in regulations can be difficult. However, adjusting regulations to serve key management objectives is an unavoidable necessity in today's world of fisheries management if we are to be successful in protecting and restoring declining fisheries. Leadership finds that this issue too is not an unforeseen circumstance or impact meriting appeal.

In light of these findings, <u>Leadership finds there are grounds for appeal to the ISFMP Policy Board as to one of the three claims under criterion two advanced in New Jersey's letter – specifically, New Jersey's claim regarding the error in the text of the Draft Addendum. While Leadership has noted several factors that significantly mitigate the impact of this error, given the paramount importance of maintaining the integrity of the Commission's decision-making process, Leadership concludes it is appropriate to provided New Jersey an opportunity to present its appeal on this issue to the ISMFP Policy Board. During the ISFMP Policy Board meeting on May 11, 2017, the ISFMP Director will present background on the Addendum and the Board's justification. Following this presentation, the Commissioners from New Jersey will be provided 15 minutes to present their rationale for the appeal and their suggested resolution of the issue. The ISMFP Policy Board will then be provided an opportunity to discuss the issue and then decide on the appeal. No additional public comment will be taken in connection with the appeal.</u>

Thank you for the continued partnership and commitment to the Commission process and actions.

Sincerely,

Douglas E. Grout

Daugles E. Ground

Chair

cc: Thomas P. Fote, Assemblyman Sgt. Robert Andrzejczak, Adam Nowalsky Interstate Fisheries Management Program Policy Board

Atlantic States Marine Fisheries Commission

APPEALS PROCESS

Approved by the ISFMP Policy Board August 18, 2004

Background

The Atlantic States Marine Fisheries Commission's interstate management process is based on the voluntary commitment and cooperation of the states. The involved states have frequently demonstrated their willingness to compromise and the overall process has proven to be very successful. However, there have been instances where a state/jurisdiction has expressed concern that the Board decisions have not been consistent with language of an FMP, resulted in unforeseen circumstances or impacts, did not follow established processes, or were based on flawed technical information. In order to address these concerns, the ISFMP Policy Board charged the Administrative Oversight Committee with "exploring and further developing an appeals process".

Under the current management process the primary policy development responsibility lies with species management boards. And, in the case of development of new fishery management plans or amendments the full Commission has final approval authority prior to implementation. The purpose of the appeals process is to provide a mechanism for a state/jurisdiction to petition for a management decision to be reconsidered, repealed or altered. The appeals process is intended to only be used in extraordinary circumstances where all other options have been exhausted. The management boards have the ability to go back and correct errors or address additional technical information through the recently clarified process on "amending or rescinding previous board actions".

During the December 2003 ISFMP Policy Board meeting, the decision was made to continue to have the Policy Board serve as the deliberative body that will consider valid appeals. This decision is consistent with the language that is included in the ISFMP Charter. However, the Charter does not provide detailed guidance on how an appeal is to be addressed.

This paper details for the Commission appeals process.

<u>Appeal Criteria</u> –The intent of the appeals process is to provide a state with the opportunity to have a decision made by a species management board or section reconsidered by the Policy Board. The following criteria will be used to guide what type of decisions can be appealed. In general, management measures established through the FMP/amendment/addendum process can be appealed. However, the appellant must use one of the following criteria to justify an appeal:

- 1. Decision not consistent with FMP
- 2. Failure to follow process
- 3. Insufficient/inaccurate/incorrect application of technical information
- 4. Historical landings period not adequately addressed

5. Management actions resulting in unforeseen circumstances/impacts

The following issues could not be appealed:

- 1. Management measures established via emergency action
- 2. Out-of-compliance findings (this can be appealed but, through a separate, established process)
- 3. Changes to the ISFMP Charter

Appeal Initiation – The ISFMP Charter provides that a state aggrieved by a management board action can appeal to the ISFMP Policy Board. Any state can request to initiate an appeal; also a group of states can submit a unified request for an appeal. The states are represented on the Commission by three representatives that have the responsibility of acting on behalf of the states' Executive and Legislative branches of government. Therefore, in order to initiate an appeal all seated Commissioners (not proxies) of a state's caucus must agree that an appeal is warranted and must sign the letter submitted to the Commission. If a multi-state appeal is requested all the Commissioners from the requesting states must sign the letter submitted to the Commission. During meetings where an appeal is discussed proxies will be able to participate in the deliberations. Meeting specific proxies will not be permitted to vote on the final appeal determination, consistent with Commission policy.

A state (or group of states) can request and appeal on behalf of the Potomac River Fisheries Commission, District of Columbia, National Marine Fisheries Service, or the United States Fish and Wildlife Service.

The letter requesting an appeal will be submitted to the Chair of the Commission and include the measure(s) or issue(s) being appealed, the justification for the appeal, and the commitment to comply with the finding of the Policy Board. This letter must also include a demonstration that all other options to gain relief at the management board level have been exhausted. This letter must be submitted via certified mail at least **45 days** prior to a scheduled ASMFC Meeting Week. The Commission Chair, Vice-Chair and immediate past Chair will determine if the appeal meets the qualifying guidelines and notify the Policy Board of their decision. If the immediate past chair is no longer a commissioner the Chair will select an alternate from a state that is not affected by the appeal.

Convene a "Fact Finding" Committee (optional) -- Upon review of the appeal documentation, the Commission Chair, Vice-Chair and immediate past Chair (or alternate if necessary, as described above) may establish a "Fact Finding" Committee to conduct analyses and/or compile additional information if necessary. This group will be made up of individuals with the technical expertise (including legal, administrative, social, economic, or habitat expertise if necessary) and familiarity with the fishery to conduct the necessary analysis. If such a committee is convened the schedule included in the last section of this document may need to be adjusted to provide time for the Committee to conduct analyses. The Commission Chair, Vice-Chair and immediate past Chair (or

alternate if necessary, as described above) may set a deadline for the Committee to complete its work to ensure the appeal is addressed in a timely manner.

ISFMP Policy Board Meeting – Following the determination that an appeal has met the qualifying guidelines, a meeting of the Policy Board will be convened at a scheduled ASMFC meeting week. The agenda of this meeting will be set to allow sufficient time for all necessary presentations and discussions. The Chair of the Commission will serve as the facilitator of the meeting. If the Chair is unable to attend the meeting or would like to more fully participate in the deliberations, the Vice-Chair of the Commission will facilitate the meeting. The ISFMP Director will provide the background on the development of the management program as well as a summary of the justification provided in the record for the management board's action. The ISFMP Director will also present the potential impacts of the appeal on other affected states. The appellant Commissioners will present their rationale for appealing the decision and provide a suggested solution. The Policy Board will then discuss the presentations and ask any necessary questions. The Board will vote to determine if the management board's action was justified. A simple majority of the Policy Board is required to forward a recommendation to a management board for corrective action. If the Policy Board determines that the existing management program should be modified, it will issue a finding to that effect as well as any guidance regarding corrective action to the appropriate species management board. The referral may be worded to allow the management board flexibility in determining the details of the corrective action.

Upon receipt of the Policy Board's recommendation the management board will discuss the findings and make the necessary changes to address the appeal. The management board is obligated to make changes that respond to the findings of the Policy Board. A simple majority of the management board will be necessary to approve the changes.

Appeal Products and Policy Board Authority—Following the Policy Board meeting a summary of the meeting will be developed. This summary will include a detailed description of the findings and will be forwarded to the appropriate management board and Policy Board upon completion. If the Policy Board determines that changes to the management program are necessary, the summary may include guidance to the management board for corrective action. The report of the Policy Board will be presented to the management board for action at the next scheduled meeting.

<u>Considerations to Prevent Abuse of the Appeals Process</u> – The appeals process is intended to be used only in extraordinary situations and is in no way intended to provide a potential avenue to preempt the established board process. The initiation of an appeal will not delay the Commission process for finding a state out of compliance nor delay or impede the imposition of penalties for delayed compliance.

<u>Limiting Impacts of Appeal Findings</u> – If a state is successful in an appeal and the management program is altered, another state may be negatively impacted by the appeals decision. In order to prevent an appeals "chain reaction," the Policy Board's recommendation and the resulting management board's decision will be binding on all

states. All states with an interest in the fishery will be obligated to implement the changes as approved by the management board. Upon completion of the appeals process, a state is not precluded from taking further action beyond the Commission process to seek relief.

If the Policy Board supports the appeal and determines that corrective action is warranted, the potential for management changes to negatively impact other states will be evaluated by the Policy Board and the species management board.

Appeals Process Timeline

- 1. Within **15 working days** of receipt of a complete appeal request the Commission Chair, Vice-Chair, and immediate past chair (or alternate) will determine if the state has an appeal which meets the qualifying guidelines.
- 2. Upon a finding that the appeal meets the qualifying guidelines, the appeal will be included on the agenda of the ISFMP Policy Board meeting scheduled during the next ASMFC Meeting Week (provided an adequate time period is available for preparation of the necessary documentation).
- 3. Following the finding that an appeal meets the qualifying guidelines, Commission staff and the appellant commissioners will have a minimum of **15 working days** to prepare the necessary background documents.
- 4. The background documents will be distributed at least **15 days** prior to the Policy Board meeting.
- 5. A summary of the Policy Board meeting will be developed and distributed to all Commissioners within **15 working days** of the conclusion of the meeting.

Atlantic States Marine Fisheries Commission

ADDENDUM XXVIII TO THE SUMMER FLOUNDER, SCUP, BLACK SEA BASS FISHERY MANAGEMENT PLAN

Summer Flounder Recreational Management in 2017



Approved February 2, 2017

Sustainably Managing Atlantic Coastal Fisheries

1.0 Introduction

Addendum XXVIII is adopted under the adaptive management/framework procedures of Amendment 12 and Framework 2 that are a part of the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP). Summer flounder, scup, and black sea bass fisheries are managed cooperatively by the states through the Atlantic States Marine Fisheries Commission (Commission) in state waters (0-3 miles), and through the Mid-Atlantic Fishery Management Council (Council) and the NOAA Fisheries in federal waters (3-200 miles). The management unit for summer flounder in US waters is the western Atlantic Ocean from the southern border of North Carolina northward to the US-Canadian border.

The Commission's Summer Flounder, Scup, and Black Sea Bass Management Board (Board) approved the following motion on October 25, 2016:

Move to initiate an addendum to consider adaptive management, including regional approaches, for the 2017 summer flounder recreational fishery.

This Addendum establishes management of the 2017 recreational summer flounder fishery.

2.0 Overview

2.1 Statement of the Problem

A fundamental goal of Commission FMPs is to provide recreational anglers with fair and equitable access to shared fishery resources throughout the range of each managed species. The Commission's ISFMP Charter establishes fairness and equity as guiding principles for the conservation and management programs set forth in the Commission's FMPs. While the current FMP for summer flounder does not include a goal pertaining to this concept, the Board and Council are considering a new goal for inclusion in the forthcoming Comprehensive Summer Flounder Amendment: "Provide reasonable access to the fishery throughout the management unit." With these principles and goals in mind, the challenges facing the Board (and Council) involve determining what is meant by fair/equitable/reasonable access, and how to achieve it.

Complicating the access issue for 2017 is the significant reduction to the coastwide recreational harvest limit (RHL) set by the Board and Council in August 2016 in response to the most recent Stock Assessment Update. The 2017 RHL is 3.77 million pounds, an all-time low. By way of comparison, the RHL for 2017 is approximately 30% less than 2016, 48% less than 2015, and 68% less than 2011, when it peaked at 11.68 million pounds. Using a projected recreational harvest in 2016 of 6.38 million pounds (subject to change), harvest in 2017 must be reduced by roughly 2.6 million pounds to not exceed the 2017 RHL.

This Addendum addresses the issue that available management approaches are not viewed as providing a fair and reasonable way to constrain the 2017 recreational summer flounder fishery harvest to the RHL. The Board recognizes the management program within this addendum will also

have shortcomings with regards to addressing this problem, and thus intends for it to be an interim program while focusing on the development of a more comprehensive solution for the future.

2.2 Background

Amendment 2 (1993) initially required each state (Massachusetts through North Carolina) to adopt the same minimum size, possession limit, and season length as established in federal waters for the recreational fishery, allowing only for different timing of open seasons. The consistent measures were intended to uniformly impact the resource and stakeholders in all state and federal waters throughout the management unit. However, the states later determined one set of management measures applied coastwide did not provide equitable access to the resource due to the significant geographic differences in summer flounder abundance and size composition.

To address this disparity, the FMP was amended in 2001 (Framework Adjustment 2) to allow for the use of state-specific "conservation equivalent" management, through which recreational harvest would be constrained the same as under coastwide management. The Board and Council would engage in an annual process of determining whether to manage the fishery with coastwide measures or state-specific conservation equivalency; if the latter, the Board would have the lead in approving state-specific regulations. Concurrently, the Board adopted a series of addenda (Addenda III and IV in 2001, and Addendum VIII in 2004) implementing state-based conservation equivalency. Estimates of state recreational landings in 1998 were established as the basis for state recreational allocations- this is outlined in Addendum VIII (see Table 1) upon which state-by-state regulations could be developed. From 2001-2013, the Board and Council opted to use state-specific conservation equivalency tied to the proportion of each state's estimated 1998 recreational landings. This provided states with the flexibility to tailor their regulations—i.e., minimum size, possession, and season limits—to meet the needs and interests of their fishery, provided their targets were not exceeded.

Table 1. State summer flounder harvest in 1998 and the proportion of harvest conservation equivalency state-by-state harvest targets are based on (Addendum VIII)

State	1998 estimated harvest (thousands)	Percent of the 1998 harvest
MA	383	5.5%
RI	395	5.7%
СТ	261	3.7%
NY	1,230	17.6%
NJ	2,728	39.1%
DE	219	3.1%
MD	206	3.0%
VA	1,165	16.7%
NC	391	5.6%

The Board also adopted Addendum XVII in 2005, enabling the states to voluntarily opt into multi-state regions that would set regulations based on a pooling of their 1998-based allocations. The Council followed suit with the adoption of Framework Adjustment 6 in 2006, complementing the regional approach set forth by Addendum XVII. However, no states used this optional regional conservation equivalency approach.

Re-assessing in the Face of Changing Conditions:

The use of state-by-state regulations based on estimated state harvests in 1998 succeeded, initially, in mitigating the disparity in conservation burden among states, but later became viewed as an inadequate long-term solution, given changes in resource status and fishery performance.

As 2013 came to an end, the Board identified the following problems with the use of state allocations based on estimates of recreational harvest in 1998:

- 1) Substantial variation in stock dynamics since 1998. These included a six-fold increase in spawning stock biomass and expansion of the age structure from including 2–3 age classes to 7 or more. These changes led to geographic shifts in the distribution of the resource; as the stock rebuilt, its range expanded. Climate change was also identified as possibly contributing to shifts in migratory patterns, spatially and temporally.
- 2) Substantial changes in socio-economic patterns since 1998, particularly with regard to the number and distribution of anglers along the coast. For example, estimated angler participation increased significantly, and a growing percentage of harvest was attributed to private/rental vessels in contrast to shore-based and party/charter vessel harvest. Industry advisors indicated the rising costs of fuel, bait, and other trip expenditures were impacting angler effort.
- 3) Possible error in the estimates of harvest for 1998. Measuring recreational catch and effort, particularly on a state-by-state basis, is challenging and not without uncertainty in the estimates. The methods used to estimate recreational catch and effort are continually evolving, resulting in more accurate and precise estimates in more recent years.
- 4) Major disparities in the regulatory programs among the states; for example, as recently as 2012 and 2013, no two states had the same regulations, and several neighboring states had regulations that differed significantly. A case in point was New York, whose regulations were more restrictive than any other state, and that contrasted markedly with those of New Jersey, Connecticut, and Rhode Island.

To address these concerns, the Board adopted Addendum XXV, which implemented conservation equivalency on a regional basis for 2014. Five¹ regions were established: 1) Massachusetts; 2) Rhode Island; 3) Connecticut, New York, and New Jersey; 4) Delaware, Maryland, and Virginia; and 5) North Carolina. All states within each region were required to have the same possession limit, size limit, and season length.

3

¹ Initially, in February 2014, the Board established four regions, one being Massachusetts and Rhode Island combined. Subsequently, in March 2014, the Board approved a request from Massachusetts and Rhode Island to split its region into individual state regions to account for the significantly different recreational fisheries of the two states.

Although the precursors to Addendum XXV (Addendum XVII and Framework Adjustment 6) envisioned a regional approach based on regional harvest limits set as the sum of the harvest limits for all the states in each region, with accountability based on the performance of each region relative to its regional limit, Addendum XXV implemented an alternative approach. Based on analysis provided by the Board's Technical Committee, the Board focused on developing regulations for each region that would lead to projected regional harvests that would collectively achieve, but not exceed, the coastwide recreational harvest limit. The projected regional harvests did not constitute the sum of the harvest limits for all the states in each region. As such, the approach constituted a de facto reallocation of recreational harvest opportunities. Nonetheless, the Board emphasized that:

The new approach is not intended to implement new state allocations and is not intended to set a precedent for new state allocations. Under the adaptive regional approach, states would not give up their (1998-based) allocated portion of the Recreational Harvest Limit (RHL), would not be held accountable for anything other than their allocated portion of the RHL, and would retain the future opportunity (depending on what management approach is adopted for 2015) to continue managing their fisheries in accordance with their allocated portion of the RHL.

To achieve regulatory uniformity within each region, and to meet the coastwide harvest target, regulatory revisions were enacted for CT, NY, NJ, DE, and MD in 2014 (Table 7).

For 2015, the Board continued regional management, with the same regions, via Addendum XXVI. For all states, the same regulations in effect for 2014 were maintained for 2015 (Table 7).

For 2016, the Board again continued regional management via Addendum XXVII, with one adjustment to provide more equity in recreational opportunities for anglers in the Delaware Bay. That adjustment involved establishing New Jersey as a stand-alone region, with the caveat that New Jersey would enact separate management measures for the New Jersey portion of Delaware Bay, while maintaining regulations for the rest of its waters consistent with those of New York and Connecticut. New Jersey complied by enacting regulations for Delaware Bay that were closer to those of Delaware. For all other states the same regulations in effect for 2014 and 2015 were maintained for 2016 (Table 6).

Beginning 2017, the Board continues to have the same concern about disproportionate impacts among states from the use of 1998-based allocations and state-by-state management measures. A return to coastwide management measures is also unlikely to provide equitable access.

2.3 Description of the Fishery

In practice, the recreational fishery for summer flounder is managed on a "target quota" basis. A set portion (40%) of the total allowable landings is established as a recreational harvest limit (RHL), and management measures are established by the states that can reasonably be expected to constrain recreational harvest to this limit each year. It has historically been deemed impractical, because of the limitations of producing timely landing estimates, to try to manage the recreational fishery based on a real-time quota.

Over the past nine years, the coastwide landings exceeded the annual coastwide RHL three times: 2007, 2008, and 2014 (Table 2). The most recent overage in 2014 was by approximately 5% (approximately 380,000 pounds). Based on preliminary harvest estimates through August 2016, coastwide landings have already exceeded the 2016 RHL. The 2016 harvest estimates are subject to change as many states seasons remain open and data for wave 6 (November-December) are not yet available. Projected harvest through the end of 2016—based on state harvest trends in 2015—indicated the final harvest may be approximately 6.38 million pounds (Table 3).

Table 2. Coastwide Harvest Relative to Coastwide RHL: 2007-2016

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Coastwide Harvest (mil. lb)	9.34	8.15	6.03	5.11	5.96	6.49	7.36	7.39	4.72	6.38
Coastwide RHL (mil. lb)	6.68	6.21	7.16	8.59	11.58	8.49	7.63	7.01	7.38	5.42
Percent of RHL harvested	139.77%	131.25	84.22%	59.47%	51.43%	76.44%	96.40%	105.41%	63.97%	117.00%

^{*2016} Harvest is preliminary, through October only, and subject to change.

Table 3. Projected Coastwide Harvest for 2016 by states

State	Jan-Aug E	Estimate Sep-Dec Projection			Projected Total Harvest	
State	Weight	Numbers	Weight	Numbers	Weight	Numbers
MA	121,791	53,294	4,860	3,348	126,651	56,642
RI	278,682	89,988	6,927	2,833	285,610	92,821
СТ	690,786	218,019	3,875	1,352	694,661	219,371
NY	2,238,513	712,643	55,118	18,164	2,293,630	730,807
NJ	1,904,113	609,878	573,966	181,181	2,478,080	791,059
DE	206,558	82,097	18,075	7,432	224,634	89,229
MD	42,574	18,537	9,123	4,538	51,697	23,075
VA	188,576	75,029	12,460	5,093	201,037	79,332
NC	16,870	9,605	12,152	7,469	29,021	17,074
Total	5,688,463	1,869,090	696,557	230,320	6,385,020	2,099,410

^{*}September-December harvest are projected using proportion of landings by two-month wave by state in 2015.

Recreational Survey Estimates

The Marine Recreational Information Program, or MRIP, is a program under NOAA Fisheries which counts and reports marine recreational catch and effort. MRIP is driven by data provided by anglers and captains. MRIP replaced the Marine Recreational Fisheries Statistics Survey, or MRFSS, in 2008, which had been in place since 1979. MRIP is designed to meet two critical needs: (1) provide the detailed, timely, scientifically sound estimates that fisheries managers, stock assessors, and marine scientists need to ensure the sustainability of ocean resources and (2) address head-on stakeholder concerns about the reliability and credibility of recreational fishing catch and effort estimates. MRIP is an evolving program with ongoing improvements. Detailed information on MRIP and the improvements can be found at http://www.st.nmfs.noaa.gov/recreational-fisheries/index. All recreational catch and effort data considered in this document are derived from MRIP.

^{**}Total Projected Harvest is based on preliminary information and is subject to change as new information is made available.

2.4 Status of the Stock

The most recent peer-reviewed benchmark assessment for summer flounder (Northeast Regional Stock Assessment Workshop 57, NEFSC 2013) was updated in July 2016. The assessment utilizes an age-structured assessment model called ASAP. Results of the assessment update indicate the summer flounder stock was not overfished but overfishing was occurring in 2015 relative to the updated biological reference points established in the 2013 SAW 57 assessment. The fishing mortality rate has been below 1.0 since 1997, but was estimated to be 0.390 in 2015, above the threshold fishing mortality reference point $F_{MSY} = 0.309$ (Figure 1). Spawning stock biomass (SSB) was estimated to be 88.9 million pounds (36,240 mt) in 2015, about 58% of the biomass target SSB_{MSY} = 137.555 million pounds (62,394 mt) and 16% above the biomass threshold (Figure 2). The 2015 year class is estimated to be about 23 million fish at age 0, continuing the trend of below-average year classes for the past six years (2010-2015).

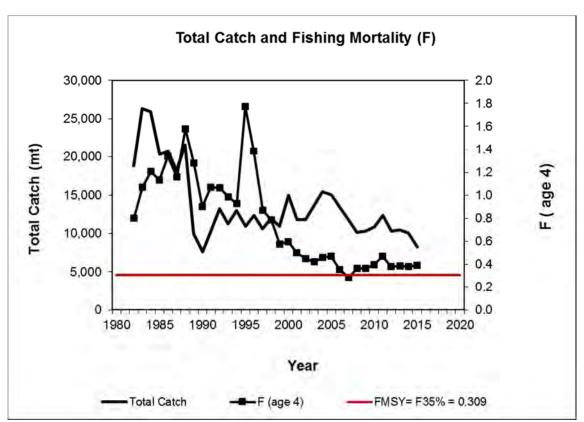


Figure 1. Total fishery catch and fully-recruited fishing mortality (F, peak at age 4) of summer flounder. The horizontal red line is the 2013 SAW 57 fishing mortality threshold reference point proxy. Source: NEFSC Summer Flounder Stock Assessment Update for 2016 (June 2016).

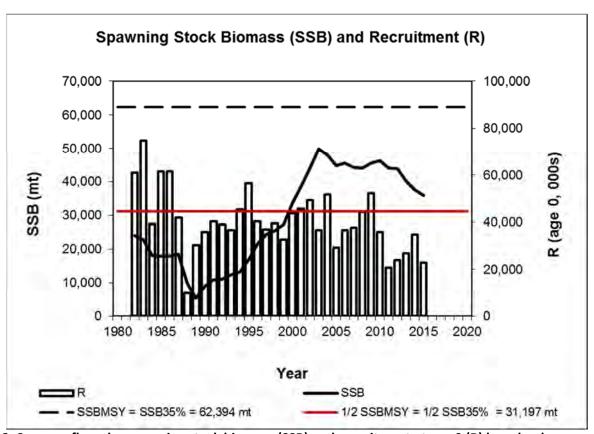


Figure 2. Summer flounder spawning stock biomass (SSB) and recruitment at age 0 (R) by calendar year. The horizontal dashed line is the 2013 SAW 57 biomass target reference point proxy; the horizontal red line is the biomass threshold reference point proxy. Source: NEFSC Summer Flounder Stock Assessment Update for 2016 (June 2016).

A breakdown of the 2017 Overfishing Limit (OFL), Acceptable Biological Catch Limit (ABC), Annual Catch Limits (ACL), Annual Catch Targets (ACT), and subsequent coastwide RHL based on the 2016 stock assessment update is included in Table 4. The 2017 proposed harvest limit is a time series low as the result of the biomass projections from the 2016 stock assessment update.

Table 4. Basis for 2017 summer flounder catch and landings limits. Numbers may not add precisely due to unit conversions and rounding.

Management	20	16	20	17	Posito for 2047 Hardin
Specifications	mil lb.	mt	mil lb.	mt	Basis for 2017 Limits
OFL	18.06	8,194	16.76	7,600	Stock assessment projections
ABC	16.26	7,375	11.30	5,125	Stock assessment projections/ SSC recommendation
Commercial ACL	9.42	4,275	6.57	2,982	60% of ABC landings portion (per FMP allocation) + 49% of ABC discards portion
Commercial ACT	9.42	4,275	6.57	2,982	Monitoring Committee recommendation: no deduction from ACL for management uncertainty
Commercial Quota	8.12	3,685	5.66	2,567	Commercial ACT, less projected commercial discards
Recreational ACL	6.84	3,100	4.72	2,143	40% of ABC landings portion (per FMP allocation) + 51% of ABC discards portion
Recreational ACT	6.84	3,100	4.72	2,143	Monitoring Committee recommendation; no deduction from ACL for management uncertainty
Recreational Harvest Limit	5.42	2,457	3.77	1,711	Recreational ACT, less projected recreational discards

3.0 Management Program

The 2017 summer flounder recreational fishery will divide the coast into six management regions (similar to 2016): 1) Massachusetts 2) Rhode Island 3) Connecticut-New York 4) New Jersey 5) Delaware-Virginia and 6) North Carolina. The combined management program of all 6 regions is designed to not exceed the 2017 recreational harvest limit.

Each region, except for North Carolina, is required to increase the minimum size by one inch from the 2016 size limit (Note: North Carolina is exempt as long as the state's harvest remains low because its fishery is confounded by three species of similar flatfish for which consistency in regulations is ideal). Each Region is required to have a possession limit of 4 fish or less.

This approach moves away from using the 1998-based allocations to set regional targets, based on the concerns listed in Section 2.2 Background (page 2). Additionally, the past three years have shown how variable annual harvest at the coastal (50%), regional (>60%), and state (>100%) level can be despite consistent measures across the years, underscoring the difficulty of using prior year harvest to predict future year harvest. The Commission recognizes the confidence intervals around the harvest estimates limit the ability to precisely project the impacts of differing management measures. The approach thus applies broad action across all states to reduce harvest and provide for more coastwide consistency in regulations.

Table 5. Example 2017 Regional Management Measures

STATE	2016 Projected Harvest	Example Size Limit	Example Possession Limit	Example Season (# of days)
MASSACHUSETTS	56,642	17"	4 fish	125
RHODE ISLAND	92,821	19"	4 fish	245
CONNECTICUT NEW YORK	950,178	19"	3 fish	128
NEW JERSEY*	782,142	19"	3 fish	
NEW JERSEY/ DELAWARE BAY COLREGS**	8,916	18"	3 fish	128
DELAWARE MARYLAND VIRGINIA	191,636	17"	4 fish	365
NORTH CAROLINA	17,074	15"	4 fish	365

^{*}New Jersey east of the COLREGS line at Cape May, NJ will have management measures consistent with the northern region of Connecticut – New York.

Management for 2018

If the Board chooses to continue this management program for 2018, the following outlines the process for setting harvest targets:

The TC will use harvest estimates and fishery performance from 2017 to evaluate the 2018 regional management approach. If the coastwide RHL is exceeded, then region specific harvest will be evaluated, with the understanding that more restrictive management measures will be needed to constrain regional harvest in 2018. If the predicted 2018 combined regional harvest is higher than the 2018 RHL, regions will have to adjust their management measures in 2018. The TC will develop proposed measures for each region that, when combined, will constrain the coastwide harvest to the 2018 RHL. Any number of size, possession, and season combinations can be evaluated when looking at regional management.

^{**}New Jersey west of the COLREGS line at Cape May, NJ inside Delaware Bay will have a similar size limit to the southern region (DE-VA), the same possession limit and the same season length as the northern region of Connecticut – New York.

3.1.1 Timeframe for Summer Flounder Measures

For 2017 and ability to extend through 2018 (One year extension)

The management program outlined in section 3.0 will be in place for 2017. The Board could take action, through a Board vote, to extend the addendum for one year, expiring at the end of 2018. After 2018 (or for 2018 if the Board does not extend the Addendum into 2018), measures would revert back to the FMP status quo coastwide/conservation equivalency measures.

4.0 Compliance:

The management program for summer flounder contained in Section 3.0 of Addendum XXVIII are effective immediately upon its approval (February 2, 2017). States will go through their administrative procedure to implement regional management measures to cumulatively achieve the needed coastwide reduction for 2017. Once management measures are finalized, the states must notify the Board of their final 2017 management measures by March 1, 2017. If a state or region does not implement management measures to cumulatively achieve across the regions the needed 2017 reduction, that state or region must implement the precautionary default management measures. The Board and Council approved in December 2016 precautionary default measures for 2017 that include a minimum size of 20 inches total length, a possession limit of 2 fish, and a season of July 1–August 31. These measures would be in place for both state and federal waters of the state or region in question. If a state or region does not implement either sets of measures, that state or group of states may be found out of compliance. States measures will made available to the public as soon as they are finalized.

Tables and Figures

Table 6. 2016 Summer Flounder Recreational Management Measures. Color blocking indicates regions

State	Minimum Size (inches)	Possession Limit	Open Season
Massachusetts	16	5 fish	May 22-September 23
Rhode Island	18	8 fish	May 1-December 31
Connecticut	18		
CT Shore Program (46 designed shore sites)	16	5 fish	May 17- September 21
New York	18	5 fish	May 17- September 21
New Jersey*	18	5 fish	
NJ Shore program (1 designated site)	16	2 fish	May 21- September 25
New Jersey/Delaware Bay COLREGS**	17	4 fish	
Delaware	16	4 fish	January 1- December 31
Maryland	16	4 fish	January 1- December 31
PRFC	16	4 fish	January 1- December 31
Virginia	16	4 fish	January 1- December 31
North Carolina	15	6 fish	January 1- December 31

^{*}New Jersey east of the COLREGS line at Cape May has management measures consistent with the northern region of Connecticut – New York.

^{**}New Jersey west of the COLREGS line at Cape May, NJ inside Delaware Bay has a similar size limit to the southern region (DE-VA), the same possession limit as the southern region (DE-VA), and the same season length as the northern region of Connecticut – New York.

Table 7. State regulations, 2013–2016. 2013 represents the last year state-by-state regulations applied; regional management applies 2014–2016. Color blocking indicates regions. Red font indicates change from prior year.

	2013	2014	2015	2016
	16"	16"	16"	16"
MA	5 fish	5 fish	5 fish	5 fish
	May 22-Sep 30	May 22-Sep 30	May 22-Sep23*	May 22-Sep 23 (125 day season)
	18"	18"	18"	18"
RI	8 fish	8 fish	8 fish	8 fish
	May 1-Dec 31	May 1-Dec 31	May 1-Dec 31	May 1-Dec 31 (245 day season)
	17.5"**	18"**	18"**	18"**
СТ	5 fish	5 fish	5 fish	5 fish
	May 15-Oct 31	May 17-Sep 21	May 17-Sep21	May 17-Sep21 (128 day season)
	19"	18"	18"	18"
NY	4 fish	5 fish	5 fish	5 fish
	May 1-Sep 29	May 17-Sep 21	May 17-Sep21	May 17-Sep21 (128 day season)
	17.5"	18"***	18"***	18"***
NJ Coast	5 fish	5 fish	5 fish	5 fish
	May 18-Sep16	May 23-Sep 27	May 23-Sep 26	May 21-Sep 25 (128 day season)
NJ	17.5"	18"	18"	17"
Delaware	5 fish	5 fish	5 fish	4 fish
Bay	May 18-Sep16	May 23-Sep 27	May 23-Sep 26	May 21-Sep 25 (128 day season)
	17"	16"	16"	16"
DE	4 fish	4 fish	4 fish	4 fish
	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31 (365 day season)
	16"	16"	16"	16"
MD	4 fish	4 fish	4 fish	4 fish
	Mar 28-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31 (365 day season)
	16"	16"	16"	16"
VA	4 fish	4 fish	4 fish	4 fish
	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31 (365 day season)
	15"	15"	15"	15"
NC	6 fish	6 fish	6 fish	6 fish
	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31	Jan 1-Dec 31 (365 day season)

^{*}MA change in season not due to cut, but correction of error from prior year

^{**}CT has 45 designated coastal sites where minimum size is 16" for the 5-fish limit, 2013–2016

^{***}NJ has 1 designated coastal site where 2 fish at 16" can be taken, 2014–2016 (another 3 at 18" can be taken outside of the designated site)



Atlantic States Marine Fisheries Commission

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Douglas E. Grout (NH), Chair

James J. Gilmore, Jr. (NY), Vice-Chair

Robert E. Beal, Executive Director

Vision: Sustainably Managing Atlantic Coastal Fisheries

June 8, 2017

The Honorable Wilbur Ross Secretary of Commerce Herbert C. Hoover Building United States Department of Commerce 1401 Constitution Avenue, Northwest Washington, DC 20230

Dear Mr. Secretary:

This letter is to notify you that the Atlantic States Marine Fisheries Commission (Commission) has determined the State of New Jersey is out of compliance with the Commission's Interstate Fisheries Management Plan (FMP) for Summer Flounder, Scup, and Black Sea Bass.

The Commission adopted the following motion on June 1, 2017, upon the recommendation of the Summer Flounder, Scup, and Black Sea Bass Management Board and the Interstate Fishery Management Program Policy Board:

On Behalf of the ISFMP Policy Board, move the full Commission find the state of New Jersey be found out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan if the State does not implement the following measures by May 25, 2017:

- Shore mode for Island Beach State Park only: 17-inch minimum size limit; 2-fish possession limit and 128-day open season.
- Delaware Bay only (west of the COLREGs line): 18-inch minimum size limit; 3-fish possession limit and 128-day open season.
- All other marine waters (east of the COLREGs line): 19-inch minimum size limit; 3-fish possession limit and 128-day open season

The implementation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP.

The motion passed with all member states voting in favor except New Jersey, which voted against the motion, and Florida which was absent from the meeting. By this action, the Commission has found the State of New Jersey out of compliance with the FMP and has outlined what the state must do to come back into compliance.

Honorable Wilbur Ross June 8, 2017 Page 2

The Summer Flounder, Scup, and Black Sea Bass Management Board approved Addendum XXVIII with the goal of providing anglers fair and equitable access to summer flounder throughout the range while staying within the 2017 recreational harvest limit (RHL) as required by the FMP and the Magnuson-Stevens Act. 2017 catch limits were reduced by approximately 30% in response to the stock assessment result that overfishing was occurring, the fishing mortality threshold had been exceeded by 26% and spawning stock biomass has been declining since 2010 and is nearing the threshold as indicated by the 2016 Stock Assessment Update. The Update, based on data through 2015, shows 14 out of 15 fishery independent survey indices along the US Atlantic coast showed declining numbers of summer flounder from their most recent peak abundance, with the largest decline at 97%. The failure of New Jersey to implement and enforce a management program consistent with the FMP will result in summer flounder harvest levels that will negatively impact state and federal efforts to end overfishing and conserve the resource by increasing its abundance. The increase in the minimum size limit from 18 to 19-inches and the bag limit reduction from 4 to 3 fish will decrease the number of summer flounder harvested in order to not exceed the RHL and work towards ending overfishing.

The Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5101) requires all Atlantic coastal states to implement and enforce fishery management plans adopted by the Commission. If the Commission determines a state is out of compliance with one of its FMPs, the Act requires the Commission to report this determination to you. I have also communicated a similar letter to the Secretary of the Interior.

Sincerely,

Robert E. Beal

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cc: New Jersey ASMFC Commissioners and Proxies
Doug Grout, ASMFC Chair
James Gilmore, ASMFC Vice-Chair
Summer Flounder, Scup, and Black Sea Bass Management Board
Summer Flounder, Scup, and Black Sea Bass Technical Committee
Summer Flounder, Scup, and Black Sea Bass Advisory Panel
Interstate Fisheries Management Program Policy Board



JUL 1 2 2017

UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration

NATIONAL MARINE FISHERIES SERVICE 1315 East-West Highway Silver Spring, Maryland 20910

THE DIRECTOR

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

Dear Mr. Beal:

On June 8, 2017, you notified Commerce Secretary Wilbur Ross of the Atlantic States Marine Fisheries Commission's determination that the State of New Jersey was out of compliance with Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass Interstate Fishery Management Plan. The measures in question regarding noncompliance are designed to constrain recreational catch to established catch limits and end overfishing of the summer flounder stock.

The Atlantic Coastal Act's noncompliance process (16 U.S.C. § 5106) involves two criteria. The Secretary must determine: 1) whether the State in question has failed to carry out its responsibility under the Commission's ISFMP; and 2) if so, whether the measures that the State failed to implement and enforce are necessary for the conservation of the fishery in question. If the Secretary determines a State is noncompliant with both of these criteria, the Atlantic Coastal Act mandates that the Secretary impose a moratorium on fishing in State waters in the fishery in question.

New Jersey makes a compelling argument that the measures it implemented this year, despite increasing catch above the harvest target, will likely reduce total summer flounder mortality in New Jersey waters to a level consistent with the overall conservation objective for the recreational fishery. While there is some uncertainty about how effective the New Jersey measures will be, considering the information provided by the State, the Secretary has found that the measures are likely to be equivalent in total conservation as those required under Addendum XXVIII. Therefore, the second criterion of the noncompliance finding is not met and it is unnecessary to implement a fishery moratorium in New Jersey waters for 2017.

Please contact Alan Risenhoover, Director of the Office of Sustainable Fisheries, if you need additional information. He can be reached at 301-427-8500, 1315 East-West Highway, Silver Spring, Maryland 20910, or alan.risenhoover@noaa.gov.

Sincerely,

Chris Oliver

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cc: Mr. Douglas Grout, Chairman, Atlantic States Marine Fisheries Commission Mr. Michael Luisi, Chairman, Atlantic States Marine Fisheries Commission Summer Flounder Management Board





Atlantic States Marine Fisheries Commission

Annual Performance of the Stocks: 2017 Review

July 2017

Objective: – Support the ISFMP Policy Board's review of stock rebuilding performance and management board actions and provide direction to management boards for 2016 Action Plan.

- A. Validate status/rate of progress (acceptable/not acceptable)
- B. If not acceptable, identify appropriate corrective action

Species Groups: – Species are grouped under five major categories (1) rebuilt/sustainable; (2) recovering/rebuilding; (3) concern; (4) depleted; and (5) unknown, as defined below.

Rebuilt/Sustainable – Stock biomass is equal to or above the biomass level established by the FMP to ensure population sustainability. When between benchmark assessments a stock can still be considered rebuilt/sustainable if it drops below the target but remains above the threshold.

Recovering/Rebuilding – Stocks exhibit stable or increasing trends. Stock biomass is between the threshold and the target level established by the FMP.

Concern – Those stocks developing emerging issues, e.g., increased effort, declining landings, or impacts due to environmental conditions.

Depleted – Reflects low levels of abundance though it is unclear whether fishing mortality is the primary cause for reduced stock size

Unknown – There is no accepted stock assessment to estimate stock status.

Status as of 2017

Rebuilt/Sustainable:

American Lobster (GOM/GBK)

Atlantic Herring

Atlantic Menhaden

Black Drum

Black Sea Bass Bluefish

Scup

Spanish Mackerel

Spiny Dogfish

Recovering/Rebuilding:

Atlantic Striped Bass

Red Drum

Tautog (MA/RI)

Concern:

Coastal Sharks Horseshoe Crab Summer Flounder Winter Flounder (GOM)

Depleted:

American Eel

American Lobster (SNE)

American Shad Northern Shrimp

River Herring

Tautog (LIS, NJ/NY Bight,

DelMarVa) Weakfish

Winter flounder (SNE/MA)

Unknown:

Atlantic Croaker Atlantic Sturgeon Jonah Crab

Spot

Spotted Seatrout

Status as of 1998

Rebuilt/Rebuilding

Atlantic Herring
Atlantic Striped Bass

Bluefish

Black Sea Bass Spanish Mackerel Summer Flounder

Concern/Depleted

American Lobster (SNE) Atlantic Menhaden Northern Shrimp

Red Drum

Scup

Spiny Dogfish

Tautog Weakfish

Winter Flounder (SNE/MA and

GOM)

Unknown

American Eel American Shad Atlantic Croaker Atlantic Sturgeon Horseshoe Crab River Herring

Spot

Spotted Seatrout

Summary Table of Rebuilt/Sustainable Species

Species	Biomass	Assessment	Caveats/Notes
	% of Target	Schedule	(what actions need to be taken to maintain rebuilt status)
American Lobster	375% of abundance		The stock is not overfished and is not experiencing overfishing. Dramatic
(Gulf of Maine/	threshold (2015		stock abundance increase since the late 1980s and at an increasing rate
Georges Bank)	benchmark assessment)		since 2005. Average spawning stock and recruit abundance are above the
			75 th percentile while young of year indicators are generally below the
			median.
Atlantic Herring	>200% of biomass	Benchmark Assessment	The stock is not overfished and is not experiencing overfishing. Survey
	target adjusted for	–June 2018	indices in the operational assessment suggest the 2011 year class is the
	retrospective bias		second largest in time series and will contribute significantly to total
	(Operational		population abundance and biomass.
	Assessment 2015)		
Atlantic Menhaden	90% of fecundity target	Assessment Update –	The stock is not overfished and is not experiencing overfishing.
		2017	Abundance of older fecund fish in the population. Significant changes
			occurred through the benchmark assessment including the addition of
			fishery-independent datasets and changes to the model structure to
			incorporate the spatial resolution of the reduction and bait fisheries.
Black Drum	192% of B _{MSY} (2015		The stock is not overfished and is not experiencing overfishing.
	benchmark		
	assessment)		
Black Sea Bass	229% of the SSB target		The stock is not overfished and is not experiencing overfishing. Recent
	(2016 benchmark stock		strong recruitment has led to the highest biomass estimate in the time
	assessment)		series. It's unknown whether strong year classes/recruitment will
			continue to maintain high abundance in future years.
Bluefish	85% of SSB target	Assessment Update –	The stock is not overfished and is not experiencing overfishing.
	(2015 benchmark	2018	Considered less vulnerable to becoming overfished relative to the
	assessment)		biological reference points due to their life history characteristics (e.g.,
			pelagic species, opportunistic feeder, multiple spawning events per
			years).

Summary Table of Rebuilt/Sustainable Species

Scup	209% of SSB target (2015 benchmark assessment)	Assessment Update- 2018	The stock is not overfished and is not experiencing overfishing. There is no consistent internal retrospective pattern in fishing mortality (F), spawning stock biomass (SSB), or recruitment evident in the scup assessment model.
Spanish Mackerel	SSB ₂₀₁₁ /SSB _{MSY} =1.49; SSB ₂₀₁₁ /M _{SST} =2.29 (2012 benchmark stock assessment)		The stock is not overfished and is not experiencing overfishing.
Spiny Dogfish	106% of SSB target in 2015 (based on the Kalman filter applied to the 2015 assessment update)	Assessment Update – Fall 2018	In November 2015, due to incomplete survey data in 2014, the Northeast Fisheries Science Center (NEFSC) updated the spiny dogfish assessment using a Kalman filter to smooth estimates across years. 2015 SSB is estimated to be 168,207 mt, about 106% of the SSB target. Commercial quotas have decreased over the past three years because SSB is projected to decline through 2019 before rebounding back up.

Summary Table of Species Undergoing Recovery/Rebuilding

Species	Biomass	Assessment	Caveats/Notes
	% of Target	Schedule	(what actions need to be taken to continue rebuilding)
Atlantic Striped	82% of SSB target in	Benchmark	The stock is not overfished and is not experiencing overfishing, although
Bass	2015 (2016 assessment	Assessment – 2018	SSB has been declining since 2006 and was estimated just above the
	update)		threshold level in 2015. Coastwide harvest reduction measures were
			implemented in 2015 in order to reduce fishing mortality and stabilize
			SSB.
Red Drum	Unknown		Red drum does not fit into any of the Commission categories perfectly.
			The stock is not experiencing overfishing. The estimates of biomass from
			the assessment are highly uncertain and were not recommended for
			management use. While Indices used in the assessment are variable, the
			long term trends are stable.
Tautog (MA/RI)	82% of SSB Target (2016		Spawning potential ratio was used to determine stock status. Total
	assessment update)		abundance and spawning stock biomass declined rapidly from 1982 until
			2000. Spawning stock biomass decreased from 8,994 mt in 1985 to the
			current estimate of 2,196 mt in 2015.

Coastal Sharks: Concern

Assessment Findings

Species or Complex	Stock	Status	References/Comments
Name	Overfished	Overfishing	
		P	elagic
Porbeagle	Yes	No	Porbeagle Stock Assessment, ICCAT Standing Committee on Research and Statistics Report (2009); Rebuilding ends in 2108 (HMS Am. 2)
Blue	No	No	ICCAT Standing Committee on Research and Statistics Report (2015)
Shortfin Mako	No	No	ICCAT Standing Committee on Research and Statistics Report (2012)
All other	Unknown	Unknown	
		Aggregated	Large Coastal Sharks (LCS)
Atlantic Blacktip	Unknown	Unknown	SEDAR 11 (2006)
Aggregated Large Coastal Sharks Atlantic Region	Unknown	Unknown	SEDAR 11 (2006); difficult to assess as a species complex due to various life history characteristics/ lack of available data
		Non-Blacknos	e Small Coastal Sharks (SCS)
Atlantic Sharpnose	No	No	SEDAR 34 (2013)
Bonnethead	Unknown	Unknown	SEDAR 34 (2013)
Finetooth	No	No	SEDAR 13 (2007)
			Hammerhead
Scalloped	Yes	Yes	SEFSC Scientific Review by Hayes et al. (2009) Hayes, et al. (2009): Rebuilding ends in 2023 (HMS Am. 5a)
			Blacknose
Blacknose	Yes	Yes	SEDAR 21 (2010); Rebuilding ends in 2043 (HMS Am. 5a)
			Smoothhound
Atlantic Smooth	No	No	SEDAR 39 (2015)
			Research
Sandbar	Yes	No	SEDAR 21 (2010)

	Prohibited				
Dusky	Yes	Yes	SEDAR 21 (2016); Rebuilding ends in 2107 (HMS Am. 5b)		
Basking		No	Campana (2008)		
Night		No	Carlson et al (2008)		
Sand Tiger		No	Carlson et al (2008)		
White		No	Curtis et al (2014)		
Bigeye Thresher		No	Young et al (2016)		
All other	Unknown	Unknown			

Board Adherence to Scientific Advice

- Based on Technical Committee advice, the Board approved FMP regulations that generally complement regulations in federal waters, ensuring F does not exceed F_{MSY} or F_{REBUILD}, and protecting shark pupping grounds in state waters.
- The Board manages the commercial fishery via management groups based on biology, fisheries, and stock status of various species.
- The Board approved a January 1, 2017 opening date for all commercial management groups in the Atlantic shark fishery, in conjunction with federal waters' fisheries.
- The 2017 commercial fishery is year-round, therefore, adjustable commercial retention limits for the aggregated large coastal shark and hammerhead shark management groups were implemented, in conjunction with federal waters fisheries, to ensure equitable distribution of the resource throughout the fishing season. The default commercial retention limit is 45 sharks per trip per vessel; it can be adjusted inseason to 0 55 sharks per vessel per trip.
- In 2017, a commercial possession limit of 8 blacknose sharks per trip was implemented in federal waters; the Commission adopted the possession limit via the 2017 specifications.
- To complement the Shark Conservation Act of 2010, the Board implemented a fins naturally attached policy for all sharks, with a limited exception for smooth dogfish. Harvesters can remove the fins of smooth dogfish provided the weight of the fins onboard does not exceed 12% of the total weight of smooth dogfish carcasses.

Monitoring and Management Measures

- May 15 July 15 closed season from New Jersey-Virginia to protect pupping females for the following species: sandbar, silky, tiger, blacktip, spinner, bull, lemon, nurse, scalloped hammerhead, great hammerhead, and smooth hammerhead.
- Fins to remain attached to the carcass through landing for all species except smooth dogfish (25% catch composition applies)
- Recreational fishing controlled through possession limits with a 4.5' fork length size limit for all species except for Atlantic sharpnose, finetooth, blacknose, and bonnethead which do not have a size limit, and 6.5' for all hammerhead shark species.
- Recreational anglers can only harvest sharks caught with a handline or rod & reel.

Next Assessment: Variable by species/complex **Rebuilding Trajectory:** Variable by species/complex

Horseshoe Crab: Concern

2013 Assessment Update Findings

- Abundance has increased in the Southeast and Delaware Bay Region (New Jersey through coastal Virginia), and decreased in New York and New England.
- In the Delaware Bay, increasing trends were most evident for juveniles, followed by adult males. A small increase in adult females was observed in the Virginia Tech Benthic Trawl

Regional Trends in Horseshoe Crab Abundance

	Time series	
	duration of longest	Conclusion about
Region	dataset	population change
New England	1978 - 2008	Declined
New York	1987 - 2008	Declined
Delaware Bay	1988 - 2008	Increased
Southeast	1993 - 2009	Increased

- Survey, but the survey has not been conducted since 2013. These patterns are indicative of population recovery, given that horseshoe crab females take longer to mature than males.
- Declines in the New England population were also apparent in the 2004 and 2008 assessments; however, the 2008 declines in New York represent a downturn from the 2004 assessment. The Technical Committee believes decreased harvest quotas in Delaware Bay encouraged increased harvest in nearby regions.
- The Technical Committee recommends continued precautionary management to address effects of redirected harvest from Delaware Bay to outlying populations.

Needed Information/Data

- Dedicated funding for a coastwide survey or surveys by broader geographical region
- Biological reference points
- A mechanism to include biomedical data and mortality estimates in regional assessments without compromising data confidentiality

Board Adherence to Scientific Advice

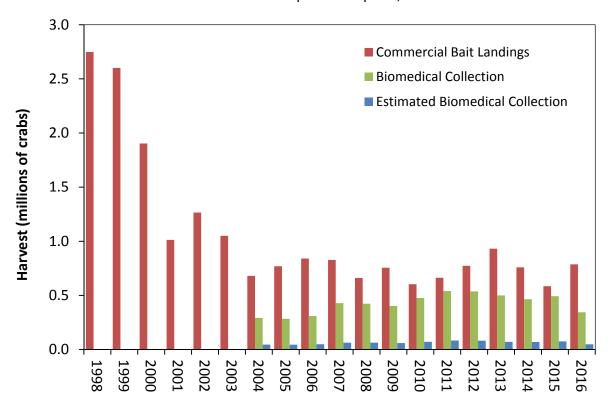
 Addendum VII, approved in 2012, implemented the Adaptive Resource Management (ARM) framework, which was used to set annual specifications for horseshoe crabs of Delaware Bay origin. The ARM framework has been used since 2013.

Next Assessment: Benchmark stock assessment scheduled for 2018

Rebuilding Trajectory: Varies by region (see table)

Horseshoe Crab Bait Landings and Biomedical Collection

ASMFC State Compliance Reports, 2017



Please note the following details regarding biomedical collection numbers:

- * Biomedical collection numbers, which are annually reported to the Commission, include all horseshoe crabs brought to bleeding facilities except those that were harvested as bait and counted against state quotas.
- * Most of the biomedical crabs collected are returned to the water after bleeding; a 15% mortality rate is estimated for all bled crabs. This is noted in the above graph as 'Estimated Biomedical Mortality.'

Timeline of Management Actions: FMP ('99); Addendum I ('00); Addendum II ('01); Addendum III ('04); Addendum IV ('06); Addendum V ('08); Addendum VI ('10); Addendum VII ('12)

Summer Flounder: Concern

Assessment Findings (2015 Assessment Update)

- Not overfished, but overfishing was occurring relative to the biological reference points (F=.390 in 2015, 26% above F_{MSY}=3.09).
- Spawning stock biomass was estimated to be 79 million pounds in 2014, 65% of the target (138 million pounds)
- Recruitment over the past six years (2010-2015) were below average.
- 2016 commercial landings were approximately 7.81 million pounds or 96% of the 2016 the commercial quota
- 2016 recreational harvest was approximately 5.42 million pounds or 114% of the recreational harvest limit. Harvest in 2016 increased by 31% relative to harvest in 2015.

Scientific Advice Based on Assessment Findings

- Retrospective patterns are evident in the assessment and have substantial implications for the reliability of the model projections.
- Projections are made assuming the acceptable biological catch (ABC) will be fully harvested, but not
 exceeded. However, there are trends in harvest indicating an increased likelihood of catches exceeding the
 ABC.
- For 2017, the probability of overfishing is higher than the Mid-Atlantic Council's risk policy.

Board Adherence to Scientific Advice

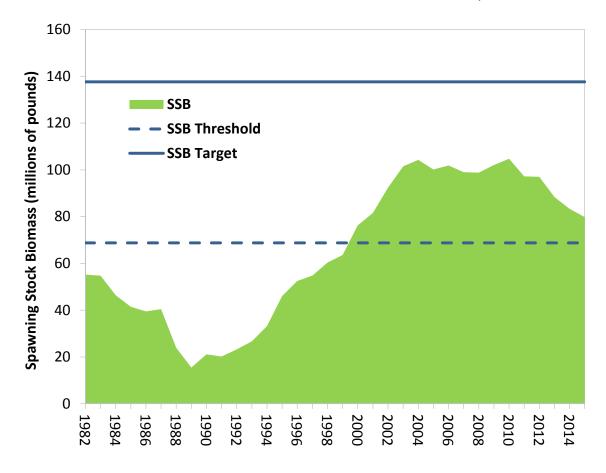
- 2017 acceptable biological catch was decreased by 30% to reflect declines in stock size.
- The Board approved a regional approach for recreational management measures which is a more precise
 use of the MRIP data. MRIP estimates are best used in aggregate annually and at the state or regional
 level.

Next Assessment: Benchmark Stock Assessment in 2018 through the NEFSC SAW/SARC process

Rebuilding Trajectory: Declining

Summer Flounder Spawning Stock Biomass

Source: Northeast Fisheries Science Center Stock Assessment Update, 2016



Timeline of Management Actions: FMP ('88); Amendment 1 ('91); Amendments 2 -5 ('93); Amendment 6 ('94); Amendment 7 ('95); Amendments 8 & 9 ('96); Amendment 10 ('97); Amendment 11 ('98); Amendment 12 ('99); Amendment 13 ('03); Addendum XVII ('05); Addendum XVIII ('06); Addendum XXVI ('14); Addendum XXVI ('15); Addendum XXVIII ('17)

Winter Flounder - GOM: Concern

2015 Groundfish Stock Assessment Update

Overfished Unknown

- Assessment is now based on 30+ cm area-swept biomass estimated directly from the surveys. The update assessment was accepted for management use.
- B_{MSY} and F_{MSY} are unknown, and consequently the F and SSB targets could not be generated.
- The lack of an apparent relationship between a large decrease in catch and little change in indices and age or size structure cause poor fit in models that have been used.

Overfishing not Occurring

- Updated 2014 fall 30+ cm area-swept biomass (4,655 mt) implies an OFL of 1,080 mt based on the E_{MSY} proxy and a catch of 810 mt for 75% of the E_{MSY} proxy.
- It is unknown why the stock is not responding to low catches and low exploitation rates.

Board Adherence to Scientific Advice

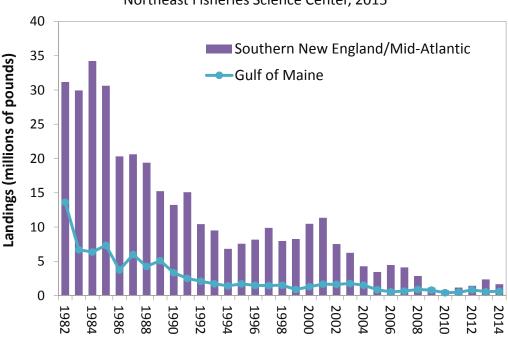
- Addendum I measures, implemented in 2009, reduced recreational and commercial harvest by an estimated 11% and 31%, respectively
- In response to the 2011 stock status, NOAA Fisheries increased the 2012 state water sub-component to 272 mt (a 450% increase of 2010 level) based on the overfishing status.
- Following this federal action, the Commission's Winter Flounder Board approved Addendum II in October

2012 to increase the maximum possession limit for non-federally permitted commercial vessels to 500 pounds.

- In response to the 2015
 assessment update,
 NOAA Fisheries increased
 the 2016 state water sub component to 122 mt
 (from 87 mt in 2015) and
 total stock-wide annual
 catch limit to 776 mt
 (from 489 mt), roughly
 three times the harvest in
 2014.
- The Commission's Board maintained the same management measures since the 2015 fishing season.

Next Assessment: N/A

Winter Flounder Commercial Landings by Stock Unit Northeast Fisheries Science Center, 2015



Timeline of Management Actions: FMP & Addendum I ('92); Addendum II ('98); Amendment 1 ('05); Addendum I ('09); Addendum III ('12); Addendum III ('13)

Rebuilding Trajectory: Flat at low levels

American Eel Commercial Landings and Ex-Vessel Value

Source: ACCSP Data Warehouse, 2017

Overview of Depleted Species

American Eel: Depleted

2012 Benchmark Assessment

Depleted: Trend analyses and model results indicate the American eel stock has declined in recent decades and the prevalence of significant downward trends in multiple surveys across the coast is cause for concern.

Overfishing Determination: No overfishing determination can be made at this time.

Assessment Findings

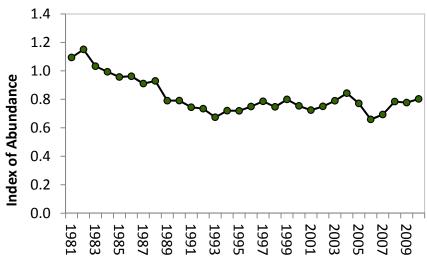
- In recent decades there has been neutral or declining coastwide abundance.
- Decreasing trends in yellow eels were seen in the Hudson River and South Atlantic regions
- Although commercial fishery landings and effort in recent times have declined in most regions, current levels of fishing effort may still be too high given the additional stressors affecting the stock such as habitat loss, passage mortality, and disease as well as potentially shifting oceanographic conditions.
- Management efforts to reduce mortality on American eels in the U.S. are warranted.

Board Adherence to Scientific Advice

- Based on results of the 2012 benchmark assessment the Board has implemented two Addenda to reduce fishing mortality on American eels.
- Addendum III (2013) increased the commercial and recreational minimum size to 9 inches, reduced the recreational bag limit from 50 fish/day/angler to 25 fish/day/angler,

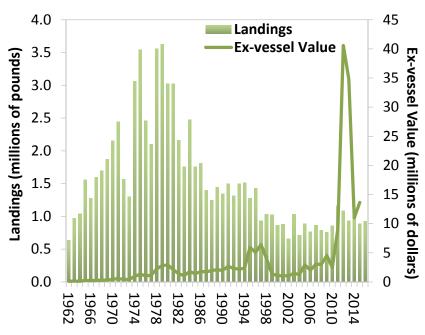
30-Year Index of Abundance for Yellow-phase American Eels along the Atlantic Coast

Source: 2012 American Eel Benchmark Stock Assessment Report



American Eel Commercial Landings and Ex-Vessel Value

Source: ACCSP Data Warehouse, 2017



* 2016 landings are preliminary; elevated 2012 & 2013 ex-vessel values are due to increased demand and price/lb of glass eels

Timeline of Management Actions: FMP ('99); Addendum I ('06); Addendum II ('08); Addendum III ('13); Addendum IV ('14)

prohibited most silver eel fisheries, and places restrictions on the growth of pigmented eel fisheries.

 Addendum IV (2014) established a 907,671 pound coastwide quota for yellow eel fisheries, reduced Maine's glass eel quota to 9,688 pounds based on 2014 landings, and allowed for the continuation of New York's silver eel weir fishery in the DE River. Management triggers exist for yellow eel state quotas if necessary.

Next Assessment: Stock Assessment Update in 2017

Rebuilding Trajectory: Unknown

American Lobster - SNE: Depleted

Assessment Findings (2015 Benchmark Stock Assessment)

- Depleted and overfishing not occurring
- Abundance at 42% of threshold
- Current exploitation (0.27) below threshold (0.41)
- Model estimates for recruitment are near zero and the lowest on record
- The inshore portion of the stock shows a dramatic decline in spawning stock abundance
- The stock has not rebuilt and is in recruitment failure
- Little possibility of recovery unless fishing effort is significantly curtailed

Board Adherence to Scientific Advice

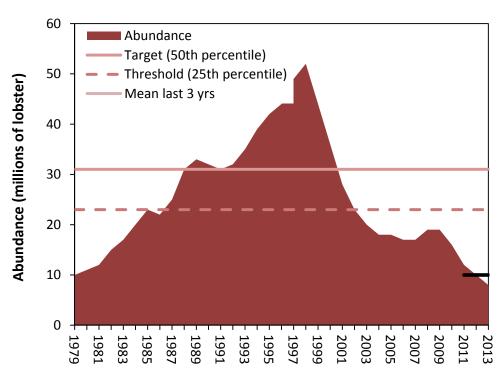
- Technical Committee has advised use of output controls, Board continues to use input measures
- Technical Committee has advised prohibiting conservation equivalency in LCMA 6, Board approved program
- Technical Committee has advised 100% trip level harvester reporting; Board maintained at least 10% active harvester reporting
- Technical Committee has advised 50-75% reductions in SNE LCMAs; Board approved 10% reduction.

Rebuilding Trajectory:

Population continues to decline; Addendum XI (May 07) established a 15-year rebuilding timeline (ending in 2022) with a provision to end overfishing immediately.

Southern New England Lobster Abundance

Source: American Lobster Benchmark Stock Assessment, 2015



Timeline of Management Actions: Amendment 3 ('97); Addendum I ('99); Addendum II ('01); Addendum III ('02); Addenda IV & V ('04); Addenda VI & VII ('05); Addenda X & XI ('07); Addendum XIII ('08); Addendum XIV ('09); Addendum XV ('09); Addendum XVI ('10); Addendum XVII ('11); Addendum XVIII ('12); Addendum XXIV ('15); Addendum XXV ('17)

American Shad: Depleted

2007 Assessment Findings

- 86 river systems assessed; 64% of which have unknown stock status
- Collectively, stocks are at alltime lows and do not appear to be recovering

Scientific Advice Based on Assessment Findings

- Improved monitoring (fishery independent and dependent) and fish passage
- Management measures based on total mortality (Z), which combines fishing and natural mortality.
- Lower JAI threshold needed to trigger management action
- The next assessment has not been scheduled.

Trends in Stock Status of American Shad Populations

Trends based on a comparison of 2007 assessment results to 1998 assessment results. Sources: ASMFC American Shad Stock Assessment Reports for 2007 and 1998

State	River	Trend
ME	Saco and Kennebec	Declining
NH	Exeter	Declining
MA	Merrimack	Low, Stable
RI	Pawcatuck	Declining
CT/MA	Connecticut	Stable
NY	Hudson	Declining
NY/PA/NJ/DE	Delaware River and Bay	Low, Stable
PA	Susquehanna	Declining
DC/MD/VA	Potomac	Increasing
MD	Nanticoke	Low
VA	York	Increasing
	James	Declining
	Rappahannock	Stable
SC	Santee	Increasing
	Edisto	Declining
GA	Altamaha	Declining
FL	St. Johns	Declining

Board Adherence to Scientific Advice

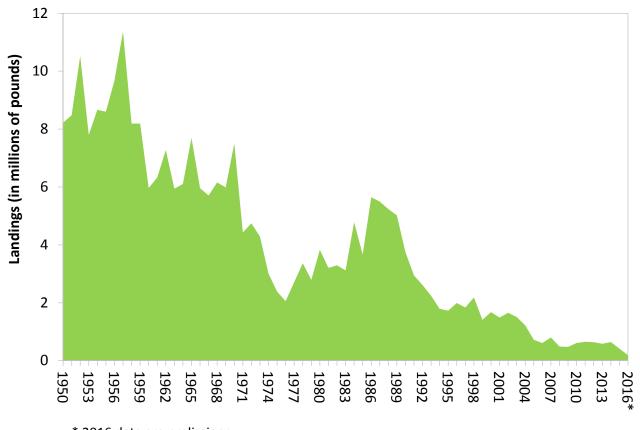
- Management Board approved Amendment 3 in February 2010
- Management actions contained in the Amendment are based on recommendations from the stock assessment.
- Member states/jurisdictions were required to submit sustainable fishery management plans (SFMPs) by August 1, 2012 (for TC review and Board approval). As of January 1, 2013, the Shad and River Herring Management Board approved SFMPs for Massachusetts, Connecticut, the Delaware River, the Potomac River, North Carolina, South Carolina, Georgia, and Florida. States/jurisdictions without approved SFMPs by January 1, 2013 were required to close their American shad fisheries, with the exception of catch and release recreational fisheries.
- By August 1, 2013, states/jurisdictions were required to submit a Habitat Plan, which contains a summary of current and historical spawning and nursery habitat; the most significant threats to those habitats; and a habitat restoration program to improve, enhance and/or restore habitat quality and quantity. In February 2014, the Board approved habitat plans for the majority of states and jurisdictions.

Next Assessment: Assessment update in 2018

Rebuilding Trajectory: Variable by River System (see accompanying table)

American Shad Commercial Landings

Source: ACCSP Data Warehouse, 2016 and State Compliance Reports, 2017



* 2016 data are preliminary

Timeline of Management Actions: FMP ('85); Amendment 1 ('99); Amendment 3 ('10)

Northern Shrimp: Depleted

Assessment Findings (2016 Stock Status Report)

- The Technical Committee evaluated a suite of indicators including catch and landings data from the winter research-set-aside (RSA) program, survey indices of abundance and biomass, and environmental conditions, to determine the status of the stock.
- Using these indices, the Technical Committee determined stock status continues to be critically poor.
- Total biomass, spawning biomass and harvestable biomass have remained at unprecedented lows for five consecutive years
- Recruitment failure has been observed in three of the past five years (the 2011, 2012, and 2014 year classes). The 2013 year class, which was well below the long-term average recruit abundance, is responsible for the increase in spawning biomass observed in 2016. Long-term trends in environmental conditions are not favorable

for northern shrimp, suggesting a need to conserve spawning stock biomass to help compensate for what may continue to be an unfavorable environment.

Scientific Advice Based on Assessment Findings

Given the continued poor condition of the resource, the poor prospects for a 2017 commercial season, and the value of maximizing spawning potential to rebuild the stock, the **Technical Committee** recommended extending the moratorium on fishing through 2017 to build on the conservation gains from the current moratorium.

Board Adherence to Scientific Advice

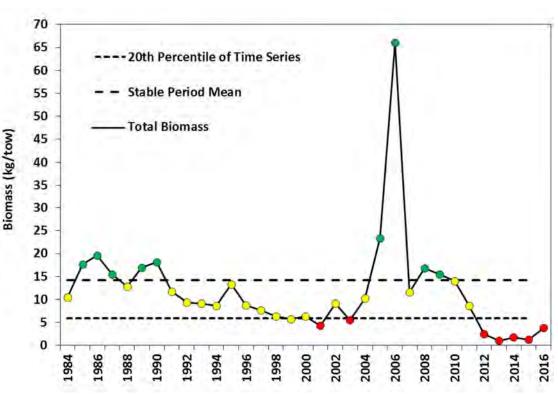
The Section has

implemented a fishery moratorium since 2014.

Prior to closure of the fishery in 2014 due to a collapsed resource, the Section initiated development of Amendment 3 to address overcapacity in the fishery. The amendment explores state-by-state allocations

Total Biomass of Northern Shrimp from the Gulf of Maine Summer Shrimp Survey

Stock Status Report for Gulf of Maine Northern Shrimp, 2016



The graph represents the annual biomass index relative to the reference period (dotted line) and to the 20th percentile of the time series (dashed line). The reference period (1985-1994) is the time period during which the fishery experienced stable landings and value. Green dots are values that are equal to or above the stable period mean (SPM); red dots are values that are equal to or below the 20th percentile of the time series; yellow dots are values between the SPM and the 20th percentile.

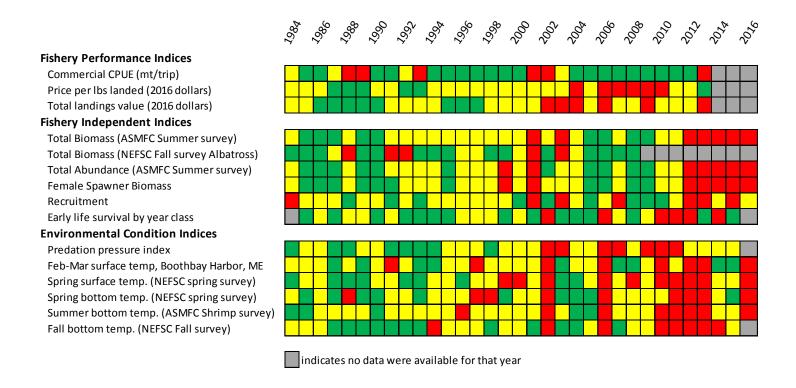
and accountability measures to adequately manage effort in the fishery, gear requirements to minimize harvest of small shrimp, and reporting measures to ensure all shrimp caught are being reported.

Next Assessment: 2017 Stock Status Update; benchmark assessment, 2018

Rebuilding Trajectory: Declining

Strict Traffic Light Approach (STLA) Results

Red indicates unfavorable conditions or status, yellow indicates intermediate values, and green indicates favorable conditions or status.



Timeline of Management Actions: FMP ('86); Amendment 1 ('04); Amendment 2 ('11); Addendum I ('12)

River Herring: Depleted

Depleted: The coastwide meta-complex of river herring stocks on the US Atlantic coast is depleted to near historic lows (2012 Benchmark Assessment).

Overfishing Determination: No overfishing determination can be made at this time.

Assessment Findings

- Of the 52 stocks of alewife and blueback herring for which data were available, 23 were depleted relative to historic levels, one stock was increasing, and the status of 28 stocks could not be determined because the time-series of available data was too short.
- 14 out of 15 river specific YOY indices showed no (7 rivers) or declining (7 rivers) trends.
- Mean length, maximum age and mean length-at-age for both species have declined.
- Recent domestic landings totaled <2 million pounds in any given year.
- Commercial landings by domestic and foreign fleets peaked at 140 million pounds in 1969.
- The "depleted" determination was used instead of "overfished" and "overfishing" because of the many factors have contributed to the declining abundance of river herring including habitat loss, predation, and climate changes

Board Adherence to Scientific Advice

- In 2009, the Board approved Amendment 2, in response to concern for river herring stocks.
- The Amendment prohibits state waters commercial and recreational fisheries beginning January 1, 2012, unless a state or jurisdiction has a sustainable management plan reviewed by the Technical Committee and approved by the Management Board.
- Amendment 2 required states to implement fisheriesdependent and independent monitoring programs, and contains recommendations to conserve, restore, and protect critical river herring habitat.
- As of January 1, 2012, the Shad and River Herring Management Board approved sustainable fishery management plans for Maine, New Hampshire, New York, North Carolina and South Carolina.

Next Assessment: Assessment update in 2017

Rebuilding Trajectory: Unknown

Status of Select Alewife and Blueback Herring Stocks along the Atlantic Coast

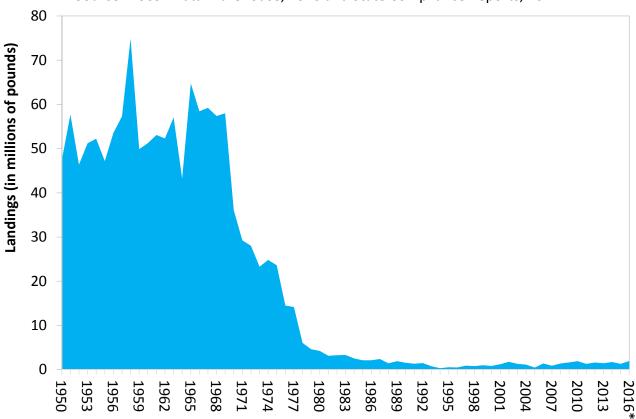
Source: 2012 River Herring Benchmark Stock
Assessment Report

State	River**	Status Relative to Historic Levels / Recent Trends*			
	Damariscotta	Depleted ^A , Stable ^A			
ME	Union	Increasing ^A , Stable ^A			
	Cocheco	Unknown ^{A,B} , Stable ^{A,B}			
	Exeter	Depleted ^A , Unknown ^A			
	Lamprey	Depleted ^A , Increasing ^A			
NH	Oyster	Depleted ^B , Stable ^B			
	Taylor	Depleted ^B , Decreasing ^B			
	Winnicut	Depleted ^{A,B} , Unknown ^{A,B}			
	Mattapoisett	Depleted ^A , Unknown ^A			
MA	Monument	Depleted ^A , Unknown ^A			
IVIA	Parker	Depleted ^A , Unknown ^A			
	Stony Brook	Depleted ^A , Unknown ^A			
	Buckeye	Depleted ^A , Unknown ^A			
RI	Gilbert	Depleted ^A , Decreasing ^A			
	Nonquit	Depleted ^A , Decreasing ^A			
СТ	Connecticut	Depleted ^B , Decreasing ^B			
NY	Hudson	Depleted ^{A,B} , Stable ^{A.B}			
MD, DE	Nanticoke	Depleted ^{A,B} , Decreasing ^{A,B}			
VA, MD, DC	Potomac	Depleted ^{A,B} , Unknown ^{A,B}			
NC	Chowan	Depleted ^{A,B} , Stable ^{A.B}			
SC	Santee- Cooper	Depleted ^B , Increasing ^B			

A = Alewife, B = Blueback Herring Status relative to historic levels is pre-1970. Recent trends reflect last ten years of data.

River Herring Commercial Landings

Source: ACCSP Data Warehouse, 2016 and State Compliance Reports, 2017



^{* 2016} data are preliminary

Timeline of Management Actions: FMP ('85); Amendment 1 ('95); Amendment 2 – River Herring ('09)

Tautog: Depleted

Assessment Findings

2016 Stock Assessment Update

- The assessment includes data through 2015
- The LIS and NJ/NY Bight regions indicate overfishing
- LIS, NJ/NY Bight and DelMarVa regions are overfished

Scientific Advice Based on Assessment Findings

• The assessment proposed new reference points for each region (see table for stock condition and regional stock definition)

Board Adherence to Scientific Advice

 Board initiated Draft Amendment 1 to consider regional stock definitions, reference points and management measures, including a commercial tagging program

Rebuilding Trajectory: Flat at low levels

Tautog Stock Status by Region

Source: ASMFC Stock Assessment Update, 2016

Stock Region	MSY or SPR	SSB Target (mt)	SSB Threshold (mt)	SSB 2015 (mt)	Stock Status
Long Island Sound	MSY	2,865	2,148	1,603	Overfished
New Jersey – New York Bight	MSY	3,154	2,351	1,809	Overfished
Delaware - Maryland–Virginia	SPR	1,919	1,447	621	Overfished

Stock Region	MSY or SPR	Fishing Mortality Target	Fishing Mortality Threshold	3-year Average (2013-15)	Stock Status
Long Island Sound	MSY	0.28	0.49	0.51	Overfishing
New Jersey – New York Bight	MSY 0.20		0.34	0.54	Overfishing
Delaware – Maryland – Virginia	SPR	0.16	0.24	0.16	Overfishing Not Occurring

Weakfish: Depleted

2016 Benchmark Assessment

Depleted: Spawning stock biomass (SSB) at 37% of threshold in 2014

Overfishing Not Occurring: Total mortality (Z) in 2014 was above the threshold but below the target, indicating that Z is still high but within acceptable limits.

Assessment Findings (2016 Benchmark Assessment)

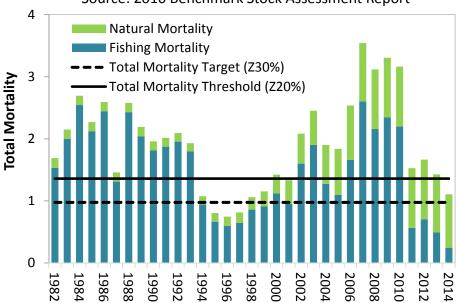
- Natural mortality (M) has increased since the mid-1990s, from approximately 0.16 in the early 1980s to an average of 0.93 from 2007-2014. Potential factors causing high M include predation, competition, and changes in the environment.
- While the assessment indicates some positive signs in the weakfish stock in the most recent years, including a slight increase in SSB and total abundance, the stock is still well below the SSB threshold.
- Weakfish landings have dramatically declined since the early 1980s, dropping from over 19 million pounds in 1982 to roughly 200,000 pounds in 2014.

Board Adherence to Scientific Advice

 Based on results of the 2009 stock assessment and peer review, the Board approved Addendum IV, which 1) revised the biological reference points; 2) implemented a commercial trip limit, and 3) reduced the recreational bag limit, the commercial bycatch limit, and the

Weakfish Spawning Stock Biomass and Recuitment Source: 2016 Benchmarck Stock Assessment Report 60 45 SSB 40 SSB threshold (SSB30%) 50 SSB (millions of pounds) Recruitment 35 40 30 (Millions of 25 30 20 20 15 10 10 0 1984 2000 1994 1996 1998 2002 **Contributions of Fishing and Natural Mortality**

to Weakfish Total Mortality
Source: 2016 Benchmark Stock Assessment Report



Timeline of Management Actions: FMP ('85); Amendment 1 ('91); Amendment 2 (1995); Amendment 3 ('96); Amendment 4 ('02); Addendum I ('05); Addenda II & III ('07); Addendum IV ('09)

finfish trawl fishery's allowance for undersized fish.

• Following the 2016 stock assessment, the Board maintained strict regulations on the harvest of weakfish in the commercial and recreational fishery. The Board also adopted new reference points based on SSB and Z, per the recommendation of the Technical Committee.

Next Assessment: Assessment Update in 2018

Rebuilding Trajectory: Slight increase in SSB and abundance

Winter Flounder - SNE/MA: Depleted

2015 Groundfish Stock Assessment Update

Overfished: Stock is at 23% of SSB target. While there have been some modest increases over the last decade, the stock has remained at approximately a quarter of the target since the early 2000s. Since 1981 recruitment has been declining, 2013 is the lowest in the time series which is approximately 4% of the estimated recruitment in 1981 (the highest in the time series). While the 2014 recruitment estimate increased slightly, the overall stock productivity continues to decline.

Overfishing is Not Occurring: 2014 F = 0.16 which is 49% of the overfishing threshold ($F_{MSY} = 0.325$)

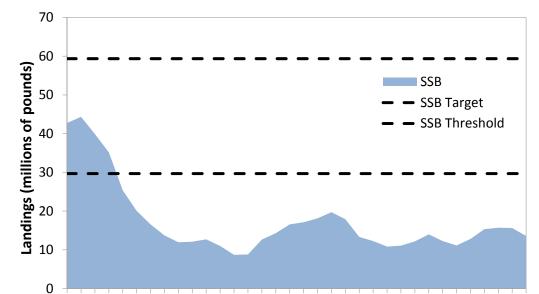
Board Adherence to Scientific Advice

- Stock status remains unchanged since the 2011 benchmark assessment.
- After reviewing the 2015 assessment update, the Board sent a letter to the New England Council and NOAA Fisheries expressing its concern regarding winter flounder stocks, specifically highlighting the SNE/MA stock. The Board requested the Technical Committee further investigate the impacts of the zero possession limit on the SNE/MA stock.
- In 2016, the Technical Committee presented the following report to the Board, A Review of the SNE/MA
 Winter Flounder Fishery and Management Program Under Zero Possession Limits. The Technical
 Committee believes the length of the moratorium (May 1, 2009-April 30, 2013) may not have been long
 enough to positively

impact the stock. Most surveys indicate a declining trend in abundance, suggesting the moratorium did not result in increased stock size. While the Technical Committee did not recommend a reduction in the trip limits, currently set at a bycatch limit of 50 pounds, it encouraged the Board to choose management actions that continue to reduce fishing morality and maintain a bycatch fishery in state waters.

 Following Technical Committee advice, the Board maintained a 50pound trip limit for non-

Southern New England/Mid-Atlantic Winter Flounder Spawning Stock Biomass Source: Groundfish Assessment Review Meeting Update, 2015



Timeline of Management Actions: FMP & Addendum I ('92); Addendum II ('98); Amendment 1 ('05); Addendum I ('09); Addendum II ('12); Addendum III ('13)

1997

1999

2001

federally permitted commercial vessels for the 2017 fishing season.

1981

1983

1985

1989

1991

1993

1995

- For 2016, NOAA Fisheries reduced the state water sub-component to 70 mt (from 117 mt in 2015) and the total stock-wide annual catch limit to 749 mt (from of 1,607 mt), but these levels are still high (in 2016 only 617 mt were harvested).
- In 2014, NOAA Fisheries extended the rebuilding timeline for this stock to 2023 and allowed for increased fishing opportunities. The Board extended the recreational season from March 1 through December 31 to increase fishing opportunities based on species' availability.

Next Assessment: N/A

Rebuilding Trajectory: Flat at low levels

Atlantic Croaker: Unknown

2010 Stock Assessment Findings

 Atlantic croaker is not experiencing overfishing. The assessment shows increasing biomass and an expanding age structure in the population since the 1980s. Atlantic croaker are considered to be a single stock on the Atlantic coast.

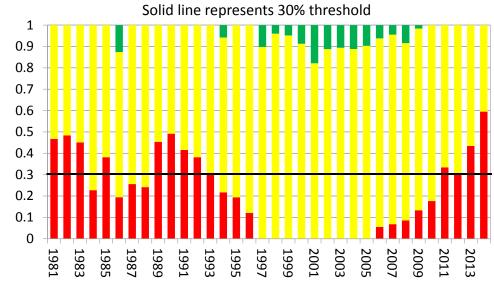
Proportion of Color

• Due to a high degree of uncertainty in the amount of shrimp trawl discards, the overfished status could not be determined. Similarly, values of spawning stock biomass (SSB) and fishing mortality (F) are not considered reliable; however, estimated trends show increasing biomass and decreasing fishing mortality.

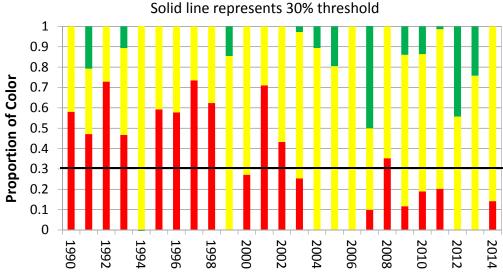
Board Adherence to Scientific Advice

In July 2015, the PRT
 completed traffic light
 analysis for the 2014 fishing year.
 The results showed declining trends
 in the fishery independent indices as
 well as a drop in both commercial
 and recreational landings. While the
 harvest index was above the 30%
 threshold with a red proportion of

Traffic Light Analysis of Atlantic Croaker (Harvest Metric)



Traffic Light Analysis of Atlantic Croaker (Abundance Metric)



Management response is triggered when proportion of red exceeds the 30% threshold level for three consecutive years in both fishery characteristics (harvest and abundance metrics).

Timeline of Management Actions: FMP ('87); Amendment 1 ('05); Addendum I ('11); Addendum II ('14)

44.5%, management measures were not tripped since the abundance index was below the threshold at 14.2%. Per Addendum II, a traffic light analysis (TLA) was not conducted in 2016 due to the on-going benchmark stock assessment.

While the 2017 stock assessment was not approved for management advice, marked improvements were
made in the estimation of removals of Atlantic croaker as discards from the shrimp trawl fishery. These
discards are the vast majority of removals from the stock, so the Board directed the TC to investigate
methods for incorporating an index of removals by the shrimp trawl fishery into the annual TLA. Potential
methods for accomplishing this will be presented at the Summer Board Meeting.

Scientific Advice Based on Assessment Findings

- The 2010 Review Panel stressed the importance of developing valid estimates of shrimp trawl discards to improve the certainty of future assessment results. The following were also highlighted as needs for data and analysis:
 - Fishery-dependent biological sampling to improve age length keys
 - o More information on growth rates, age structures, estimates of fecundity, and maturity
 - o Increased focus on collecting subsamples in the species southern range through fishery independent surveys

Monitoring and Management

• Under the TLA management program, if thresholds for both population characteristics (adult abundance and harvest) achieve or exceed the management threshold of 30% for the specified three year period, management action will be taken.

Rebuilding Trajectory: Increasing

Next Assessment: N/A

Atlantic Sturgeon: Unknown

Available Information

- Commercial landings of Atlantic sturgeon peaked in 1890 at an estimated 7.5 million pounds.
- Populations throughout the species' range are at low levels of abundance.
- Data from fishery-independent surveys conducted in New Jersey and North Carolina (along with some rivers in Georgia and South Carolina) suggest populations may be rebuilding (figures below).
- Effective April 6, 2012, NOAA Fisheries listed five distinct population segments (DPS) of Atlantic sturgeon under the Endangered Species Act (Gulf of Maine DPS as threatened and the New York Bight, Chesapeake Bay, Carolina and South Atlantic DPSs as endangered)
- In response to the ESA listing, the Atlantic Sturgeon Board initiated development of a coastwide benchmark assessment, which is scheduled for peer review in August 2017
- States have been working with NOAA Fisheries on their Section 10 incidental take permits
- In June 2016, in accordance with the ESA, NOAA Fisheries released two proposed rules (one for each regional office) designating critical habitat across all five listed DPSs. The Final Rule is expected to publish late-summer 2017.

Needed Information/Data

- Increased fishery-independent monitoring efforts directed at sturgeon
- Conduct assessments of population abundance and age structure in various river systems
- Improve fishery-dependent monitoring or sturgeon bycatch and ship strike reporting efforts
- Improve bycatch and annual mortality estimates, including ship strikes.

0.06

0.04

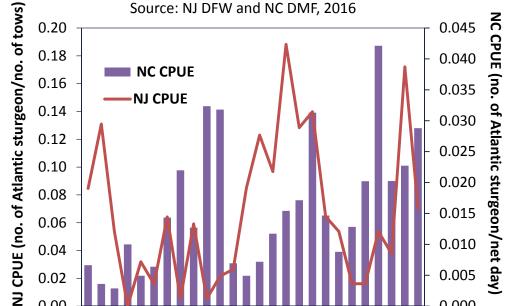
0.02

0.00

Monitoring and Management Measures

- Monitoring: States must report annually on Atlantic sturgeon bycatch, fisheriesindependent monitoring, habitat status and authorized aquaculture operations.
- Management: In 1998, the ASMFC implemented a coastwide moratorium until a minimum of 20 year classes of spawning females is protected.

Next Assessment: 2017 benchmark assessment



0.015

0.010

0.005

Atlantic Sturgeon Fishery-independent Catch-Per-Unit-

Effort in NJ's Coastal Waters & NC's Albemarle Sound

Timeline of Management Actions: FMP ('90); Amendment 1 ('98); Addendum I ('01); Addendum II ('05); Addendum III ('06); Addendum IV ('12)

2005 2007 2009

2003 2001

1995 1997 1999

Jonah Crab: Unknown

Available Information

- Jonah crab landings have increased 6.48 fold since the early 2000s, with over 17 million pounds of crab landed in 2014. Roughly 13.5 million pounds of Jonah crab were landed in 2015.
- The status of the Jonah crab resource is relatively unknown and there is currently no data on juvenile recruitment.
- Bottom trawl surveys conducted by the Massachusetts Division of Marine Fisheries found Jonah crab are frequently caught north, rather than south, of Cape Cod.
- The Northeast Fisheries Science Center 2014 surveys showed record high abundance in Georges Bank and Gulf of Maine regions.

The spring survey in Southern New England has been fairly stable.

Needed Information/Data

- Conduct age-at-maturity studies in U.S. waters.
- Investigate the extent and motivation of annual migrations patterns.
- Research the recruitment of juvenile Jonah crabs into the fishery.
- Determine the extent of sampling as well as the size distribution, sex composition, and ovigerous condition of Jonah crabs.

Jonah Crab Landings and Ex-Vessel Value Source: ACCSP Data Warehouse 18 14 Landings 16 12 Ex-Vessel Value (millions of \$) Value 14 Landings (millions of pounds) 12 10 8 6 4 2 2006 2008 200C 2002 2004

Timeline of Management Actions: FMP ('15); Addendum I ('16); Addendum II ('17)

Management and Monitoring Measures

- Following the recommendations
 of the Jonah Crab Fishery Improvement Project, the Board approved an Interstate Fishery
 Management Plan for Jonah Crab in August 2015 which included a 4.75" minimum size and a
 prohibition on the retention of egg-bearing females. To address concerns about bycatch in the fishery,
 the Board approved Draft Addendum I in May 2016, setting a 1,000 crab limit for non-trap gear and
 non-lobster traps.
- The Board will consider approving Draft Addendum II for public comment in August 2016. The Draft Addendum proposes establishing a coastwide standard for claw landings.

Next Assessment

No assessment is currently scheduled for Jonah crab due to a lack of data.

Spot: Unknown

Data Trends

- Coastwide commercial landings have declined since 1950; with a high of 14.52 million pounds landed in 1952 and a low of 1.37 million pounds in 2012.
- Recreational catches between 1981 and 2015 are variable but show a slight decline.
- Traffic Light Analysis of the 2014 fishing year showed a decline in harvest through 2012 and a reversal of this trend in 2013. Adult abundance fell and was above the 30% threshold at 43.5%. Management measures were not tripped since the harvest index was just below the threshold at 26.5%.
- Commercial catch-at-age data, which showed an expansion of the age structure in the early 2000s, has contracted since 2007.
- Recruitment indices show large inter-annual variability as expected, with low abundance observed in 2009 and 2011.
- Most indices of adult spot abundance in the species core area exhibit high inter-annual variability, with noticeable peaks in 2005 and 2012.
- A stock assessment has not been completed; ability to conduct a defensible assessment has been hindered by inadequate discard data, particularly in the South Atlantic shrimp trawl fishery.

Board Adherence to Scientific Advice

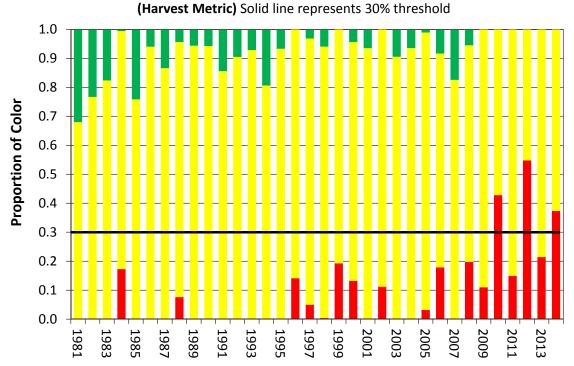
- The Management Board followed recommendations from the Plan Review Team to monitor the stock with available data the last four years, evaluate data availability and adequacy for a stock assessment, and conduct a life history workshop.
- In 2014, the Plan Review Team recommended spot for a stock assessment, which was subsequently scheduled for 2016.

Monitoring and Management Measures

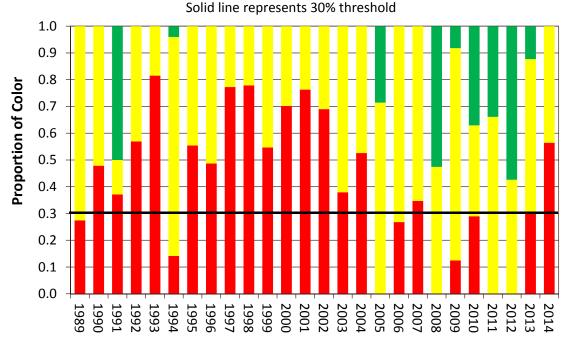
- Omnibus Amendment, approved in 2011, updated the Spot FMP by adding management triggers to annually monitor the stock status of spot until a coastwide stock assessment is completed. The Amendment also sought to increase the level of research and monitoring on spot bycatch.
- Addendum I (2014) established the Traffic Light Analysis as the new management framework to evaluate trends in the fishery. When harvest and abundance thresholds are exceeded for two years, management actions are developed. The Traffic Light Analysis is not updated during years in which a stock assessment is being conducted.

Next Assessment: Benchmark: 2017

Traffic Light Analysis of Spot Commercial and Recreational Harvest



Traffic Light Analysis of Spot Fishery-independent Survey Indices (Abundance Metric)



Management response is triggered when proportion of red exceeds the 30% threshold level (black line) for two consecutive years in both fishery characteristics (landings and fishery-independent survey indices).

Timeline of Management Actions: FMP ('87); Omnibus Amendment ('11); Addendum I ('14)

Spotted Seatrout: Unknown

Available Information

- Commercial landings have generally decreased from the 1970's through 2014.
- Recreational catches have increased since 1981; however, the number of releases has also increased and harvest has remained stable.
- State stock assessments
 - NC and VA: stock assessment covering 1991-2013 indicated SPR above 20% goal; shows expanded age structure but a decline in recruitment after 2010
 - SC: SPR just above 20% goal in 1992; non-peer reviewed assessment through 2004 indicated SPR below 20% goal
 - o GA: SPR below 20% goal in 1995
 - o FL: SPR = 67% northeast region, 45% southeast regions during 2007-2009; goal of 35% SPR

Needed Information/Data

- Examine the stock structure of spotted seatrout on a regional basis, with an emphasis on tagging techniques
- Collect data on the size or age of spotted seatrout released alive by anglers and the size and age of commercial discards
- Develop state-specific juvenile abundance indices and fecundity estimates

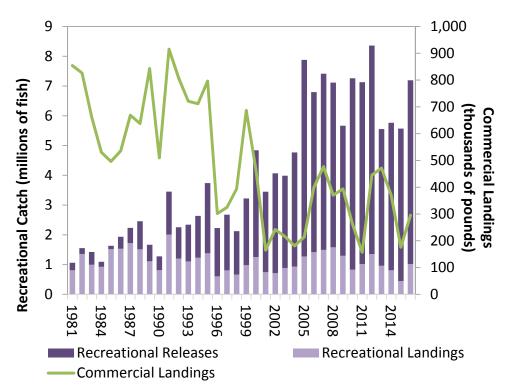
Monitoring and Management

- Amendment I sets the objective of the FMP to achieve 20% spawning potential to minimize the possibility of recruitment failure. Florida has established a 35% SPR.
- The Omnibus Amendment, approved in 2011, updated the Spotted Seatrout FMP to include at 12" TL minimum size and recommended measures to protect the spawning stock.

Next Assessment: No coastwide assessment planned or recommended by PRT due to the non-migratory nature of the species and the lack of available data.

Spotted Seatrout Commercial Landings and Recreational Catch

Source: ACCSP Data Warehouse and NMFS Fisheries Statistics Division, 2017



Timeline of Management Actions: FMP (1985); Amendment 1 (1991); Omnibus Amendment (2011)

ASMFC Standard Operating Procedures for Meetings

February 1, 2017

As established by the Interstate Fisheries Management Program Charter, the Atlantic States Marine Fisheries Commission (Commission) generally uses Roberts Rules of Order to conduct its business. There are some deviations from Roberts Rules adopted by the Commission. The following operating procedures are provided to make Commission meetings more effective and efficient.

Required Elements

The following voting and quorum provisions are established in the Commission guiding documents and are not subject to the discretion or interpretation by the meeting chair.

Quorum – The following quorum provisions are included in the Commission guiding documents. These provisions are not subject to the meeting chair's discretion.

- The presence of Commissioners representing a majority of the state members (>50%) constitute a quorum at a meeting of the Commission.
- Any state shall be recorded as present when represented by one or more of its Commissioners.
- A quorum for any Commission group shall be a majority of the members of such body, provided that any such body may petition the Executive Committee in advance for approval of an alternative quorum procedure.

Voting – The following voting provisions are included in the Commission guiding documents. These provisions are not subject to the meeting chair's discretion.

- The Commission's Business Session, and management boards and sections shall be by state (or by jurisdiction or federal agency) with one vote per state. A state's vote shall be determined by the majority of that state's delegation of Commissioners who are present. Based on the number of delegates present, votes may be cast in favor, in opposition, in abstention, or null. A null vote occurs when only two state delegates are present and they do not agree on a position. A null vote can also occur if three state delegates are present and one delegate abstains from participating in the state caucus and the other two delegate do not agree on a position.
- No person may, by proxy, vote more than once on any issue.
- Any Commissioner or Commissioner Proxy or duly authorized representative of a jurisdiction or agency that is a member of a management board/section may make or second any motion; provided the maker of the motion and second (when necessary) must each come from a different state, jurisdiction, or agency.
- Any meeting-specific proxy appointed by a Legislative or Governors' Appointee Commissioner
 may not vote on a final action being considered by a management board/section. Meetingspecific proxies may vote on preliminary decisions such as issues to be included in a public
 hearing draft or approval of public information documents.
- A final action is defined as: fishery specifications (including but not limited to quotas, trip limits, possession limits, size limits, seasons, area closures, gear requirements), allocation, final approval of FMPs/amendments/addenda, emergency actions, conservation equivalency plans,

- and non-compliance recommendations. A meeting-specific proxy may participate in the deliberations of the meeting, including making and seconding motions.
- The roll must be called for all final actions unless there is no objection to the motion.
- A two-thirds majority, which is required for an emergency action, extending a management action, or amending/rescinding a final action, is defined by the entire voting membership.
 However, federal agency abstentions do not count when determining the total number of votes.

Discretionary Elements

The following process recommendations are meeting best management practices for use by a meeting chair to effectively and efficiently run Commission meetings.

Process – The meeting chair has the discretion to manage the meeting conduct and application of the following best management practices.

- All board members should have the opportunity to speak once prior to anyone speaking a second time.
- An individual may not be recognized to speak on a motion more than two times during a single board meeting.
- If the chair believes there may not be opposition to the motion, he/she will seek board consent of the action by asking "If there is no objection, this item will be adopted." After pausing for any objections, the chair states "As there are no objections, this item is adopted unanimously." It is not necessary to ask for a show of hands.
- If the chair determines too much time is being consumed by speakers, he/she can set a time limit on such speeches.
- The meeting chair can use either of the following options for "one in favor/one against":

Options for use of "one in favor/one against":

Option 1: At any time in the meeting based on concern regarding limited time availability to conduct the full business of the board/section or in cases when extensive debate on an issue has occurred, the chair can limit debate to one in favor/one against.

Option 2: After all members have had the opportunity to speak on a motion twice, the chair will limit debate to one in favor/one against. If there is no one left to speak in favor/against the chair will call the vote on the motion.



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: ISFMP Policy Board

FROM: Assessment Science Committee

DATE: April 24th 2017

RE: Stock assessment schedule updates

At its April 2017 conference call, the Assessment Science Committee (ASC) met to discuss various issues and receive presentations on several topics. The ASC had a number of recommendations to present to the ISFMP Policy Board regarding the ASMFC Stock Assessment Peer Review Schedule.

- 1. Following the request of the Horseshoe Crab Management Board, a benchmark assessment was added to the schedule in 2018.
- 2. SAW-SARC reviews were added to the schedule for Atlantic herring in 2018 and the 2019 summer flounder assessment was changed from an update to a benchmark at the Fall 2016 NRCC meeting, with the potential to move it forward to 2018.
- 3. The benchmark assessment for Northern shrimp was moved back to spring 2018 to accommodate a calibration study for the State-Federal (ASMFC) Summer Survey. A necessary equipment change on the Summer Survey requires these side-by-side calibration tows.
- 4. Per the request of the South Atlantic Board, a cobia SEDAR review was added to the schedule in 2019.
- 5. The ASC also discussed the implications of the MRIP Coastal Household Telephone Survey transition to the Fishing Effort Survey. Following calibration model peer review, the reestimation of historical catch and effort could lead to changes to stock status or quotas that may require management action. The ASC divided ASMFC-managed species into anticipated levels of impact based on the amount of recreational harvest. For now, since most of the potential "high" impact species, including striped bass and summer flounder, are already on the stock assessment schedule for a benchmark trigger in the near future, the ASC decided to leave the assessment schedule as is. Once the calibrated numbers are released, the ASC and TCs can reevaluate the schedule and timing based on the difference between the calibrated numbers and the previous numbers. Jointly or cooperatively managed species are being updated on the Federal schedule.
- 6. The ASC updates the Assessment Scientist Workload Scoresheet on an annual basis as a means to calculate the workloads of the TC and SAS members along the coast. Historically, this scoresheet has only included benchmark stock assessments and more recently assessment updates. This overlooks participation and assignments on other science committees as well as tasks outside of a stock assessment and in-state duties. The ASC is working with Science Staff to identify a more representative way to capture scientist workload which could help with future task prioritization and will bring this improved scoresheet to the ISFMP Policy Board at Annual Meeting.

Long-Term Benchmark Assessment and Peer Review Schedule (Updated April 2017)

Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
American Eel				ASMFC					Update			
American Shad										Update		
American Lobster	ASMFC						ASMFC					Х
Atlantic Croaker		SEDAR 20							ASMFC			
Atlantic Menhaden		SEDAR		Update		SEDAR			Update		SEDAR	
Atlantic Sea Herring	Update			SARC 54			Update			SARC-Spring		
Atlantic Striped Bass	Update		Update		SARC 57		Update	Update		SARC-Fall		
Atlantic Sturgeon									ASMFC			
Black Drum						ASMFC					Х	
Black Sea Bass	Update	Update	SARC-Fall	Update	Update	Update	Update	SARC- Fall	Update	Update	Update	Update
Bluefish	Update	Update	Update	Update	Update	Update	SARC-Spring	Update	Update	Update	Update	Х
Cobia											SEDAR	
Horseshoe Crab	ASMFC				Update					ASMFC		
Menhaden ERPs	Update			Update		Update					SEDAR	
Northern Shrimp	Update	Update	Update	Update	Update	SARC-Spring	Update	Update	Update	ASMFC	Update	Update
Red Drum	SEDAR						SEDAR					Х
River Herring				ASMFC					Update			
Scup	Update	Update	Update	Update	Update	Update	SARC-Spring	Update	Update	Update	Update	Х
Spanish Mackerel				SEDAR 28								
Spiny Dogfish	Update	TRAC	Update	Update	Update	Update	Update	Update	Update	Update	Update	Update
Large Coastal Sharks			SEDAR					SEDAR				
Small Coastal Sharks			SEDAR		SEDAR							
Spot									ASMFC			
Spotted Seatrout	VA/NC	FL					VA/NC	FL				
Summer Flounder	Update	Update	Update	Update	SARC 57	Update	Update	Update	Update	Update	SARC	Update
Tautog			Update			ASMFC		Update			Х	
Weakfish	SARC-Spring							ASMFC		Update		
Winter Flounder			SARC 52			Update	Update		Update			

2013 marks transitioning to the new NE Stock Assessment Process

Please note that all species scheduled for review must be prioritized by management boards and Policy Board.

Additional Notes:

Black Sea Bass 2016 benchmark to include new model development

Large Coastal Sharks 2016 Update dusky, 2017 Standard sandbar, 2018 Update blacktip

Small Coastal Sharks SEDAR 34-HMS bonnethead and Atlantic sharpnose 2013

Spot PRT annually reviews

Spotted Seatrout States conducting individual assessments

Winter Flounder Operational assessment Sept 2017 with 20 groundfish stocks

SEDAR External Review

ASMFC External Review

Fall SARC Review

Spring SARC Review

x = 5 year trigger date or potential review

Completed

Italics = under consideration, but not officially scheduled

SA Staff KΑ JK JK KΑ KA/KD KD KD KA/KD JK JK KD KΑ KΑ KD KD JK JK JK KD KΑ KΑ KΑ JK KD JK KD KD KD

					2017						2018			
	Total Workload SASC Score	Scientist	Croaker Sp	oot	Menhaden (ERPs)	Sturgeon	Updates	Northern shrimp	Striped bass	Spiny dogfish*	Menhaden (ERPs)	Atlantic herring	Horseshoe Crab	Update
=active member of SASC	8 14	Kristen Anstead	2	2	2	3	3	2				1	2	2
=co-lead for assessment	7 13	Jason McNamee			3	3	•	1				3		
=lead for stock or stock unit/DPS	7 10	Katie Drew			1	3	3	-		1		1		1
=combined score for multiple updates	5 9	Laura Lee		1	1	3		1						
от поставания в по	5 9	Jeff Kipp		3	3		,	1					†	
2017	3 9	Jim Uphoff			3	1		1				3		
Benchmarks	5 8	Amy Schueller					2	2				1		
Sturgeon	4 8	Mark Terceiro						2				•		
Spot	7 7	Alexei Sharov			+		-			1	1	1		
Croaker	6 7	Matt Cieri			1		 	1			'	1 2)	
Updates	6 6	Jeff Brust						· 1				1		
American eel	5 5	Chris McDonough	1		1		1	1				'	+	
River herring	5 5	Michael Celestino			' 	+	1		+	1	+	1	+	+
Atlantic menhaden	5 5	Micah Dean								1	+	1 1	1	+
2018	3 5	Gary Nelson					 	1		2		1	<u>' </u>	
	3 5	John Sweka					!	1 1	•	5			3)
Benchmarks	3 3						<u> </u>	1		1)
Atlantic striped bass (SARC-F)	4 4	Gary Shepherd						1		1				
Horseshoe crab	3 4	Maggie Hunter					1	4	4					
Spiny dogfish (SARC-S)	3 3	Burton Shank						1						
Atlantic herring	3 3	Kim McKown						1						
Northern shrimp	3 3	Tracy Pugh						1						
Black sea bass (SARC-F)?	3 3	Kierstin Curti				1		1						
Bluefish (SARC-F)?	3 3	Kathleen Reardon			+		<u> </u>	l l				1		
Scup (SARC-S)?		David Chagaris					<u> </u>					4		
Updates	3 3	Howard Townsend										1		
American shad	2 3	Kelly Whitmore						2	2				1	
Weakfish	1 3	Jared Flowers				3	3							
2019	1 3	Katherine Sosebee									3			
Benchmarks	2 2	Mike Bednarski				1								
Atlantic menhaden (ERPs)	2 2	Dawn Franco		1	1									
Atlantic menhaden (Single-species)	2 2	Harry Rickabaugh			1									
Black drum	2 2	Joseph Munyandorero			1									
Summer flounder (SARC)	2 2	Mary Fabrizio		1	1									-
Cobia	2 2	Michael Bailey						1						
Tautog	2 2	Scott Newlin				 				1			1	
Yearly updates	2 2	Edward Hale				1				1				
Bluefish	2 2	Ed Hale							'	1			1	1
Northern shrimp	2 2	Rob Latour					 	1		4		 		1
Scup	2 2	Kurt Gottschall								1		1	!	
Spiny dogfish	1 2	Anne Richards			-		1	2	4	1	_			
Spot (TLA)	1 2	Josh Newhard					 				_	2	4	
Croaker (TLA)	1 1	Greg Wojick					 				_	+	1	
American lobster (Stock Indicators)	1 1	Chris Legault			-		1			1	_	+	+	
Summer flounder	1 1	Steve Doctor			<u> </u>							1	1	4
*=Jointly managed with Councils handling	1 1	John Maniscalco					1							
most of assessment workload	1 1	Joe Cimino												
	1 1	Yan Jiao												
	1 1 1	Chris Bonzek												1

		2019					
	Scientist	Summer flounder*	Menhaden (ERPs)	Menhaden (Single- species)	Black drum	Tautog	Updates
=active member of SASC	Kristen Anstead		(LIXI 3)	I	I	Tautog	T
			I				4
=co-lead for assessment	Jason McNamee		3	1			1
=lead for stock or stock unit/DPS	Katie Drew		1 1				2
=combined score for multiple updates	Laura Lee						
	Jeff Kipp		_			3	
2017	Jim Uphoff		3				
Benchmarks	Amy Schueller		1	3			
Sturgeon	Mark Terceiro		3				
Spot	Alexei Sharov		1	1			1
Croaker	Matt Cieri		1	1			
Updates	Jeff Brust		1				1
American eel	Chris McDonough					1	
River herring	Michael Celestino		1				
Atlantic menhaden	Micah Dean		1	1			
2018	Gary Nelson						
Benchmarks	John Sweka						
Atlantic striped bass (SARC-F)	Gary Shepherd						
Horseshoe crab	Maggie Hunter						
Spiny dogfish (SARC-S)	Burton Shank						
Atlantic herring	Kim McKown						
Northern shrimp	Tracy Pugh		†				
Black sea bass (SARC-F)?	Kierstin Curti			<u> </u>			
Bluefish (SARC-F)?	Kathleen Reardon			<u> </u>			
Scup (SARC-S)?	David Chagaris		1	 			
Updates	Howard Townsend		1				
American shad	Kelly Whitmore		<u>'</u>				
Weakfish	Jared Flowers						
2019	Katherine Sosebee						
	Mike Bednarski						1
Benchmarks Attention many to dear (EDBs)							1
Atlantic menhaden (ERPs)	Dawn Franco		<u> </u>				
Atlantic menhaden (Single-species)	Harry Rickabaugh		<u> </u>				
Black drum	Joseph Munyandorero		1	ļ			
Summer flounder (SARC)	Mary Fabrizio		1	ļ			
Cobia	Michael Bailey		1	ļ		4	4
Tautog	Scott Newlin		1	ļ		1	1
Yearly updates	Edward Hale						
Bluefish	Ed Hale						
Northern shrimp	Rob Latour			1			
Scup	Kurt Gottschall						
Spiny dogfish	Anne Richards						
Spot (TLA)	Josh Newhard		1				
Croaker (TLA)	Greg Wojick		1	ļ			
American lobster (Stock Indicators)	Chris Legault		1	ļ			
Summer flounder	Steve Doctor	1 1	1				
*=Jointly managed with Councils handling	John Maniscalco	1					
most of assessment workload	Joe Cimino					1	
	Yan Jiao						

How our State and Federal Partners are working to Protect SAV

On the 20th anniversary of the Commission's SAV Policy publication, the Habitat Committee decided to check in on the progress of each state and federal agency to conserve SAV over the past two decades. In January, the Habitat Program Coordinator sent out a survey asking each partner a series of questions based on the goals and components of the original policy statement.

The goal of the policy was to preserve, conserve, and restore where scientifically possible, in order to achieve a net gain in SAV distribution and abundance along the Atlantic coast and tidal tributaries, and to prevent any further losses of SAV in individual states by encouraging them to:

- 1. Protect existing SAV beds from further losses due to degradation of water quality, physical damage to the plants, or disruption to the local benthic environment;
- 2. Set and achieve state or regional water and habitat quality objectives that will result in restoration of SAV through natural re-vegetation;
- 3. Develop and attain state SAV restoration goals in terms of acreage, abundance, and species diversity, considering historical distribution records and estimates of potential habitat.

The policy provided six key components to achieving its goal: 1) Assessment of historical, current and potential distribution and abundance of SAV; 2) Protection of existing SAV; 3) SAV Restoration; 4) Public Education and Involvement; 5) Research; and 6) Implementation.

The summarized results below are from nine states (those who responded to the survey and have marine seagrass species within their borders), as well as five federal agencies. The states include New Hampshire, Massachusetts, Rhode Island, New York, New Jersey, Maryland, Virginia, North Carolina, and Florida.

Seven of the nine states have implemented a resource assessment and monitoring strategy to quantitatively evaluate SAV distribution and abundance (Figure 1). One state is currently in the process of developing an assessment. All nine states have put measures in place to limit permanent and irreversible direct and indirect impacts to SAV and their habitats. Evaluation of the effectiveness of these measures has been mixed along the coast (Figure 2). One third of the states have carried out an evaluation, and one third have not. Two states have evaluations in development, and one state has conducted an evaluation in the past, but is not currently doing so.

55% of the states have set restoration goals, whereas 45% have not (Figure 3). Most (89%), however, have identified the key reasons for SAV loss in their state (Figure 4). Two thirds of

states have identified suitable areas for protection and restoration, and two states are in the process of doing do (Figure 5). One state identifies conservation areas as needed.

Information is being included in aquatic education programs across the coast. Seven states have incorporated it directly, and other entities (such as National Estuarine Research Reserves) have taken on that role (Figure 6). Most states (8) have also supported research on SAV (Figure 7).

From the survey, we found that most of our federal partners do not have regulatory authority, but do serve in an advisory role and can designate specific SAV areas as protected. More than half have developed technical guidance or SAV standards, and promote particular Best Management Practices. While they have not implemented the Commission's SAV Policy, most have implemented other, similar policies to protect SAV.

There has been a lot of process to conserve SAV over the past 20 years on the Atlantic coast, but work can still be done. To read the Commission's original SAV Policy, please visit http://www.asmfc.org/uploads/file/savpolicy.pdf.

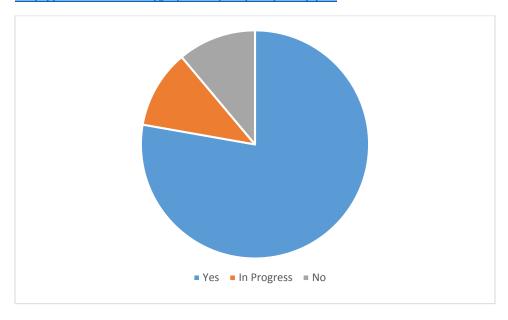


Figure 1. Proportion of states that have implemented an SAV assessment and monitoring strategy. Total = 9.

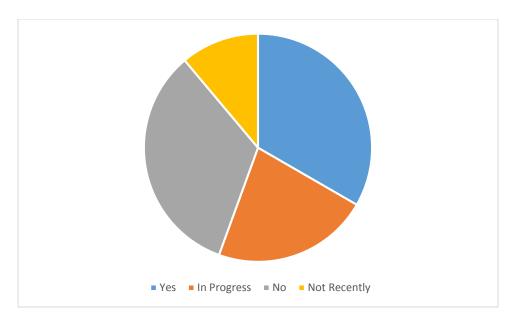


Figure 2. Proportion of states that have evaluated the measures they put in place to limit permanent and irreversible direct and indirect impacts to SAV and their habitats. Total = 9.

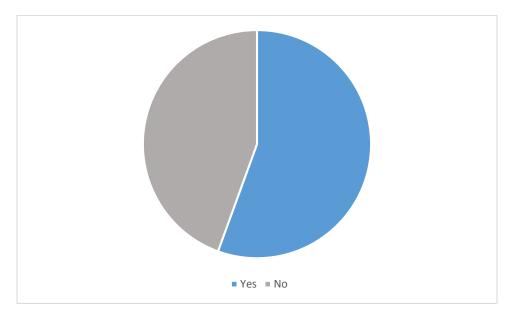


Figure 3. Proportion of states that have set restoration goals. Total = 9.

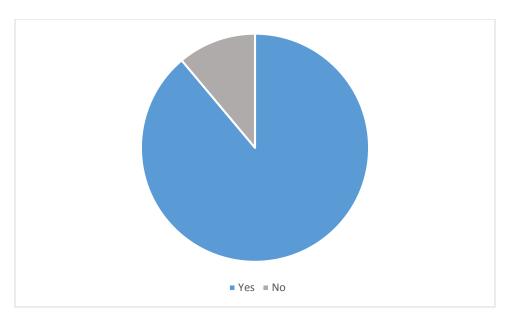


Figure 4. Proportion of states that have identified key reasons for SAV loss. Total = 9.

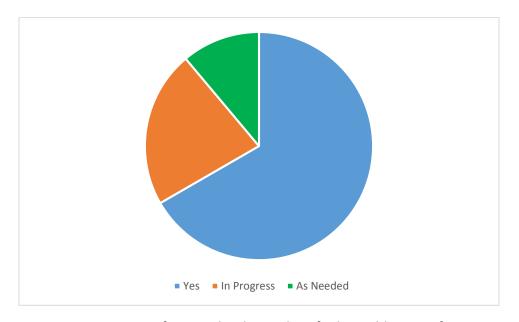


Figure 5. Proportion of states that have identified suitable areas for conservation. Total = 9.

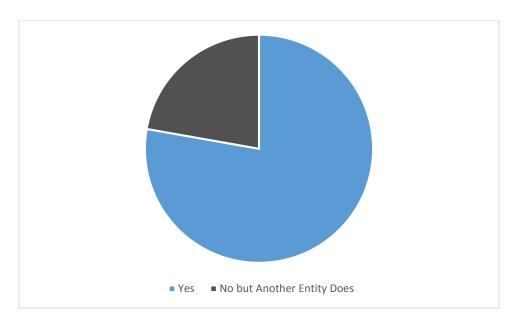


Figure 6. Proportion of states that have included SAV in their aquatic education programs. Total = 9.

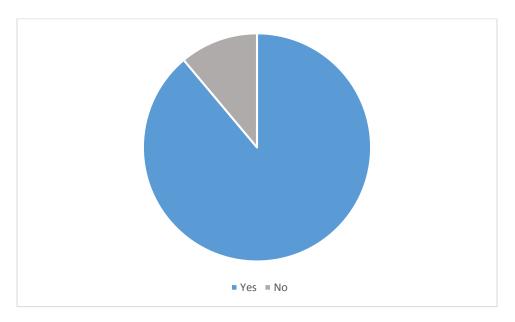


Figure 7. Proportion of states that have supported SAV research. Total = 9.

Atlantic States Marine Fisheries Commission

Business Session

August 3, 2017 11:15 – 11:30 a.m. Alexandria, Virginia

Draft Agenda

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

1.	Welcome/Introductions (D. Grout)	11:15 a.m.
2.	 Board Consent Approval of Agenda Approval of Proceedings from May 2017 	11:15 a.m.
3.	Public Comment	11:15 a.m.
4.	Review Non-compliance Findings (if necessary) Final Action	11:20 a.m.
5.	Other Business/Adjourn	11:30 a.m.

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

BUSINESS SESSION

The Westin Alexandria Alexandria, Virginia May 11, 2017

Draft Proceedings of the Business Session May 2017

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- 1. **Approval of Agenda** by consent (Page 1).
- On behalf of the ISFMP Policy Board move the full Commission find the state of New Jersey be out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan if the State does not implement the following measures or equivalent measures as approved by the Summer Flounder Board by May 21, 2017:
 - Shore mode for Island Beach State Park only: 17-inch minimum size limit; 2-fish possession limit and 128-day open season.
 - Delaware Bay only (west of the colregs line): 18-inch minimum size limit; 3-fish possession limit and 128-day open season.
 - All other marine waters (east of the colregs line): 19-inch minimum size limit; 3-fish possession limit and 128-day open season

The implementation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP (Page 1).

Motion made by Mr. Grout on behalf of the ISFMP Policy Board. Motion carries (Roll Call Vote: In Favor – RI, CT, NY, NJ, PA, DE, MD, VA, NC, SC, GA, FL; Abstentions – NH) (Page 2).

3. **Move to Adjourn** by consent (Page 2).

ATTENDANCE

Board Members

Dennis Abbott, NH, proxy for Sen. Watters (LA)

Doug Grout, NH (AA) Ritchie White, NH (GA) Raymond Kane, MA (GA) David Pierce, MA (AA)

Eric Reid, RI, proxy for Sen. Sosnowski (LA) Jason McNamee, RI, proxy for J. Coit (AA)

David Borden, RI (GA) Mark Alexander, CT (AA) James Gilmore, NY (AA) Emerson Hasbrouck, NY (GA)

Russ Allen, NJ, proxy for L. Herrighty (AA)

Tom Fote, NJ (GA)

Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)

Andy Shiels, PA, proxy for J. Arway (AA)

Roy Miller, DE (GA)

John Clark, DE, proxy for D. Saveikis (AA)

Craig Pugh, DE, proxy for Rep. Carson (LA)

David Blazer, MD (AA) Rachel Dean, MD (GA)

Ed O'Brien, MD, proxy for Del. Stein (LA)

John Bull, VA (AA)

Chris Batsavage, NC, proxy for B. Davis (AA) David Bush, NC, proxy for Rep. Steinburg (LA)

Robert Boyles, SC (AA) Malcolm Rhodes, SC (GA) Spud Woodward, GA (AA)

Pat Geer, GA, proxy for Rep. Nimmer (LA)

Rep. Thad Altman, FL (LA)

Jim Estes, FL, proxy for J. McCawley (AA)

Martin Gary, PRFC

Wilson Laney, proxy for Sherry White, USFWS

Kelly Denit, NMFS

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

Ex-Officio Members

Staff

Bob Beal Katie Drew
Toni Kerns Ashton Harp

Guests

The Business Session of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 11, 2017, and was called to order at 11:28 o'clock a.m. by Chairman Douglas E. Grout.

CALL TO ORDER

CHAIRMAN DOUGLAS E. GROUT: Okay, everybody stand up, take a stretch, and then sit back down immediately and we'll go right into this Business Session so we can give the South Atlantic Board an opportunity to do their work before their flights go out. I'm calling to order the Business Session of the Full Commission.

APPROVAL OF AGENDA

CHAIRMAN GROUT: We have an agenda before us. I'm going to modify it. I'm going to take out the proceedings.

There were no proceedings from January, 2017. Are there any other changes or additions to this agenda? Seeing none; any objections to approving the agenda as modified? Seeing none; the agenda is approved.

Is there any public comment on items not on the agenda?

REVIEW NON-COMPLIANCE FINDINGS

CHAIRMAN GROUT: Seeing none; we'll move on to Item 4; Noncompliance Finding. We have a motion from the Policy Board, which is up on the board. Because it's a Board motion it doesn't need a second. Is there any discussion on this motion? Okay, I'm going to read this into the record; and while I'm reading it into the record, please caucus within your states.

On behalf of the ISFMP Policy Board, move the Full Commission find the state of New Jersey be out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII of the Summer Flounder, Scup and Black Sea Bass Fishery Management

Plan; if the State does not implement the following measures, or equivalent measures as approved by the Summer Flounder Board by May 21, 2017.

Shore mode for Island Beach State Park only: 17-inch minimum size limit, 2-fish possession limit and 128-day open season. Delaware Bay only (west of the colregs line): 18-inch minimum size limit, 3-fish possession limit and 128-day open season. All other marine waters (east of the colregs line): 19-inch minimum size limit, 3-fish possession limit and 128-day open season.

The implantation of these regulations is necessary to the achievement of conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP.

Are you ready to vote? Roll call vote.

MS. TONI KERNS: Maine is absent. New Hampshire.

CHAIRMAN GROUT: As the Chair I am not going to vote.

MS. KERNS: Massachusetts, absent. I didn't realize he left, I'm sorry. Rhode Island.

MR. JASON McNAMEE: Yes.

MS. KERNS: Connecticut.

MR. MARK ALEXANDER: Yes.

MS. KERNS: New York.

MR. STEVE HEINS: Yes.

MS. KERNS: New Jersey.

MR. TOM BAUM: No.

MS. KERNS: Pennsylvania.

MR. ANDY SHIELS: Yes.

MS. KERNS: Delaware.

MR. JOHN CLARK: Yes.

MS. KERNS: Maryland.

MR. DAVID BLAZER: Yes.

MS. KERNS: Virginia.

MR. JOE CIMINO: Yes.

MS. KERNS: North Carolina.

DR. MICHELLE DUVAL: Yes.

MS. KERNS: South Carolina.

DR. MALCOLM RHODES: Yes.

MS. KERNS: Georgia.

MR. PAT GEER: Yes.

MS. KERNS: Florida.

MR. JIM ESTES: Yes.

CHAIRMAN GROUT: The motion carries 11 to 1 to 1; and there were two absences.

ADJOURNMENT

Is there anything else to come before the Business Session? Seeing none; this meeting is adjourned.

(Whereupon the meeting was adjourned at 11:32 o'clock a.m. on May 11, 2017.)

Atlantic States Marine Fisheries Commission

Summer Flounder, Scup, and Black Sea Bass Management Board

August 3, 2017 11:45 a.m. – 1:45 p.m. Alexandria, Virginia

Draft Agenda

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

1.	Welcome/Call to Order (M. Luisi)	11:45 a.m.
2.	 Board Consent Approval of Agenda Approval of Proceedings from May 2017 	11:45 a.m.
3.	Public Comment	11:50 a.m.
4.	Update on Summer Flounder Recreational Working Group Possible Action (<i>K. Rootes-Murdy</i>)	12:00 p.m.
5.	Lunch provided for Commissioners, Proxies, and Board Members	12:30 p.m.
6.	Review of 2017 Black Sea Bass Recreational Measures Possible Action (K. Rootes-Murdy)	12:55 p.m.
7.	Update on Black Sea Bass Recreational Working Group (K. Rootes-Murdy)	1:15 p.m.
8.	Other Business/Adjourn	1:45 p.m.

MEETING OVERVIEW

Summer Flounder, Scup, and Black Sea Bass Management Board August 3, 2017 11:45 a.m.-1:45 p.m. Alexandria, Virginia

Chair: Mike Luisi (MD)	Technical Committee Chair:	Law Enforcement Committee				
Assumed Chairmanship: 10/15	Greg Wojcik (CT)	Representative: Snellbaker (NJ)				
Vice Chair:	Advisory Panel Chair:	Previous Board Meeting:				
Bob Ballou	Vacant	May 10, 2017				
Voting Members: ME, NH, MA, RI, CT, NY, NJ, DE, MD, PRFC, VA, NC, NMFS, USFWS (14 votes for Black Sea						
Bass; 12 votes for Summer Flounder and Scup)						

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2017
- **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. Update on Summer Flounder Recreational Working Group (12:00-12:30 p.m.) Possible Action

Background

- In May, the Board discussed ways to address Summer Flounder recreational management in 2018 and requested the Summer Flounder Recreational Working Group develop alternative management strategies for consideration.
- The Working Group met once in June and July to consider recreational management objectives and develop recommendations for the 2018 fishing season.

 (Supplemental Materials)

Presentations

• Overview of Working Group Discussion and Recommendations by K. Rootes-Murdy

Board Actions for Consideration

- Initiate an addendum for summer flounder recreational management in 2018
- 5. Lunch provided for Commissioners, Proxies, and Board Members

6. Review of 2017 Black Sea Bass Recreational Measures (12:55-1:15 p.m.) Possible Action

Background

- In May, the Board was briefed on final 2016 black sea bass recreational harvest estimates, which indicated a reduction in harvest through measures was needed to stay within the 2017 coastwide Recreational Harvest Limit.
- After considering final harvest estimates, the Board moved to set the black sea bass recreational possession limit for wave 6 (November/December 2017) at five fish in state waters from Rhode Island through New Jersey to address the harvest reduction. All other state measures remain unchanged from 2016.

Presentations

 Status of implementing new possession limit for northern states (RI-NJ) by K. Rootes-Murdy

Board Actions for Consideration

• Adjust 2017 Black Sea Bass recreational measures

7. Update on Black Sea Bass Recreational Working Group (1:15-1:45 p.m.)

Background

- In May, the Board initiated an addendum to explore options for Black Sea Bass recreational management in 2018. The Board specified the addendum is to include options for regional allocation, uniform regional regulations, and alternatives to the current north/south regional delineation in measures.
- A Black Sea Bass Recreation Working met by conference call in July to discuss and develop management options. (Supplemental materials)

Presentations

Overview of Working Group Discussion and Recommendations by K. Rootes-Murdy

Board Actions for Consideration

• Provide feedback and further guidance on the development of the draft addendum

8. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SUMMER FLOUNDER, SCUP AND BLACK SEA BASS MANAGEMENT BOARD

The Westin Alexandria
Alexandria, Virginia
May 10, 2017

Draft Proceedings of the Summer Flounder, Scup, and Black Sea Bass Management Board and Mid-Atlantic Fisheries Management Council Meeting May 2017

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Adjournment	02

INDEX OF MOTIONS

- 1. **Approval of agenda** by consent (Page 1).
- 2. **Approval of proceedings of February 2017** by consent (Page 1).
- 3. Main Motion: Move to select Alternative 2 from Section 3.0 for Addendum XXIX and Preferred Alternative 2 from Section 5 for Framework 10

Board: Motion by David Pierce; second by Tom Baum (Page 5).

Council: Motion made by Tom Baum; second by Laurie Nolan (Page 5).

4. Motion to Substitute: Move to substitute Alternative 1 for Alternative 2.

Board: Motion by Eric Reid; second by Mark Alexander (Page 6). Motion fails for lack of majority (4 in favor, 5 opposed, 3 abstentions) (Page 8).

Council: Motion by Peter Hughes, seconded by Roger Mann (Page 6). Motion fails (Page 9).

- 5. Main Motion: Motion to select Alternative 2 from Section 3.0 for Addendum XXIX and Preferred Alternative 2 from Section 5 for Framework 10. Motion carried (Page 8).
- 6. **Move to approve Addendum XXIX as modified today** (Page 8). Board: Motion by Emerson Hasbrouck; second by Tom Baum. Motion carried (Page 9).
- 7. **Move to submit Framework 10 to the National Marine Fisheries Service for approval** (Page 10). Council: Motion by Steve Heins; second by Peter deFur. Motion carries by the Council (Page 10).
- 8. Main Motion: Move to accept the staff recommendations to provide direction to move forward with the draft amendment (Page 25).

Council: Motion by Tony DiLernia; second by Howard King. Motion amended.

Board: Motion by Emerson Hasbrouck; second by Eric Reid. Motion amended.

9. Motion to Amend: Move to amend to drop landings flexibility (Alternative 4B) from the staff recommendations (Page 27).

Board: Motion by David Bush; second by Rob O'Reilly. Motion carries (8 in favor, 2 opposed, 2 abstentions) (Page 32).

Council: Motion by Chris Batsavage; second by Peter Hughes. Motion fails due to lack of majority (9 in favor, 9 opposed, 2 abstentions) (Page 32).

10. Main Motion: Move to accept the staff recommendations to provide direction to move forward with the Draft Amendment (Page 33).

Council: Motion by Tony DiLernia; second by Howard King. Motion carried (16 in favor, 3 opposed).

Board: Motion by Emerson Hasbrouck; second by Eric Reid. Motion carried (8 in favor, 3 opposed, 1 abstention).

- 11. Move to task the TC to review the recreational black sea bass MRIP harvest estimates over time, five years/ten years to identify highly variable state, wave, mode (other) combinations that contribute to harvest volatility. Generate a methodology to smooth problematic harvest estimates along with criteria that determine when smoothing is appropriate to avoid an ad hoc approach. The TC should consider some or all the following; high and low estimates, PSEs, preliminary versus final estimates, and regulatory changes (Page 42). Motion by Jim Gilmore; second by John Clark. Motion carried (Page 45).
- 12. Main Motion: For 2017, move to close the recreational black sea bass fishery in wave 6 (November 1-December 31) in state waters for the states of Massachusetts through New Jersey and maintain all other management measures from 2016 (Page 46).

Board: Motion by David Pierce; second by John Bullard. Motion substituted.

13. Substitute motion: For 2017, move to impose a 5 fish possession limit for recreational black sea bass in Wave 6 in state waters, for the states of Rhode Island through New Jersey; and maintain all other management measures for 2017 (Page 53).

Board: Motion by Bob Ballou; second by Mark Alexander. Motion becomes main motion.

- 14. Main Motion as Substituted: For 2017, impose a 5 fish possession limit for recreational black sea bass in wave 6 in state waters for RI through NJ and maintain all other management measures for 2017. Motion carried (Page 56).
- 15. Move to initiate an addendum for 2018 recreational black sea bass management; with options as recommended by the Working Group and Plan Development Team. Options for regional allocation shall include approaches with uniform regulations, for example number of days. Another alternative to the current north/south regional delineation, which is Massachusetts through New Jersey, and Delaware through North Carolina, such as those apply for summer flounder; that is one state region (Page 56).

Board: Motion by David Pierce; second by John Clark. Motion carried (Page 57).

16. Tabled Motion from February 2017: motion to move to allow an experimental 2018 January/February Wave 1 recreational federally permitted for-hire fishery for black sea bass, with a 15 fish per person possession limit, a suspended minimum size limit, and zero discard policy; to allow for barotrauma and a mandatory trip reporting requirement (Page 63).

Board: Motion by Steve Heins; second by Eric Reid. Motion substituted.

Council: Motion by Tony Dilernia; second by Howard King. Motion substituted.

17. Motion to Substitute: Motion to substitute to initiate a framework/addendum to allow a 2018 and beyond January/February black sea bass recreational fishery, with the vessel participating being required to obtain a letter of authorization from GARFO; also a 15 per person possession limit, no minimum size, zero discard policy and require a call-in and call-out process and mandatory trip reporting. The fishery closes when the quota is met (Page 67).

Board: Motion by Jim Gilmore; second by Rob O'Reilly. Motion carried. (10 in favor, 3 opposed) (Page 73).

Council: Motion made by Tony DiLernia; second by Adam Nowalsky. Motion carried (13 in favor, 2 opposed. (Page 73).

18. Main Motion as Substituted: Move to initiate a framework addendum to allow a 2018, and beyond, Jan/Feb black sea bass recreational fishery with the vessel participating being require to obtain a letter of authorization from GARFO. Also, a 15 per person possession limit, no min size, zero discard policy, and require a call in and call out process and mandatory trip reporting. The fishery closes when the quota is met.

Board: Motion carried (11 in favor, 2 opposed) (Page 73).

Council: Motion carried (13 in favor, 2 opposed) (Page 73).

- 19. Main Motion: Motion that the Summer Flounder, Scup and Black Sea Bass Board recommend to the ISFMP Policy Board that the state of New Jersey be found out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan; if the state does not implement the following measures by May 21, 2017 (Page 75):
 - Shore mode for Island Beach State Park only: 17-inch minimum size limit; 2-fish possession limit and 128-day open season.
 - Delaware Bay only (west of the colregs line): 18-inch minimum size limit; 3-fish possession limit and 128-day open season.
 - All other marine waters (east of the colregs line): 19-inch minimum size limit; 3-fish possession limit and 128-day open season

The implementation of these regulations is necessary to achieve the conservation goals and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance, the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP.

Board: Motion by David Pierce; second by Bob Ballou. Motion carries (9 in favor, 1 opposed, 2 abstentions) (Page 77).

- 20. Move to approve today the following measures for the 2017 New Jersey summer flounder recreational fishery based on conservation equivalency:
 - Shore mode for Island Beach State Park only: 16-inch minimum size limit; 2-fish possession limit and 104-day open season (May 25-Sept 5)
 - Delaware Bay only (west of the colregs line): 17-inch minimum size limit; 3-fish possession limit and 104-day open season (May 25-Sept 5)
 - All other marine waters: 18-inch minimum size limit; 3-fish possession limit and 104-day open season (May 25-Sept 5)

Board: Motion by Tom Baum; second by Rob O'Reilly (Page 82). Motion fails (Roll Call Vote: In Favor – NJ, DE, PRFC, VA; Opposed – MA, RI, CT, NY, MD, NC, USFWS; Abstentions – NMFS) (Page 88).

- 21. Move to approve the following measures for 2017 NJ summer flounder recreational fishery based on conservation equivalency:
 - Shore mode for Island Beach State Park only: 16-inch minimum size limit; 2-fish possession limit and 104-day open season (May 25-Sept 5)
 - Delaware Bay only (west of the colregs line): 17-inch minimum size limit; 3-fish possession limit and 104-day open season (May 25-Sept 5)
 - All other marine waters: 18-inch minimum size limit; 3-fish possession limit and 104-day open season (May 25-Sept 5)

This is subject to the review and approval of the Technical Committee and subsequent Board consideration and approval.

Motion by David Borden; second by John Clark (Page 88). Motion carried (11 in favor, 1 opposed) (Page 90).

22. **Motion to adjourn** by consent (Page 93).

ATTENDANCE

Board Members

Rep. Sarah Peake, MA (LA)

Ray Kane, MA (GA)

John Clark, DE, proxy for D. Saveikis (AA)

Craig Pugh, DE, proxy for Rep. Carson (LA)

David Pierce, MA (AA) Mike Luisi, MD (Chair)

Bob Ballou, RI, proxy for J. Coit (AA) Ed O'Brien, MD, proxy for Del. Stein (LA)

David Borden, RI (GA)

Eric Reid, RI, proxy for Sen. Sosnowski (LA)

Rachel Dean, MD (GA)

John Bull, VA (AA)

Mark Alexander, CT (AA)

Sen. Craig Miner, CT (LA)

Rob O'Reilly, VA, Administrative proxy
Chris Batsavage, NC, proxy for B. Davis (AA)

Jim Gilmore, NY (AA) Doug Brady, NC (GA)

Emerson Hasbrouck, NY (GA)

David Bush, NC, proxy for Rep. Steinburg (LA)

Larry Herrighty, NJ (AA) Martin Gary, PRFC
Tom Fote, NJ (GA) John Bullard, NMFS

Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)

Sherry White, USFWS

Roy Miller, DE (GA)

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

Ex-Officio Members

Jason McNamee, Technical Committee Chair Jason Snellbaker, Law Enforcement Representative

Staff

Robert Beal Kirby Rootes-Murdy

Toni Kerns

Guests

C. Mead Amory, VA Seafood Council Jon Hare, NOAA Dave Bard, NOAA Victor Hartley, Ocean City, NJ Tom Baum, NJ DFW Steve Heins, MAFMC Julia Beaty, MAFMC Dewey Hemilwright, Wanchese, NC Rick Bellavance, NEFMC Peter Hughes, MAFMC Howard Bogan, Brielle, NJ Howard King, MAFM Aaron Kornbluth, PEW Kevin Chu, NOAA Kiley Dancy, MAFMC Wilson Laney, USFWS Jeff Deem, VMRC Arnold Leo, E. Hampton, NY

Jeff Deem, VMRC
Peter deFur, MAMFC
Nicole Lengyel, RI DEM
Kelly Denit, NMFS
Roger Mann, MAFMC
Laura Diedenck, NOAA
Chris McDonough, SC DNR
Tony DiLernia, MAFMC
Warren Elliott, MAFMC
Skip Feller, VA Beach, VA
Arnold Leo, E. Hampton, NY
Roger Mampton, NY
Roger Mann, MAFMC
Chris McDonough, SC DNR
Dan McKiernan, MA DMF
Stewart Michels, DE DFW
Chris Moore, MAFMC

Lindsey Fullencamp, NMFS

Matthew Gates, CT DEEP

John Navratik, Mangate NJ

Melissa Nills, NOAA

Jack Greenberg, PEW Trust

Laurie Nolan, MAFMC

Derek Orner, NOAA
H.D. Parsons, Lewes, DE
Michael Pentony, NMFS
Rebecca Peters, NOAA
Robin Scott, Mangate, NJ
Andy Shiels, PA Fish & Boat
Ward Slacom, MAFMC
Mark Sterling, VA Beach, VA
Wes Townsend, MAFMC
Jack Travelstead, CCA
Scott Ward, NOAA
Sherry White, USFWS
Kate Wilke, TNC

Andrew Cicchitti, Wildwood Crest, NJ Jim Cicchitti, Wildwood Crest, NJ Jeff Gutman, Pt. Pleasant, NY The Summer Flounder, Scup and Black Sea Bass Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 10, 2017, and was called to order at 1:05 o'clock p.m. by Chairman Michael Luisi.

CALL TO ORDER

CHAIRMAN MICHAEL LUISI: We welcome everyone. I would like to welcome everybody today to a meeting of the Summer Flounder, Scup and Black Sea Bass Management Board; convening with the Mid-Atlantic Fisheries Management Council. I will be serving as the Chair today for both the Board and the Council; as the Mid-Atlantic's Chairman.

My name is Mike Luisi; and I'm from the state of Maryland. Let me just say, my appearance here at the Board table has everything to do with what has been going on the last couple days in discussions regarding this meeting and how it's going to be carried off today. We have an enormous agenda, a very, very, very ambitious agenda.

I am going to do everything that I can do in my power to keep this meeting on schedule. That is going to be a difficult task. What I would ask from you as both Council members and Board members, is to direct questions very concisely. Comments that you need to make should in some way be part of the decision making process; rather than just being sure to put something on the record.

We have a lot of people at the table; and we have a lot of materials to cover. I also want to make it clear that when we have motions that we're considering, there will be opportunity for the public to provide comment on those motions; but that comment is probably going to need to be very limited.

I'm not going to be able to allow everyone to offer all of their thoughts. We may find

ourselves going back and forth between support and opposition; to the point where we've heard what we need to make a decision. I'm sorry for that but that is just the reality of what we're dealing with this afternoon.

We've set up the agenda today, there are going to be Board and Council actions that will need to happen as part of a few of the agenda items. Towards the end of the meeting the Council will no longer need to be a part of any decision making or motions. Once we get through the Wave 1 Black Sea Bass Fishery issue on the agenda, I plan to take a ten minute break; that way some council members that need to get back to the airport or get on the road, can do so. Then we'll bring everybody back. But everybody is welcome to stay; I just wanted to make sure everyone was aware of that.

APPROVAL OF AGENDA

CHAIRMAN LUISI: Moving forward to Item Number 1 on the agenda, we have an approval of the agenda. Are there any modifications or changes to the agenda? Emerson.

MR. EMERSON C. HASBROUCK, JR.: I know we have a very busy agenda today. But I would ask that under Other Business, if we have any time at all, I would like to initiate a discussion about RSA; and if we don't have time then maybe we can schedule that for another board meeting.

CHAIRMAN LUISI: We'll go ahead and hold off to that until Other Business. Even if we don't have the time, at least we can bring it up and decide on the plan forward for the RSA discussion. Any other modifications or changes to the agenda? Okay seeing none; consider the agenda approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN LUISI: Our next item of business is approval of the proceedings from the February 2, 2017 meeting. Kirby just informed me that there are notes that were submitted by New

Jersey regarding the proceedings; and we'll be making those modifications based on New Jersey's letter to the proceedings, which we are about to approve.

Is there any opposition to approving the proceedings with New Jersey's input? Seeing none; the proceedings are approved.

PUBLIC COMMENT

CHAIRMAN LUISI: Our next order of business is public comment. I would challenge anyone from the audience to discuss anything regarding black sea bass, scup or summer flounder that is not on this agenda.

But if you do have something that is not going to be part of the discussion today, I would offer the opportunity now to provide that comment. I do have one person on my list, Victor Hartley. Victor, were you planning to make comment regarding an issue that we'll be discussing today? Okay, so we'll go ahead and pass on that.

Please make sure when the time is right to get your hand over Steve Heins head so I can see you.

SCUP ADDENDUM XXIX FOR FINAL APPROVAL

CHAIRMAN LUISI: We're through public comment, moving on to Item Number 4; the Scup Addendum and Final Approval of Framework 10 for the Scup Framework. I'm going to turn to Kirby to make that presentation. Kirby, the microphone is yours.

REVIEW OF MANAGEMENT OPTIONS

MR. KIRBY ROOTES-MURDY: I am going to try to go through this presentation fairly quickly; as we have a lot of items to address today. In the presentation itself I am going to lay out the management options that are included in the draft addendum, the public comment summary, the Advisory Panel report, the Technical Committee report, I'll take any questions, and

then it is for the Board to consider final action on Draft Addendum XXIX, and for the Council to consider action on Framework 10.

The document development started in December of 2016. The Board approved the draft addendum for public comment in February of 2017. Public comment took place between February and March, 2017, and the Board is taking final action on this document today. Up here on the board is a decision tree basically, for the alternatives.

Alternative 1 and 2 don't have sub components to it, but it is important to note that for Alternative 3 there are accounting procedures that differ; depending on which one you select. There is A, B, and C and I'll go through those momentarily. Alternative 1 is to maintain the current trimester periods for start and end dates. It is important to note on the board right now the number of days in each of those trimesters, because those are modified in Alternatives 2 and 3. As you see there is Winter 1, there is the Summer Period, where you have state-specific shares, and Winter 2.

For Alternative 1, important note that was included in the addendum, if the winter period closes on or before April 15 then state permit holders can land scup from April 15 through the 30th and those landings are counted against the state share of the Summer Period quota for those states in which those landings occur in. Moving on to Alternative 2, this alternative proposes to move the month of October to the Winter 2 trimester period.

As you can see the dates change for the Summer Period and Winter 2. The Summer Period would run from May 1 through September 30th, and be truncated to 153 days. For Winter 2 it would increase to 92 days, and would start October 1st and run through December 31st. Alternative 3 moves the month of October to Winter 2, as well as the first two weeks of May to Winter 1.

Under this approach the Winter 1 and Winter 2 periods are extended and the Summer Period is truncated further. Winter 1 is increased to 135 days, Winter 2 maintains an increase of 92 days, and the Summer Period is reduced to 138 days. Under Alternative 3 there are the accounting procedures that differ.

For Alternative 3A, if the Winter 1 Period closes by April 15, then state permit holders can land scup from April 15 through April 30th, and those landings would count against the Summer Period state quota. After April 30th, the fishery is then closed from May 1 through May 15th, and officially opens again on May 16th. This is the Alternative 3A.

For Alternative 3B, if the Winter 1 Period closes prior to April 15, state permit holders can land scup from April 15 until May 15. That extends it a full month. Landings count against the Summer Period state quota, with the official start date maintained at May 16, but landings that are occurring in the early part of May before the 16th, the official start of the date, will count against the summer quota period.

Alternative 3C modifies it so that if the Winter 1 Period closes on or before April 30th, different from the previous two, April 30th, then state permit holders can land scup from May 1 through May 15th, and those landings count against the state quota. Again the official start under this Alternative 3 is May 16th.

This is just a summary again of the different alternatives that are included in the draft addendum.

PUBLIC COMMENT SUMMARY

MR. ROOTES-MURDY: Next I am going to move on to the Public Comment Summary. Public hearings were conducted in the month of March in the states of Massachusetts through New York. There were 19 people who attended those public hearings across four states.

There were written comments submitted. A total of eight comments were received, two of which came from groups or organizations. In summarizing the total comments received, a majority of the comments we received were in favor of Alternative 1; status quo. The second most popular alternative was Alternative 3B, which shifted October to Winter 2, and the first two weeks of May to Winter 1. Equal numbers of comments were provided for unspecified options; as with Alternative 3. When it came to reasons cited in support of these alternatives, for those in support of status quo, concerns were raised over market stability and maintaining price; if the Alternative 2 or 3 were selected. There was also concern that there would be potentially negative impacts to the inshore smaller boat fleet, for those participants who take part in the Summer Period.

With that period getting truncated they would effectively disenfranchise some of them. There was also concern over the status of the resource, whether the resource is actually in as good a shape as the stock assessment states. Reasons cited in support of Alternative 3B, cited that it was the best opportunity to catch the state quota during the Summer Periods.

The reasoning behind that was that in having a shorter summer period; trip limits could be higher for longer periods of the year to allow fishermen to achieve that quota, both on the Winter 1 and 2 periods as well as the summer. There is also the potential, or reasons cited in support of it were the potential to convert regulatory discards into landings that might be happening currently under the current trip limits.

It was also cited that with the reduction in the summer flounder quota, there was an increase in interest for fishermen who have both permits to target scup, and that it would be advantageous to allow for-hire trip limits with a reduction in this other species.

ADVISORY PANEL REPORT

MR. ROOTES-MURDY: Next is the AP Report. The AP call was held on April 19, and there were members from both the Commission and the Council's AP; a total of five participants.

Only three participants provided comment on the call, and there was one that was provided beforehand. One AP member was in favor of Alternative 1, two were in favor of Alternative 2, and one didn't specify any preferred alternative. Their concerns were primarily focused on discards.

Reasons cited in favor of Alternatives 1 and 2, mirrored those of the public comment that I just went through.

TECHNICAL COMMITTEE REPORT

MR. ROOTES-MURDY: Next was a Technical Committee review of the draft addendum. The Technical Committee had no comments on the technical information or data that was used for the document. The TC noted that the changes in the quota periods may not have an impact on the spawning activity or population.

Essentially that removals whether in the summer or the winter, will have the same impact on the resource regardless of the time of year. Fishing efforts that is an increase in fishing efforts, would likely have more of an impact on a resource than any changes to the start or end dates for the quota periods.

The Technical Committee did coalesce around the idea that social economic study could be conducted, and would be beneficial for better understanding the dynamic between trip limits, market demand, and trying to better utilize the quota. There was the suggestion of mirroring it off of some of the efforts that have been going on with menhaden.

Lastly, the TC noted that we are awaiting the results of the stock assessment update for scup

that will be completed later this year. What will likely come out of those results may have more of an impact, in terms of management, than changes to quota start and end dates that are included in the alternatives for this addendum. Anecdotally there has been recent information from young-of-year surveys that are indicating that abundance remains very high; but that will need to be corroborated through the stock assessment. Next steps are for the Board to select an alternative and to approve the Addendum XXIX. As I said before, the Council will also vote on a preferred alternative for With that I'll take any Framework 10. questions.

CHAIRMAN LUISI: Before we get to questions, just so everyone is aware. The alternatives that need to be selected by both the Commission and the Board need to be the same alternatives. Therefore, we can accomplish that with one motion; which we'll get to in a second. But before we get to any motions, are there any questions for Kirby? Yes, David Pierce.

DR. DAVID PIERCE: Yes Kirby, I think we would all benefit by a reminder as to the trip limits in the different seasons; because if we modify the seasons, changing some months for example, the implications of large trip limits in different months. That might influence how people vote on this issue, what options they would prefer. Could you just repeat those for us?

MR. ROOTES-MURDY: I don't have the trip limits for the state-specific period right now off the top of my head; but what I do have are the federal trip limits. For Winter 1 it is 50,000 pounds during the Winter 1 Period. Then for Winter 2 it is between 12,000 and 18,000; depending on the amount of unused quota from Winter 1.

DR. PIERCE: With the option that would put, strangely enough, the month of May into the wintertime, the limit would be 50,000 pounds;

an inshore limit basically, would be 50,000 pounds.

MR. ROOTES-MURDY: That's right, for half of the month of May with Alternative 3, it would move the first two weeks of May into Winter 1.

CHAIRMAN LUISI: Any other questions for Kirby? Rob O'Reilly.

MR. ROB O'REILLY: The trip limits in the summertime are important, and overall the quotas are important for the summer as well as state specific; so the two most northern states have very small percentage of the quota, and the states from really Delaware south to North Carolina also have very small percentages.

States such as Rhode Island has 10,000 pounds per week in summer period in 2016. Massachusetts and New York 800 pound trip limits, 750 pounds for Connecticut, and also at a different date 1,500 pounds. New Jersey, 5,000 pounds, the other states don't have any trip limits. I just wanted to point that out since I had that opened to that page.

I also wanted to maybe ask a question whether the Technical Committee, I know there were some comments about not moving May 1 through15 from the public about not disrupting the spawning. What I saw Kirby put up was that that really is not an impact that concerned the Technical Committee. Is that correct?

MR. ROOTES-MURDY: That is correct. As I said in the presentation, the Technical Committee noted that really a removal of fish in May versus August or December is the same. The spawning, while it's noted that that is an important time of year for the population; its overall impact on the population the TC was not able to differentiate that having a big impact.

BOARD ACTION ON SCUP ADDENDUM XXIX

CHAIRMAN LUISI: Any other questions for Kirby? Okay seeing no questions; I have already

been corrected, but I mentioned before that I said the Board and the Commission, so the Board and the Council both need to take action on these items or suggest action. I've asked staff to put a template for a motion up, which just needs to be filled with the alternatives that you would like to select. I would look to council members, board members to provide a thought on this and to make that selection. David Pierce.

DR. PIERCE: I would move on behalf of the Board to select Alternative 2 from Section 3.0 for Addendum XXIX. I'm not prepared to go with a preferred alternative from Section 5. I'm going to stick with just that alternative, Alternative 2. Move to select Alternative 2 from Section 3.0 for Addendum XXIX. That is the one that would move October to the Winter 2 period, and then May is left alone.

CHAIRMAN LUISI: David, that same alternative is in Section 5 of Framework 10. I wanted it to be all in one place so that we're making a decision jointly on this. Can we add Alternative 2 from Section 5 of Framework 10? Would you be comfortable with that?

DR. PIERCE: If it's the same, yes.

CHAIRMAN LUISI: Okay so David Pierce has made the motion on behalf of the Board. Do I have a second? Max, that is not the Council motion. That will be the Board motion. I need a second from a board member; Tom Baum. Tom.

COUNCIL ACTION ON SCUP FRAMEWORK 10

MR. TOM BAUM: I would like to second the motion for the Board and make that same motion for the Council.

CHAIRMAN LUISI: Okay, so Tom has seconded the motion by the Board and is offering the motion for the Council. Do I have another Council member, Laurie Nolan? Laurie has seconded for the Council. We have a motion on the table; any discussion on the motion? Steve Heins.

MR. STEVE HEINS: I just want to point out in Alternative Number 3; if we were to move differently than this that the states have the option of setting landings limits different than the federal trip limits. If a state is concerned about 50,000 pounds in those first two weeks of May, the state could put alternative limits in place; 5,000 pounds for example.

CHAIRMAN LUISI: Thanks for the clarification, Steve. Were you suggesting a substitute? Not now. Okay, any other members? Yes, Mark.

MR. MARK ALEXANDER: When we had our hearings our industry was very vocal that they opposed any of these alternatives. They were very concerned about how this would affect the markets in Connecticut. There was a very nice study done by Dr. Steve Cadrin, as a response to an RFP that the New England Council put out.

They did a study that examined the market of yellowtail flounder in response to regulations. It was very enlightening in that when you disrupt the supply of local fish, you irreparably harm the local markets, and those markets no longer persist. The management strategy that is in place now for scup, results in periods where there are very high trip limits; and during those periods of times those fish bypass the local markets, so that there is not a consistent supply of fish to the local markets. As a result, where there used to be a fairly robust local market for scup in Connecticut, it doesn't exist anymore; because people are no longer familiar enough with the fish to purchase it. While these options seemingly spread out the supply of fish to a bigger part of the year, it is just more of the year with big trip limits when these fish aren't available to local markets.

Our industry and our department are very disappointed that this action did not consider any alternatives that might redistribute unused

winter quota to the Summer Period. I know there might be difficulties in doing that and reconciling the amount of unused quota in Winter 1, but I think this action falls short of maximizing the economic yield from this fishery. I'm going to oppose this motion.

CHAIRMAN LUISI: Okay thank you for offering that, Mark. Eric Reid.

MR. ERIC REID: I'll be as brief as possible. I oppose this motion. I would like to make a motion on behalf of the Board to substitute Alternative 2 with Alternative 1. Following Mark's comments, I would 100 percent support the public comment. As far as the market for scup, I really think that if we go status quo it gives us the ability to better analyze what we do now with a socio and economic analysis; because I'm a fish dealer. To say that the scup market is unstable is an understatement. I'll leave it at that, Mr. Chairman. If I get a second I can come back at it again.

CHAIRMAN LUISI: Okay so for process, we will need a second by the Board; but then we also need the motion to be made by the Council as well. Mark Alexander is going to second for the Board. Do I have council members who would like to? Okay so that is Peter Hughes is making the motion on behalf of the Council.

Do I have another council member? Yes, Roger Mann, was that Roger or Peter deFur? I couldn't see whose arm it was; Roger, okay. Roger Mann is making the motion on behalf of the Council. We have a substitute motion for discussion. Eric, would you like to offer any other thoughts now that we have a motion on the table?

MR. REID: The comments really have already been made by the public and by myself and Mr. Alexander. The problem with scup now is that there is no stability in supply. We have a total hog cycle; I remember that from my economic days, situation in the market. We have lost

market share. We have driven customers away, because on Monday fish may be worth \$2.75 a pound.

Two days later they might be worth \$0.50 a pound; in which case the customer that bought the ones at \$2.75 will never buy one pound of scup ever again in his life, because he just lost his shirt. Then by Friday it might be back up again. There is not stability in the market. We need socio and economic analysis to better distribute the quota, to maximize the economic yield of that biomass. Two doesn't do it, so status quo; we need the economic analysis to get a better shot at this job.

CHAIRMAN LUISI: Peter Hughes, on behalf of the Council, since you were the maker on behalf of the Council. Did you want to add any thoughts to the discussion?

MR. PETER HUGHES: Although I am the maker of the motion, I don't necessarily know that I'm going to vote for this motion. I do believe that status quo is good for the market place, and I understand Mr. Reid's reasoning behind it. But I thought it was important to get the motion on the board; but like I said, I don't know that I'll support my own motion.

CHAIRMAN LUISI: Any further discussion on the motion? Laurie Nolan.

MS. LAURIE NOLAN: I don't support the substitute motion. We do have problems in the marketplace with scup, but by sticking with no action, status quo, we're not fixing anything in that case either. We're just continuing a problem. The issue with Winter 2 is that it is a short season. It doesn't give the industry an opportunity to catch the fish. We look as if we're managing on a trimester period, but Winter 2 has two months to it.

What the industry asked for was to add October, to give it another month so that that Winter 2 quota would have an opportunity to get caught, it just doesn't have that opportunity. You hear the summer fleet complaining about low trip limits. You know if we're taking a month off the summer period, this might give us an opportunity to increase the summer quota trip limits by a little bit; and get away from status quo and the problems that we're living with, with the scup fishery. I don't support the substitute motion.

CHAIRMAN LUISI: Okay, seeing no other comments I am going to turn to the audience. Can by show of hand members of the audience just indicate whether or not you have an interest in providing comment on this. Okay seeing one, Arnold, would you like to step to the microphone? My bridal party up here is taking up all the microphones, so somebody may have to get up; or you might have to go down to the public microphone.

MR. ARNOLD LEO: Arnold Leo; I am representing the fishing industry of the town of East Hampton, and the town's Fishery Advisory Committee has specifically requested that I support Alternative 2. We would of course be opposed to 1. The reason for 2 is that it does indeed provide an opportunity for greater catches in the latter part of the fall.

October being moved into Winter 2 would of course substantially increase what the inshore fisherman as well as the offshore fisherman could catch in the month of October. Moving October into Winter 2, shortening the Summer Period means that the daily quota in the summer would increase; because the total quota would stay the same, but the number of days would be reduced. Those were the reasons offered for support of Alternative 2. Thank you.

CHAIRMAN LUISI: Go ahead, guys, unplug. My microphone is still working with them being unplugged so I'll just go ahead and continue. There is no other comment from the audience; so I'm going to bring it back to the Board and to

the Council. Are there any other thoughts before we caucus and take a vote on this substitute motion? Bob Ballou.

MR. ROBERT BALLOU: I do support the substitute for two reasons, one is I was very interested, as I think everybody was, in hearing from the public on this issue. I think that was exactly why we popped it and put it out for hearing. I was struck by how limited and sparse the public comment was. I think I counted a total coastwide; a total of 20 comments on this, what you would think would be a pretty significant issue. The majority of those comments were in favor of status quo. In keeping with that spirit, I would certainly support the substitute and maintaining status quo. The second reason is because if the annual quota continues to decline and landings remain the same or even increase, the subperiod quotas will come closer to being filled; and the under harvesting issue will essentially resolve itself. I see that as a trend. That may well play out, and this could very well be a solution in search of a problem in very short order. For that reason I'm supporting the substitute.

CHAIRMAN LUISI: One last comment, Mark Alexander.

MR. ALEXANDER: Thank you, Mr. Chairman for that opportunity. Yes, I just want to respond. Yes, in the summertime if you shorten the summer period the price may go up. But the problem is, you're shortening the period of time in which inshore and artisanal fishermen can sell their fish to local markets.

Without having those local markets available year round, those markets can't develop and persist; there is nobody to sell the fish to. I think we have to vote for Alternative 1, and drop back and think about this; do some more economic analysis, and figure out a better way to maximize the use of this resource.

CHAIRMAN LUISI: Okay with that said, seeing no other hands, let's take 30 seconds to caucus or let's take a minute to caucus, and we'll come back and call the question. On the table we have a motion to substitute Alternative 1, for Alternative 2. Before we vote, I want to clarify that the Council and the Board would need to take like action; in order for any motion when a joint action is taken to pass.

In the past we have met as a Demersal Committee of the Whole; but that is not the case today. If you are a member from New England on the Demersal Committee of the Whole, and you're not a Mid-Atlantic Council member, you cannot vote on this as a council member. We are not convened as a Committee of the Whole.

This is just for Board consideration and for the members of the Mid-Atlantic Council. With all of that said, I am going to go to the Board vote first. I am going to call the question for the Board. All those in favor of the substitute motion please raise your hand. That is 4 in favor. All those opposed same sign; that is 5 opposed, any null votes? Seeing none; any abstentions from the Board, 3 abstentions. Motion fails for a lack of majority.

Given that that motion has failed, the overall substitute motion is now failed; and we're back to the main motion; which was to select Alternative 2. Does the Board need another opportunity to caucus on this? Okay seeing no other need to caucus I am going to call the question. Move to select Alternative 2 from Section 3.0 for Addendum XXIX and Preferred Alternative 2 from Section 5 for Framework 10.

All those members of the Board, who support this motion, please indicate by raising your hand. That is 9 in favor, all those opposed same sign. That is 1 opposed, any null votes, seeing none; any abstentions, 2 abstentions. Motion carries, well motion carries the Board. It is now time for the Council to take action.

Is the Council ready for the question? All those Council members in favor of Alternative 2 please indicate by raising your hand. That is 20 in favor, all those opposed, seeing none, any abstentions? Seeing none; motion carries. Kirby or Julia, is there any other actions that we need to take regarding the scup framework and addendum?

MR. ROOTES-MURDY: Two more motions are needed, one for the Board to approve the document as modified today. The second is for the Council to recommend the Framework 10 be submitted to National Marine Fisheries Service.

CHAIRMAN LUISI: Can we bring those motions up? I know that they've been crafted.

MR. ROOTES-MURDY: Just give us a second as we get our results ready.

CHAIRMAN LUISI: Be thinking about whether or not you want to make that motion or second that motion. Okay so we have a motion on the board. The motion would be to approve Addendum XXIX as modified today. Do I have board members who would like to make that motion, Emerson Hasbrouck, as a board member?

MR. HASBROUCK: So moved.

CHAIRMAN LUISI: Do I have a second from another board member from another state? Tom Baum seconds the motion. Let's go ahead and dispense with this motion. It is only a Commission vote and it is a roll call vote. Do you need time at all? I don't see anybody that looks like they need time to discuss this on the Board. Kirby, are you going to call the roll?

MR. ROOTES-MURDY: I will call the roll; starting north to south, Commonwealth of Massachusetts.

DR. PIERCE: Yes.

MR. ROOTES-MURDY: Rhode Island.

MR. REID: Yes.

MR. ROOTES-MURDY: Connecticut.

MR. ALEXANDER: No.

MR. ROOTES-MURDY: New York.

MR. JAMES J. GILMORE, JR.: Yes.

MR. ROOTES-MURDY: New Jersey.

MR. BAUM: Yes.

MR. ROOTES-MURDY: Delaware.

MR. JOHN CLARK: Yes.

MR. ROOTES-MURDY: Maryland.

MR. ED O'BRIEN: Yes.

MR. ROOTES-MURDY: Potomac River Fisheries

Commission.

MR. ANDY SHIELS: Abstain.

MR. ROOTES-MURDY: Commonwealth of

Virginia.

MR. O'REILLY: Yes.

MR. ROOTES-MURDY: North Carolina.

MR. CHRIS BATSAVAGE: Yes.

MR. ROOTES-MURDY: U.S. Fish and Wildlife

Service.

MS. SHERRY WHITE: Yes.

MR. ROOTES-MURDY: National Marine

Fisheries Service.

MR. MIKE MILLARD: Yes.

Draft Proceedings of the Summer Flounder, Scup, and Black Sea Bass Management Board and Mid-Atlantic Fisheries Management Council Meeting May 2017

CHAIRMAN LUISI: It is 10 in favor, 1 opposed and 1 abstention.

MR. ROOTES-MURDY: That's correct.

CHAIRMAN LUISI: Motion carries; back now to the Council. Do I have Council member, Steve Heins who would move to submit Framework 10 to National Marine Fisheries Service for approval? I need a second from the Council; Peter deFur. We have a motion, move to submit Framework 10 to the National Marine Fisheries Service for approval.

All those in favor of the motion by the Council, please indicate by raising your hand. That is 19; all those opposed same sign, any abstentions? Seeing none; I'm sorry, John, one abstention. Motion carries. I believe that concludes our business on scup. Rob O'Reilly.

MR. O'REILLY: I know time is short. I just wanted to say that Julia, for the Council staff did a very thorough job in bringing all this information to us. Clearly the economic data that she compiled supported an October situation moving into Winter 2. I will add, although the May 1 to 15 did not likewise perform the same for inclusion in Winter 1.

I hope that's not lost; because earlier I mentioned just how small some of the state's quotas are during the summer. I just want to bring that to your attention. There is transferability during the summer period, so I think that is something that states with a very small quota and with a changing stock dynamics, can take advantage of too.

CHAIRMAN LUISI: Thanks Rob, and thanks for being brief with that. Okay we're going to move to our next item on the agenda. I do apologize. I didn't recognize Julia. Julia was the one who was up here a few seconds ago. She works on the scup side of this plan for the Council. There is a number of staff that share

responsibilities on the summer flounder, black sea bass and scup for the Council.

REVIEW OF THE SUMMER FLOUNDER DRAFT COMPREHENSIVE AMENDMENT RANGE OF ALTERNATIVES FOR COMMERCIAL USE

CHAIRMAN LUISI: We have Kiley, who is at the table now, Kiley Dancy, and she will be presenting the Review of the Summer Flounder Draft Comprehensive Amendment Range of Alternatives for Commercial Use. One thing I'll add before Kiley gets started is that in discussions with staff, both on the Commission and the Council, what they're looking for from this body today is some direction.

Not necessarily comment to all the alternatives, but whether or not we want to get rid of alternatives at this point or add additional things for consideration in the amendment. Be thinking about that as Kiley and Kirby kind of tag team this presentation; as to whether or not you would want to take any form of action today regarding the removal or the addition of alternatives to the commercial side of this comprehensive amendment. Kiley with that it's all you.

MS. KILEY DANCY: Good afternoon everyone. Kirby and I are going to be splitting this presentation up a little bit. I'm going to do the first half and he's going to do the second half. The discussion document provided for this meeting contains a range of draft commercial alternatives for this amendment.

The alternatives, as you probably noticed, are largely conceptual in nature at this point; and many of them do require some additional specificity eventually, in order to analyze their impacts. For example, there are approaches to revisiting state-by-state commercial allocations, but they don't include specific base years or other metrics to develop new percentages. Things like that we will eventually need to add some specificity for.

The goal of this meeting is for the Council and Board to provide feedback on the draft range, and specifically we are asking for some comments on prioritizing issues and alternatives for further consideration. We're looking for thoughts on the overall appropriateness of the range of alternatives, which alternative sets or specific sub-alternatives should be pursued for further analysis, and which should be dropped from consideration at this time and why.

Any Council and Board proposals on additional specificity or how to go about adding details to a particular alternative, or how that alternative should work, and finally, this would be the appropriate time to add alternatives the Council and Board feel are missing. Unfortunately we do have a packed agenda today.

We don't have a lot of time in this presentation, so we can't go through all of the details in the discussion document, but Kirby and I will go through each alternative set and offer some comments from the FMAT and the Commercial Working Group and staff, and describe each alternative set.

Just a quick note on the current timeline for the action, it is included in the discussion document. This timeline as always is subject to change; particularly based on the feedback that we get today about the scope of issues that we're going to be pursuing for commercial issues. The current plan is for the Council and Board to identify priority draft alternatives, and comment on the range as prepared today. Then that will be refined by the FMAT and Working Group later this summer. Then in August we plan to come back to the Council and Board with a refined range of alternatives, including some added specificity and some initial impacts analysis.

In December, it is possible that the Council and Board could approve a Draft Public Hearing Document and a Draft EIS on the Council side, but as noted in the FMAT summary this might

be unrealistic, in terms of timing; depending on the scope of issues pursued. Another option is that the Council and Board could identify preferred alternatives in December, and the Council could then later in February approve the Draft EIS, assuming that the entire range is included in what is identified in the selection of preferred alternatives in December.

The rest of the timeline is a little bit uncertain, depending on the actual range of options pursued for analysis; but we could be looking at public hearings in early 2018 or spring 2018, and then rulemaking later in 2018. The issues we're going to be talking about today, just in terms of an overview. We have alternative sets for permits and latent effort, commercial allocation, safe harbor, landings flexibility, commercial data collection, and commercial discards.

Before we get into the details of the alternatives, I do want to note some general FMAT recommendations. The FMAT met last week on May 4, and had some overarching kind of recommendations and comments. First and foremost, for each issue the FMAT reiterated that some of the Council and Board's goals and priorities for some of these issues were a little bit unclear at this point; and that it would be beneficial to amendment progress if the group were to prioritize and clarify objectives for each issue.

Because there are so many ways to pursue all these issues in the document, additional guidance on, it's sort of difficult for the FMAT to evaluate whether we're making good progress in developing alternatives, if the overall goal of the amendment is just to reevaluate everything; that can kind of spiral out of control pretty quickly.

Some additional guidance on what the Council's objectives are for each of these issues would be helpful. We do understand there is a need for some back and forth between the technical

teams and the Council and Board. But having a little bit more clear definition of where we're going would help identify more relevant alternatives; rather than trying to address everything conceivable in the summer flounder FMP.

Another note is the more options that we include in the document and more sub-options, the longer this process is going to take, the more intense the analysis needs to be and the more back and forth we're probably going to need between the Council and Board and the FMAT. In addition, the FMAT noted that the timeline that I just discussed is possibly feasible, if staff have no other priorities between now and December; but otherwise it might be overly ambitious.

It also depends on the range of alternatives that we discuss today. Another note on this, the timing is that the Council on the Council side, we do need to complete a draft environmental impact statement, so there is an extra step in this amendment: in that we do need to finalize a Draft EIS, and that also requires an additional public comment period. The Council needs to approve that Draft EIS prior to public hearings. Then that has a 45 day comment period, and it is important to note that we do kind of need a very solid range of alternatives prior to that approval of the Draft EIS, because if it is modified substantially after that point, we do need a supplemental comment period. We're trying to avoid that if at all possible. The key point is prior to approval of that Draft EIS we need a pretty solidly identified range of alternatives; and there can't be much modification after that without an additional comment period. I am going to talk about the first two alternative sets and then hand it over to Kirby; but the first is permits and latent effort.

Had a few general comments, first from the Working Group and the FMAT. The biggest is that this draft range, this document currently it contains only alternatives for federal moratorium permits. While state permits we do recognize may be an issue, and they might be even a bigger issue than the federal permits.

It is not entirely clear to the working group and the FMAT whether this action is the appropriate place to address those state permit issues. We're looking for a little bit of guidance from the Council and Board on whether this action should address state permit requirements. Permit structures and requirements vary quite a bit by state, as described in that document.

It is possible that the Commission's FMP could set minimum criteria for permits for states, but it isn't clear whether this is something the Council and Board would like to pursue through this action, or as suggested by the FMAT that this may be more appropriate for a Commission only action.

We have four main alternatives for this, with a couple sub-alternatives. The first is no action or status quo. Alternative 1B would be a requalification of the existing single tier federal moratorium permits. As noted here and in the document, there are a lot of different ways to do this, and we don't have sort of the many possibilities for sub options identified here; based on requalifying criteria.

The specificity that we need here eventually includes what those exact qualifying criteria would be, including possible base years for landings and/or effort. Alternative 1C would involve creating a tiered permit system, unlike what's currently in place; and 1C specifically would look at landings or effort qualifying criteria. Again, those criteria are to be determined.

Then Alternative 1C-2 would be some associated management measures associated with those tiers; because this option is really getting at looking at sort of a possibly a directed fishery versus incidental fishery permits, or

different levels of participation in the fishery. If the desire is to manage those aspects of the fishery differently, there would need to be some sort of associated measures with these permits; in order to manage those differently.

That perhaps could be done later on in the process, but it is included here as a sub-option. Alternative 1D is also a tiered system, but it is based on gear type. The exact categories are to be determined; as noted in the document. The overwhelming majority of the landings were taken by the trawl fleet.

Then again, there is a sub-option for management measures here, if the Council and Board would want to manage those gear-based tiers differently. If it's just the goal is to achieve a particular balance of access then that is maybe a different thing, but again that gets back to what are the Council and Board's goals for each of these issues. The next range of alternatives is for commercial allocation. This one we actually have quite a few draft alternatives, and the FMAT did note that the range here is a little bit probably extensive for what we need to do here. Some of them are going to end up having sub-options; so this is an area in particular that could benefit from some simplification and from narrowing the range.

Some FMAT members commented that these alternatives ranged a little bit in flexibility; depending on whose flexibility and how you're defining it. Some of them provide more flexibility in managing the annual coastwide quota; some of them provide more flexibility to individual states, and some to fishermen.

It is just one way to look at those alternatives. Also as noted in the document for both permits and commercial allocation, this document does not currently include any limited access privilege program such as catch shares or IFQs or sectors. Because it wasn't clear to any of the technical groups that the Council and Board really wanted to consider this option.

It has been mentioned only a few times throughout the process, and there didn't seem to be a lot of support for it, so it is as of now not included in this range; but if there is a desire to incorporate those approaches, we would request some guidance from the Council and Board to that affect today.

Otherwise, they won't be included in the document, but I will note that they could be done on an individual state basis; if there is a continuation of state-by-state quotas, or perhaps if there are regional quotas. Under some systems it could be done on a state level. This is just referring to sort of the overall coastwide management.

On the subject of incorporating recent or current summer flounder distribution, the FMAT and working groups have discussed that it is possible to take some fishery independent survey data to tie that to current distribution and therefore to allocations; but what you really need to do is kind of agree on what surveys to use and what lines to draw, in order to take that survey data and attribute it to a given state.

If we don't have a process where there is a basic agreement about what to use and how this could easily kind of spiral into an overwhelming number of options. It's something that it is best approached kind of by agreeing what to look at first, and then looking at how it shakes out with the survey data.

But if there is guidance on perhaps other sources of data or other quantification methods to use that would be helpful to know at this point too. Then finally the FMAT and working groups did discuss the difficulty of accounting for the quotas that are currently in place; since they have been in place since 1993. If we were using more recent years than that it gets difficult to get away from the impacts of the current management regime.

That's something that needs to be given some Getting into the actual range of alternatives here. I have four slides on this. The first option is no action or status quo. Alternative 2B would be revised state-by-state allocations. There could be any number of suboptions under this. Some general approaches that we have drafted here include 2B-1, which is a revised base year period. That would be a new set of base years, and if you're looking at landings alone in the more recent years, again this wouldn't be a very big departure from what we currently have; unless you can incorporate some effort metrics or something else to kind of consider there. Two-B-2 would be based on not a set number of years, but on a best year system over a certain time period; perhaps the best five-years of landings by each state. Like the options above, it is a little bit difficult to get away from the effects of the current management regime; but that's one option there.

Two-B-3 would be using a combination of the current allocation and recent distribution. Once we figure out how to take recent distribution information and translate that into allocation percentages, we could use let's say 50/50 for current or historical allocations; and then recent distribution.

The next set would be 2C and sub-options, which is a coastwide quota with seasonal periods. For summer flounder we do need to account for the seasonal migrations of summer flounder, and making sure to distribute the availability throughout the year to different fisheries in different states. A couple options here, there could be a coastwide quota on a trimester system.

The details of how that would work, whether it would be based on a certain set of base years or a strict split of the year into trimesters is to be determined. Two-C-2 would be a bimonthly quota system. This I think was originally considered when the allocations originally went

into place in a state-by-state basis. That would kind of break the year into smaller time chunks that might help distribute the quota better throughout the entire year.

Two-C-3 would be again, measures that are associated with those types of systems, such as again, this would be on a coastwide basis. You would have the ability to land in any state, but you would need some measures to control harvest during each period. You would have perhaps trip limits, triggers for lowered trip limits, and rollover provisions for quota between periods and things like that. Alternative 2D is the scup quota model, which we heard a lot of support for in scoping.

That would be to implement a coastwide quota in the winter and state-by-state quotas in the summer; as was just discussed with the scup agenda item. This alternative set might need to be restructured a little bit, because it is a little confusing as written; but the first two options would be to look at quota period dates. Are they using the same quota period dates as scup, or if summer flounder is different enough to warrant using different dates for the summer and winter periods that could be an option as well; details of that to be determined?

Alternative 2D-3 would be looking at allocation between the quota periods, and then 2D-4 would be an option for looking at what the actual state-by-state summer flounder quotas are. The summer quotas could be the same as they are now, or there could be alternative base years that are use to divide the quota up by state in the summer period. Finally for commercial allocation, there is an option for a regional quota system that would work in theory similar to the current state-by-state setup; but on a regional basis.

There are some quota accounting and monitoring questions remaining with this. GARFO has indicated that like they monitor quota on a state-by-state basis currently, it is

probably possible for them to monitor it on a regional basis; similar to the current system. But there are some questions about how exactly that would work. Then the options for specific regions and regional allocations are also something that needs to be added to this alternative set for some specificity if this is kept. The last option in this category is quota allocation by permit category. If there is a creation of tiered permits, either by levels of participation, landings or effort or gear type, there could be guota allocation used in conjunction with that; if that is the direction that the Council and Board would like to go. I think that about covers it for commercial allocation and Kirby is going to describe the rest of the Alternative 3.

MR. ROOTES-MURDY: As Kiley said, I'm going to go through safe harbor, landings flexibility, monitoring, data collection, and then discards and then we're actually going to come back to Kiley to go over staff recommendations; as that is a part of the Council process. The next item as I said is landings flexibility in safe harbor.

These issues are addressed in the document starting on Page 24 through 28. As many of you are probably familiar with, safe harbor is generally understood as a general policy that allows vessels to seek shelter in non-home ports due to safety concerns; whether they're mechanical, due to injury to staff onboard, or weather.

But it should be noted that there currently is no uniformity between the state-by-state policies that are in place. Where this comes into effect with summer flounder, and specifically this amendment is the transferring of quota, and at times the efforts to land summer flounder under the guise of a safe harbor request.

Transferring of quota is allowed under the summer flounder plan; it is laid out in Amendment 5. It's a very formal process where the two states in which quota is being landed

from one state to another for that vessel that is not a home port, it is administered between the two states; and then those requests are sent to the Regional Administrator to approve.

There are instances when safe harbor has been used as an effort to push a transfer, and those have not always been granted; between the two states, not necessarily at the Regional Administration level denying it. I will say that the document tries to lay out some of the ongoing work that is happening within the Commission's Law Enforcement Committee to address safe harbor policies on a state-by-state basis.

We have Jason Snellbaker, who is the LEC representative at the table, and after we get done with our presentation he can address any questions you have regarding safe harbor. But that is where primarily we are trying to focus on this in the document. It should be noted on Page 25 that if the Board and Council are interested in making sure that safe harbor is something addressed through this amendment process.

They need to provide some more specific guidance to staff on the appropriateness of its inclusion; and specifically why it needs to be included, and whether alternatives related to safe harbor need to be drafted. The other component that is connected and related to safe harbor is landings flexibility.

This is a concept that was first brought up to staff through the scoping process that took place back in 2014. It was mentioned by a number of states as an interest; and the general concept was to allow for vessels to land in states that are non-homeport states, but to try to maximize market demand, and would do steam time if they were coming from further away on the coast. I wanted to note that on Page 26 we do lay out some of the drawbacks and concerns, specifically around equity and fairness; that is with regards to whether or not

you would allow for a state to continue to benefit from a participation in the summer flounder fishery, if the resource say is not near that state. Because those vessels might not be steaming all the way back to their home port if the resource is not near.

Another drawback or concern that has been noted is the monitoring of state and coastwide quota that would become a little bit more burdensome under this approach; because of the possible quick nature in which quotas might be transferred, depending on a vessel leaving and not necessarily declaring what state it was going to go back to.

The last part is the effectiveness and law enforcement concerns over what the current state level trip limits are, and those requirements to ensure that they are abiding by the conditions of the permit, and helping the state monitor and stay within its current quota. We have, for safe harbor specifically, kind of three options included in the document.

The first is no action. That is 3A; 3B is to move towards a more uniform coastwide written safe harbor policy. Within it there are two kinds of components that could be pursued. Mandatory measures and this could be included into the Commission's process as part of our compliance criteria that we request the states submit annually in their compliance reports.

The second version would be 3B-2, which would be to have voluntary measures. The last alternative would be to possibly direct the states to develop their own policies that are more formalized. I will say that tomorrow morning the Policy Board will be hearing from a subcommittee of the Policy Board on some of the current discussions the LEC has been having on safe harbor.

Again, it should just be noted that if this is something that the Board and Council feel needs to be included in the amendment, we would look to have some more guidance; and it does not necessarily have to be included in the amendment. The second part is with landings flexibility, and we have a number of options.

We've tried to draft around the scoping comments we had received, and the general comments and feedback we've received from the Council and Board over the last year. The first is no action. The second would be to adopt a commercial landings flexibility policy. Within that 4B option there are sub-options for it.

The first would be to allow for the sale of landings in that state. Vessels could then sell to permitted dealers in that state in which they land. However, a quota transfer would be needed to attribute the landings to the vessel's permitted state; 4B-2 would require the transport of summer flounder by land to stay associated with the vessels permit. For example, for fishermen with a Virginia permit would land summer flounder in a New York port, and then truck that fish down to Virginia with both states then accounting for the transfers.

It should be noted at this point that law enforcement has noted some concerns on whether this would be enforceable, because it is difficult to track a truck once it leaves one port and makes its way south; and how to ensure that if it did offload between a point of leave and its point of destination, where to track those landings to. The last sub-option under this approach of adopting a commercial landings flexibility policy would be to allow vessels to possess multiple state possession limits at one time. You could have for example, North Carolina and Virginia trip limit that the vessel would be operating under; and that vessel would then be able to land in both of those states, because they would have compatible trip limits. But again, with this option if it is to be included in the amendment moving forward, details specifically on how the states would like to see this play out are needed

for staff to try to further develop these alternatives.

Again, we have some big questions that need to be addressed under this approach, specifically around quota transfers and accounting policy; as well as whether there is new permitting or licensing requirements that would be needed, or if it would further complicate the current permits that are in place.

That is landings flexibility in safe harbor. The next item is data collection and monitoring. This is included in the document on Pages 29 through 31. It should also be noted for this section that we're talking about data collection and monitoring specific to federal permits. Currently VTR, Vessel Trip Reports are required and must be submitted for those permit holders on a monthly basis.

Dealers who are federally permitted must submit trip level reports on a weekly basis. What is not currently in place for those federal permit holders is a vessel monitoring system which pulls from satellite tracking to further monitor spatial components of the vessels trip that can be helpful in trying to better understand distribution of the resource and fishing effort across the ocean.

As I said that is not something that is currently in place for federal permit holders, but could be a possibility under this issue item. Last is the Northeast Fisheries Observer Program, as well as the At-Sea Monitoring Program. These two components try to get at collecting information on data and biological sampling.

Specific to data we're talking about catch, gear, fishing effort information, and under this issue item there are really a couple of main questions that should be considered by the Board and Council; and that is that should state level data collection and monitoring be addressed through this amendment.

Many perceived data collection problems are not specific to summer flounder. Trying to make this something that is specific to summer flounder in the amendment, if that is of the interest of the Board and Council we can do, but these issues are not necessarily unique to fluke. There is an ongoing fisheries dependent data visioning project that is being carried out through GARFO.

We have some GARFO staff here that might be able to answer questions on that project, if there are questions about it. But that ongoing project might actually address some of these issues that are specific to federal permit holders. Then again, if this is to be pursued a more focused problem statement is needed to ensure that these alternatives are addressing what is the perceived issue by the Board and Council.

The two action items that could be included under this issue as alternatives, the first would be no action and the second 5B would be to require all federal summer flounder moratorium permit holders to have VMS onboard to record that information on their trip. In terms of what should be considered with that option, it is unlikely to improve the catch accounting that we currently have through the SAFIS system; but two possible benefits would be investigating enforcement, and possibly a fine scale effort information to better understand how that varies across the coast by vessels and area. The last issue item is summer flounder discards: and I have some stats up here that are included in the document.

Discards are addressed on Pages 32 through 34. From 2011 to 2015, commercial dead discards averaged about 796 metric tons, or approximately 8 percent of the total catch discarding; why fishermen are discarding has changed over time from '89 to 1995, 90 percent of the discards that we had from the observer

program indicate that this was due to minimum size.

This was observed in both the trawl and scallop dredge tows. But in recent years, 2012 to 2016, there has been kind of a variation depending on the issue reason; there could be minimum size as being a reason that they're discarding. It could be a quota, a trip limit component; there could be high grading in an effort to select for a bigger fish.

Then there is also unaccounted for reasons. But the reasons why people have been discarding have changed over time, and it is variable. It also should be noted that this information comes from the Observer Program that has a limited scope, in terms of its coverage on the fishery. Key questions for the Board and Council to consider.

Should discards be addressed through this action, this amendment, or is this something that should be addressed more in the annual specification process or through a framework or an addendum; something that can move much quicker and in a shorter timeframe than our amendment?

Some options under other commercial alternatives that Kiley went through, in terms of allocation and permitting, may actually address some of the discarding concerns that have been raised in scoping that is something to keep in mind as well, in terms of alternatives that we've developed for the Board and Council to consider for this amendment; if you all hope to keep this issue in the document.

First is no action, the second is to include a spatial, temporal closure or gear restricted areas for the fishery. Six-C would actually focus primarily on accountability measures. This would be more in the Council's purview. It may not require an amendment to address this, and the ongoing black sea bass framework action to revise the commercial AMs will likely be

expanded to address summer flounder and scup as well. Those are some things to keep in mind when thinking about discards; with regards to the amendment.

MS. DANCY: Just to wrap up, some of the key questions to reiterate. We're looking for guidance on priority alternatives to pursue for further analysis in this action, and then what is more appropriate to be split into a separate action addressed elsewhere; either through the Commission process, through a Council-only action, through the specifications process.

In the discussion document there is a list of issues that can be addressed through specifications relatively quickly; and that includes things like gear requirements and minimum fish size. Things like that are things that we can address through specifications, or other processes that we could use to address some of these issues. We really would like to know what to focus on in this action for commercial issues specifically; and it would be especially helpful at this point if the Council and Board sees alternatives, sub-alternatives in there that are really not the direction that you all want to go with this amendment; it is helpful to drop them now, so we can focus on developing issues that are really going to address the Council and Board's priorities. Because the more that is in there the longer the analysis takes, the longer the back and forth takes, and then the longer the timeline stretches out.

Any guidance on the Council and Board's objectives for each issue, where possible, would be helpful. I know we're not going to get very detailed into each issue about objectives today; but just general guidance on feedback on this range of alternatives is helpful. Staff has a couple of recommendations at the end here, after we had sort of had a chance to think about some of the Working Group discussions and some of the FMAT discussions.

Upon reflection, staff is recommending as a starting point for the conversation today that the Council and Board prioritize the permits and latent effort issues, and the commercial allocation alternatives; because that seems very clear that there are many members around the table that want to pursue those issues.

Drop the sub-alternatives, again that are unlikely to meet the objectives or that don't seem realistic, or that don't seem worth pursuing at this point. For landings flexibility, staff would recommend including that. First of all, if it is an issue that the Council and Board determine that is a priority issue and at the same time, it is an issue that would need federal FMP changes or federal regulation changes to implement that the way that the Council and Board are envisioning it.

I think that kind of depends on the details of what is proposed; but if that requires federal changes that would need to be probably a joint action. If not that could likely be done through a Commission process. Given what Kirby had mentioned about the safe harbor discussions that are ongoing with the Commission, and a number of comments we have received about that really being a Commission and a state issue.

We are recommending dropping that from this action at that time and continuing to address that through the Commission's process. That also is applicable to multiple species other than summer flounder; although I think summer flounder is the focus of a lot of the concerns about safe harbor. But that is being discussed, as Kirby said through the LEC.

Then finally, we would recommend at this point dropping the commercial data collection and discards alternative sets, unless there is a specific problem or objective that can be identified; or unless any of the alternatives that were up there was really something that the

Council and Board thinks are specifically worth pursuing.

Because with these two alternative sets we kind of struggled to draft alternatives; because we weren't exactly sure where the Council and Board wanted to go with those, and what the problems were to be addressed. Those are kind of summary recommendations as a starting point. I think that's all we have.

CHAIRMAN LUISI: Thank you Kylie and Kirby for your presentation. What I would like to do at this time is to have direct questions regarding the material that has been presented. I want to hold off on discussion regarding the recommendations that staff have provided on the alternative sets, until after we take direct questions on the material. Tony DiLernia.

MR. ANTHONY DILERNIA: I would like to make some recommendations, but I would like to ask the staff some questions as I'm making these recommendations. The first is to prioritize permits and latent effort, I agree with that and I believe that we should proceed and focus on the permits and specifically latent effort. I think latent effort could be a real problem in this fishery.

Commercial allocation alternatives, so on the commercial allocation alternatives my question to the staff would be would that include the use of the scup model in the analysis? Yes it would, I saw Kiley nodding yes, and so if that is the case then I support both Items 1 and 2 in the prioritization.

MS. DARCY: It's in there right now, so if that is the direction the Council wants to go.

MR. DiLERNIA: So the scup model would be included in that; very good.

MS. DARCY: Yes, unless we are directed to take it out.

MR. DiLERNIA: The next bullet item, it says landing flexibility. I believe landing flexibility is something that we should look at, focus on, after all these quotas are 30 years old and we have climate change issues. Landing flexibility is something that we should very much be included in this amendment; so I am good with that.

I drop down to the final action, which says commercial data collection discard alternative sets from this action. Now, I thought I heard the staff say, and I want to clarify this, that we could address fish minimum size and perhaps the utilization of or changing mesh size. Currently, do we have that ability in the current plan?

MS. DARCY: Yes. Those are issues that can be addressed during specifications. In the document there is a list of everything that we can do annually through the specifications process; and that includes mesh size, gear requirements, and minimum fish size.

MR. DiLERNIA: All right thank you very much, because I personally believe to eliminate discards in this fishery, we should be increasing the minimum mesh size and eliminating the minimum fish size. The minimum fish size, the mesh size was included in the original, well in the amendment 30 years ago; because there were so few summer flounder that individuals resorted to the use of liners to catch as many summer flounders as they could.

Because the fishery now is strictly regulated by the quota, the incentive to utilize the liners and to cheat we'll say, in this fishery no longer exists. I believe that if we increase the minimum mesh size and left the minimum fish size along, we would eliminate a large number of the discards and that as cliché goes, convert discards into landings. Those are my recommendations.

CHAIRMAN LUISI: That was as close to a Rob O'Reilly question as you can get there. Sorry, Rob. Before I go to Rob, I am going to go to Chris Batsavage. Here's my plan. If we can get direct questions to staff regarding the material, then what I do plan to do is to step back through the recommendations and alternative sets to get guidance. What I also will say is that if we do not feel that right now is the time to provide that guidance, I've been discussing with Bob and Chris the Executive Director of the Council, the opportunity that we may convene the Demersal Committee this summer, along with some selected Commissioners, to really try to dig down into these alternatives.

Know that there is a backstop to the discussion today, as far as kind of a Plan B if you will, because I did hear some concern; just from Board members this week that there might not have been enough time, given the distribution of these materials just a few days ago. They may not have the time to provide really indepth guidance at this point. Bob, did you have something to add? Okay, so go ahead Chris Batsavage.

MR. BATSAVAGE: A question on the regional quota option. By region do you mean where the fish are landed, or where the fishing activity took place; such as statistical area? I'm assuming that it was region where landed, but it wasn't clear; so I just wanted to make sure I understood.

MS. DARCY: Yes that was referring to the state of landings; similar to the state-by-state, just collections of states.

CHAIRMAN LUISI: Rob O'Reilly.

MR. O'REILLY: I'm going to behave here and save my comments. I was interested, Kirby first of all. I imagine the Law Enforcement Committee has also been working on the safe harbor provisions. I would say that I'm glad you

asked whether it should be mandatory, voluntary, or a state comes up with a system.

Being in a state that has had that for 20 years, you know we have a very good system. I guess the question is, if you haven't run this through the Law Enforcement Committee is that intended? That is one question I'll ask, and I'll have just a couple more.

MR. ROOTES-MURDY: What I can offer is last fall, in October at our annual meeting; I brought this issue to the LEC to discuss a little bit further. Jason was in attendance, and maybe he might be able to provide some more context on how the LEC discussed it then and since; because it has been an ongoing discussion item.

MR. JASON SNELLBAKER: It has been discussed at length, without going into further detail. It has been discussed. We've kicked it around up, down and sideways; to be honest with you.

CHAIRMAN LUISI: Rob, did you have a follow up?

MR. O'REILLY: I've got a follow up for Kiley, and that is you know neither a borrower nor a lender be, but I assume when you look at some of these challenges that you're also combing through other council's what their actions have been, and also what the states have done. In particular you made the comment that the IFQ was not really latched onto in the scoping process; but it may be something that is best left up to the states, and I agree with that.

I think the landings are in the state, and if a state has already chosen to go the IFQ part with or without transferability that is good and that should solve that situation. I hope to keep it with the state. The last thing, just to double up on you just for a second, would be that if we had quantification of some of these provisions. For example, we know better when we see the answer, and if we can see some answers. For example, when we look at the 25 years of the

same period that we looked for allocation, we at least if we're going to talk about other time periods such as you mentioned, such as perhaps older, newer or however that goes; that we see what that looks like.

I think what happens is we all pretty much have a rough idea, but it would be good to see that data. I think for the next time around, if there is anywhere where you can put some quantification; make it more of a menu for all of us to sort of have choices that might help a whole lot.

CHAIRMAN LUISI: Just to add to that. Kiley or Kirby, have you discussed, I assume the impact on states as we have in Maryland, and we have an IFQ for summer flounder. The alternatives that are coastal in nature, would that essentially eliminate that IFQ at the state level? I mean in order to become a full coastal fishery.

I would assume that the state of Maryland would not be given a piece of the pie and then just have them manage it as they choose to. Has that been discussed at all about what the implications would be for a state like mine that has an IFQ on some of the alternatives that are coastwide in nature?

MS. DARCY: We haven't really gotten that far yet into the impacts, but it has been brought up a couple of times that Maryland had ITQs and that a lot of these coastwide options would probably not work with Maryland having an ITQ system. We haven't really gotten that far into exactly how that would work, and that is the kind of thing that if it's clear that that is not a direction that the Council and Board wants to go then we could knock that off. If it is, we can look into that in a little bit more detail.

CHAIRMAN LUISI: On my list I have Jim Gilmore, and then I'll come back to Howard King.

MR. GILMORE: It's a question for Kiley, and it really has to do with the 2B sections on

allocation. I want to make sure I have this right. If you looked at the options you had under 2B, well you're trying to do a baseline, but the baseline is essentially problematic; because if you only had 7 percent, no matter which way you cut it the best you're going to get is 7 percent.

But then you also mentioned that looking at distribution was another way to actually get at that. Is that going to be separate or can you take distribution in addition to the history of allocations and work them together to come up with, maybe a more realistic picture of what the fishery is doing today?

MS. DARCY: Our Option 2B-3 would be a combination of the current or historical allocations and recent distribution; presuming that we can figure out a way to take recent distribution, and we can agree on data sources to use and how to divide that up, and turn that into state-by-state or other allocations.

That was an option where we could take, so in this draft an example is 50/50 current allocation and recent distribution. There can be a combination of that; we just need to put a little bit more thought into and perhaps get a little bit more guidance on that and how to take the current distribution and translate that into state-by-state quotas.

MR. ROOTES-MURDY: Just real quick I wanted to follow up on Kiley's point. This is Kirby. One thing that was mentioned, this discussion happened at the FMAT level, so please ta ke a look at the FMAT summary; but we had Mark Terceiro on the call and he talked about how this could possibly play out.

As Kiley mentioned, what data you're using for this is key. You could maybe do it based on the surveys that are used in the current assessment; but not all states are represented through those surveys, so that would maybe bring up some questions of how useful bringing in other surveys that have been deemed as not useful for the assessment would be for then allocation. It gets complicated, and therefore we'll really need more specific guidance on what it is you guys are looking for, for distribution to be considered with allocation.

CHAIRMAN LUISI: Jim, follow up.

MR. GILMORE: Mike, your idea about doing maybe a workshop in the summer. I think this would be a great topic to brainstorm on; because you really need to sit down and think about how you get past that. We've had allocations for 30 whatever years and how do you really get a meaningful number out of this? That is a good suggestion. I definitely will either come to it or send a retiree to it.

CHAIRMAN LUISI: I'd rather you come to it, if that's okay. Mike Pentony, did you have something to follow up here? Okay let me go around the room then. Howard King.

MR. HOWARD KING: I generally support the staff recommendations, including dropping the commercial data collection; but is there a timeline for the fisheries dependent initiative that you mentioned, I think undertaken by the Regional Office with the Center?

MS. DARCY: I don't know specifically. I know that I included in the document, there is a link to a recent presentation about that project. You could go look at kind of what that looks like; and then I did hear that there is possibly going to be something presented to the Council at the June, probably not in June, because I don't think it's on the draft agenda. But at one of the upcoming council meetings something would be presented to the Council as an update; but I'm not sure the broader timeline of that project.

CHAIRMAN LUISI: David Pierce.

DR. PIERCE: Yes Kiley or Kirby, on Page 3 there is a listing of the issues that are not included in this document. I'm unclear as to whether the commercial/recreational allocation reference is out of bounds and it will not be in this amendment; or is there a chance that it might be? Because it says the following amendment issues will be included in later documents for this amendment or separate action.

I know quite a few fishermen, recreational in particular; have said they would love to see this council and the commission deal with the commercial/recreational split. Is it out of bounds or is it still in play?

MS. DARCY: As far as we're concerned that is still understood to be a priority for the Council and Board; but as our understanding from the last few Council and Board meetings is that due to the delays with the revised MRIP time series and associated recreational issues, anything involved in the recreational fishery is going to be delayed a little bit.

We are focusing now on commercial alternatives to be split off into this action, into a separate action. Then everything under the umbrella of the Comprehensive Amendment that was initially started by the Council and Board will be addressed. But that issue specifically would be pushed off to the next action.

DR. PIERCE: The next amendment, okay. One final question, on Page 20 of the document there is reference to a point that was just made by Mike Luisi. Moving away from state-by-state quota system would represent a problem for states managing through ITQs, for example, Maryland.

I assume Maryland is the only state that is managing with ITQs, and the related question is, are those ITQs for federally permitted fishermen or just state permitted fishermen? I always had a question about how federally permitted fishermen could actually be managed by a state with ITQs.

CHAIRMAN LUISI: I believe that Maryland is the only state with an IFQ. I would have to go back through all the states to determine how they're managed. I mean you guys could tell me if there is someone else that has an ITQ. The way it works, and those fishermen are federally permitted.

We have our own permit that we issue through the state, and it's only issued to seven fishermen; based on qualifying criteria. Those seven fishermen are the individuals who get the lion share of the allocation that comes to our state. Now they're fishing in both state and federal waters, but they are state permitted, and in addition federally permitted.

DR. PIERCE: Okay thank you for the clarification, Michael. In the case of Maryland, let's say Maryland is the only state with an ITQ. Maryland would be faced with how to deal with the seven fishermen with ITQs, if indeed collectively the Board and the Council decided to go with a scup-like approach for summer flounder.

In other words, it would no longer be state-bystate; it would be well somewhat of a state-bystate summertime, for example. I'm just trying to figure out how many fishermen might actually be affected by this amendment if we went in that direction; specifically fishermen out of Maryland. It's a relatively small number.

CHAIRMAN LUISI: It's a small number, David, but I think when people hunt in a pack you sometimes can't outrun the pack. Even though it's seven fishermen, I would have a terrible time trying to explain to those fishermen that what they have invested in and what the state over the last 20 year, how we've managed them, would be taken from them.

It would be awfully difficult, and I would be looking through this work to try to offset that in some way; even if it is an allocation. In some ways I view it as all the states would essentially, if we went coastwide, they would be pooling all of their quota together; and fishing under that pooled allowance. But maybe there is a way where states like mine that have an IFQ, would be able to take away from that pool. We only have a couple percent allocations. It is not a lot of fish, but for the seven individuals that have invested in those permits, because they are bought and sold; it would be really difficult for me.

MR. REID: I am trying to figure out how to put this into one question, because I have a lot of questions about the effect on vessel permits if we eliminate state-by-state landings. What happens to shore side infrastructure, efficiency, law enforcement et cetera, et cetera? I guess I'll condense my question.

Would it be okay if I took you up on your offer to have the Demersal Committee meet in the summer; and then I can ask my questions then? Would that be okay? That is my question. It's a very complicated issue, Mike; very little time to analyze this document. We've got no time today to really go into a very complicated issue. I would prefer to take you up on your Plan B.

CHAIRMAN LUISI: That's fine with me. I'm not going on vacation this summer so it's all good. Yes, so with that said there is no time today to get into the details of all of this. What I had thought, after seeing the presentation by staff, and maybe this is as good a time as any to follow up; is to go back to the staff recommendations.

The FMAT has been talking about these issues. They are obviously providing a recommendation to us here today on priority, on things that need to be included, and then also dropped. Maybe we can focus on just this. Instead of getting

into the details, we focus on the recommendations by the staff.

Maybe we can agree and reach a consensus as to forwarding the next draft of this amendment, based on the recommendations of the staff, and that we deal with the more complicated "get into the weeds" issues of the alternative sets; when we get together and have a full day or a day and a half as a workshop with the Demersal Committee and members of the Commission, to dig into all of this. I'll look to your thoughts as to how to proceed in that way. Tony DiLernia.

MR. DiLERNIA: I would be happy to make a motion for the Council regarding how the staff should proceed. If you think a motion is in order, I would be happy to make one at this time.

CHAIRMAN LUISI: Yes, a motion wouldn't hurt, Tony.

MR. DILERNIA: I move that as the staff develops the amendment for the Summer Flounder Plan that they, can you put that other screen back up for me, please? Because I'm going to take your recommendations, I'm going to move with your two recommendations; that we accept the staff's recommendations to prioritize permit and latent effort and commercial allocations. Number 2; include landing flexibility as a priority issue, and to look at federal FMP changes that may need to be implemented. That is what my motion includes.

CHAIRMAN LUISI: Tony, you're not suggesting dropping safe harbor, the commercial side.

MR. DiLERNIA: I would drop safe harbor at this point. Because of the mesh size or the minimum size is included and is an action that we could take now without additional amendment action or action on a federal level, I would drop also the commercial data collection at this point. To get things going, rolling, and quite frankly those first two items, the permit,

latent effort, commercial allocations and with landings flexibility is going to take a lot of time, and a lot of debate. Just the issue that you brought up regarding how do we deal with the states such as yours, Mr. Chairman that has the individual ITQ system; if we went to some other type of landing flexibility requirements.

It is going to take a lot of effort. I believe those two items alone will be more than enough to keep our staff and our committee and our Council busy. I would drop the other two items; as per the staff's recommendations.

CHAIRMAN LUISI: Tony, would you consider just a motion to approve staff recommendations for the continued development of the Comprehensive Summer Flounder Amendment as language?

MR. DILERNIA: I would be very happy to, thank you, yes.

CHAIRMAN LUISI: Let me get a second from a Council member on that. Howard King seconds that. How about to the board? Emerson Hasbrouck.

MR. HASBROUCK: Yes, I would make that same motion, but I also have some recommendations that I would like to make today. Before we're done with this part of the agenda, I would like to be able to make those recommendations.

CHAIRMAN LUISI: Absolutely. Okay so we have a council motion, the motion has been made by Emerson Hasbrouck on behalf of the Board. Do I have a second; Eric Reid? While Max is working on that essentially what it says on the screen is guidance to the FMAT to continue to develop and present the next draft of this amendment at a future meeting, by removing some alternative sets and prioritizing others. Is there any discussion on the motion? Dewey Hemilright.

MR. DEWEY HEMILRIGHT: I must be a long way away, not able to see me. I had some comments about ten minutes ago I was going to give, before a motion or something. It had to do with the landing flexibility. In reading the document on Page 28, I'm under the impression, and we had discussion about this the June, 2014 in New Jersey Meeting; that there was already voluntary landing flexibility between two states. Is that clear that that is already voluntary in place?

MS. DARCY: Yes, currently there is the ability to transfer quota. I think that is by agreement of the two states. I think that we when we hear about landings flexibility, we as staff have heard a couple of different ideas about how it might work. I think there are some other suggestions out there about exactly how that would work. That may or may not involve a quota transfer, and that kind of thing. As staff it has been a little hard to come up with alternatives; when every time we kind of ask about landings flexibility we get a different answer from different people.

But yes, currently you can transfer quota between two states by mutual agreement.

MR. HEMILRIGHT: A follow up. For 4A, it would really be status quo. There is already a voluntary landing flexibility, so it wouldn't be any landing flexibility, because there already is in place. We had a discussion about that a few years ago. That would be your status quo. There is already between two states that agree to flexibly land quota. That is already in place. What the other one would do would adopt mandatory landing flexibility policies. Is that two differences, or am I seeing something wrong?

MS. DARCY: I don't know that it would be, well yes it would be landings flexibility as a coastwide policy instead of kind of determined on a state-by-state, case-by-case basis. It would be more of an open policy of being able to land

wherever. There are details that I think Kirby mentioned that we are not exactly clear on; in terms of filling out this alternative.

There have been suggestions that you could land in any state, but have to truck the fish back to the permit state. There have been suggestions about tracking by permit. I think that is something entirely different than landing in a certain state and then transferring quota. There are a lot of different questions about how this would work. But yes, for status quo we would describe in the document that there is currently the ability on a voluntary basis for individual states to make that agreement for a quota transfer.

CHAIRMAN LUISI: Mike Pentony.

MR. PENTONY: I just had a couple of thoughts or a concern to raise just for consideration by the Board and the Council. I realize that it is very early in the development of this amendment, and we're not ruling anything out at this point. But I do want to just raise a couple of concerns regarding the safe harbor and the implications regarding that for the landings flexibility.

For context, as Dewey asked the question about the status quo landings flexibility, which is that states can request a quota transfer. That is really for any reason consistent with the intent of the FMP. The states can request transfer from one state to another. In the time that I've been with the Agency, we've never denied such a request made by both the receiving and the donating state; that is sort of context.

That includes safe harbor, but for any other reason we've approved those requests. But on the issue of the landings flexibility, you know the concern is that we're constrained by the data that we have available to us, and the timing of those data. We work very hard to post landings, particularly for summer flounder; where there are state-by-state allocations.

Knowing your landings to the pound, or as near to the pound, is important for the state to know how to adjust measures throughout the season to achieve the states objectives for ensuring a longer season; and for us to make sure that we're closing the fisheries in concert with the states, so that we're a partnership closing the fisheries at the appropriate time, to get as close to without exceeding those state-by-state allocations.

Those landings data come in, we use only the dealer data that come in through SAFIS. For a landings week that ends on Saturday, the requirement under SAFIS, under regulations, is that the dealer's report those landings by midnight Tuesday. By Thursday afternoon we are posting those updated landings to the website; and sharing that information, so people understand where we are relative to the quotas. Anything that complicates that process by requiring us to go through and look, not just at the landings reports by dealers, but look at the vessels that sold to those dealers and trace back what states those vessels are permitted in; is going to significantly complicate our ability to do that quota monitoring, and significantly complicate and probably extend the time period before we can post accurate and complete landings data on the web for everyone to have.

I also suspect it would complicate our ability to manage these quotas and know exactly, and project the appropriate closure dates. Again, not ruling anything out, I think we should stay closely involved in any further discussions on landings flexibility. I understand the issues. I understand what we're trying to achieve by putting those options on the table. But I feel I would be remiss if we didn't raise these concerns early; so that you don't hear them only at the very end of the process.

MR. ROOTES-MURDY: Just so that we have it down on record, now that you've heard from Mike Pentony on this. We wanted to reiterate

that the motion, you said staff recommendation. Now it is important to note we don't have those codified in any of the documents we gave out to you all.

We were going off of the presentation we were showing. What you want the staff to prioritize in the amendment moving forward are the permit and latent effort, commercial allocation alternatives, and landings flexibility. We will be dropping out safe harbor, commercial data collection and discard alternatives; is that correct?

CHAIRMAN LUISI: That's the way I interpreted the recommendation, it was essentially taking this screen shot and using it as a basis for continued development. But I'll ask the maker from both the Council and the Board if that is how you interpreted the motion as you made it. Tony.

MR. DILERNIA: Yes, I agree with what Kirby just said, with the understanding that we can currently use our current FMP to address the minimum size and mesh size.

CHAIRMAN LUISI: Emerson.

MR. HASBROUCK: Yes, I agree with Tony, but also with the understanding that we can address or the Board can address safe harbor issues going forward independently ourselves.

CHAIRMAN LUISI: I believe that was part of the language; that the Commission could deal with that by itself, without being in this amendment. I'm going to take a few more comments; and then look to the audience very briefly, and then we'll call the question. Right now I have David Pierce, David Bush, and Rob O'Reilly.

DR. PIERCE: I had misunderstood Kirby, because I thought he said the staff recommendations as provided to us would mean that the safe harbor element would be out. But that has been clarified, it would be in

actually; because if you could put the staff recommendation on safe harbor up on the screen again.

I could swear it said that that would be dealt with by the Commission. Where is it? Yes, drop safe harbor from this action and address through the commission process. That is telling me that okay; we're going to go with the staff recommendation, which means that Kirby in particular, being our staff is going to have to work with the Board to deal with safe harbor provisions. We can use much of what's in this document already as a way to move that forward. I can say that in Massachusetts we're working on that now, at the request of law enforcement that is seeking some better clarification as to what safe harbor exactly is; but also looking for some consistency between states.

This language could serve as a nice template for that. With regard to the landings restriction, the landings flexibility, Mike did a good job; Michael Pentony did a good job describing the federal concerns. I'm going to continue to insist that his concerns can be dealt with rather effectively, as well as the safe harbor issue, by going with a scup-like approach for summer flounder. Because we're really talking about winter fisheries, plus fishing offshore, getting into bad weather, needing a safe harbor; not so much during the summertime.

It's really a winter thing, which is what my staff always has to address; breakdowns, bad weather and all of that. There are some aspects to landings flexibility that I just will never support, and there are some aspects of it that I will support; but again, go with the scupapproach and things will work out rather well, I suspect. The motion that is on the screen, I would support that motion with an understanding that once again the safe harbor provisions will be dealt with by the commission.

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CHAIRMAN LUISI: That's correct, David. The safe harbor provisions could be taken up as an addendum by itself, without having a joint agreement with the Council on that. David Bush.

MR. DAVID BUSH: I've heard some good arguments, specifically the comments by Kylie and Mike as well, given the concerns of landings flexibility; and also the comment earlier in the presentation, when they were talking about how closely they were tied to the safe harbor provisions. If it would be all right with you, Mr. Chairman, I would like to substitute a motion that would remove the Option 4B from the recommendations, or include it as one of the drop items; however that would best be worded.

CHAIRMAN LUISI: David, I was having a sidebar with Chris. Can you just repeat what it was your intent was there?

MR. BUSH: Basically to change the 'include" on the landings flexibility to "drop", given the comments that we've heard. It's going to overcomplicate a system that is already well worked out and fits specifically and tailored to each state already. I would move that we change that from "include" to "drop" in the landings flexibility portion. Obviously with Mr. DiLernia's comments earlier with mesh size, most certainly I would like to keep that intent with this motion.

CHAIRMAN LUISI: Okay so your motion to drop 4B, which that is the only other alternative in the document that is not status quo. Because there would be no other alternative, and I look to staff to give me some guidance on this. We would essentially be removing landings flexibility, and dropping it along with the safe harbor provisions and the other stuff that we said we would drop. I need to see it on the board. Is that a fair interpretation?

MR. BUSH: Yes, Mr. Chairman that would be it would be dealt with the commission process as necessary, if necessary in the future.

CHAIRMAN LUISI: Okay, so we have a motion by David Bush to essentially remove landings flexibility from the Comprehensive Amendment to be dealt with maybe at a commission level only. Do I have a second from the Commission on that? Rob O'Reilly, second spot for the Commission.

Now to the Council, do I have a like motion to remove landings flexibility from the Summer Flounder Comprehensive Amendment from the Council? Chris Batsavage makes that motion. Do I have a second on that motion? Peter Hughes. Okay, so we have a motion to substitute, to drop landings flexibility Alternative B from the staff recommendations.

Essentially what that would do is it would remove it from the continued development for landings flexibility in the Comprehensive Amendment. From what I heard you say, David, this would not necessarily eliminate it from discussion at the Commission level, but it would be removed from the Comprehensive Amendment.

MR. BUSH: Yes that is correct.

CHAIRMAN LUISI: Okay, discussion on the motion. Eric Reid.

MR. REID: If this motion were to pass, does that preclude states from working out a side deal? States could do whatever they want with their quota. If that flexibility remains in place for states to cooperate, then I would support the motion.

CHAIRMAN LUISI: Even if this remained in there and status quo was selected, the states still have the opportunity to transfer quotas in this case. Rob O'Reilly.

MR. O'REILLY: Thank goodness. I have been waiting on a few items. I'm going to address the substitute motion first, which is the idea that came up was the Council and ASMFC will determine whether this is a priority. That is not my intent when I heard the motion. That is not where I was thinking about. I was thinking it's time to determine whether or not this really is still as viable as it was two, two and a half years ago.

Before, I hadn't intended that staff has to go scurrying to collect all this information, provide all these analyses; because I don't know that there is the same level of support that I heard from two and two and a half years ago, when this first came up. Along those lines, I think what Dewy Hemilright is talking about, which has been I guess a little bit of an unknown.

Virginia, North Carolina since 2005 at least have had a system where you can have the Virginia and the North Carolina trip limit onboard a vessel that enters Virginia waters. Only the Virginia trip limit can be offloaded. Then the rest is down to North Carolina. That has been a system for about 12 years, and recently there have been some other states that at least have been informed of that system that that exists.

That is really the situation I think that Dewey was capturing; about the landings flexibility. One thing that would be important to Virginia, if there is anything done further on landings flexibility, is to outline all the methods that really are flexible; that do exist or can exist. One of them I thought is not to allow trucking of fish from one state to another. Because about six years ago that question came up, or maybe five years ago in the Mid-Atlantic Council, and I consulted with then Deputy Regional Administrator and the answer was no, you can't do that because once you come into the port, or actually come into that state waters, we'll choose Virginia. Then that is a landing. That is the possession limit. I really don't understand why that's even posed today. I can be wrong.

That can be part of the plan. It's a part that I don't know about, but it would certainly complicate things.

Talking about landings flexibility, if you are a state you know that you have difficulty with monitoring. I mean you're doing all your best to figure out how to monitor your quotas, let alone safe harbor and keeping that all straight. Then imagine what landings flexibility would be like to the whole system.

I have to agree with Mike Pentony that there certainly are pitfalls that we haven't yet faced, and probably don't want to face. All in all, I am going to support this motion on the basis that it's been pushed today, and I really don't think landings flexibility, those who held to what they originally thought they wanted, is the same as it was two, two and a half years ago. I hadn't intended to get pushed to this situation, but I'm here; so thank you.

CHAIRMAN LUISI: David Pierce and then Laurie Nolan after David.

DR. PIERCE: Rob O'Reilly just covered what I was going to get into, which is 4B-3, allowing a vessel to possess multiple state possession limits at any one time; and it goes on from there. I'm working on that now with my industry, and with other states to work it out on our own; with a lot of enforcement officer input, as to what needs to be done to make sure that it can be monitored properly and enforced correctly. Yes, I would say that these are not needed. Rob is correct, and I would therefore support dropping the landings flexibility.

MS. NOLAN: We've been talking about the landing flexibility issue for a while. My understanding was that maybe through this amendment process, the imagination would expand and we would come up with some new formulas that might work for vessels who currently are not being accommodated in any

way, shape or form; having multiple state permits.

I'll speak specifically to the New York vessels, who have perhaps a Virginia or a North Carolina permit; who have been begging for some kind of landings flexibility, because the fish are being caught south of Montauk, and they have to steam down to Virginia or North Carolina to unload. I know we've discussed all the different aspects.

Just because you bought that state permit, it never meant you were going to be able to land them at home. I know we talked about all that. But I feel like there are some alternatives and compromises, where without getting into nitty gritty here, this would be the summer project when we all get together; that maybe those vessels would be allowed to land half that state's permit or that trip limit.

There could be compromises perhaps, and alternatives developed that would create flexibility across the board. Because New York vessels feel very left out. While this is occurring, and if it is occurring currently and the states can do it, and they are doing it. I don't understand the tracking issues; and suddenly by doing this we're not going to be able to keep track of it in a timely way. Everyone here is saying it is currently being done. Clearly it can be tracked. It can't be interfering completely with the tracking of the overall quota, or it would have been nixed by now. I just wish we could keep it in; because it has been this ongoing issue for probably seven years this has been on the table as a big issue. Because one state feels that they are not being considered and incorporated into the idea of landings flexibility. Maybe some kind of compromise could come out of a summer meeting, and some idea could be developed; and then it would be happening across the board.

All the states could then perhaps take advantage of it. I don't know. I wish we could

leave it in for further development, and certainly to get the AP involved, to get everyone around the table to talk about this specifically; I think it came screaming out of public comment, landing flexibility.

CHAIRMAN LUISI: This substitute motion, I have a long list of individuals now to turn to. What I plan to do is to go through the list that I have from hands that have been raised, and then we're going to take up the question. There may not be time left after this issue is discussed to consider any additional actions to the amendment. We're going to stop, we have 15 minutes until three-thirty, and then we're going to take a break after we finalize this. Let me go through my list. I've got six people on the list; Adam you're first.

MR. ADAM NOWALSKY: First, I just wanted to clarify. This currently says it's a motion to substitute, which should it become the main motion says to me that all we're doing is dropping landings flexibility from the staff recommendations. But I think the intent is to accept the other staff recommendations to keep those in; which would make this more of amendment to accept the staff recommendations except to drop landings flexibility. I just wanted to be clear on that with the intent of the motion.

CHAIRMAN LUISI: Yes that was what I believe the intent to be. Before we get to that point we would essentially accept the staff recommendation; as you just mentioned, Adam. With the exception of the recommendation on landings flexibility; if that's okay with the makers and everybody nod and that will be how we do it.

MR. NOWALSKY: Great, thank you for clarifying that. The other item I wanted to add is we're in year three of this process at this point. The Council website addresses what the amendment started out as; a Comprehensive Amendment, goals and objectives, quota

allocation between recreational and commercial, commercial management measures, recreational management strategies.

We've pulled out recreational management. We've pulled out the quota allocation. We've got the goals and objectives on hold, and now we're down to two issues here. I can't believe we're going on three years, and we're down to two issues. That is all we think is really important as the addressed more quickly items.

I've got grave concerns. I mean I think it is important that we've got staff time involved looking at these issues. We're making the decisions as we go through them, to pull things out. But what started out as a real comprehensive look at the fishery, is turning into a very targeted, almost scalpel-like impact to the fishery management plan moving forward.

It just gives me pause when we keep pulling things out, because somebody doesn't like them or we can't get to it quickly enough. What are we actually going to accomplish when we're done here? It gives me great concern about this motion specifically. I've got to hear the rest of the comments before I know how to move forward; to keep pulling things out of something that was supposed to be comprehensive.

MR. HUGHES: The flexibility being developed jointly through the council process and through the commission, it really kind of scares me; because flexibility to me is that I can take my boat anywhere and unload. If every person seated in this room today were a boat, and those fish were being caught in southern Long Island, every boat would go pack out on Long Island somewhere.

You're going to severely impact and hurt communities up and down this coast, where those boats used to go unload; and you're going to severely hurt and impact the fish houses that are associated with those communities. I think that the states do have agreements; and have the ability to make those agreements with other states already.

That is why I would favor the motion to substitute or amend or whatever. It says substitute on the board. That is why I would favor that and move forward with all the other alternatives in the document. I just think too many boats would move. It would be a colossal shift of unloading effort into different areas; that I think is really an unintended consequence.

MR. REID: I just want to point out to both the Council and the Commission that New York is not unique in a situation that those vessels are in. Rhode Island is in the same situation. We have boats with multiple state permits that have to travel a long way. I don't want anyone to think we're picking on New York. Perhaps again, we are not.

I really would have supported this motion for all the comments that have been made prior to that; including the show of cooperation between the state of North Carolina and Virginia as an example, Mr. Hughes comments, and of course Dr. Pierce's willingness to work with other states in a cooperative effort. It does worry me that the effective value of a state permit, fluke permit, will be adversely affected if this isn't handled pretty properly. Some of those permits are pretty pricey, so I support this motion.

CHAIRMAN LUISI: David, do you have any additional thoughts that haven't been already made or that you want to offer right now?

MR. BUSH: Yes, just very briefly. First, any parliamentary corrections that need to be made to the motion to get it to pass as intended are fine. Just very briefly, the concept is status quo allows the most flexibility there is. Once you go ahead and make it a coastwide program, you

take away the ability for the states to say no. You're actually decreasing flexibility at that point.

CHAIRMAN LUISI: Okay I have two more speakers, Chris Batsavage and then Ton DiLernia; and then we're going to caucus.

MR. BATSAVAGE: Real quick, since most of my comments have already been made. Just to speak to Laurie's, I guess example of landings flexibility versus what's going on now from an administrative standpoint; what's going on now like we do with Virginia is actually very straightforward

You need enforcement no matter what, but they're there to just make sure that the boat doesn't possess more than two states trip limits; and to make sure that only the home state's trip limit comes off the boat. There aren't any transfers or anything like that involved, where if you have boats that are going to the closest state to land another state's fish; that is where the administrative burden really comes in at the state level. The more that happens the greater the burden, and kind of goes to Mike Pentony's comments earlier about just trying to track the quotas on a real time basis.

MR. DiLERNIA: Earlier today we spent some time on scup, and we moved the quota around to control when it would be landed, during what period. Months, we moved months around as to when quota could and could not be landed. We very much like, this council very much wants to stay in the business of controlling landings.

I've heard some people object to the concept of the landings flexibility, but you made the recommendation that I've heard the discussion of a meeting, a workshop during the summer where these issues could be discussed. If this motion were to pass, well that discussion goes away this summer; and that's a discussion that needs to take place.

The Council clearly wants to stay in the business of controlling landings. Because we want to examine alternatives to flexibility, it doesn't mean we'll accept them; but we have an obligation to examine them. I would not support this motion, and include it including landings flexibilities in the original motion as I made it.

I don't support eliminating it at this point, but let's go forward with it and let's see what happens when we discover we have time for more detailed discussions; because I can answer many of the questions that have risen around this table. You don't want me to do that today. You'll think I will be going on forever. I'll sound like I'm a love child between Rob O'Reilly and Jeff Kaelin. You look like you could go without that. Let's stop there.

CHAIRMAN LUISI: You'll be talking into a microphone that won't be amplified into the crowd. Let me look to the audience quickly. Is there anyone from the audience that would like to offer comment on the substitute motion? Okay I see one hand, yes sir, if you could keep your comments brief. There is a public microphone at the end of the table.

MR. MEADE AMORY: Hi, I'm Meade Amory with the Virginia Seafood Council. I thank the chairman and the Council and the Board members. A lot going on here so I want to just focus on one thing today; the landings flexibility, I think there is an issue with the definition of landings flexibility. It's never been defined.

There are quota transfers; there are states that allow possession of other states quotas in their states. A big problem is it hasn't been defined; other than several of the options that discuss just letting a boat land wherever he wants, another state's quota, any state he feels like

landing. These options seem like enforcement nightmares and data collection nightmares.

Right now with the states currently allowing transfers from one state to the other, or allowing the different boats to possess a different state's quota coming through that state. We've got flexibility in the fishery. It's already built in, and that is expanding. States are talking to each other now about doing more and more of that. That is the best flexibility you could have, it's working well. Anything else would be a nightmare; an enforcement nightmare and a data collection nightmare. I know Laurie mentioned that certain boats, say in New York where they bought permits in Virginia and Carolina. They knew when they bought those permits what the landing requirements would be. That is important to keep in mind. From the beginning in the scoping comments and all the way through this, the majority of the fishermen in the trawl industry have not supported any landings flexibility. What the states are doing now, there is no need for it, and the majority of the fishermen like to leave it the way it is; status quo, and no other sort of landings flexibility. Thank you very much for the opportunity.

CHAIRMAN LUISI: Okay let's take a one minute caucus, and we'll call the question. Okay if everybody can get back to their seats we're going to take action here. At the completion of this action we're going to take a short break. We're right on time which is great, but I know we have a lot of things to cover still today.

To clarify the actions, it was asked of me to just clarify what we're saying here. If you would support the amended motion, you are basically supporting the entire box within that staff recommendation; with the exception of their recommendation to include landings flexibility in future development of the amendment.

By supporting the amended motion that is what you're supporting. If you are in opposition of

the amended motion, you would like to see that entire box that staff recommended move forward, with landings flexibility as something that we will further develop; perhaps at a meeting this summer, kind of a workshop meeting, where we would dig into it even more deeply.

With all of that said, we're going to go ahead and call the question for the Board. The motion is move to amend to drop landings flexibility, Alternative 4B from the staff recommendations. All those on the Board in favor of the amended motion, please raise your hand. That is 8 in favor, all those opposed same sign; that is 2 opposed; any null votes, any abstentions, 0 null votes, 2 abstentions. Okay to the Council.

All those in favor please indicate by raising your hand. That is 9 in favor, all those opposed same sign. That is 9 opposed. Can those who opposed please raise your hand again. I thought I counted 9, but I'm getting a different – raise them high – it was 9; any abstentions, 2 abstentions. Okay motion fails for a lack of majority.

While the Board motion passed, the council motion fails the motion and we're back to the main motion on the table. The main motion now is move to accept the staff recommendations to provide direction to move forward with the Draft Amendment. We're going to go to the Board. All those in favor by the Board, please indicate by raising your hand, that is 8 in favor, all those opposed same sign that is 3 opposed; any null votes, seeing none; any abstentions, 1 abstention.

To the Council, all those in support of the staff recommendations please indicate by raising your hand, 16 in favor. All those opposed; that is 3 opposed, abstentions, okay seeing none the motion carries. Staff will move forward based on this action, and develop what they recommended regarding permits and latent

effort, commercial allocation and landings flexibility.

I hope that you stay tuned for a message from me at some point soon about the potential; I need to work with Chris and Bob. But we will likely convene some type of workshop to dig into this over the summer; and I hope it doesn't conflict with any of your vacations that you have planned. Unless Kirby and Kiley have anything else we need to do right now, I think I will conclude this item on the agenda. Let's take a five minute break, get up and get some coffee; then we'll reconvene in five minutes to take up black sea bass.

(Whereupon a recess was taken.)

CONSIDER 2017 BLACK SEA BASS MEASURES

CHAIRMAN LUISI: The next item on the agenda, if everyone could have their seats we're going to begin. The next item on the agenda is Item Number 6. I'll probably have to say it again, since there are a few people that aren't here right now. The next consideration will be for Board consideration and action only. There won't be any need for the Council to take an action after the presentation.

TECHNICAL COMMITTEE REPORT

CHAIRMAN LUISI: Jason McNamee is stepping in for the Technical Committee Chair, Greg Wojcik, and Jason is going to provide us a presentation regarding black sea bass recreational measures for 2017. Kirby is also going to provide the Board with a presentation, and then we'll have to consider how to move forward as a Board only again after those presentations; Jason, with that said, the microphone is yours.

MR. JASON McNAMEE: As Mike said my name is Jason McNamee. I work for the Rhode Island Department of Environmental Management, pinch hitting for my colleague in Connecticut, Greg Wojcik today. I've not had this

presentation for too long, so as I'm coming off the bench I hope you can be patient with me as we're going through this. Kirby can save me if I mess anything up.

A quick presentation outline, I'm going to give just a couple of slides on background; and then we're going to go through, we were given a set of tasks by the Board, thank you very much for that by the way. It is nice to get specific tasks that we can respond to at the Technical Committee. We're basically just going to tick through those tasks and provide our responses.

In addition, final harvest estimates came out in fact two days ago, and so we'll hit that right at the tail end of the presentation. Then I will stop for any questions that you have. Just to start off with a little bit of background. You all had a joint meeting back in February. At that time the recreational harvest limit for 2017 was raised, and there was much cheering and confetti and fireworks. But this is fisheries, and so the good times were short lived.

We found out at that time that the recreational harvest kept pace and then some with the increase in the harvest limit. But at the time it was status quo federal measures were the recommendation or was what was approved. In addition it was recommended to maintain 2016 harvest levels in the northern region states, so basically trying to keep everything at status quo; because the harvest limit and the harvest estimate weren't too far off from each other.

Then the preliminary 2016 data came out, and it was quite a bit higher than we had projected. That estimate came out at 5.62 million pounds, and that exceeded both the previous and the current 2017 recreational harvest limit. At that time the Board tasked the Technical Committee with evaluating the 2016 data.

As I mentioned, we really appreciated that it gave us really clear guidance as to the feedback you were looking for. We went through those

tasks, we've completed them. Then one final note here, the last bullet as I've already indicated, 2016 final estimates came out on Monday; and it is important for you to remember when we did all this work and we developed our memo, we were still working on the preliminary data, not the final data. Task 1 that you asked us to cover. Using the Technical Committee's recommended measure of uncertainty, what is the uncertainty buffer around the 2016 harvest estimate? How does this compare to the 2017 recreational harvest limit?

How does the Technical Committee recommend incorporating the uncertainty of the harvest estimate into determining the harvest reduction needed to not exceed the 2017 RHL? That was the task that you had given us. The first thing we did was we looked at the uncertainty, and what we had to work with were the PSEs; that is an uncertainty estimate produced by MRIP.

What we did was we made a couple of assumptions about what that PSE represented, and backed out the standard error from that; and from that standard error we then calculated a 95 percent confidence interval. That was the uncertainty that we applied to that recreational harvest limit. There was some discussion about this at the Technical Committee.

I'll offer that this is not necessarily a definitive approach at this point. I'll talk more about why that is, as we move through the presentation here. One of the things that we discussed on our last call was how do we, there was a lot of discussion about availability and the projected decline in spawning stock biomass for black sea bass, and so one of the things that we discussed was we could look at, we know that there was a big recruitment event in 2011.

That is the body of fish that we believe we've been fishing on, and one thing we could do, we have an age structured stock assessment. We could use that information. We have information on cohorts from that stock assessment, and we could look at that 2011 year class; and then kind of track it.

You see that number decay as it gets a year older and an age older, you can see that number go down; and from that we can make an estimate of how availability might decrease. That's one of the things we discussed. We also discussed possibly evaluating the 2016 harvest estimate differently than in previous years.

The one that we have up on this slide is averaging multiple years' harvest to dampen down the inter-annual variability that we all see in the MRIP data. One additional piece of information here, the New York TC member was briefed by the MRIP staff on ways to evaluate the 2016 Wave 6 harvest estimate.

I'll drill into that in a subsequent slide, but know that there was the estimate coming out of New York was extremely high, and so that Technical Committee member went and talked to the folks at MRIP; and just so you know that that happened, and I'm going to talk a little bit more about that in a slide or two down the road here.

Then the final bullet here, we had made recommendations to you about management. That previous recommendation on status quo we thought needed measures to reevaluated. That was based on old news. We wanted the opportunity. We weren't tasked with doing that for our last call, and when we were tasked with doing that we have a completely different sense of the black sea bass universe at that point. Long story short, questions remain on the changes in harvest from Wave 5 to Wave 6 for 2016, and we hope to investigate those further. This is just a graphical representation of this idea of the MRIP estimate and the uncertainty around that estimate. Just to orient you to this plot along the Y axis, the vertical axis there; that is millions of pounds. Along the X axis that is year. The

blue line is the harvest estimate coming out of MRIP.

You can kind of see it up there, the dashed gray lines; that is the upper and lower bound of the 95 percent confidence interval. Then the, I'll call it orangey line there is the recreational harvest limit. You can see there is a gap there, certainly a gap between the harvest estimate and the harvest limit; and even when you account for the lower bound there is still a bit of a gap there.

Okay, on to Task 2. The task that you gave to us was, by state identify 2016 wave and mode harvest estimates that are significantly higher than prior years. Describe the MRIP intercept data used to generate the 2016 and prior year harvest estimates, and compare their associated percent standard errors.

Were there any changes that could help explain a harvest increase in 2016, such as changes to regulations or MRIP sampling methods? Is there reason to believe these harvest estimates will change from MRIP preliminary to final status, such as due to low sample size or incorporation of VTR effort data?

Here is our response. The preliminary 2016 harvest from New York was about 62 percent higher than in 2015. It is a whopping 138 percent higher than in the average from 2013 to 2015. Connecticut also increased in harvest from 2015 by about a half a million pounds. Rhode Island has been jumping up since 2003 by about 100K per year.

On the VTR data, what we learned last year was this data is not incorporated until the end of the year. When we're talking about recreational VTR data, we're talking about information coming out of the for-hire fleet; and there is this use of that information to adjust the effort metrics. It happens at the end of the year; and subsequent to the most recent years, it hadn't

had much impact going from the preliminary to the final estimates.

But starting in 2015, there was a big impact from that information; and it comes in really late in the year. In fact, early in the following year is when it finally gets to the Technical Committee. On sampling, across the coast there hasn't been a substantial change in sampling; and so what we mean by that is the methodology is still MRIP.

It is still conducted in the same way. But there were a couple of things that we got wrapped around the axle on. One of them was we understand the weighting as it comes in and gets used in the estimates, but what's unclear to us is how that weighting gets developed and it interacts with things like site pressures. There are a lot of, or I'll say a lack of clarity on what exactly, how that weight comes into the dataset.

Just a general feeling from the group was that there are a lot of unanswered questions with the MRIP dataset that we were hoping to get a little more information on. A little bit more about our response to, I think we're on Task 2. The possession limit in New York for Wave 6 appeared to have an effect on harvest in 2016. The New York Wave 5 and 6 harvest increased from 2015, but Wave 4 decreased from 2015. There was a difference between information late in the year, and a little bit earlier in the year. To our understanding, the only thing that changed there was the possession limit. I've been alluding to this as we've been going along. There are a lot of questions that remained for the Technical Committee on the MRIP data. I've already talked a little bit about the intercept weighting. We would like to talk to MRIP a little bit more about that; how that gets calculated, not necessarily how it gets used.

Changes in the APAIS program, one of the things that we discussed, I'll use the New York example. As the states took over the APAIS

program, what we found is the states are doing a lot of outreach. We're going out talking to groups, we're certainly doing that. In Rode Island we're trying to get people more familiar with the program.

The other thing that has changed is now it is their guys. It is the state guys conducting this. They know these dudes. They are not strangers, they're not contractors. Our sense is that that could have introduced a bias that is not accounted for in any way; and would be, quite frankly, difficult to account for.

The point is, we might be getting now that it's the states that are running the program, we might be getting more positive interviews; as opposed to what was occurring in the past, in important locations like Montauk for instance. The PSE calculation, it is not that we don't understand the percent standard error itself. What we don't understand is how the standard error gets calculated and then brought into the PSE.

That is something we would like a little more definition on. The MRIP methodology, they've rolled out changes year-to-year, and this is something that concerns us; because it feels at least in the past couple of years, as these pretty significant changes in the program have occurred. It feels like there is a lot more chaos in the estimates that are coming out year-to-year.

Then finally, the 2016 harvest in Wave 6 was unusually high, not just for black sea bass, but it seemed to be a shift across a number of species. We've noted three here; cod, tautaug, and scup. But there seem to be like a phase shift across a number of different species; and it wasn't just unique to black sea bass.

That would indicate a potential something going on, in not just the site interviews, but also the effort calculations. Task 3; would closing Wave 6, all or part in the northern region, or just Mass

or New York, or just New York, reduce 2017 projected harvest, so that the 2017 recreational harvest limit is within the harvest estimates uncertainty buffer?

What bag limit for Wave 6 in the northern region, again or just Mass and New York or just New York, would reduce 2017 projected harvest so that the 2017 recreational harvest limit is within the harvest estimates uncertainty buffer? Our response reevaluated a couple of combinations of closing Wave 6.

What we found is that any combination that closes Wave 6 in particular, had to include New York, brings the projected harvest within 1 standard error of the 2017 recreational harvest limit. We've got now in the next bullet a bunch of reductions that are associated with closing; different combinations of states.

This, Kirby was frantically doing the math here over the past day or so, so these actually represent current understanding. These are based on final estimates. If you close Wave 6 in Massachusetts through New Jersey, you would reduce 16.2 percent. If you closed Wave 6 in Massachusetts through New York it would be a 12.9 percent reduction; and if you just did New York, it would be a 12 percent reduction. One other idea that came up from one of the Technical Committee members was looking at this estimate not using the final or preliminary estimate; but calculating something different. The one that we had available to us on our call was this use of a ratio of Wave 5 to Wave 6 harvest from previous years.

We did look at that. We didn't have time to review it ahead of time; we were just presented with it during the call, which we appreciated. But the point is that the Technical Committee hasn't fully explored this due to the timing that we had. If you were curious about what was done there, it is included in the memo from New York that I'm assuming was in your meeting materials.

Task 4, I think we're getting close to the end here. Consider that the New York Wave 6 numbers at first appear unrealistic. Over the prior six years, 2010 through 2015, New York's recreational harvest in Wave 6 averaged about 26,000 pounds; yet 2016 Wave 6 has New York at over 887,000 pounds.

Was New York actually responsible for about 88 percent of the 2016 recreational harvest? There was both a question mark and an exclamation point; so you know that was an important statement. You can use the right voice in your head when you're reading that. Did New York's Wave 6 effort significantly increase in 2016; as compared to previous years?

The response as I had noted earlier, there was some correspondence between specifically New York's Technical Committee representative and MRIP. That correspondence, and then there was a bit of a delay in the response coming back to him. That prevented a more in-depth analysis. I mean it was already late in the year, and then that delay just made it a little worse.

The New York staff Technical Committee member, he was briefed by MRIP about the mid mark in April. The report became available to the public on Monday. You can take a look at that. I just looked at it yesterday. The Technical Committee has not reviewed it yet. A couple of things that is kind of important to point out. It noted that lower fishing effort can influence variability. What we mean by that is species that have lower effort or the effort kind of comes in chunks, and it's very specific; something like tautaug or black sea bass. Variability can be high in species like that; just based on the nature of the fishery.

Then the staff also suggested something that got my ears to perk up a little bit. They suggested smoothing the information out using an approach; very specific they said using a Bayesian statistical approach. We're interested

in exploring the approach that the New York Technical Committee representative brought forward; and also this wonkier approach of using Bayesian statistics.

We plan on doing that. We'll do it for the whole northern region, and we'll look at what it does to just New York; and you know give you that context if you wish. That was it for the tasks, and I'll just drop a couple of notes here on the final harvest estimates. Just some highlights for you. The MRIP released a final data on Monday. The final coastwide harvest is 5.18 million pounds; and so that is a little less than what we had for the preliminary estimate. The new reduction associated with that new harvest estimate is 17.3 percent coastwide; the coastwide harvest decreased by about 7.8 percent from that preliminary to the final estimate, so it's a fairly significant drop. The New York party and charter mode harvest decreased significantly in both Waves 5 and 6, from the preliminary estimate to the final estimate. This is within the year the preliminary to final estimates; that's what we're talking about there.

I'll throw this table up, I'll yammer for a minute here so you can take a look at it; but I won't walk all the way through it. But you can see that you've got all the states, and you can see the wave specific harvest estimates there. If you remember what your preliminary estimate was you can see the change in your state from this table.

Megan will flip back to it if you want. Massachusetts through Delaware and North Carolina decreased over all, their 2016 harvest from their preliminary to their final harvest estimate. The New York decrease was pretty big. That one decreased by about 265,000 pounds; split between Wave 5 and 6. You can see that split out there.

New York harvest actually increased from preliminary to final in Wave 4, and then the

states of Maryland through Virginia also increased harvest from preliminary to final; but only by a pretty small amount. The Technical Committee, it just came out Monday, so we've not had a chance to look at that. We still, all of our questions from before remain, and now we've got probably even more. That's it for the Technical Committee report; happy to take any questions.

CHAIRMAN LUISI: Let me ask Kirby, Kirby do you think it would be best to complete the presentations, or should we just do Technical? Do you have anything that is going to reinforce what Jason has presented? Just let me know which way is best.

MANAGEMENT MEASURES FOR 2017

MR. ROOTES-MURDY: I'll go through mine real quick and then we can take questions for either/or that would be fine. Now we're going to move on to the actual management measures for 2017 black sea bass recreational management measures. The background Jason went through, I think very succinctly, thank you for that.

Back in February the Board and Council voted on federal measures, maintaining status quo from 2016. But it was a little bit more vague when it came to the 2017 measures. It was trying to maintain harvest at 2016 levels, and again the assumption at that point we were working under was preliminary data through Wave 5 that then changed, and then changed again. What I have on the screen now is I have 2016 state measures.

It is important to look at those for Massachusetts through New Jersey; because under the addendum we've been working under for ad hoc regional management, those were in place in 2016. What happened following the February meeting is we were trying to over that two month period, do the analysis, try to make sense of this data; and hopefully get final data in time to provide the

Board with enough information before this meeting to set measures.

That obviously didn't take place. A number of states went forward and implemented their state measures from 2016 for 2017, with a couple of states slightly changing the dates; but maintaining the same number of days. The next slide I have up here is what the state measures I have as of today. Well actually before this meeting, checking the state websites and checking with staff on what had been implemented. You'll see that there are asterisk for New York's measures. These are what their measures were last year. I will note that we did receive an e-mail over the course of this afternoon's meeting that they have since implemented for 2017 black sea bass measures that were status quo essentially from 2016, and they can elaborate on that if needed.

New Jersey has not yet implemented black sea bass management measures either, oh excuse me, at this point those are pending commissioner approval; and then for Delaware through North Carolina the status quo measures from 2016, which were the federal measures. Before the Board today for your consideration, final 2016 data, you all received the memo from staff; I believe it was yesterday, laying out what those final numbers are.

Then the action item is either to set or adjust 2017 black sea bass recreational management measures for those northern states of Massachusetts through New Jersey. Again, we are working under the Addendum XXVII provisions of ad hoc regional management that will expire on December 31st. With that I'll take any questions, or if you have questions for Jay on his presentation, we can handle those now.

CHAIRMAN LUISI: Before I get to questions, let me just make sure we're all on the same page, as far as what action we can or don't have to take here as a Board. We've already established and recommended federal measures be status quo. That has already happened. The states have taken it upon themselves. Between the February meeting and today, all the states with the exception of New Jersey have implemented status quo measures or very close to status quo measures from 2016.

With the new final estimates that are higher than what they were when those decisions were made in February, the Board now needs to determine whether or not to take additional action; as a result of that extra harvest that was added during the final release of data. The Board can either take additional action to account for that difference or do nothing. If the Board does nothing, everybody has in place what they have in place and we just move on without any other reactions by NOAA or the states.

MR. ROOTES-MURDY: Point of clarification there. In previous years we have operated under an if/then approach in setting measures, and this year in light of the assessment that we were waiting on in December, there was the move to push that decision to February. At the February meeting the Board and Council set those federal measures, and we had again the broad motion to try to maintain harvest in 2017 at 2016 levels.

Again that was under the assumption that we were going to be very close to the 2017 RHL, the updated one. Now that we have final data that indicates that we are still, it would take an approximate 17 percent reduction from 2016 levels to get at that. I can't speak to what National Marine Fisheries Service would do.

In past years there has been the potential to have different measures that would be put in place for federal waters, if the reduction is not addressed by the state measures that are implemented through the Commission. That is just another thing to consider today in taking action.

CHAIRMAN LUISI: Okay and secondly to that. Even though we have the final estimates that came into us on Monday, there still seemed to be a lot of questions, Jason, regarding just how we might understand those data. That was clear in your presentation. With all that said, let's turn to the Board for questions regarding the presentations. Dr. Pierce.

DR. PIERCE: I've got two questions, and the first one is in your presentation you indicated that there were about five very major, very important questions unanswered regarding MRIP and how the calculations were done. This is very troubling, obviously. Why can we not get that information?

It is very critical for you and the rest of the Technical Committee, in order to perform the work you must do on our behalf. Why can we not get that information? What is the rationale for that; because it leaves us with so much uncertainty as to the validity of the numbers, if you could address that Jason?

CHAIRMAN LUISI: What are you doing the next couple of hours, Tina? Jason do you have a comment to that? I realize that timing is of the essence here as well, regarding how much you had time to prepare for those answers. But maybe you could address Dr. Pierce's concern.

MR. McNAMEE: Mr. Chair, I'll take a shot at it. I guess this is the way that I'll approach the question. It is not that we're being refused information or anything like that. I guess when we went in, for instance to look at the PSE. There is a little bit of information on the PSE itself. But then to get more detail on well, what's under the hood there.

That is the stuff that there is no manual that kind of steps through the calculations that they go through. I guess at the Technical Committee, what we've requested, and whether that request has been passed along I'm not sure. But we requested to actually have a

workshop with MRIP where they walk us through from that interview to that final estimate; not just the stuff that we've all seen before, but equations. We want the math.

That is the one thing. Again, it is not that they're being obstinate or something like that. I don't think we've ever asked for that directly before, but now we have. I'm optimistic that we'll get the opportunity to sit down with them step through it. But I will note that it's not something that is readily available that you can pull off the web or something like that. We did kind of look around for that type of information.

DR. PIERCE: Okay so I'm encouraged, but at the same time discouraged that here we are, and we're still not making enough progress regarding getting under the hood. It's just amazing. My second question relates to the figure that you showed; black sea bass landings relative to or compared to the RHL over all the years.

You notice the 95 percent confidence bounds around the harvest limits through time. We see that in recent years 2015, '16, '17 notably, were below the number; meaning we've been above with our harvest, above the recreational harvest limit. One looks at that figure and we get concerned, obviously.

We're not doing enough it would seem. Now, my question is in our memo that I provided to the Board back in February, I highlighted a Mid-Monitoring Atlantic Council Committee conclusion. That conclusion was based upon the new assessment, this is from the monitoring committee, with the new benchmark stock assessment information analysis indicates that recreational harvest limits during the last few years would have been significantly higher, approximately double those implemented. That is a very important conclusion that was reached by the Monitoring Committee. I take that conclusion. I look at the figure you provided, and I see that we would have been in 2017, according to the Monitoring Committee, where we could have been is a harvest limit of about 5.64 million pounds.

Lo and behold that's where we were. My question is, have you and the Technical Committee in any way reacted to this information, this conclusion of the Monitoring Committee? Because I'm left with a very unsettling feeling that we're okay, yet we're not okay and more action is demanded of us.

Whereas if the red line, if the number was properly drawn according to the last assessment, and the Monitoring Committee conclusion. That red point at the end would be right on that blue point and we'd be all right. What can you say regarding that Monitoring Committee conclusion, relative to what we're now obliged to do?

MR. McNAMEE: I remember your comments to that affect. I guess the way that I interpreted them was thinking with our new understanding of the stock that orange or red line, it would have a different shape in the most recent years; but I guess, and I agree with that that it wouldn't have that big from that lower number jumping up, you know to that higher level in 2017.

But I guess what I don't think is right is that the terminal year number that is coming right out of the assessment. That recreational harvest limit is backing straight out of the process, using the stock assessment information. As far as that terminal year goes that information is right. As far as history, you're correct. There would be a much different look to that plot. But the final year would look the same.

CHAIRMAN LUISI: Bob Ballou.

MR. BALLOU: On this very slide Jason, if I'm not mistaken that final point source for the blue line was the preliminary harvest estimate 5.62. It looks to me like that lines up pretty well. The

new estimate now, 5.18 would shift everything down; including that lower confidence interval. I'm just guessing now, but if I had to guess we would be within the lower confidence interval; if that were the approach used to assess harvest. Am I correct in that?

(Operator inattention: the CF card filled and needed to be changed.)

MR. GILMORE: I guess in terms of how we relate to what we're going to harvest in 2017, the one thing that wasn't said by Jason or Kirby was that fact that we all know. We're 200 plus percent over the target right now for the stock. We don't have a lot of risk going on right now. If we kind of like try to figure out what's going on with the MRIP numbers and maintain status quo.

When you're ready, Mr. Chairman, I do have a motion. It's a motion to get at maybe looking at these numbers, along with what Jason was talking about; maybe start averaging or smoothing, and have the TC to task them to do something to maybe look at what's going on with those numbers, because MRIP again is a work in progress. It's still all over the place, and it is hopefully going to get better. But maybe this effort will help speed that along; so when you're ready.

CHAIRMAN LUISI: Okay seeing no other questions at this time, Jim, if you want to make that motion. What I would ask is whether or not the motion that you intend to make would provide guidance based on the Technical Committee work for this current year, still. It's May 10th today. We're still talking about 2017 recreational measures for black sea bass.

We can address your motion after it's made. But I think we need to be clear as a Board how we're going to proceed with 2017. Are we going to do nothing more than what has already been done, or are we going to take additional action based on the new MRIP estimates? With

all of that said, Jim, please your motion when you have time.

MR. GILMORE: My intention is actually this would be for 2018, primarily because my good friend from the Commonwealth in Massachusetts is very concerned about if this number is real then 2018 there could be some real interesting management changes. Actually, Kirby has got a copy of the motion. Kirby, if you could put that up. Yes that is it. I will read it.

Task the TC to review the recreational black sea bass MRIP harvest estimates over time, five years/ten years to identify highly variable state, wave, mode or other combinations that contribute to harvest volatility. Generate a methodology to smooth problematic harvest estimates along with criteria that determine when smoothing is appropriate to avoid an ad hoc approach. The TC should consider some or all the following; high and low estimates, PSEs, preliminary versus final estimates, and regulatory changes. If I can get a second I'll talk a little more about it.

CHAIRMAN LUISI: Absolutely, is there a second to Jim's motion, which he just read? Seconded by John Clark, okay, Jim.

MR. GILMORE: Simply again, you can look in the details in the memo that we included in the briefing materials. We're really trying to get at the root of this. I think Jay brought it up. I mean it's not only black sea bass. There are several of these estimates are just very volatile. If it was just this one number in black sea bass, maybe you can start believing it. But there seems to be an inherent problem; maybe in MRIP. We're going to have to come up with a different tool as we move forward.

If we start getting these extremely volatile and high numbers, or low numbers for that matter; that we have a way to deal with them so that we're not, I think the term we used before whipsawing the fishing community with these massive changes, because of the volatility of MRIP. That is really the intent of it. Again, if this would be to work through this year, so when we get to 2018 we have another tool in the tool box to maybe address this if we still have some crazy numbers.

CHAIRMAN LUISI: Thanks for that justification. Jason, may I just ask is there clear direction here, as far as the guidance that you're reading about from the motion that would task the TC accordingly?

MR. McNAMEE: Yes, I think so. In particular I think it gives us the ability to look at some of that advice we got from MRIP directly, for instance that Bayesian approach; and looking at things like that. This gives us latitude to check out a couple of things. I guess maybe one question I would have. You have this five years/ten years with question marks. My question is, are those two versions of the world you would like to see, or would you rather have the Technical Committee find some value in there that kind of makes some logical sense?

MR. GILMORE: I am just going to let the TC have some latitude, in terms of picking those, because you guys are better with the data than I am; so that was the intent.

CHAIRMAN LUISI: Let's take discussion on the motion. I've got Mark Alexander, and then I'll go around the table.

MR. ALEXANDER: I just have a question for the maker of the motion. It was brought up earlier that with the states taking over the conduct of APAIS that there may have been some bias introduced during the last year or two. Did you specifically leave that out of your motion on purpose, or is that something you thought might be considered as well?

MR. GILMORE: Well that I figured as being through the MRIP process. That is some of the things that they are already doing; and I think

each one of the states is doing. I think that is being addressed as a separate. I mean if you want to include that. I was trying to keep the workload down for these guys.

There was issues about that we're all rolling this out. This was the first year for the pressure correct. There were different things that we're looking into. But I understand that the MRIP folks and well the APAIS folks are going to be evaluating that consistently as we move forward.

MR. NOWALSKY: With regards to this motion. I think given the theme of the terms of reference, we could probably benefit from a couple exclamation points in here, to go along with the question marks. That being said, when we looked at that slide with the harvest limit compared to the landings; and we heard the comment about at the very end of it that the harvest limit is now based on an updated stock assessment.

The landings are what they are. They would probably still be somewhat relative to what they are. From my perspective, if the RHL was where it should have been over the last number of years, we would be talking about a reduction; not from 15 inch size limits up and down the coast, but from 12.5 or 13 inches, with reasonable seasons, which I think is a discussion a lot more of us could stomach at that point.

I'm not going to dispute that the current RHL to landings ratio is right or wrong. I've certainly voiced my concerns about it over the years. But I don't think there is any dispute that where we're making these changes from today is the bigger problem, and it argues in favor for more of a reset.

The one area of concern I have with doing this review now is the MRIP re-estimation that is going to take place. I would love to hear some thought from the maker of the motion, perhaps from staff, about is now the time to do this

versus waiting another year? Are we likely to get a different answer by looking at the re-estimation that is going to occur, or is this still a valid analysis to do now; and could be applied to the re-estimation when it's done?

CHAIRMAN LUISI: Jason or Jim.

MR. GILMORE: I'll go first. Again, this was something Adam, to have. Right now if we don't do anything and we get to the end of 2017, we're just going to be looking at possibly another lacking number that we have no way to maybe analyze, or maybe to deal with on a multi-year basis. This was just giving us another tool. I think this moving forward in parallel to what the other effort is going to be, I think is worthwhile; but I'll let Jason weigh in.

MR. McNAMEE: I think it's a good thought, but the method, it could have broader application; and so I think the development of it in this context I think is still okay. It might be that maybe things calm down. For instance, if we're using like a Bayesian statistical approach, and that wild variability from year-to-year kind of goes away, it is going to produce the same estimate as MRIP.

Like things will kind of normalize. I still think it's a valid thing to look at. I think beginning to develop some tools for this kind of stuff, regardless of the uncertainty we have with the recalibration and all of that. I think it's still valid and a worthwhile endeavor; not a waste of time.

MR. ROOTES-MURDY: I think an important thing to piggyback off of this discussion, as Jay lay out; this is a helpful exercise for the TC to undertake to help us add more tools to our toolbox. But for the Board's consideration today, again we're talking about 2017 measures. I think it's important for the Board to keep in mind that whatever the Board chooses to do, whether it is status quo or do something different.

The RHL is set to be reduced in 2018. Keep in mind that if things remain, say status quo, and we have a harvest estimate in 2017 that is higher than the 2017 RHL, and higher than the 2018 RHL, there will be a need to address that through management action next year. I just want to make sure that that is clear to all the Board members; that if there is no action taken today with regards to measures in 2017, we are still facing a reduction in the RHL per the specifications we got out of the latest stock assessment.

CHAIRMAN LUISI: You stole my thunder, Kirby. I was getting to this as a tasking of the TC, which has been agreed upon by the representative, by Jason; that this is probably something that would be good to do. I would like to limit the discussion at this point; unless somebody wants to speak in opposition of this task. Do any Board members want to speak who are opposed to tasking the TC with this motion? Okay seeing no one who is opposed to this. Rob.

MR. O'REILLY: Not opposed, but I hope there is a time when the TC starts the exploration, and looks at all the variability they face. I think Mark Alexander's comment I agree with, about the change in who's doing the survey is important. There have been regulation changes throughout the six years or so; into the seventh year, for black sea bass recreationally above Delaware. Those are going to be things that I hope at some point the TC is able to say, yes we can go forward or no we can't. I think that's important to establish that.

CHAIRMAN LUISI: Seeing no one in opposition, I'm going to just read the motion into the record, and we'll call the question on this and then move onto the task that we need to deal with; which is the 2017 recreational measures. The motion is to task the TC to review the recreational black sea bass MRIP harvest estimates over time, five years/ten years to identify highly variable state, wave, mode

(other) combinations that contribute to harvest volatility. Generate a methodology to smooth problematic harvest estimates along with criteria that determine when smoothing is appropriate to avoid an ad hoc approach. The TC should consider some or all the following; high and low estimates, PSEs, preliminary versus final estimates, and regulatory changes. Is there any opposition by the Board for the motion? Okay seeing no opposition the motion carries unanimously by consent. Thank you for that Jim, David Pierce.

DR. PIERCE: I would like to address 2017. Obviously many of us are concerned about what is going to happen in 2017. With the anticipation, the 2017 will very likely look like 2016; and they will have an extremely large catch of black sea bass. Something needs to be done in 2017, and I'm very sympathetic to all those states that would have to do something more.

But I say it is very likely, especially in looking at the limits that would be in place for Wave 6 in 2017, it is very likely that we're going to have through MRIP, through all the work that's done through extrapolations and all the procedures that they use to expand data. It is very likely that we're going to see, in New York notably, very, very high take of black sea bass; not just in New York, but New York of course stands right out.

New York always stands out in my mind, but anyways this way, not in a good way. For example, New York is going to have a 10 fish limit from November 1 through the end of December. At a 10 fish limit, we end up with a high probability that indeed we are going to have a problem, I think harvest estimates; because all it takes is a few intercepts at 10 fish, and bang the whole catch goes up to a skyrocketed amount.

It's the way they work, it's the way the calculations are done; and live with all of these

extrapolations, and will continue to haunt many of us, because we don't necessarily believe those results. But we're still obliged to live by those results. Maybe this work by the TC will lead us in a different direction regarding the numbers, and what they eventually end up being calculated to be.

I'm convinced, and again Kirby made this point, I'm convinced that 2017 is going to be a real train wreck for us; and that the states collectively in the northern regions specifically, which includes New York of course, are going to have to take another dramatic cut in black sea bass harvest by the recreational fishery.

I've already taken in Massachusetts a number of cuts, frankly more than necessary, and other states have done the same thing. We could have had a much higher recreational harvest limit, but we didn't have them. There is going to be an overage, a major overage in 2017; I suspect. That has tremendous implications for 2018.

Now I look at the task, Task 3 that was covered, notably it means we're closing Wave 6, a lot of or part of in the northern region, reduced the 2017 projected harvest so that the 2017 RHL is within the harvest estimates uncertainty buffer. An answer was provided by Jason, and indeed I believe the answer is yes.

I am obliged; I think we're all obliged to take a very serious look at Wave 6 and to take some action, even though it's May. But the consequences are going to be that 2018 will be a very shortened season for black sea bass, I suspect; and one that most of us if not all of us will have serious objections to. I would move that all Wave 6 fishing from Massachusetts through New Jersey be closed.

CHAIRMAN LUISI: Thank you for that motion, let's get it on the board and I'll ask for a second. Does that motion reflect?

DR. PIERCE: Yes, it reflects it. I'll acknowledge right away that I have no Wave 6 fish in Massachusetts. I only put it up there, because it was highlighted by the Technical Committee. Our black sea bass season ends in August. We had our harvest and there will be no more. But the other states that do have a very active Wave 6 fishery, and the potential for very high landings, they are going to have very liberal limits during that time period. That would be my motion.

CHAIRMAN LUISI: I just wanted to clarify, because you only mentioned New York and New Jersey; but Rhode Island and Connecticut were also part of this as well.

DR. PIERCE: I thought I said Massachusetts through New Jersey. I thought I did.

CHAIRMAN LUISI: Okay, I'm sorry.

DR. PIERCE: I'm acknowledging Massachusetts is closed already. It is the other states that will be opened, and they will have very significant harvest in 2017 if 2016 is any example; and if 2011 year class is still out there.

CHAIRMAN LUISI: Okay thank you. We have a motion made by Dr. Pierce. Is there a second to this motion by a member of the Board, not from Massachusetts? Is there a second to the motion? Okay seeing no second to the motion, motion fails or it's no longer a motion. Motion dies.

Back to the discussion that we need to have, we do need to understand as a Board what consequences there are to taking action or taking no action at this point; and maintaining the 2016 regulations within the states. We're at a point in time where all of us mostly have our regulations in place that are status quo. The motion already failed, but if somebody else wants to, or David you want to remake the motion, we'll go back and consider it.

DR. PIERCE: With your forbearance I'll make the same motion again and wait for a second.

CHAIRMAN LUISI: Seconded by John Bullard. Discussion on the motion, Tom Fote.

MR. THOMAS P. FOTE: Well, if I wanted to be kidding around here I would basically suggest that we change it to August; since we only have a two fish bag limit in August, and it won't affect us; like Massachusetts is making this when it affects from New Jersey to New York and a few of the states that are open.

We've run into this problem before, and I'm sitting here thinking about, I was happy Jim didn't make the motion I did in 2001 or 2003; I can't remember the year anymore, because I'm getting older. When we found out New Jersey, we caught two-thirds of the recreational weakfish catch in New Jersey. The first motion I jumped up and made he says, well that's a new base year; we'll take two-thirds of the catch. Well everybody knows those numbers are ridiculous. Now we're sitting here in 2017, looking at 2016 and we still have numbers that nobody trusts and nobody respects. I mean the black sea bass numbers in 2001 for New York, in a two month period they caught more black sea bass; excuse me, tautaug than they had done in three previous years. Well, we shouldn't be suffering the consequences as fishermen when we have a stock that is at 230 percent of what it's supposed to be at.

They were basically talking about making major reductions on a fishery that we basically have been cutting back all these years on. But we've been underestimating the stocks; because of what the SSC, because they don't have the confidence level in what the sea bass stocks, the information coming out of NMFS.

We shouldn't pay for the consequences of not having good information by NMFS. We should get Congress to appropriate the money to basically have where we can get the good information, so we don't run into this problem. But until we do, I'm not making fishermen suffer; because they have no say in this. They can't get the money to do it themselves, and we're basically punishing them every year for the lack of confidence of information, and numbers that are completely outrageous every year, so I don't know what to do at this time.

CHAIRMAN LUISI: David Borden.

MR. DAVID V. D. BORDEN: I'm opposed to the motion the way it stands. But I would like to go on record as actually supporting the sentiment of the motion. I'm not trying to split hairs here. The motion as far as I'm concerned is a blunt instrument. We have a really significant problem in one state, and you're going to penalize with this motion essentially all the states; because of that.

I think we need a more tailor-made motion that addresses the problem where the problem exists. I plan to vote against it. I would also point out, and I appreciate Kirby's comments about 2018, because this is a looming problem for the Commission in 2018. Not only that every single constituent seat that's represented by the people around this table are part of kind of a whole. The whole that we're not talking about, at least in this context, is the commercial fishery; the split.

In the plan, both in the federal plan and the interstate plan is 48/52. To the extent we have recreational overages; that essentially is taking allocation from somebody else. If the reverse were true, I would be saying exactly the same thing. If the commercial people were over, I would want to take action on that and bring that back into sync with the plan. I think we have to do something, but not this.

MR. GILMORE: I'll start by saying I disagree we have a problem in one state. I think we have a problem with our estimates would really be the issue. We did ask MRIP, is this accurately

predicting effort landing. I can't get a clear answer on that. Right now it's still like that is to the work in progress of this.

I will just add one simple thing. The states took over the APAIS last year, so it's our first year. If go back to basic biology fisheries management, any assessment ever done; it is kind of a standard. You need a minimum of three years before you can start making conclusions about what's going on. We've got one data point. If you look at the five years before that we're talking about an order of magnitude difference. I've got five data points that are very low; new estimate, new data. Shoots up, we've got one data point. We're going to need multiple years before we can start saying, oh my God, the harvest in this particular area is a lot higher than we ever thought.

MR. CLARK: Not so much about this motion. I'm just concerned, as a state that matches the federal regulations. As we've been hearing about 2018, I'm just wondering, if we go over again this year, what type of effect this will have on the federal water regulations; and for our states in DelMarVa where we're fishing almost entirely in federal waters, if the size limit is increased greatly or the season is shortened, we're going to be suffering worse than those with state water fisheries, possibly. What are the ramifications of this for the federal versus state waters?

CHAIRMAN LUISI: I'll add to that as being one of the states in DelMarVa. I think there is more consequence to the action in 2017; even that we should get some clarity on, not so much the overage into 2018. But I'll turn to GARFO maybe for an explanation on what consequence there could be to federal waters; as a result of the Board either taking action or not taking action, in this case for 2017 and/or for 2018, Mike or John.

MR. MIKE PENTONY: Thank you, John, and Mr. Chairman. There is not a whole lot I can say. We don't have a rule on the street yet, but we're obviously following this very closely. As you know, under the Council's plan we're required to implement regulations that constrain catch to the recreational harvest limit; which is 4.29 million pounds.

The process, the system that we've been using in this fishery and our other recreational fisheries for years is we used prior year's harvest, for a given set of measures, as an indication of next year's harvest under those same measures. If that harvest is higher than the recreational harvest limit, then we come up with more restrictive measures to try to constrain that catch.

If the recreational harvest limit is higher, we can liberalize those measures. When we talk about overages, in the recreational side it is going to remind everybody we're not talking about paybacks or concerned about overages. The 2016 recreational harvest limit could have been 6 million pounds; and we would be having the same conversation, because last year's catch was higher than this year's harvest limit. That's the issue that we have to deal with.

I will also point out that as we're touching on 2018, and what might happen next year. The 2018 recreational harvest limit is 3.66 million pounds; so it drops by over 600,000 pounds from 2017. If we're trying to predict what catch we might have this year, for a given set of measures. Think about how that's going to translate into 2018, when the harvest limit is going down. Granted that is a projected, based on the information that we had in February; and that could change. But at least based on the advice of the SSC that is what we're looking at for 2018.

CHAIRMAN LUISI: John, did that address your question?

MR. CLARK: Yes, I mean just to follow up, Mike. As Mike said that the rule for this year has not been finalized; and we're opening our season on Monday, to match the federal waters. There could be an in-season adjustment apparently; that could be pretty drastic for those states like ours that are fishing on the federal regulations. MR. LUISI: You're correct in that. What I would imagine, it would be an end-of-the-season adjustment; obviously it would have to be. Another thing that complicates it is that while we're fishing 100 percent in federal waters in our region, compared to the catch in the state waters in the northern region, it is minimal.

By taking action in federal waters, you're not necessarily solving the problem; given the amount of fish that the southern region is harvesting. Are there any other thoughts on this; Tom Fote? Just so you know I'm going to try to conclude this business in the next ten minutes. I'm going to take another comment or two, turn to the audience for a second, and then come on back to call the question.

MR. FOTE: I wanted to answer Dave's question about the commercial quota being over like the recreational. But we also were dealing with the commercial quota. There is not the percentage of error that we have in the recreational quota. It doesn't depend on outliers throwing everything out of whack.

I hope and I pray, because we've done this often enough that we have a commercial quota, it's followed, the landings are pretty accurate of when they're over, and they're usually over by a little bit; not these dramatic numbers that happen because of outliers. Because you're actually collecting good information on the commercial fishery, where on the recreational fishery we've been waiting to collect good information for 25 years; and we're still not there.

MR. BALLOU: I'm going to circle back to the issue that I raised earlier. I'm trying to reconcile

the portion of the TC report that addressed, in response to one of the tasking questions, the confidence interval; the 95 percent confidence interval. My understanding is that was a question raised; how would that play out? My understanding is the TC responded and said here is how it would play out.

At the time, dealing with the preliminary estimate it played out in a way that didn't fall into those bounds. My understanding based on the question I asked Jason McNamee is that the math hasn't been done yet for the new estimate. But were it to be done, it could turn out that we're now within that 95 percent confidence interval. My question I guess to you, is how pressing a matter is this?

How relevant might that application of the 95 percent confidence interval be; and if it is relevant, and it seems like it might be, otherwise there wouldn't have been a tasking question asked. Is it possible that we can ride on that or base our decision if you will, on 2017 measures on the likelihood, possibility that we're within that 95 percent confidence interval? I'm just trying to understand the implications.

CHAIRMAN LUISI: Thanks for that question, Bob. I would have said two months ago, three months ago that it wouldn't matter whether or not the recreational harvest limit was within the confidence interval around the estimate. As you know, the point estimate has been what we've used in the past.

Reductions that have been needed have been calculated to a decimal point in some cases, in order to achieve the RHL that is prescribed. Given actions that have recently been taken with summer flounder, and options that this Board has chosen to move forward with, didn't necessarily do that. There was a discussion and a justification; which is part of the conversation we're going to have in a little while, about moving forward in the terms of conservation

equivalency as states. Right now there is a proposed rule out that allows the conservation equivalency to carry forward, even though the point estimate on paper, or the reduction needed on paper was not completely addressed.

It was more about the Option 5. I would have said months ago that there wasn't really any significance to that; but there might be more to it at this point. But I can't answer. It is hard to know what's going to happen, because it is so new. We don't have the experience to understand how all of that would factor into this discussion; any other comments? I'm going to the David's and then we'll call the question. David Bush.

MR. BUSH: The points that Bob just discussed, you know I understand the point is where you would normally base your decisions from. In the context of our current biomass and it's not trending down near any target or threshold at this point. I would have to believe that that would buy some latitude to make some decisions you might not ordinarily make. I find it hard to penalize fishermen in light of that.

CHAIRMAN LUISI: Last point, Dr. Pierce.

MR. PIERCE: I understand the opposition to the motion. I clearly understand the opposition. It's a very significant action that we would take. However, with what Mike Pentony said my understanding is that if we don't do something in 2017, something very meaningful, we are going to end up with a very high risk and a very high probability of there being almost no, if any, recreational fishery for black sea bass in 2018.

I think that's very highly likely. That is a tremendous risk and an adverse consequence that none of us want to see as an outcome. Again, New York took 88 percent of the RHL in 2016. I know there are some questions about the data. Nevertheless, it stands. I will wager that they will have about 88 percent in 2017 as

well, so 2018 we may as well prepare ourselves and our recreational fishing industry; for-hire as well as the guy and the gal fishing from the docks and fishing from the shore in small boats. Their fishery is not going to exist in 2018.

CHAIRMAN LUISI: Okay, I'm going to turn to the audience. Can I see a show of hands of anyone in the audience that would like to offer comment on this? Okay that is more than what we can do. Can I see a show of hands that would want to comment in support of this motion? Does anyone want to speak in support of the motion?

Okay seeing none in support, I'm going to take two comments. Jeff, I recognize you, and then Victor, was this what you wanted to address? Jeff, if you can keep your comments to a minute or two. We have a lot more to cover this afternoon. I'm going to keep the clock on you for two minutes, so if you can do me the favor for not hitting the pink button up here that would be great.

MR. JEFF GUTMAN: I appreciate that; but we did drive five hours through traffic to get here. At least I get my two minutes in. I'm a little confused, because I had one question for Kirby real fast. Did you say that New York Wave 5 and 6, for-hire was down; yet the numbers, I guess for private recreational was way up?

MR. ROOTES-MURDY: I have to double check the numbers, but I believe they decreased in 2016 and the private increased in 2016; so you're correct. But then I would have to go back and double check how they changed from preliminary Wave 6 to final numbers.

MR. GUTMAN: Just saying that seems to make these numbers even more anomalous. But I just want everybody to know, New Jersey as a state itself, fishes significantly more like the southern states. Anything, be it a decision on state levels to close something or a decision that will cause the federal waters to be closed

in Wave 6 is significantly unfair to New Jersey; since New Jersey prosecutes the bulk of its fishing, I believe 85 or 86 percent in federal waters.

New Jersey as a state would be taking an undue hit, where other states to the north of New Jersey can mitigate the problem by doing something in state waters at different times during the year. But I think it should be noted that I'm here looking for an answer. I mean I'm trying to run a business. I mean we did this whole tap dance in February, and we're doing it again now.

I would like to ask Mr. Bullard, Mr. Pentony, what are we going to do? I mean I'm trying to run a business and I'm trying to sell trips for Wave 6. I have to do that now to survive. I need to know what to tell people. Right now, if Wave 6 is shut down, certainly for New Jersey in one form or another, state or federal; it is going to be the same result.

I mean New Jersey is down to a 24 day Wave 3 season, and 9 days in Wave 5. Our July and August, our Wave 4 fishing is two fish per person, it is a bycatch fishery for summer flounder fishermen. It's not a directed fishery at all. Those days are gone. We're talking that New Jersey is going to end up with not even a 35 day season if there is no Wave 6.

I would like to know what the Service plans to do in a situation where either state waters are closed, as in this motion, or whether we're in a situation where state waters remain open and the Service has to do something? Mike, I'm sorry before you speak. There are a number of guys here that are also in the same position here, and that is why a lot of people are here; because this is pretty darn important to the way we survive as businesses.

MR. PENTONY: Jeff, I understand your situation and I wish I could give you a clear answer. But as I tried to answer the earlier question, we

haven't published a proposed rule yet; in part because we're waiting to see what measures this Board takes to address catch in the northern area. The recommendation from the Council and the Board for federal waters is to maintain status guo measures in federal waters.

But I think that was in part made, because the Council and the Board made similar recommendations in prior years contingent on the northern states addressing any required catch reduction. Now that we have the final MRIP numbers, we know what last year's catch was relative to this year's harvest limit; and the discussion today is to try to resolve what measures if any, the northern states will take through the Commission process to address that disconnect.

We are waiting to see what measures those might be, whether it's this motion or something else; before we can make a decision about what we might be able to do in federal waters, to address any shortfall or disconnect. I wish I could give you a better answer than that. But unfortunately that's all I can say.

MR. GUTMAN: Okay just last, will there be a comment period on that before you do it?

MR. PENTONY: Absolutely.

MR. GUTMAN: Thank you.

CHAIRMAN LUISI: Thank you, Jeff.

MR. HOWARD BOGAN: Howard Bogan; the vessel Jamaica, Brielle, New Jersey. I'm pretty much in the same position as Jeff and all the southern boats are. We're fishing in mostly federal waters. We need to know if Wave 6 is going to be open. We need it open. Also, based on the uncertainty of recreational harvest, and how to measure it accurately, it seems like we go through this every year.

We have a stock that is 230 percent rebuilt. We're not even sure if we're measuring the catch properly. How can we have a hard quota system for recreational management? I don't see why that can't be a wider margin of error; because we know that these numbers aren't right. We know there is a wide variation.

Is there some way that we can have a system where we don't have to be so critical going by this hard quota system for recreational fishermen? Is there any way to do that? They used to do that years ago and now all of a sudden, was it because of law suits? What is the answer to that? Is there any way that we can have a little more leeway, margin of error? Like it was proposed, status quo, can that be done?

CHAIRMAN LUISI: I would say that it can be done. It can be a decision of the Board not to do anything in this case. But with that decision, it doesn't end. There is a federal decision that needs to be made, as Mike alluded to just a few minutes ago. That is the issue facing the Board right now.

Whether or not to take the action that is in this motion, to reduce harvest in 2017, as it related to the recreational harvest limit that is projected to be caught; or do nothing, and see what happens at the federal level. That is really where we are. It is difficult. There are no answers, as Mike said, until the Board decides on something today they're in a holding pattern.

MR. BOGAN: what can be done to change this in the future then on the federal level? If they are going to ultimately decide, what do we have to do to change that? Because this system, with the amount of fish that are out there, we're catching lots of fish, there are lots of them out there. We're not going to catch them on hook and line unless the stock is in great shape.

CHAIRMAN LUISI: To answer that question. I mean in order to change the format for which we manage at the federal level, we would have to have a Council initiative to make adjustments to how that's all done. There would need to be an amendment at the Council level to modify how the approach that we currently use is conducted.

MR. BOGAN: How long would that take?

CHAIRMAN LUISI: A couple years.

MR. BOGAN: I don't know what the answer is, but everybody here knows that the sea bass stocks are in great shape. We're saddled with crappy regulations for about seven years, and then they do a stock assessment and it justifies what we said. Now we're still looking at the same thing New Jersey already has. We're hardly ever open in New Jersey anymore. We used to be open all winter long.

We would go out January through March and catch sea bass. The summer used to be open, the fall, and now New Jersey is the 26th through the 18th with ten fish, two fish all summer, and then we're closed for some of the best fishing of the year inshore; and it opens up again. I mean New Jersey is certainly doing its part. The other states, they're only catching the fish because they're there. Something has to be done to change the system to be more fair.

CHAIRMAN LUISI: Thank you for your comments. I appreciate that. Okay I want to come back to the Board. Any last thoughts before we caucus? John Bullard.

MR. JOHN K. BULLARD: I supported, or the Service supported the original motion by New York to look at the issue of smoothing; because we certainly understand the frustration when you get a dramatic question mark/exclamation point kind of anomaly, or whatever you want to call it on a data point, and the frustration that causes.

That is why we supported that motion. I understand the frustration from not just the two speakers, but all the people in the audience who are represented by those speakers, about the inability to plan. I seconded David's motion, because I thought, I mean if it didn't have a second I knew what was going to happen to the motion. But I seconded it, because this is something we have to talk about. The facts are there is one state that catches an awful lot of these fish. There are an awful lot of other states that are affected by what happens if we go over.

That is what David Borden was getting at. If you don't solve it one way, you still have to look at this, because there are an awful lot of other states whose fisheries hang in the balance here. We're constrained by rules and regulations; and so as frustrating as it may be to have this anomaly, we still have to act. What happens in 2017 if we don't constrain catch? Mike Pentony has laid out a picture that there are some worries about what may happen in 2018.

The fact is that states with very small quotas, or federal waters with small quotas, have very little influence over this. There is really only one state that can influence the outcome here; that's the state that has the largest catch. They can influence, to a large degree, how much we go over in the next year.

Again, I'm sympathetic to people who need to plan their trips months and months in advance. There are consequences for an awful lot of us around the table that have been voiced by John and others; and the Chair. I don't know what the Service is going to do in response. I don't know whether no action is the right thing to do; and if it is what we end up doing, what our response will be. We're in a tough spot here.

CHAIRMAN LUISI: Rick Bellavance.

MR. RICK BELLAVANCE: Trying to characterize what is going to happen with this motion, and

I'm not 100 percent sure it's going to do a ton. Closing in Wave 6 for one species like black sea bass that swim around with cod fish and porgies and every other thing, we're still going to catch them and we're still going to end up letting them go. At that time of year, Wave 6, the fish have moved off into deeper waters, into federal waters. I'm starting to think of the mortality of those fish that we're going to just be throwing back now.

I think it's in the best interest of preserving some kind of fishery in those months for the folks that go out. Maybe it doesn't need to be the same bag limits we have now, but they are just going to die anyway; so it doesn't make a ton of sense to me.

CHAIRMAN LUISI: With that let's go caucus for a minute, and we'll come back and call the question of the Board. We're faced with very challenging decisions. These are not easy decisions to make. Given the uncertainty that has been surrounding this, I'm going to take the liberty at this time to allow for additional thoughts before we vote on this motion; even though we caucused, I'm going to look around the table. Bob Ballou.

MR. BALLOU: I would like to move to substitute; and the substitute motion would read; For 2017, move to impose a 5 fish possession limit for recreational black sea bass in Wave 6 in state waters, for the states of Rhode Island through New Jersey; and maintain all other management measures from 2016. If there is a second I will speak briefly to it.

CHAIRMAN LUISI: Is there a second to that motion? Mark Alexander seconds. We have a substitute motion, which would allow for Wave 6 to remain open, with a reduction by half from what I heard. Is it about a half of the bag limit? I think Bob, maybe you would want to speak to the motion, and I will look around the table for other thoughts.

MR. BALLOU: Sure, five fish is half of the possession limit in New York. New York has certainly been a focus of a lot of the discussion. It is a reduction for several states, including Rhode Island; and it therefore constitutes a significant reduction in Wave 6, to address the very valid concerns that have been raised around the table today.

CHAIRMAN LUISI: Other comments. Dave Pierce.

DR. PIERCE: But we really don't know what affect this will be. For example, in all those states how many trips revealed a catch of five or more fish? I don't know. Reducing it down in New York, and notably from 10 to 5; I assume it will have some effect, but I don't know how much. I suspect it won't be enough.

In addition, I'll just highlight the fact that this is for state waters only. Let's face it, November and December most of the black sea bass, I think, are in federal waters; in deeper waters, in colder waters. Any cut that occurs that is going to be really meaningful is going to have to include of course something that is done in federal waters as well. It is better than nothing, but certainly falls far short of the original motion.

CHAIRMAN LUISI: David, just to clarify. While the fish may be caught in federal waters, they'll need to be transported back through state waters; so the state waters regulations would be the limiting factor on that catch. Okay, I saw another hand or two. Adam Nowalsky.

MR. NOWALSKY: Again, I'll go back to my earlier comments. Mr. Bullard went on record in North Carolina saying, we missed the 2011 year class and as a result the recreational community, and the commercial community has paid; paid with dollars, paid with not being able to support their families to the level that they had, paid with their businesses, paid with their boats, paid with their docks.

I'm sure in some cases probably paid with their houses. Now we're going to sit here, after having been penalized for that for five years. We're probably going to take one of the most anomalous recreational estimates the country has probably ever seen, in the history of recreational estimates, and use that as a justification to basically eliminate the Wave 6 fishery. I am embarrassed. I don't know if I can turn around and look at the people behind me. I oppose the motion.

CHAIRMAN LUISI: Mark Alexander.

MR. ALEXANDER: Yes I supported this. We were thinking about this even before the motion was offered. Maybe one added benefit in a five-fish possession limit. I think I read somewhere in the TC report that lower bag limits reduce the probability of the real high bag intercept being expanded to crazy numbers. For this reason, and for the fact that this will result in some reduction in harvest; we're going to support this motion.

CHAIRMAN LUISI: Any other comments? All right, Tony DiLernia.

MR. DiLERNIA: Recreational success is based upon availability. The number of fish that we caught in New York while we're good, it's not that good. That number is stupid, excuse the technical term. Well, you keep saying 230 percent, 2.3 times the number of the target. As I said to Mr. Bullard in 2013, when they close the fishery because there are too many fish, yes there are too many fish and because there are so many fish people catch them.

Do they catch as many as they say we did in New York? No, we didn't. But there are a lot of fish there. Look beyond this room. Look beyond what is going on here. Just say to yourself, do you want to really begin to dismantle the Act? I mean you do something like this; you close Wave 6 because there are too many fish. During the next reauthorization

you are going to see amendments that will begin to dismantle the Act and the hard work that we've been doing. Do not do this. Thank you.

CHAIRMAN LUISI: Okay last comment, Tom Fote.

MR. FOTE: When I read the memo and basically looked at, well we should do this because you have a 10 fish bag limit. It's too much possibility of extrapolating those numbers that causes the high number that is not really valid. That's not the mistake of fisherman that is the mistake of MRIP again.

We're paying the consequences of bad data, and that is the real problem here. After 25, 27 years dealing with bad data in the reauthorization of the last Magnuson Act that said it was supposed to be corrected by 2009; and we're sitting here in 2017 with data that is even worse than it was in 2009, I said this is not the way we should be going. We shouldn't penalize fishermen, because we might extrapolate numbers wrongly in MRIP. That is a joke.

CHAIRMAN LUISI: Does the Board need time to caucus on this? Do we need maybe just a real minute, not a five-minute minute? But let's just caucus quickly. I need to speak with my commissioners. Okay we have a motion to substitute for the main motion, and that motion is for 2017 impose a 5 fish possession limit for recreational black sea bass in Wave 6 in state waters; for Rhode Island through New Jersey; and maintain all other management measures for 2017. Is the Board ready for the question?

Okay all those states that supports the substitute motion please indicate by raising your hand. That is 9 in favor, all those opposed like sign. That is 2 opposed; abstentions, like sign. One abstention, motion carries. Okay, so we now have a main motion. This is final action so the substitute becomes

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the main motion. We'll need a roll call vote in this case. Before we take the roll call, Adam do you have something very quick?

MR. NOWALSKY: Mr. Chairman, I would like to amend the main motion to allow for conservation equivalency. New Jersey in particular would look at simply removing our Wave 5 days entirely, to maintain the Wave 6 fishery.

CHAIRMAN LUISI: Adam, Bob is going to comment to that. I believe you have that option already; but Bob is going to comment.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Yes Adam, any state has the ability to use conservation equivalency; unless it is specifically not allowed within the document. Under the circumstance of New Jersey, you can demonstrate to the Technical Committee and Board there is a trade-off by closing Wave 5 days and allowing a higher bag limit in Wave 6. New Jersey has that ability.

MR. NOWALSKY: Thank you for that clarification on the record, and in that case I would withdraw the motion.

MR. GILMORE: Do all the states have that Bob, because you just said New Jersey? What about New York and the other states that are probably voting against this?

EXECUTIVE DIRECTOR BEAL: All states do. I was just referencing New Jersey, because Adam asked the question.

CHAIRMAN LUISI: Okay I'm going to read the main motion, and then I'm going to turn to, I guess it's Kirby to call the roll. The main motion is; for 2017 impose a 5 fish possession limit for the recreational black sea bass in Wave 6 in state waters; for Rhode Island through New Jersey, and maintain all other management measures for 2017, Kirby.

MR. ROOTES-MURDY: I'm going to go north to south. With sea bass we have a management unit that extends up to Maine. Maine is not present. Next is New Hampshire.

MR. DOUGLAS E. GROUT: Abstain.

MR. ROOTES-MURDY: Commonwealth of Massachusetts.

DR. PIERCE: Yes.

MR. ROOTES-MURDY: Rhode Island.

MR. BALLOU: Yes.

MR. ROOTES-MURDY: Connecticut.

MR. ALEXANDER: Yes.

MR. ROOTES-MURDY: New York.

MR. GILMORE: No.

MR. ROOTES-MURDY: New Jersey.

MR. NOWALSKY: No.

MR. ROOTES-MURDY: Delaware.

MR. CLARK: Yes.

MR. ROOTES-MURDY: Maryland.

MR. ED O'BRIEN: Yes, reluctantly.

MR. ROOTES-MURDY: Potomac River Fisheries Commission.

MR. DAVE BLAZER: Yes.

MR. ROOTES-MURDY: Commonwealth of

Virginia.

MR. O'REILLY: Yes.

MR. ROOTES-MURDY: North Carolina.

MR. BATSAVAGE: Yes.

MR. ROOTES-MURDY: U.S. Fish and Wildlife Service.

MS. WHITE: Abstain.

MR. ROOTES-MURDY: National Marine Fisheries Service.

MR. MILLARD: Yes.

CHAIRMAN LUISI: Okay we have 9 in favor, 2 opposed, and 2 abstentions; Kirby is that correct? You've got nine fingers, Kirby, I know that.

MR. ROOTES-MURDY: Nine in favor, 2 opposed and 2 abstentions is correct.

CHAIRMAN LUISI: All right, motion carries. That concludes our business under this agenda item. I'm going to move immediately into our new agenda item. David.

DR. PIERCE: I have another motion to make regarding black sea bass. This shouldn't take too long, Mr. Chairman. The motion has been given to Kirby, and this relates to 2018, preparation for 2018. It follows up on work that has already been done by the Board's Working Group, and it also follows up on work that has been done by the Plan Development Team; ongoing work and work that needs to be done.

I would move to initiate an addendum for 2018 recreational black sea bass management; with options as recommended by the Working Group and Plan Development Team. Options for regional allocation shall include approaches with uniform regulations, for example number of days.

Another alternative to the current north/south regional delineation, which is Massachusetts through New Jersey, and Delaware through

North Carolina, such as those apply for summer flounder; that is one state regions. That is my motion, Mr. Chairman, to provide the Board a particular with what I hope will be a way forward; subject to again the creativity of the Working Group and the Plan Development Team that has already done some good work.

CHAIRMAN LUISI: Thank you and I think it is important to understand that this work is ongoing, but this formalizes it through an addendum. Is there a second? John Clark seconds the motion; any discussion on the motion? Emerson.

MR. HASBROUCK: I'm wondering why this is needed. Don't we have the ability to go forward with regional management in 2018 without this?

MR. LUISI: Well, what I would say is, so we're starting an addendum that would consider alternative measures that we have not worked on before through these addenda that we continually address each year. Maybe Toni can offer some thought.

MS. TONI KERNS: Two things that I wanted to clarify, one the addendum that you are working off of expires at the end of this year; so you need to initiate another one. The second is just to control expectations that it is unlikely that we will give you a draft in August, but likely that we'll give you a draft in October with this information. But I expect that summer flounder will ask for the working group to get together this summer, so we will be doing this in conjunction with that same working group.

CHAIRMAN LUISI: Does that address your question, Emerson? Adam.

MR. NOWALSKY: When we've gone through the current black sea bass addenda, we've made great pains to stress that these have not been allocations. This motion specifically references regional allocations. Is that within the bounds of the FMP as it exists; given what I've heard we've done with the previous addenda? What's different about this than the previous addenda, where we've made great pains to state these are not allocations?

MS. KERNS: You can do allocations through addenda, it is just that it was the will of the Board to stress that they were not allocations previously. That was specifically mostly for summer flounder. In black sea bass, I think when we started doing this it was roughly 97 or 95 percent of the catch was mostly in the northern states; New Jersey north.

CHAIRMAN LUISI: Any other questions, comments regarding the motion? Seeing none; do the states need time to caucus on this? Raise your hand if you would like to have a caucus. Seeing none; let me read the motion into the record and we'll call the question for the Board. Move to initiate an addendum for 2018 recreational black sea bass management with options as recommended by the Working Group and Plan Development Team.

Options for regional allocations shall include approaches with uniform regulations, with an example of number of days and other alternatives to the current north/south regional delineation; Massachusetts through New Jersey and Delaware through North Carolina, such as those apply for summer flounder, one state region.

Is the Board ready for the question? All those in favor please indicate by raising your hand. There are 12 in favor, all those opposed like sign, there is one opposed; any null votes, any abstentions? Seeing none; the motion carries. Regarding black sea bass, and not regarding the Wave 1 fishery; is there anything else to come before us on this agenda item for recreational measures?

REVIEW OF WHITE PAPER ON THE POTENTIAL EXPERIMENTAL RECREATIONAL WAVE 1 BLACK SEA BASS FISHERY

CHAIRMAN LUISI: Thank you, I'm going to conclude that item on the agenda and move to the next item, which is the review of the white paper on the potential experimental recreational Wave 1 black sea bass fishery; and there is a possible final action for this. This final action would be both a Board and Council action. I'm not going to provide any background, because I think Brandon, who is taking the lead on this for the Council, will offer that. Brandon.

MR. BRANDON MUFFLEY: I actually don't have a whole lot in terms of background, but I will give it in hopefully a couple sentences here. If you all remember at your February Board meeting and Council meeting, there was a motion put on the table to evaluate an experimental fishery in 2018.

That motion was tabled at the time, and brought for consideration while staff drafted a white paper to evaluate what a Wave 1 fishery may look like. It was brought back to this meeting for your consideration. I will try to be brief, and hit the highlights of the highlights of the white paper. There is a lot of detail in the white paper; in terms of analysis and sort of the caveats and assumptions that were made, in terms of the analysis and how I came to those.

I don't plan to go in any detail on those, but kind of hit those points where I think the Council and Board need to evaluate to make their decisions today; when it comes to their vote. With that said. Just to give a quick summary of what I plan to discuss. I just have a few slides, in terms of how the Wave 1 fishery has operated over the recent history.

I just want to touch upon that to kind of highlight those issues, and how it may be different from the rest of the recreational black

sea bass fishery. Then there are some projected catch options for the Board and Council to consider. I put it in air quotes kind of how you would allocate some catch to the Wave 1 fishery, and then therefore what those implications may mean for the rest of the recreational fishery. If you were to put an allocation in place, how you may implement the fishery going forward, and then I'll touch upon some data and biological considerations that I think need to be discussed. Then this was all talked about happening under an exempted fishing permit; so I'm going to kind of lay out some of the issues and procedures that may happen under the exempted fishing permit.

With that the first thing I want to look at and a lot of questions were raised. Well what is this sort of scope, and how many participants may participate in this Wave 1 fishery? The first evaluation was just looking at federal for-hire black sea bass permits. The other line is the total number of federal for-hire black sea bass permits that are issued each year, since 1997.

That was the first year, in terms of when that permit was required; because in 1996 was when black sea bass was added to the management plan. That is the total number of permits that are issued each year. The green line in the middle there is the total number of permits that actually report any black sea bass catch during any time of the year. On average there are about 306 permits actually report any black sea bass catch. That is about 44.5 percent of the total number of black sea bass permits actually report any catch.

Then to fine tune that even more, to look at what has actually happened during the Wave 1 fishery. It is sort of that gray line at the bottom. On average, 15 vessels actually report black sea bass catch during the Wave 1 fishery. Now it's varied from a low of 4 vessels to a high of 39 vessels in 2013; and that was the last year the sea bass fisheries was open.

Four percent of those active permits, those permits that have any black sea bass catch; actually have any catch reported during Wave 1. The universe of vessels that actually have any history of participating in the fishery is actually quite small. Then when you begin to look at the actual participation by fishermen and by states, it is actually even smaller than that.

When you look at the proportion of catch, the majority of the catch in the Wave 1 fishery is coming out of three states. The overwhelming majority comes out of New Jersey; so 83 percent of the reported catch on VTRs is coming from New Jersey during the Wave 1 fishery, followed by New York and Virginia.

They make up 97 percent of the catch in Wave 1 is from those three states. When you look at the proportion of participation, which is the number of anglers within each state that are participating in Wave 1 on these for-hire vessels; it is a little bit more distributed. But again, those three states make up over 90 percent of the participation is actually taking place.

It is a fairly concentrated fishery, in terms of the number of vessels and number of states that are actually participating in the fishery. Just to give you a sense of what the catch has looked like over time, again back to 1996, looking at the VTR data. This is again just the Wave 1, and you see a steady increase in overall catch from 1996 to 2009. The fishery was closed, the Wave 1 fishery was closed in 2010; you see that dramatic drop off.

It was reopened in 2013, and catch essentially doubled in 2013, when that fishery reopened. The line kind of going above the catch bars is the number of trips that documented black sea bass catch during time; it obviously follows the catch trend pretty closely. But you will notice in 2012 and 2016, even though the fishery was closed, there were a fair number of trips that

reported black sea bass catch during those years. Just two other notes to make, it is not reflected specifically in this graph; but I evaluated catch-per-angler during the Wave 1 fishery. The catch-per-angler at this time of the year is significantly higher than it is during the rest of the year; nearly five times higher. The catch-per-angler takes place in Wave 1, than it does during the rest of the fishery. You'll notice here that discards that sort of bluish color at the top of the bars that is the proportion of discards of the total catch, is actually relatively small during Wave 1.

It averages about 13 percent of the catch is actually discarded; which is quite small. The rest of the fishery during the rest of the year, 80 percent of the catch is discarded in the rest of the year. There is a high success rate and low discards during this time of the year. It does operate quite differently than the rest of the recreational fishery.

That is sort of the background in terms of the fishery itself. This is the first decision point that I see the Council and Board needing to make, in terms of are you going to allocate any sort of catch to the Wave 1 fishery, and if you do obviously any catch that occurs during Wave 1 needs to be evaluated against the recreational ACL and RHL.

Adjustments need to be made if you are going to put some portion of catch to Wave 1, adjustments need to be made to the rest of the recreational fishery; in order to constrain landings through the 2018 RHL. All of those things are under consideration here. I came up with four different options for consideration in a way that you could cap the amount of catch that you would give to the Wave 1 fishery.

I'll just kind of go through these relatively briefly, just to kind of give you the rationale behind where these different options came from, and what those implications may mean for the rest of the recreational fishery. Option 1 is an allocation of 250,000 pounds to the Wave 1 fishery. This was generated, I came up with what the 2013 catch was; that was the last year the fishery was open, and converted that into weight, assuming that the trends in interest and participation would likely continue if we reopened the fishery.

Assuming an expansion of the Wave 1 fishery compared to 2013. I increased the 2013 catch by 25 percent and came up with 250,000 pounds. If you give 250,000 pounds to Wave 1 that would require a 6.8 percent reduction to the rest of the recreational fishery. Now it gets to be quite cumbersome to try to evaluate what those implications are going to mean for the rest of the recreational fishery.

As we've talked about, we've been putting more and more constraining measures on the recreational fishery over the last five years. States have been getting more and more divergent, in terms of their measures. This was kind of taking a mish mash of data to try to evaluate what it might mean from a coastwide perspective, what it might mean for the different regions, or what it may mean for states.

I would caveat, so that if anything would be allocated to the Wave 1 fishery, sort of I would need to refine this with the Monitoring Committee and Technical Committee folks; to evaluate what those actual reductions would look like. These are here for examples. I think it's relatively in the ballpark, but something more concrete would need to be developed. But under Option 1, a 6.8 percent reduction under the coastwide measures would be about 12 days would need to be lost in Wave 3 or Wave 5. If you're looking at the southern region, which follows federal measures, you would need to lose 9 days in Wave 3 or 8 days in Wave 5. Then I came up with state-specific measures for New York and New Jersey; and I just chose them just because they make up a great proportion of the Wave 1 catch. I just used them as examples. But it would be about five days in Wave 4 for New York and 5 days in either Wave 3 or Wave 5 for New Jersey.

That is sort of the details for Option 1. The next option, Option 2, is just taking 3 percent of the 2018 RHL and moving that to the Wave 1 fishery. We're not actually reducing the RHL; we're just going to shift it over to the Wave 1 fishery, so 3 percent of the 2018 RHL is about 110,000 pounds. Obviously 3 percent less in the RHL means a 3 percent reduction needs to happen in the rest of the recreational fishery.

You can see what a 3 percent reduction would mean, in terms of number of days under the different options. Option 3 is taking 3 percent of the 2018 RHL, and 3 percent of the 2018 commercial quota. A process similar to what the RSA program looked like a number of years ago. That would give you an allocation for the Wave 1 fishery of 215,000 pounds.

But the reductions would only need to be a 3 percent reduction, because that is where you're taking it out of the RHL, the 3 percent from the commercial sector would be an actual increase in the allocation. But I will point out, and it is pointed out in the white paper that this sort of option likely cannot occur.

We don't have an RSA program. We can't take quota from one sector and apply it to the other sector. That is now allowed within the FMP. We're putting in specifications now, setting the 2018 commercial quota. This isn't really an option that would actually be able to be implemented; but to give you a sense if you were to think about going down that road, this option was presented.

Then Option 4 is capping what I estimated the 2013 harvest to be; which is about 188,000 pounds; which would require a 5.2 percent reduction in the rest of the fishery. This is where I see would be your second decision. If you ultimately decide to give an allocation to

Wave 1, how would we go about implementing this?

With the way I came up with sort of structuring this was the Council and Board would determine the number of vessels that you will allow to participate in this fishery. Then you would, depending on the number of vessels that you would allow, you would determine the number of trips that each of those vessels would be allowed; to come up with a total number of trips allowed during the Wave 1 fishery.

Then I used, now this example here uses 2013 information only. I provide an example in the white paper that evaluates, uses data over a longer time series. But if you look at the average number of anglers on a trip during Wave 1, which was 26 anglers, their average catch was 15.5 black sea bass per trip.

You just kind of expand that out to determine the total catch under a particular number of vessels, and particular trips allowed in the fishery. I have two examples here; the top suite of numbers is to meet that target of 250,000 pounds, so that was the Option 1 on the previous slide. Then the bottom set of figures is to reach the target of about 109,000 pounds; so that was that Option 2 on the previous slide. I chose this number of vessels based off of sort of previous participation within the fishery. For example, I have 15 vessels would be allowed in the fishery. That is the average number of vessels that have participated, or at least documented catch during Wave 1. They would be allowed 20 trips per vessel for a total of 300 trips, which would meet the target of 250,000 pounds. That is the kind of way you follow it through, 39 vessels is the number of vessels that participated in 2013.

If you allowed all 39 vessels that would be eight trips per vessel, and I bumped that up to 45 vessels if participation continues to increase. If you allow 45 vessels into the fishery, they would be allowed seven trips. It is the same sort of scenario below. But I would caveat that these are just sort of projections; in terms of if the average number of anglers per trip is right, and if the average catch per angler is right.

If those variables are different and if our average weight of black sea bass that I used to make these calculations is right. If any of those variables that are used to make those projections is incorrect, obviously then the overall catch is going to be different from what I'm projecting here. It is just a note to caveat.

The way you can monitor the fishery under the EFP, and I'll get into some of those decision points later is there would be a mandatory callin requirement for any vessel that is going to participate. A vessel could call in and say they are on trip 2 of 10, so assuming it would be GARFO; GARFO would be monitoring that call-in system and the number of trips being taken on an individual vessel basis on any total basis.

The fishery could be closed when 300 trips have been reached, and the vessel would be done participating in the fishery once it reached its targeted trips that it was allocated. If it was 10 trips, once that vessel reached its 10 trips it would be done in the fishery. If it fished every day from January 1st to January 10th, after that that vessel would be out of the fishery; because it took its 10 trips allowed during that fishery.

Other things that I think you need to consider, in terms of how we go about doing this. This would all be implemented, for-hire vessels would be required to submit e-VTRs that is part of the Mid-Atlantic Council has moved forward with an EVR framework that requires all federally permitted for-hire vessels to submit electronic vessel reports; that is likely to be finalized this year for implementation in 2018.

We would use this e-VTR process. However that information on VTRs is all self-reported, so there is a strong need to validate that information. It is probably even more critical that we validate this information under this sort of scenario; where we're allocating fish to this fishery that has implications for the rest of the recreational fishery.

Understanding and getting good data from those e-VTRs and validating what the information is that is coming out of those VTRs is really critical. There is going to be a need for some sort of dockside or at-sea observer program on some sort of subsample of these trips; in order to validate the information that's coming across on these e-VTRs.

But going this route also provides an opportunity to collect really important and needed biological and fishery information. We have the ability under this system to collect total weight information and individual length and weight information, so we can get length and weight frequency information that we don't have on the Wave 1 fishery, or at this time of the year when the fish are offshore. There are some implications that we could use data that would be collected under this system that may be helpful for stock assessments, and for future management action. The Council and Board motion that was discussed in February did have a zero discard policy. I think it is something that we need to consider.

I don't think zero discards is likely going to be feasible. In the document I talk about the catch-per-trip. It is really high in Wave 1, and in 2013, more than half of the trips the average catch-per-angler was greater than 15 fish. There are going to be a lot of trips where anglers are catching way more than 15 fish.

If they have to keep all of those fish under a zero discard policy and a 15-fish bag limit; discards are going to happen. There is no way of getting around discards. With the high availability right now of black sea bass, and like I said in these higher catch rates, discards are likely still going to happen.

I also think there is the potential for high grading if the captain settles on a site where those first sea bass that come up are small; and they ask that captain to move, and they move to another site where the sea bass are larger and what folks want to take home. I think there is the opportunity for particularly again, where you have to keep all those fish; there is going to be a potential to high grade and dump those fish that are smaller.

Under that zero discard policy I think there are enforceability issues; particularly if there isn't any at-sea observer program taking place to monitor whether or not this zero discard policy is actually being effective and enforced. There may be other options that you may want to consider; such as the implementation or use of descending devices.

There is a lot of movement in terms of evaluating how successful those are on black sea bass, particularly at this time of the year where the fish are offshore in the deeper water. We're implementing a minimum hook size to kind of ensure that you're not catching those smaller black sea bass.

Then lastly, some items to consider under the exempted fishing permit. This is sort of, at least in my discussions with GARFO, since this was discussed in February. This is going to be a unique situation for an implementation of an exempted fishing permit. How do we go about implementing this, as there are a little bit of some question marks going forward?

But what I would see as some likely requirements of vessels that would participate, again sort of this submission of e-VTRs 48 hours after a directed trip is completed. That is part of the Council's e-VTR Framework. That will be a requirement, so 48 hours after a trip is completed they are going to have to submit a VTR. Again, this call-in requirement prior to a directed trip, I think is important.

I think we can add some additional conditions and reporting requirements for those vessels that do participate; either allow for at-sea or dockside observers to monitor and sample the catch that is taking place, and requiring the captains to collect additional information such as individual length and weight information on these fish. We're going to need weight information to begin with so that we know. Right now VTRs, all you are required to submit is total numbers of fish.

Well, we need to know what the weight of those fish are; so we can calculate what the implications are for the rest of the fishery. Weight information is really needed, and then any vessel that is interested in participating in the Wave 1 fishery would need to apply to be considered. But in developing the EFP, part of the application requires that purpose and goals and justification of the fishery be provided.

We haven't really talked about what the goals and what the justification is for this Wave 1 fishery. I provided some examples of what some information we could collect out of, and how that may be useful. But I think the Council and Board need to come up with a strong rationale, in terms of why GARFO needs to consider issuing an EFP for this situation.

I think how we handle applicants; traditionally an EFP is issued to a state agency. They are conducting the research or they're having people conduct the research for them, or we're getting it to a university; and they're conducting the research. I know this is a little bit different when we're opening up a fishery, so who is the actual applicant for the exempted fishing permit?

Is it the Council? Is it each vessel that is interested is going to apply, and each individual vessel gets an exempted fishing permit? There are some of those nuances that need to be considered. If there is really high interest in the fishery and if the Council and Board decide to

only allocate 15 vessels be allowed to participate in the fishery, but we get 50 vessels are interested. How do you make those decisions; in terms of who should actually participate?

Are there other reporting requirements that would need to be considered that we may want to put into this EFP? If it is decided to go down this road, I think after this meeting I would probably like to form a group of technical folks, and maybe even some Council and Board members to sort of flesh out the details of the EFP; and with GARFO, and figure out the best way to move forward and implement this. I think that is all I have.

CHAIRMAN LUISI: Any questions for Brandon? John Clark.

MR. CLARK: Thank you, Brandon that's interesting. What is the impetus from this? Where is this coming from? What information could you get from this fishery that you're not getting from other times of the year with black sea bass?

MR. MUFFLEY: Well I think the impetus was at the February meeting we got information about the positive status of the stock that there is high biomass, fishing mortality is low. This was an important fishery over time; so there was some interest in reopening the fishery, just to give fishermen access to a fishery that they used to have and they no longer do.

As I said, it depends on what we put in the EFP is I think the important information that we can get out of it. I mean we're already getting VTR information now, but I think additional biological information needs to be collected under this program that we're not collecting under VTRs; such as individual lengths and weights and some other biological information, to give us a sense of what the size distribution of the fishery is and what they are fishing on during this time of the year. Those are some of

the biological benefits of data collection we could get under this.

CHAIRMAN LUISI: Okay any other questions for Brandon? Okay seeing none; why don't we put up the tabled motion for this meeting and I'll just offer some thoughts while that is going up. We certainly need to work off of the motion that was tabled for this meeting. But in preparation for this and having listened to the number of questions that Brandon has regarding moving forward, if we do decide to move forward here. I think we need to make a decision today as a joint body.

The first decision is whether or not we do this or not. If we decide we want to pursue this, we need to select that allocation that would be given to Wave 1, based on the options that Brandon presented. A lot of these questions that are being asked for guidance from us tonight, it can't happen tonight. It is six o'clock already, these are big decisions that we need to make. I don't want to force it and have those decisions be made quickly.

I would rather have the opportunity to think about it and have all of you think about it, and spend some time developing this. In handling the tabled motion, this is something we need to discuss. I guess I read the motion into the record and go from there. This was an approved Council and Board motion. Tony DiLernia made the motion by the Council, and it was seconded by Howard King.

The Board made the motion, Steve Heins, and it was seconded by Eric Reid. We do have a motion for discussion; and that motion is to move to allow an experimental 2018 January/February Wave 1 recreational federally permitted for-hire fishery for black sea bass, with a 15-fish per person possession limit, a suspended minimum size limit, and a zero discard policy; to allow for barotrauma and a mandatory trip reporting requirement; discussion on the motion. Tony DiLernia.

MR. DiLERNIA: While I have the floor, I understand it's a late hour but there are a number of issues I must discuss. First of all when I originally intended to offer this as an action at the February meeting, I had discussions with some of our federal representatives. It appeared that the only way to do this at the time was as an experimental fishery.

Well, the only way we could do an experimental fishery was for federally permitted vessels. My original intent was to have this motion apply to all recreational vessels; not just federally permitted vessels, which means for-hire vessels. I was disappointed that I wasn't going to be able to do that and so I proceeded with the motion that discussed an experimental fishery; which would eventually result in federally permitted vessels getting an experimental fisheries permit.

But as I discussed this with fellow council members, there appeared to be a number of recreational anglers, private recreational anglers in different states that felt that it was perhaps a resource grab, which it wasn't. That I was being unfair to them, recreational fishermen in states, private recreational fishermen; and that they had also participated in the fishery traditionally, and they wanted to be able to have the opportunity to participate again.

I went back and I thought about it and I said well, let's try to do it for 2018 as an experimental fishery with just federally permitted vessels, and then if things work out and if things are developing the way we like, as we develop regulations for 2019, we could open it up to everyone.

That was the premise that I was operating under. Brandon did a very good job, and the staff has gone a very good job of developing a white paper based on some of my thoughts and some of my recommendations. But it has come

to my attention that there is another way that we could do this. It seems that any vessel, be it a federally permitted vessel or a private recreational vessel, can obtain from GARFO a letter of authorization that permits them to participate in the fishery. Well gee whiz. That is exactly what I would like to do. I don't want to restrict it to just for-hire vessels.

I would like to have it opened up to all recreational vessels. Let the recreational vessel apply for a letter of authorization, now with that is going to come requirements; a mandatory reporting requirement. Just think, we're going to have private recreational vessels mandatory reporting. Not a two week recall period versus MRIP, but rather writing down, reporting exactly what they caught within 48 hours of their catch.

I think that information will be a big more accurate than some of the MRIP numbers that we've been getting. The zero discard policy, I would still encourage to go that route; because I believe the barotrauma that exists by having a minimum fish size in this fishery in the deep water, results in a tremendous waste of fish that are discarded.

You throw a short fish over the side, it has already been inflated; a dogfish will eat it. On a descending device, well you're just sending it down to the dogfish a little bit slower so he can get to it. The descending devise is not going to work. You need to have a zero discard policy. Will there be some high grading? Yes. Let's face it. We have to admit reality.

There will be some high grading. But will it also affect the way people fish, the zero discard policy? Yes it will, because rather than spreading two anchors out over a couple thousand feet of rope. Sometimes it takes 45 minutes to set a set of anchors in really nasty weather. You're going to do a drift on the wreck first.

Once you do that drift and you take a peek at what is going on there. If you see a lot of small fish coming up off that wreck, you're going to move to the next wreck. It is going to affect angler behavior; it is going to affect captain's behavior, as far as observers are concerned. Some of my colleagues have suggested that we need to have some observers onboard.

Well, it is very simple. On a for-hire vessel anyone can go in plain clothes, pay their fare, fish and observe what is going on the vessel. That's the only sector that we can do this in. You can't do it on a commercial vessel, you can't do it on a private recreational vessel; but a for-hire vessel, any law enforcement agent can go on a vessel, pay their fare, and observe what is going on.

Now that is for purposes of law enforcement. If you want to have observer coverage a little bit differently, take some of the MRIP samplers; put them on the boats. Let them watch what is going on. You can collect data. You can collect data using the letter of authorization. We can include the entire universe of recreational fishermen.

I believe this is something that we should be considering. Now you're going to say to me well, why should we consider this? We just reduced Wave 6 down to 5 fish; and now you're walking in here with saying Wave 1, 15 fish. Yes I understand that. But what we're trying to do is to restore fishing opportunity to the recreational community. There is a tradeoff here of four or five days. In New York if you did this with some of the poundage that you assigned to the fishery, New York and New Jersey have to give up four or five days each. Just think New York would give up five days fishing opportunity in exchange for 60 days of recreational opportunity during the months of January and February. Not just for for-hire vessels, for anyone. Recreational fishermen want to have the opportunity to go fishing.

I'll trade you five days during the summer, when there's a time that you can fish for other species in exchange for 60 opportunity days during the winter months; when there is not much left to fish for. This fishery was developed once we lost the codfish. Southern New England vessels, once we lost the codfish in the late eighties, early nineties, we developed this fishery offshore. For all those reasons, I believe that this is an action that we should take.

Now, my motion speaks to a recreational federally permitted fishery. I'm not sure how you want to go about doing this, Mr. Chairman, but I believe that we can initiate at this meeting a framework to create this 2018, January/February recreational fishery; with the vessels that are participating obtaining a letter of authorization.

Now my final comments let me just say this. I want to thank the Agency, for being helpful and making some recommendations. I want to thank the staff for working on this paper. I want to thank Adam for working with me, and very hard in trying to make this happen for all recreational fishermen. I'm not sure how you want to proceed, Mr. Chairman, but I believe this is an action that we should be taking; and probably the best way to go about it would be to initiate a framework for 2018.

CHAIRMAN LUISI: Obviously you're changing the approach that was tabled to this meeting. There are a couple things. By going down the path of a framework that would mean the Board would take action to initiate an addendum as well; so like action by the Board to meet and discuss. The process of that would take six months, perhaps.

The second point, the work that Brandon did on the white paper was directed based on this motion. None of the analyses that we just had reported would apply, because now this could be thousands of thousands of recreational anglers versus a few charterboats. I just want to make that clear; that I don't think we can use all of the analyses that Brandon put in his white paper and apply it to how this would change as a result of your suggestion.

Now, in order to handle this motion, what we need to do to change it is to substitute for it. I think there are too many changes. We're not amending it by a word or two; this is a whole new entirely different path forward. I would offer that to you as the path that we need to take. We need a substitute for your previous motion, and the motion by the Board that we were discussing today; and consider that as a joint body.

MR. DiLERNIA: Yes, I agree with everything that you've said. Quite frankly that is why I initiated this action in February of '17, for January of '18. I know how long it takes us to do things. I mean I want to be able to get people the opportunity to plan. We're going to have time. We're going to have months to develop this framework, and to go forward with that.

Yes, I understand that the numbers that Brandon worked up in the white paper regarding the amount of fish to be allocated to Wave 1 was based on the VTRs. Now I'm expanding it to the universe of all recreational vessels. That number is going to have to change. But we don't know what that number may or may not be. That guite frankly is a number that we're going to have to figure out and decide upon based on how it effects. Quite frankly, each individual state is going to have to look at it and say, how does it affect the anglers in my particular state? What are the benefits and the cost of those benefits to my particular state?

You won't know that until you initiate the framework. We need to initiate the framework in order to keep this moving and keep it rolling along. After we initiate the framework, after we're done and people look at the numbers

they'll say, no we just can't do this. If that is the case well, then they'll have to accept that vote.

But I'm convinced that if we start to do the work of the framework and we start to look at the numbers; and we consider this as something that eventually we will view favorably. I have, if you want me to withdraw my original motion and make another motion, or if you would like me to make a substitute motion; whatever is the pleasure of the Chair, I would be happy to follow.

CHAIRMAN LUISI: John or Mike.

MR. BULLARD: As Tony says he and Adam have spent some time talking to the Service about this. While it is a new approach, it doesn't necessarily mean it is a more complicated approach; it's just different. Like the EFP letter of authorization is also controllable, and Brandon's paper, which is a good analysis, raised some questions.

One of the questions is what is the scientific purpose? Well, you need that in an EFP; you don't need that in a letter of authorization. Another question is who is the applicant? Well you need that in an EFP; you don't need that in a letter of authorization approach. There are some things that if you go down the road of a letter of authorization, all of a sudden some of these questions don't have to be answered.

I think that some of the analysis that Brandon's done is still good in this approach, in terms of while you might not know how many people would participate; you still have the ability to, once you do know how many LOAs are out there. You can determine or shut the season down once you hit it; because these people would be reporting every week.

You've got pretty fine tuning, in terms of controlling it. I think if we initiated this now, we've got time to put this together. If the Board and the Council want to go down this

route, I think we may be able to do it. We certainly want to work with you, if it's the will of the Board and the Council.

CHAIRMAN LUISI: All right, so in order to move this along. Obviously the motion in front of us is not what you were intending. I would look to you, Tony to make a motion; and that motion would be in the form of a move to initiate a framework/addendum, so that actions are being taken by both the Council and the Board simultaneously to allow a Wave 1 fishery. Okay, if you have something.

MR. DILERNIA: If I may read.

CHAIRMAN LUISI: Sure.

MR. DiLERNIA: I withdraw my original motion and I'm not sure parliamentary, Mr. King, can't we do that? No. Parliamentary, whatever, I have a new motion. Do you want the motion? I move to withdraw my original motion. All right, I move to substitute for my original motion. My substitute motion is to initiate a framework/addendum action.

For the council I'll make it to initiate a framework. Someone will have to make an addendum motion for the Board. I move to initiate a framework to create a 2018 January/February black sea bass recreational fishery, with the vessels participating in the fishery being required to obtain a letter of authorization from GARFO. The fishery would establish a 15-fish per person possession limit.

I would suspend the minimum size limit. I would again establish a zero discard policy and require a call-in and call-out process, and require mandatory trip reporting; and for the fishery to close once the quota is met. Whatever quota, we'll have to decide what that quota is at a future meeting. That is my substitute motion. I'm not sure if you got it all up there. That's good.

CHAIRMAN LUISI: Okay, so you're making that motion on behalf of the Council. The motion is made, do we have a second from a member of the Mid-Atlantic Council for this; Adam Nowalsky seconds the motion? Let me look to the Board, we're going to need like action by the Board; Jim Gilmore. Jim, would you add addendum next to framework here.

MR. GILMORE: Yes, just exchange the word framework with addendum and everything else should be the same.

CHAIRMAN LUISI: Let's just get it right here, so Jim has made the motion on behalf of the Board. I'll look for a second on behalf of the Board; Rob O'Reilly, discussion of the motion, Adam.

MR. NOWALSKY: Again, I appreciate Tony's efforts in getting this off the ground. I appreciate the Service's efforts in being willing to work with both of us to provide us a path forward. We could is such a powerful phrase, and then put it in the power of ourselves here to work out the details.

But giving us a path forward is tremendous cooperation; and it's much appreciated here on all levels. Again, I'll certainly leave it to leadership to determine that the addendum is needed at the Commission level. I think it's just a function of the states opening their fisheries, perhaps. There might be some more conversation about that.

I'm not familiar enough with that LOA process to know that the Commission needs to take the complementary action. Obviously if it is, great we'll go through that process. With regards to the measures that are in here, I would suggest that these are measures that we use as a baseline when we start the framework process; and that we could have discussion about them during that framework process, to decide if they are in fact correct and whatever further analysis is done.

In talking with a lot of Council members prior to this meeting, there were a number of concerns about the EFP process; I think John did a great job of itemizing a lot of them. I think this addresses a lot of those concerns, gives us away forward, and also gives us the time through that framework process to make sure that we have any other information we need. I thank Council members, Commission members today for supporting this issue.

CHAIRMAN LUISI: Peter deFur.

MR. PETER deFUR: Thank you, Mr. Chairman. I think this question is mostly for Chris, in terms of where such an effort would fall in our annual work plan. I know that there is always a black sea bass effort in our work plan every year. But where does this fit in terms of completing the already overburdened efforts of staff?

EXECUTIVE DIRECTOR DR. CHRISTOPHER M. MOORE: That's an excellent question, Peter. I have no idea. Just sitting here listening to the conversation, we walked into the meeting talking about EFPs. Now we're talking about LOAs. I'm not even sure how the LOA process would work in this particular circumstance. I would have to have some conversations with GARFO.

But in terms of our workload, we would have to have two framework meetings back to back. We would have to make sure that those framework meetings occurred in time to allow for us to effect a change for January 1. That would mean June, right and August. I don't know if we could do August and October. We already have an agenda out for the June Council meeting, certainly this wasn't contemplated for June. I'm not sure how we could get it done.

CHAIRMAN LUISI: Rob O'Reilly.

MR. O'REILLY: I wanted to say that I support this motion. It's entirely different than what we had tabled, so it changes a lot of things; as far as my perception goes. I do think that Tony's indication that once we get sort of a straw man idea of what the states are planning; that it could be that it's overwhelming. I don't know that.

But I think it's worth trying. I had this motion back in 2013, and then a year later because of circumstances, RSA, things of that nature, it wasn't perceived very well. I think it is overdue to take a look at this. I am aware, as everyone else is around the table that we have to watch 2017 pretty carefully, and hope the action today helps out. We'll be watching that and we know that this fishery is very important to many.

CHAIRMAN LUISI: Dewey Hemilright.

MR. HEMILRIGHT: This could be real interesting with a letter of authorization, if you're not going to cap how many letters you're going to give out to everybody. Are you going to give 50,000 or whatever? It is kind of changing thinking here what's going on with the amendment that was passed before; because I was thinking more of an exempted fishing permit with a limited number of vessels that you could get some biological sampling on.

With zero discards you could have high grading that you're not going to be able to control in any way, shape or form. I'm for people going fishing, but this is going to be real interesting. You know you're not putting - are you going to limit to 10,000 people or what is the amount of poundage here before we're going on? You need to put poundage of what is it going to be, when is this going to come up? Because I just see exempted fishing permit or what it started out to be; and this is totally different. But it will still be interesting for me to sit back and watch how this folds out; and who you're going to deny a permit to, or is everybody going to fill out a letter of authorization? This could be some hacked off folks, because they didn't get their letter to go fishing. With exempted fishing permit, you would have more control over your vessels.

Not only that with the headboats, you would put a percentage of 10 or 15 percent observers on there to get the data that you need, and you would have some that wouldn't have observers, some would. You would be able to see it a lot different. But it's interesting, but it's just where your limits are going to be was better with your exempted fishing permit, what it started out to be, and this I see it just kind of you are going to have to limit somebody; unless you're going to just put out 10,000 letters of authorization and everybody go fishing.

CHAIRMAN LUISI: I think to your first question about allocation. That would obviously be a part of the framework and the addendum. But to your second question I might turn to GARFO; if you have any response or not about the letter of authorization and how that process would work, if you guys want to address anything Dewey asked, or we would wait to see how this just flushes out.

MR. PENTONY: Yes, I think Dewey hit on some important questions that I think would be fleshed out during the development of this framework adjustment. It's probably premature to try to answer all of them now; but dealing with the rough concept with the letter of authorization that we have in other fisheries, just as examples.

We have had letters of authorization that we issue for a seven-day period, and impose as conditions to fish under that letter of authorization; which exempt you from what the regulations would otherwise be, certain conditions for reporting, so a call-in prior to the trip, call-out after the trip with reporting through IVR.

We would only issue new LOAs for another seven day period; if the quota hadn't yet been reached. The idea is if we're getting that trip-

by-trip reporting, and we're issuing LOAs that expire after seven days, then it is easier at least conceptually it is easier to contemplate that when we get sufficient data indicating that the quota has been reached. We simply stop issuing LOAs at that point; in order to preserve whatever allocation is established by the Council.

CHAIRMAN LUISI: John.

MR. BULLARD: I think, I mean this is going to be how this is worked out. But I think both are privileges. I think it's important to establish that up front that no one has a right to an LOA, any more than anyone has a right to an exempted fishing permit; and that to use Dewey's technical term, people may be hacked off, whether they don't get an LOA or whether they were excluded from an exempted fishing permit. In either case they might get hacked off.

EXECUTIVE DIRECTOR MOORE: Since you guys are in the mode of answering questions, I've got one for you. When I was addressing Peter's question earlier, I talked about timing. Am I correct that the second framework meeting, if in fact we move forward with this, would have to occur by August; in order to get a change made by January 1 of 2018?

MR. PENTONY: I think that's correct, Chris. I'm don't know exactly when in October your meeting is, but yes I would imagine that if your second framework meeting isn't until October; expecting completion of the document, submission of the document proposed in final rule making by January 1st is not a realistic expectation.

EXECUTIVE DIRECTOR MOORE: I thought you would say that. Having the expectation that we would have the first framework meeting in June is probably not something that we could do. I can't imagine that we could turn around coming out of this meeting and put together a

framework package for consideration of the June meeting; and actually have the Council consider it. That is a problem. We would have to think of some alternative that would involve, I don't know, something else.

But we certainly at this point do not have room on the June agenda, nor do we have time in terms of staff time to put together a package for the Council to consider. The first framework meeting, if again we decided to move forward with this. The first framework meeting would be August. That would be August, October, we would miss our January 1 start date. That would be a problem.

CHAIRMAN LUISI: All right thanks, Chris. I have a couple more commissioners and board members who want to speak. I'm going to try to limit this debate to the next ten minutes; because we still have a lot of things we need to cover tonight, and it's getting late. Right now I have David Borden and then David Pierce.

MR. BORDEN: I'll be brief. Although I applaud the advocates for this, I have some reservations and one of them I won't repeat what Chris just said. I think it's almost an impossible timeframe. If we had the details of the proposal before us, I think it would be realistic to expect that we could work through all the issues; but we don't have the details.

I for one want to know the details; particularly if it's going to have implications for other recreational fisheries. The other major concern I have about it is the Commission and the Council have vast work tasks on scup, sea bass and fluke. I need to know how this meshes with all of those other tasks. There is just a lot of uncertainty there.

The final point, when Brandon gave his excellent presentation he qualified it basically by saying that there were 39 vessels that had a history of participation. But in reality there are 300 potential party charter boats, and Brandon,

correct me if I misstate the facts; that could potentially apply. Then we're going to open it up to all the recreational fishermen. At least my history with this process, I've never known NOAA to be willing to issue an unlimited number of LOAs.

DR. PIERCE: Got to love the optimism. Administratively difficult to do, tremendous monitoring challenges to overcome, timing problems, no real objectives for it; except to provide opportunities for fishing in Wave 1. There is no experiment behind this. There is nothing really behind this except to go fishing. As noted in that very well done presentation by Brandon, high availability, and high discards, they will be high grading.

We'll all have to reduce our recreational harvest within our individual states to account for what might be caught during the wintertime, January and February. Then of course there is the assumption, I think that the 2018 recreational harvest limit is still going to be significant or meaningful; and I don't think it will be. This is nothing I can support. This is a waste of time, and it diverts attention away from ASMFC staff and Council staff to do very important work on other aspects of managing the black sea bass, fluke, to name just a few.

CHAIRMAN LUISI: Roy Miller.

MR. ROY W. MILLER: I'll be brief. I believe I'm the only one to raise this particular point, and my concern, which may be a function of my age; I don't know. I'm concerned, by opening this up to all vessels as opposed to just for-hire vessels from the original proposal, I'm concerned about safety considerations for those who might apply for these particular permits. We're almost creating a derby type fishery; very attractive to the average angler with a 20 foot boat, and those people have no business being that far offshore in January and February; so I just throw that concern out there for what it's worth.

CHAIRMAN LUISI: Last word, Tony.

MR. DiLERNIA: A waste of time, gee whiz. You know we wouldn't be in this position if 20 years or so ago when we said we want data collection for this fishery. Folks in the agency, not the present representation, but previously in the agency said, oh no this fishery is so small. We don't have to sample it. We don't have to do any work to document this fishery.

We don't want to do any work. Okay, so then we didn't do any work; and what happened? A lot of people that worked 62 months a year got put out of work, because government didn't want to do its work. Now we're saying, oh my goodness this is going to be more work for us. Yes it is. It is going to be more work for us so that other people can go to work.

We have to do this. On top of that think of the policy changes that you're initiating. You're getting recreational fishermen to go to the federal government and say, I want a letter of authorization to fish, and I agree to the mandatory reporting requirements that you're attaching to this. Think about where we've come; from people opposing a recreational fishing license, to the point now where people are saying, I'll sign up for this. Let me report what I catch.

That is light years away from where we were; and yet we're afraid to do it. Are we afraid to do anything different? Are we afraid to do anything new? Anything different and new is going to take work. Albert Einstein once said, "The definition of insanity is doing the same thing over and over and over again, and expecting a different result."

If we don't do something, if we don't change it, we're going to be doing the same thing over and over again; and the results are going to be the same. Pass this motion. Let's get this work done. If we have to start in February, because the agency can't start it in time for 2018,

January 1st, well that may be what we have to do; but pass the motion. Let's get it done, and let's get the work done so that when we look at it in '19, we're not sitting around in '18 saying oh, we can't do it in '19; we have too many things to do. Pass the motion.

CHAIRMAN LUISI: Are there any members of the audience who would like to voice an opinion on this? Jeff. If I could ask you again to just keep it as short as you can, in support or in opposition.

MR. GUTMAN: Well I certainly echo the comments that Tony DiLernia made. I mean this has really gone down a real slippery slope here. I mean you are talking that you don't have time to do what people are being paid to do. I mean I can't even go to work the way this is. This is at the end of the day, everyone is tired, and nobody wants to do anything.

But for God's sakes, an hour ago everybody around here just approved a motion that in essence threw New Jersey under the bus; with no idea, nobody knows what the effect of a five-fish bag limit is going to be, if it is going to have any conservation effect or a limited conservation effect, or if we're going to preserve the RHL for 2018.

Nobody knows that; but you guys were quick to do that and undercut, basically you've eviscerated the fishery in New Jersey now in November and December. Now we've got to work with that. Now you're too lazy to go do anything here, it sounds like. This is just so people can go fishing. Isn't that what this is about? I mean to allow a sustainable fishery to exist and to manage it? I mean if we're not going to manage it then what is everyone doing here?

I mean we take out recreational fishermen in the wintertime. This is not somebody going out for fun. While it may help me from a business standpoint, these are recreational anglers that some of whom own private boats, and go on our boats because it is safer. Yes, there are a lot of anglers from North Carolina to Maine, or wherever they may be from, who come and fish on a handful of boats in the wintertime; because there are only a handful of boats that go do this.

But these are still taking recreational fishermen out, and these fishermen shouldn't be disenfranchised. They are no less important than the fishermen in July or August. To say that ah, we don't want to do it. We can't get around to it. Find a way. I mean this is ridiculous. Just so you know some of the numbers that Brandon threw out earlier are someone biased.

In 2012, Wave 6 was closed. Those wrecks stood there just accumulating fish, and then we were blessed with nice weather and the chance to go fishing in Wave 1, and that is why you saw such a high catch in Wave 1. Wave 1 there was a lot of fish around and we happened to have nice weather.

The reason there was a lot of fish around is because there was a low commercial quota at the time, and there was no fishing on those wrecks in November and December of that particular year. Lastly, with the LOAs, I don't think too many private boats are going to use LOAs. They're not going to go through the time and effort to do that; and to fulfill the requirements.

To tell you the truth, most of them, certainly most of them from probably Maryland up or maybe even Virginia. A lot of places, marinas, tell their private boaters they have to be out of the water by November 1st, certainly up our way they do. A lot of those people aren't even in the water. It is not like you have 10,000, 50,000 permits; as Dewey may have alluded to.

You're not going to have that because those boats are not going to be in the water, because

their marinas don't even let them be in the water. I don't think you're going to have this tremendous effort; and I think that some people are going to fish on headboats, and some people are not. But we are taking recreational anglers out. They are deserving of going fishing at a time where historically they were allowed to fish, at a time that they look forward to; and used to look forward to all year. They would forego other fishing opportunities so that they could go at this time, and we should let them have it again.

CHAIRMAN LUISI: One more speaker.

MR. HOWARD BOGAN: Yes, Howard Bogan; I want to pretty much just echo what Jeff said. I've been doing offshore trips since the early eighties. We rarely see recreational vessels out there in January and February. This numbers of 10,000, 50,000 people looking for letters of authorization is a joke. Even in '13 when they opened it up, and it was great weather and great fishing, we still hardly saw any recreational vessels out there. This is not going to be some massive fishery that you're talking about. We do carry recreational people that like going out that time of year, and we should be able to fish then. It's not going to be a very big quota.

CHAIRMAN LUISI: Okay back to the Board. We need to dispense of this motion and take this action. I was just reminded that the garage closes at seven o'clock, so if anyone is planning to leave tonight. We have to just take action here. We're going to take a break. This Board and Council is going to decide right now whether or not to move forward with this action, and then we're going to take a short break; so those of us that have cars in the garage can move them. With that said, does the Board need to caucus on this? Do we need a one minute caucus? Doug.

MR. GROUT: Just a very quick question to help us on this. This motion is specific to 2018. Does

that mean that we would have to go back and initiate another framework and addendum if we wanted to do this in '19 and '20 and beyond, or is the intent of this motion to initiate a framework and addendum to do this in January and February from now and in future years?

CHAIRMAN LUISI: The intent would be to have this done by January 1st. Whether or not that continues for future years could be something that is in the addendum. That is how I would interpret it.

MR. GROUT: It says allow a 2018, January/February black sea. It doesn't say. I would suggest that if the intent is that they want to get it in by '18, but they want the ability within the addendum to have it continue on; that it just say allow a January/February black sea bass recreational fishery.

CHAIRMAN LUISI: Let me look to the maker of the motion on that. Tony, so Doug was suggesting that instead of identifying this as 2018, you strike 2018 from this so that it would continue into the future and not just be for one year.

MR. DiLERNIA: I would be happy with that; as long as we don't lose the urgency of having this completed for 2018. I'm afraid if by removing that 2018 date, the urgency to have it done falls by the wayside; as long as we have an understanding or to allow 2018/19, and beyond. What was the space guy who did that? To allow a 2018/19 and beyond, there you go, and I'm good with that. But I want the urgency in place for 2018.

CHAIRMAN LUISI: All right is everyone else that has a motion for this; are you okay with making that amendment? Well, one minute caucus. Then we're going to call the question. I'm going to read the motion into the record, and then we're going to ask the Board and Council for their vote. Move to substitute to initiate a framework/addendum to allow a 2018 and

beyond January/February black sea bass recreational fishery, with the participating being required to obtain a letter of authorization from GARFO; also a 15-perperson possession limit, no minimum size, zero discard policy and require a call-in and call-out process and mandatory trip reporting. The fishery closes when the quota is met. Is the Board ready for the question? All those in favor of the substitute motion for the Board, please raise your hand; it is 10 in favor. All those opposed same sign, it is 3 opposed, any null votes, any abstentions, okay that is 0, 0.

For the Council, is the Council ready for the question? All those in favor of the motion, please indicate by raising your hand; that is 13 in favor. All those opposed; that is 2 opposed, any abstentions, okay seeing none, motion passes. We now have a substitute motion that is the main motion. Do we need any additional time to caucus? I hope not, because I need to run across the street very quickly in about 30 seconds.

With that said, I'm not going to read the motion back into the record. The substitute motion is now the main motion. We're going to take the Board vote first. All those in favor by the Board of the main motion, please indicate by raising your hand, 10 in favor, all those opposed; that is 2 opposed, any null votes, none, any abstentions, no abstentions.

For the Council, all those in favor of the main motion, please indicate by raising your hand; that is 13 in favor, all those opposed, 2 opposed, any abstentions? Okay, motion carries. That concludes our business under this agenda item; let's take a ten minute break, and we'll come back and take up our last two issues. This is the last issue that the Council needs to weigh in on, so if Council members want to leave they are welcome to. Thank you, I'll be back in ten minutes.

(Whereupon a recess was taken.)

CHAIRMAN LUISI: I do apologize to all of you for not holding up my end of the bargain here; to keep us on track. I knew we weren't going to stay on track, I just was being optimistic. I am sorry that we are running so far over. We did discuss how many things were on this agenda, and realized that this may be the case.

But we only have two more issues to discuss tonight.

REVIEW STATE COMPLIANCE WITH ADDENDUM XXVIII SUMMER FLOUNDER RECREATIONAL MEASURES

CHAIRMAN LUISI: We're going to move to Item Number 8 on the agenda, which is to Review State Compliance with Addendum XXVIII Summer Flounder Recreational Measures. Kirby is going to give us a presentation, and there might be action that will come after Kirby's presentation, so Kirby when you're ready.

MR. ROOTES-MURDY: It is a pretty short presentation. First is background. The Board approved Addendum XXVIII in February of 2017. The addendum specified that states needed to notify the Commission of the measures they were going to implement by March 1st. The Board met via conference call on March 30th to review proposals from Massachusetts and Rhode Island for alternative measures for 2017 that differed from those that were spelled out in the Addendum XXVIII. Those proposals were not approved.

Moving forward, nearly all the states have both indicated their 2017 measures for summer flounder recreational fishery in 2017, and implemented them. New Jersey has not implemented measures. The next slide here shows what the approved measures were for 2017, as per the Option 5 that the Board selected. Then next we have the implemented measures for 2017 so far, the days in terms of the start and dates differ a little bit from previous years. But as you can note here, New

Jersey has not implemented those measures yet. For the Board's consideration today, taking action for states/regions that have not implemented the provisions of Addendum XXVIII; and I'll take any questions now.

CHAIRMAN LUISI: Any questions for Kirby regarding his presentation? David Pierce.

DR. PIERCE: Just to make sure I've got this, Kirby. What states have not yet implemented their rules for 2017?

MR. ROOTES-MURDY: New Jersey.

DR. PIERCE: New York has?

MR. ROOTES-MURDY: Yes, as of this afternoon, New York has implemented those measures. They were signed by the governor, and I was sent notification of that.

DR. PIERCE: Okay I'm still confused. I thought New York was appealing on the fluke measures. What has happened relative to New York and fluke?

CHAIRMAN LUISI: I'm not aware of an appeal by New York on fluke. There is an appeal by New Jersey. Unless you guys know something I don't, Jim. There has been no appeal.

DR. PIERCE: It's late and I'm probably mixing up sea bass and fluke, so all right, thank you.

CHAIRMAN LUISI: Why don't I just clarify what we're asked to do here? I've been made aware of an alternative approach that New Jersey would like to discuss with the Board this evening. However, I feel that the question that the Board is being asked right now to decide upon is whether or not we want to make a recommendation to the Policy Board, to find any state that has not implemented fluke measures as a result of the decisions that were made on Addendum XXVIII; if we want to make

Draft Proceedings of the Summer Flounder, Scup, and Black Sea Bass Management Board and Mid-Atlantic Fisheries Management Council Meeting May 2017

a recommendation to the Policy Board to find them out of compliance.

That is the question before the Board. New Jersey is the only state that has not put forth those measures that were all part of the option that were voted on as part of Addendum XXVIII. That is the question. Do we want to make a motion? Does the Board want to take action to recommend to the Policy Board New Jersey being found out of compliance? I say that meaning that I view this issue and the recommendation to the Policy Board as a black and white issue. They are in compliance or they're out of compliance.

That is my interpretation of the idea behind the compliance measure. Now, I mentioned that New Jersey would like to present an alternative approach, after this action is taken on whether or not they're compliant or not. I would offer them that opportunity to make that appeal. That is the wrong choice of words, to propose what they're considering. But let's dispense with the issue over compliance now; and then we can turn to that.

DR. PIERCE: With that said and with that clarification then I would move to recommend to the Policy Board that New Jersey be ruled out of compliance.

EXECUTIVE DIRECTOR BEAL: Out of compliance motions have a lot of very specific, prescribed parts. In the anticipation that this may come up at this meeting, staff went ahead and pulled together a motion that Dr. Pierce, redo it if that is what you want, then we can go with that if you want to make changes to it that's fine. But there are a number of sort of prescribed pieces that need to be in a noncompliance motions.

DR. PIERCE: With that said, then I'll make the motion, which is the first one on the top, right? That is the one that you penned?

MR. ROOTES-MURDY: No, it is the whole thing.

DR. PIERCE: The whole thing.

CHAIRMAN LUISI: Start reading, Dr. Pierce.

DR. PIERCE: Wow, okay, standard stuff, okay the intent is obvious. Do I need to read that? I guess I do, don't I? I'll read it if need be, Mr. Chairman.

CHAIRMAN LUISI: I can read it or you can read it.

DR. PIERCE: I'll read it. I can see that far. I would move that the Summer Flounder, Scup and Black Sea Bass Board recommend to the ISFMP Policy Board that the state of New Jersey be found out of compliance for not fully and effectively implementing and enforcing Addendum XXVIII to the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan; if the state does not implement the following measures by May 21, 2017.

Shore mode for Island Beach State Park only, 17-inch minimum size limit, 2-fish possession limit, and 128-day open season, Delaware Bay only west of the COLREGS Line; 17-inch minimum size limit, 3-fish possession limit and 128-day open season. All other marine waters east of the COLREGS Line, 19-inch minimum size limit, 3-fish possession limit, and 128-day open season.

The implementation of these regulations is necessary to achieve the conservation goals and objectives; and there are shadows on the screen. I can't see that far. I'm reading over here. I can read it, and objectives of the FMP to end overfishing of the summer flounder stock. In order to come back into compliance the state of New Jersey must implement all of the measures listed above as contained in Addendum XXVIII to the Summer Flounder FMP. That is my motion, Mr. Chairman.

CHAIRMAN LUISI: Thank you David for reading that into the record. Do I have a second on this

motion? Bob Ballou seconds the motion; discussion on the motion, any discussion? Tom. Tom, before I go to you, I think we've identified a typo or an error in this motion. I'm not going to ask you, David, to reread it. But the Delaware Bay only west of the COLREGS line should have been 18 inches; that was part of the Option 5 as it was described. With that Tom, did you have any comment?

MR. BAUM: I realize there is a motion on the floor. If this happens, then we'll get a chance to at least possibly discuss our alternative measures. I am not quite sure what happens after that; if there is another motion that could be contingent on these other measures. Maybe you can follow up with that.

CHAIRMAN LUISI: Yes, I would be happy to. I realize that there might be another motion regarding the alternative measures that you may suggest. This is not determining noncompliance; this is recommending to the ISFMP Policy Board whether or not this Board would recommend to the Policy Board a noncompliance finding. Tomorrow, depending on what actions are taken after this action is taken, I want to get this off the table; so that we can address your alternative proposal.

As Kirby mentioned, there were previous alternative proposals that were reviewed and the Board denied. There will be a follow-up action to this action; the way I'm seeing it take place, whether or not the Board would want to agree to allow New Jersey and/or now, the previous proposals from Massachusetts and Rhode Island to be put forth.

All of this action today will go to the Policy Board, and the Policy Board I guess will be hearing the appeal; as well as making a final determination on whether or not to recommend noncompliance. Those actions will be taken up at a different time, if that makes sense. Okay, Bob.

EXECUTIVE DIRECTOR BEAL: I think one important thing to remember in this motion is that the Summer Flounder Board is recommending that the Policy Board and potentially the Full Commission find New Jersey out of compliance; if they haven't done something by May 21st. This isn't an immediate noncompliance finding.

It is an, if by date certain something hasn't happened in New Jersey, then letters could be sent off to the Secretaries of Commerce and Interior. This is not an immediate noncompliance finding. That window I think provides some of the opportunity that the Chair is speaking of to consider these alternative options that New Jersey appears to be potentially bringing forward.

MR. NOWALSKY: This motion is very specific regarding the number of days, size and possession limits. When we had a motion about black sea bass earlier about very similar measures, and we allowed for conservation equivalency, is the message here that it needs to be exactly these measures; pending other discussion or are we saying or something equivalent to those measures by May 21st?

EXECUTIVE DIRECTOR BEAL: I think, Adam, the wording is in there now because those are the suite of regulations that the Board has approved so far. If a new set comes forward, I think that at the Policy Board level those can and should be reconsidered at that time, to maybe changing the wording of this motion or incorporate the notion of conservation equivalency.

CHAIRMAN LUISI: Any other discussion on the motion? Seeing none; does anyone need to caucus on this? Raise your hand if you need to caucus. Seeing no hands; do I need to reread this to the record? Since it was only a few minutes ago, I'm going to let David — you're going to give me a pass on this one to reread it.

We have a motion, essentially what this motion does is recommends to the Policy Board the finding of noncompliance; based on New Jersey's implementation of Option 5 regulations, which include what is listed here. As Adam mentioned, when this comes up in front of the Policy Board tomorrow; depending on what further action this Board may consider tonight. Those modifications could be made at the Policy Board level, depending on whether or not the alternative approach that New Jersey is preparing right now to present is something that this Board would agree upon.

All those in favor of the motion, please indicate by raising your hand. It is 9 in favor, all those opposed same sign, 1 opposed, null votes, seeing none; any abstentions, 2 abstentions. Okay this motion carries and will be made tomorrow to the Policy Board; Tom, back to you on the alternative approach.

MR. BAUM: Yes, thank you, I did provide those measures to Toni. Back in February we made a plea to remain at 2016, or to postpone the motion. We didn't receive support. We made the plea to have time to figure out something that would work, work for our fishermen. Since then we filed an appeal on that February 2nd decision to the Commission. I believe it is on the agenda for tomorrow at the Policy Board.

We've also been working with NOAA. Our Commission has been working with NOAA. Our Technical Committee member has been working on basically a conservationally equivalent proposal. I believe at least one other person from the Technical Committee has seen it, but not everybody on the TC.

The new option is based on both the harvest and the discards mortality. We find it more conservative than having a 19-inch size limit, 3-fish bag and 128-day season. Again, we were in consultation with NOAA Fisheries, and I believe the TC member from New York. I believe NOAA Fisheries supports this methodology.

Without further ado, we're proposing to have an 18-inch minimum size limit, a 3-fish bag limit and a season of 104-days; and that season would be May 25th to September 5th. Those dates are important because they get both of the major holidays in, being Memorial weekend, the whole weekend, and the Labor Day weekend.

As far as the methodology, in comparison these measures equate, as far as dead discards. At 19 inches we'll have all these extra dead discards, regulatory discards, the mortality from these discards; and we eliminate them by staying at 18 inches. We eliminate the majority of them. Compared to Option 5, going to 19 inches, the total mortality would be 1,195,155 fish as opposed to what our 18-inch size limit would do, would be 1,280,936 fish.

Depending on what percent of mortality rate you use for the discarded fish, if you use a 10 percent discard mortality rate, which is what is accepted, it would be a 23 percent reduction from our 2016 regulations. We're proposing to have an outreach and education blitz, as far as angler behavior and fish handling and releasing; so we would reduce that discard mortality by at least 2 percent.

That would bring us up to a 30 percent reduction from our 2016 regulations. Part of our education and outreach blitz, we would promote the NOAAs Fish Smart and Take Me Fishing applications through our social media. We would create videos specific to fluke handling that people can access on their smart phones, urge the for-hire fleet to show that video to their customers onboard; again through social media, and radio advertisements, local publications. We would have posters and brochures to distribute, especially through our APAIS outreach. All the businesses, the bait and tackle shops, and also promote and looking into promoting the gear. Gear, especially larger size hooks, I believe there was Carl Benson and I can't remember

the researcher's name, gave the Mid-Atlantic Council a presentation on hook sizes; that was J hook sizes. Basically it showed that the larger hook size you use was selective to the size of the fish you would harvest.

It eliminated those smaller size fish that you would catch. I did neglect to include in those measures that we would still maintain a shore-based fishery, shore-mode-only fishery for Island Beach State Park with a 2-fish bag, and a 16-inch size limit and a 17-inch size limit in the Delaware Bay, with a 3-fish bag limit; and also both would have that 104-day season. The added benefit to this is it maintains for the first time in who knows when, similar size limits in the same water body. I'll pause there and take questions.

CHAIRMAN LUISI: Okay does anybody have any direct questions for Tom on the proposal?

MR. CLARK: Is this a motion?

CHAIRMAN LUISI: No, not at this time. What I would like to do is take any direct questions. I noticed Jay is back up here, so if there are any technical questions that we might be able to answer, any questions directly to Tom. But at some point I'm going to look to New Jersey to make a motion that we could debate and decide upon and then take final action on that decision. I saw a couple hands. Who has a comment?

EXECUTIVE DIRECTOR BEAL: Tom, I have a quick clarification question. The 18 inch, 3 fish, 104 days, you know the holiday weekends included. Is that for your ocean fishery? Maybe you missed it, but what would happen with the Delaware Bay fishery and the one shore-based fishery?

MR. BAUM: Yes, I covered that at the end. I didn't include it with the original measures. For Island Beach State Park, which was our shore mode only site that would be a 16-inch

minimum size limit and a 2-fish bag limit; and the same season as the rest of the state, and for Delaware Bay it would be a 17-inch size limit, 3-fish possession limit, and the same 104-day season, the same dates.

CHAIRMAN LUISI: Let's do questions, and then Tom, I'll turn to you in a few minutes here to make a motion. Jim.

MR. GILMORE: Just another point of clarification. Tom had mentioned that this was approved by the New York TC member. My understanding was actually they provided some information for the spread sheet, but the entire thing was not approved. Okay, just wanted to clarify that. After we get a motion up we'll have further comments.

MR. CLARK: Tom, can you elaborate on what you said you vetted this with GARFO already? Is somebody from GARFO here to respond to that that this has already been cleared by them?

MR. BAUM: I'll turn to GARFO, but yes we were in consultation with them and their staff.

CHAIRMAN LUISI: I don't know; do you guys have anything to comment on?

MR. BULLARD: We've been in touch with New Jersey on this. It hasn't been fully analyzed, so I don't think it's something we can say we've approved. I don't know whether that was what Tom was saying. We have certainly been in discussions with them, yes.

MR. BALLOU: Tom, my question for you is has this been submitted as a conservation equivalency proposal in accordance with the Commission's conservation equivalency guidelines and policy, and along with that reviewed by the Technical Committee; and if not, why not?

MR. BAUM: Well no, it hasn't been officially submitted. It would need to have gone through

the TC. Why not? Well, we were going through the whole appeal process, and in the meantime our department staff, our Commissioner's staff working behind the scenes with the federal office as well. As our Commissioner had said back in February, he was going to exhaust all avenues, and this was one of them.

CHAIRMAN LUISI: David Pierce.

DR. PIERCE: Bob just covered it.

CHAIRMAN LUISI: Roy Miller.

MR. MILLER: Mr. Chairman, help us out procedurally. Ignoring the details of the proposal for the moment, procedurally my perception is we're unable to take action on this proposal at this point in time; since it hasn't been vetted by the Technical Committee. Apparently it hasn't been fully vetted by our federal partners either. Where are we? What is a reasonable path forward to entertain this proposal; so that it can be fully vetted and approved at perhaps some point in the future, or at least fully evaluated?

CHAIRMAN LUISI: I don't have a great answer for you, Roy. Why don't I try to spend a minute to just frame out where we have been and what may be in front of us as a result of action here. If you think back to February, the Board made a determination to go with the Option 5, and Option 5 came with a justification that was submitted by ASMFC to GARFO, regarding those actions as they would be taken by all of the states; based on the decision that was made by the Board.

That justification had a lot of details to it. In between the February meeting and this meeting, Massachusetts and Rhode Island submitted conservation equivalency proposals for the Board's consideration. Those conservation equivalency proposals were different than what the regulations would have been if Massachusetts and Rhode Island would

have followed the recommendation of the Board for Option 5.

The Board at the time of consideration on those conservation equivalency proposals, which were vetted through the Technical Committee, denied those requests based on at the time, what the Board perceived to be a justification that was written, based on a unified approach along the coast of increased minimum size limits, reduced bag limits, and season structure. We are now being approached by New Jersey with an alternative look, another conservation equivalency proposal; but the Technical Committee review and the other parts that would have been considered have not happened. What faces the Board right now, this is how I see it, we need to decide if we want to continue down the path of reviewing New Jersev's conservation equivalency proposal; allowing for time for review and further board action at a later date, whether it is webinar.

We're going to have to do something very soon to make that happen. In that consideration of New Jersey's conservation equivalency proposal, the Board may want to reconsider the actions it took on the Massachusetts and Rhode Island proposals. Those are the different pieces of the puzzle that are kind of linking themselves together right now. I hope that that is clear enough. John, if you have something else to offer.

MR. BULLARD: Yes, Mike. I think you've, Mr. Chair, summarized this. I want to say something in addition to my earlier remarks; because similar to some discussions we've had earlier in the day, all of us around the table find ourselves in a difficult situation where there isn't a pure or right answer. There is just a situation in front of us. It is May 10th, and we are where we are.

The Fisheries Service has been working with New Jersey, and I've certainly had a lot of conversations with a lot of you about what is the best outcome. When I looked at Option 5, it seemed to me that one of the things, it had many advantages, but one of the disadvantages it had was that it required people to catch 19inch fish in southern New Jersey, which is a trick.

As I said to a number of people, I think asking people to do things that they can't do is not a wise policy. Asking people to catch 19-inch fish in southern New Jersey is a pretty hard thing to do. I understand what led to frustration. New Jersey has tried to come up with an equivalent way to achieve conservation. Now, I wish they had done that earlier. It would have been a hell of a lot easier.

But we are where we are. Tom has laid out 3 fish, 104 days; that is a cut of 24 days. We don't have time to understand what that gets us. It's hard to say yes, the Service can approve it or any of us can look at it; because it is late in the day, and people are opening their seasons. But it is significant. All of us have to look at it against the other real options that are out there staring us in the face.

All of us are used to dealing with real choices. That is why I say, this isn't about like some other decisions we've made today, this isn't about pure right and wrong kind of things. This is about the real choices that are in front of us and making the best of it. Fortunately we've had some practice today.

CHAIRMAN LUISI: I'll clarify, based on my discussion with Bob. We're looking at; we have three different paths that we can take here. We can make the policy decision and approve this tonight if that is the Board's wishes, without any further review by the Technical Committee. We can approve this option tonight pending a Technical Committee review, or the third one was we go through the process of.

The second option would require a Technical Committee review, if the Technical Committee were to say that this conservation equivalency is equal to that for which Option 5 was, it would be approved or the Board could ask the Technical Committee to review it and then reconvene to discuss and determine at a later date. But again, it's May 10th, so that later date might be next week. This would have to happen very quickly. With all of that said and clarified, we'll take another comment or two and then Tom, I want to turn to you for a motion. Jim.

MR. GILMORE: Maybe one other option. We're trying to cram this thing down for a 21st start, 21st of May. Not to get into the details of this, but I mean this is procedurally a real difficulty; because we have a process and we're way past that. One other option would be to implement the regulations in Option 5, and then the fishery will open and they won't be out of compliance.

Then they can essentially put in that proposal, and that gives us a little bit more time. I mean I prefer the last option that we would essentially have the TC review it. We would have to set up a Board meeting by conference call or something to vote on it or whatever, and again with schedules; in a week or two that's not going to happen.

That last option I'm suggesting is maybe essentially let them file their regulations now, as an Option 5, and then we can consider this proposal, and I guess probably Rhode Island and Massachusetts if they wanted to raise theirs again; and that gives us some time to look at those without delaying the opening of the fishery.

CHAIRMAN LUISI: Thanks for that suggestion, Jim. Eric Reid.

MR. REID: I want to make this as short and as clear as possible. Rhode Island will not be able to have our proposal reexamined, because we

proposed a later start date; but because we are in compliance, we cannot do what we wanted to do; which was more conservative than we needed to do to meet the requirements of Option 5, which by the way didn't meet the requirements of meeting the target anyway. To use Dewey's word, I got hacked. Let's be clear. Rhode Island will not have the ability to revisit their proposal, because we are in compliance.

CHAIRMAN LUISI: David Bush.

MR. BUSH: Yes just a quick question. If I heard you correctly the estimated reduction would be at 23 percent.

MR. BAUM: We're proposing; I'll use the term ad hoc methodology. Right now the discard mortality rate for summer flounder I believe, it's used up 10 percent. We are going to have an education blitz to our anglers and we're going to target to reduce that mortality rate; and estimate it to be 8 percent. Then it would be a 30 percent reduction from our 2016 regulations, yes.

MR. BUSH: The total would be 30.

MR. BAUM: Yes.

MR. O'REILLY: I think David asked the question I was interested in from before, but also the 23 percent reduction versus the 30 percent reduction. Are they on the same footing? In other words, is that done with the same type of analysis to get that difference? I realize that the information that is going to go to the public and everything else, I think you said adds about 2 percent or something like that. I wasn't sure. But I was interested in whether they were both done on the same footing. Then I did want to say for those who were Rhode Island and Massachusetts, who were on our conference call that there was a real impetus for a lot of us to sort of hold the line on Option 5. That was done, and the line has gotten a little bit blurred I think.

With a little bit of situation that we had then compared to now, I think we need to probably maybe take a little more time next time around. But this was a new way of looking at it. Option 5 is still supported by many of the regions, and the states in the region; and I think that's important. But perhaps time got us; now I kind of wish that Rhode Island would be able to do something.

CHAIRMAN LUISI: Okay Tom, so at this time I would like to get a formal motion on the table. I know that you provided staff with what we see on the board, but I'm also going to look to you to determine the path forward that we would take, how the Board would consider those three alternative paths; and the fourth one that Jim offered.

MR. BAUM: I move to propose the following measures for New Jersey's 2017 summer flounder recreational fishery, based on conservation equivalency. The shore mode for Island Beach State Park only; a 16-inch minimum size limit, 2-fish possession limit, and 104-days open season, May 25th to September 5th.

Delaware Bay only; west of the COLREGS line, 17-inch minimum size limit, 3-fish possession limits, and 104-day open season, May 25th to September 5th. All other marine waters, I don't believe I need the east of COLREGS line, so I'll delete that; 18-inch minimum size limit, 3-fish possession limit, and 104-day open season, May 25th to September 5th. I would look for the board to approve these measures at this venue.

CHAIRMAN LUISI: To clarify, you're asking for the approval this evening without technical review and further consideration by the Board. I just want to be clear on that.

MR. BAUM: I would love a TC review. I'm willing to put that in, so I would say Board approval tonight pending timely TC approval. I

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don't know if I could put a date in there or not, and if I could I would actually put a due date in there; probably next week.

CHAIRMAN LUISI: All right, let us get clear on this, Tom and then I'll look for a second. My phone is dead, so I can't look at the calendar.

MS. KERNS: The 17th is a week from day.

CHAIRMAN LUISI: The 17th is a week from today. Tom, we have May 17th in there, which is a week from today. Is that how you want to move forward?

MR. BAUM: We could do it the 16th. Is that too tight?

CHAIRMAN LUISI: It's up to you.

MR. BAUM: I would say May 16th.

CHAIRMAN LUISI: Okay let's change that to May 16th, Russ; do you have something you would like to add before I look for a second clarification?

MR. RUSS ALLEN: Just to clarify our timing on things. We're going to have to have an emergency Marine Fisheries Council meeting, probably Tuesday or Wednesday next week to get them to approve it, and our commissioner to sign off on it by the end of next week to have it done by the 21st. We're on a kind of strict timeline too. We can play with the 16th or 17th, it doesn't really matter; as long as we can have that in hand for our Marine Fisheries Council at four o'clock on the 17th, it would be really nice.

EXECUTIVE DIRECTOR BEAL: The tricky part on putting a date here is you know you've got to find a date that works for the TC. It is hard to predict availability, and a week is not much time. The more time you can give the TC the better, but I understand the limitations that procedurally that New Jersey has.

CHAIRMAN LUISI: Okay so for now we have the 16th in there. Given all the clarifications and discussions, I'm going to look for a second to Tom's motion.

MR. CLARK: The way this is written, New Jersey wants us to approve this tonight, and pending the approval of the Technical Committee. The way it's worded right now, it could be pending timely Technical Committee approval then we'll move to approve it. I just don't know which one they're actually asking right now.

CHAIRMAN LUISI: It's my interpretation that we are approving the measures, and if the Technical Committee can report back by the 16th, that those measures meet the conservation equivalency of Option 5. Right, Tom? I mean if the new measures meet the same level of reduction, based on Technical Committee review of the Option 5 measures, then we are essentially approving those tonight, and there will be no further action by the Board on this issue.

MR. CLARK: If the TC finds they don't meet the conservation equivalency then they are back to out of compliance? Okay, just checking.

MR. ROOTES-MURDY: Something that I think should be made clear to the Board right now, in terms of having the TC review this, and Jason maybe can elaborate on it if needed, is that we have a standard methodology for calculating reductions; and what is being proposed here on the board at least, are measures.

But we don't have a sense on how those measures are derived from either a standard methodology was alluded to, and possibly an ad hoc methodology was used. In trying to task the TC with determining if it meets conservation equivalency, it needs to be real clear if they are supposed to be evaluating it based on standard methodology or to be accepting the methodology that New Jersey is proposing at

face value in achieving the reduction. Does that make sense?

CHAIRMAN LUISI: Yes it makes sense. I don't know how the Technical Committee will come to those conclusions. I look to Jay or Bob on this one.

EXECUTIVE DIRECTOR BEAL: I think part of that is a question to New Jersey. Can New Jersey develop or share the methodologies that they used to evaluate percent reduction associated with these measures, and the percent reduction in discard mortality associated with their blitz; what did you call it, the PR Blitz, Fishery Blitz or whatever it was.

MR. BAUM: I'm sorry, Bob. I didn't hear all your question, but if Mike would let me I do want to eliminate the pending timely technical committee approval by May 16th, as far as that process goes. Basically, because what the Board did today with sea bass, taking Wave 6 and basically eliminating that fishery. There was no TC review, methodology, approval or guidance from the TC on that; based on that I'm taking out the Technical Committee review.

CHAIRMAN LUISI: That's fine; this is still your motion without a second. Let's just get it right. I want to make sure everyone is clear. Any more questions regarding, just questions on the motion not comment on the motion at this point; since it's not a completed motion. All right seeing none; I'm going to ask.

Tom has removed the Technical Committee review, which means that if the Board approves this it happens tonight, and no further review and New Jersey would be approved to implement these measures. How that plays into tomorrow's discussion regarding compliance would be based on Policy Board interaction with this decision tonight. I'm going to look for a second. Rob O'Reilly seconds the motion, further discussion on the motion; David Pierce.

DR. PIERCE: You did a good job, Mr. Chairman, describing the Rhode Island and Massachusetts situation, subject to approval of the New Jersey proposal for 2017. I'm trying to work my way through this motion specific to how Massachusetts proposed measures that were not approved on a conference call should be reconsidered and then approved.

If this passes, I will make another motion specific to Massachusetts and measures for 2017. I was going to tack it onto this motion; but I don't want to complicate matters for New Jersey. Rhode Island I suspect is not going to be part of that initiative, since they've already said, or at least one has said that their season is already. I'll have Rhode Island speak for itself. I'll make a motion after this one, Mr. Chairman.

CHAIRMAN LUISI: That's fine, David, and yes Rhode Island has been clear in that they've lost their window of opportunity; based on the denial of their request by the Board. Just so you know, since the Board already took an action on the Massachusetts request, and it's being reconsidered, we're going to have to go through the reconsidered process.

Anybody can bring it up, but it will need a twothirds majority vote in order to pass; while this vote tonight will just need a simple majority. Okay so we have a motion. We'll take a couple more comments on that motion. David Borden.

MR. BORDEN: Quick point, Mr. Chairman. From my perspective, I think it should be incumbent upon the state of New Jersey to submit the methodology that they used to do the calculations as part of the proposal, so that it's clear when it goes to the Technical Committee. Isn't that routine?

CHAIRMAN LUISI: It's not planning to go to the Technical Committee. We're looking at making a policy decision tonight to approve this with no further review. That is how the motion has been crafted. The Technical Committee review

was eliminated from consideration. Jim Gilmore.

MR. GILMORE: I can't support the motion, because this is way outside the box. If we're going to really look into this, we need to have, you know in respect to first off what New York had gone through the development of Option 5, the effort we put in, what Rhode Island and Massachusetts did in terms of their proposal.

They submitted formal proposals that were reviewed by the TC; and then brought back to the Board. This very late, we think this will work; proposal is just too loose for me. I really couldn't support it unless we go back to what I mentioned before that it be submitted as a formal proposal so we can review it, have the TC review it, and then come back to the Board for approval.

MR. FOTE: A couple of years ago we got forced into going into a region with New York and Connecticut. It forced us to raise our size limit so they could bring their size limits down. We've been in that basically situation for a long time now. We had to raise it to 18 inches; we had 17 inches, just because we were in that region. We are now going to raise it to 19 inches.

Our fishermen, I'm sure they're not going to be happy when we inform them that they are going to lose 24 days of their season. How many of you around this room are going to your fishermen right now and telling them, we're going to cut off all of September. We're going to cut off all of May; you usually fish for 24 days, and basically be living with just 104 day season. That is a drastic cut by any means.

We've been stuck in this region. We've been abiding by the rules. We haven't pushed the overage. We didn't push; when we got the same thing with black sea bass, pushed into a region with Massachusetts. Massachusetts walked and they made a motion years ago; and

then we've been stuck with that where we now basically get forced to go out.

We never had a separate region where we belong on black sea bass, but that's another story. I'm just asking for relief for my fisherman. At 18 inches they were discarding a lot of fish, at 19 inches they're going to be discarding. We're killing more summer by discards than we are taking home now.

That is not how we should manage summer flounder. That is how you manage striped bass, because it is a lot of catch and release fishery along the coast; but that is not what we ever had for summer flounder. We're supposed to have sustainable stocks. I also, Amendment 5 I didn't support in the first place, because when you looked at it, we're living by a benchmark stock assessment for 2013.

In that benchmark stock assessment, they say recruitment is not based on spawning stock biomass. There is no reason for the commercial fishery and the recreational fishery to take a cut in quota on something they know will not make any difference on recruitment, but they did it because of poor recruitment.

That's a catch 22 here. We do measures that really have no purpose but to avoid law suits. I've been at this for a long time; it was actually '96 when we started getting sued, when the NMFS starts getting sued over a bunch of measures that were made. We've been suffering the consequence for years, whether it's black sea bass, whether it's scup or whether it's summer flounder. This has gotten to a point when my fishermen say, we've had enough. We can't live, the party boats are going out of business, tackle stores are going out of business.

We're down two million trips in New Jersey since 2007. Now, a lot of the other states, New York is down trips, and so is any of the Mid-Atlantic. We're down six million trips from 2007

to 2014. We're down 50,000 boats in New Jersey since 2007 to 2014. Yet, our catches go up. As a matter of fact it amazed me when Sandy hit in 2012, which was after the summer flounder season, we looked at the next year and all of a sudden I get told by MRIP that I caught more fish in May and June of 2013 than I did in 2012.

I said, this makes no sense, we have no boats in the water, and nobody is fishing except for a few people. Well, in my comment I got from the person on MRIP says, well they were really good fishermen. They must have caught all the fish that nobody else was fishing for. I say, there aren't that many fishermen to catch those fish. We haven't really gotten length enough, and you just basically killed us on black sea bass.

We are not going to have a season, we do summer flounder, where fishermen stop fishing in September, Labor Day weekend, and they have nothing, nothing to fish for until when you open the black sea bass fishery. Now we're going to open it up with five fish. I mean you're killing a 1.1 billion dollar industry in New Jersey needlessly, whether it is black sea bass or whether it's summer flounder.

That is not what we're here to do. We're here to build sustainable fisheries that we can accommodate both commercial and recreational. It just doesn't happen lately, hasn't happened on black sea bass, hasn't happened summer flounder. We get a little relief on scup. But this is the wrong message we send. I started pointing out earlier today; these are going to be the ones that make us revisit the Magnuson-Stevens Act.

People might now be happy what comes out of the next Magnuson-Stevens Act if we keep making moves like this. I am kind of passionate. I've been sitting here, you notice quietly all day, not getting involved in a lot of issues; just sitting here listening. I am asking you, we need this. We need it for the fishermen of New Jersey. It's not going to hurt the stocks. It is not going to affect recruitment one iota, and that's why we're doing this. I'm just asking you to be helpful to us, because ? I don't think you want to see in New Jersey.

CHAIRMAN LUISI: I'm going to go to the audience and we'll take one comment. Victor.

MR. VICTOR HARTLEY: My name is Captain Victor Hartley. I own the Ocean City Fishing and Cruising fleet; one boat that primarily fishes for sea bass that has been tied to the dock this whole entire month, because I have nothing to fish for. Another boat, it strictly stays in the Bay and fishes for flounder.

If we have a 19 inch fish, I won't catch a fish all summer; maybe one or two, maybe I'll put 10 in the boat that I can actually count for. What I want to know, I've been coming to these meetings and I don't think they get me anywhere. Since 2007, 2008, we've went over twice. Since 2009 to 2013, we didn't even go over. Sometimes, in 2011 we hit 51 percent of the total quota out of 100. In 2014, 105 percent, 2015, 63 percent, and 2016 we hit 117 percent. All those years that we did not hit our quota throughout the whole entire eastern seaboard, they don't count for nothing. Now all of a sudden 2016, we have to take a 30 percent cut. We're not going to carry people for 5 sea bass in November and December. That is going to be a travesty.

I don't have striped bass and bluefish down the southern end of the state like they do up north. Now, if you make me and my family takes this 19 inch fish, like I said, we're not going to catch anything. I run a fuel business. I used to sell four million gallons of fuel in the state of New Jersey to boats. Last year, my wife told me we did a million gallons of fuel. We lost three million gallons over the last three or four years. I'm in both ends of the industry. Where is the

three million gallons of fuel that I lost? It ain't going into the boats that I used to sell for.

Three party boats in my area, in Ocean City, just went out of business. There are three less boats. Like Tom said, but yet we're catching more fish. Now you're going to hit us with this 19 inch fish, instead of making a motion tonight. Go without the Technical Committee and just give us this horrible cut to our season; because now in September I'm going to have nothing to fish for.

I can't fish for sea bass. I ain't going to have flounder. It's going to be another month of my boat being tied to the dock. I've already, when people were talking earlier. I've already lost my house over this, and one boat. I have one boat left, because I can't fish and can't pay my bills. I mean I don't know what you people do sitting here. You're making a salary. But I sure as hell aren't making a living.

CHAIRMAN LUISI: All right thank you, Victor. We're going to go ahead and caucus. Let's take a minute. Tom, it's time to caucus. Go ahead, I didn't see her. I apologize. Nobody raised their hand. Yes, Robin, please; if you could provide us your comments.

MS. ROBIN SCOTT: Usually you can hear me without, Robin Scott; owner of Ray Scotts Dock in Margate, New Jersey. Victor and I are stakeholder here, we're the couple from New Jersey that are. I implore all of you. I mean I've met many of you over these meetings, and I simply implore you to use your common sense.

I absolutely am abominated by having to cut 24 days out of my season. But I also know that I don't need a Technical Committee, no disrespect intended. I don't need any kind of quantification of what that does to reducing the flounder catch in New Jersey. Not only will we be under the 2017 proposed limits, we'll be under 2018 also.

I already know that; 24 days out of our prime fishing season. I'm 30 miles north of the Delaware Bay; and the Delaware Bay for the past couple years, we've had a 2-inch fish limit difference from the Bay that we share and the flounder size that we share with them. We've been compelled with 18-inch fish while they're taking 16; which are right sized. Four fish at 16-inches that's what we have in New Jersey, we have sandy bays and estuaries.

The little guys come back from the Continental Shelf, and hit New Jersey and then flow down to Virginia. The big guys go up to New York with the rocky areas and all the cool substrate and things like that. We all know the migration patterns of flounder. I implore you to allow us to stay in the business. Reduce the enormous amount of discards, target fewer of the female breeders, and preserve the fishery in New Jersey. Thank you so much.

MR. BAUM: Please, Mr. Chairman, I'll be a minute and you can cut me off. I just want to remind this Board. Back in 2009, when it was going through the process in February, they made a motion and passed a motion that said, any states that need to make reductions have to make 50 percent of those or more restrictive measures through a more restrictive season.

Since then, that motion was year specific, I believe; and it has never been followed up. I believe that year that was by the Technical Committee, I think there was a performance evaluation to see how measures performed. I'm sure New Jersey's measures performed actually very well. In 2006, the state of New York had an 18 inch size limit. In 2009 they had a 21 inch size limit. We don't want to end up at a 21 inch size limit.

We chose by state-by-state management measures through 2001 to 2013, when our Marine Fisheries Council met and they had to decide, should we go up an inch or should we reduce the season. Sometimes they went up a

half an inch, and most times they restricted that season; because they did not want to end up with a 21 inch size limit. I don't want to see history repeat itself, because there has been a 21 inch size limit for a couple years. That is why we're in regional management. I understand that. But I don't want history to repeat itself.

MR. O'REILLY: Since I did second the motion, I appreciate a brief opportunity here to say why. When we started on Option 5, one of the things that were said by a board member was, this is an experiment. This is an experiment. Well apparently one-third of the states did not really want that experiment, they wanted something else.

I think we have to recognize that. I would love to have the Technical Committee review this, but I'm hearing problems on both sides of having that done; both from New Jersey and both from, rightly so with Bob Beal's comments on the Technical Committee. We didn't know at the time, Option 5 is going to be a good experiment. I didn't want Option 5, I wanted Option 1. But, I'm in a region and Option 5 made a lot of sense for good reasons to the region itself.

We all talked about it. I think we ought to keep that in mind. We also ought to keep in mind that the staff from New Jersey has been working in technical committees themselves for many, many years. I don't think, even though it's a little bit of a situation without overview by the Technical Committee that we need to have anything but concern for the timing of everything, and where we are today. That is why I supported the motion.

CHAIRMAN LUISI: We're going to go ahead and just caucus for a minute or two, and we'll come back and call the question. There is still some steam coming out from the other side of the table here. But I'm going to go ahead and read the motion and call the question, if everyone is ready. Move to approve today the following

measures for the 2017 New Jersey summer flounder recreational fishery based on conservation equivalency, shore mode for Island Beach State Park only; 16-inch minimum size limit, 2-fish possession limit, and 104-day open season.

Delaware Bay only west of the COLREGS Line; 17-inch minimum size limit, 3-fish possession limit, and 104-day open season, all other marine waters; 18-inch minimum size limit, 3-fish possession limit and 104-day open season. Is the Board ready for the question? All those in favor, asked for a roll call vote. Kirby will call the roll.

MR. ROOTES-MURDY: Going north to south, we'll start with the Commonwealth of Massachusetts.

DR. PIERCE: No.

MR. ROOTES-MURDY: Rhode Island.

MR. BALLOU: No.

MR. ROOTES-MURDY: Connecticut.

MR. ALEXANDER: No.

MR. ROOTES-MURDY: New York.

MR. GILMORE: No.

MR. ROOTES-MURDY: New Jersey.

MR. BAUM: Yes.

MR. ROOTES-MURDY: Delaware.

MR. CLARK: Yes.

MR. ROOTES-MURDY: Maryland.

MS. LYNN FEGLEY: No.

MR. ROOTES-MURDY: Potomac River Fisheries Commission.

MR. SHIELS: Yes.

MR. ROOTES-MURDY: Commonwealth of

Virginia.

MR. O'REILLY: Yes.

MR. ROOTES-MURDY: North Carolina.

MR. BATSAVAGE: No.

MR. ROOTES-MURDY: U.S. Fish and Wildlife

Service.

MS. WHITE: No.

MR. ROOTES-MURDY: National Marine

Fisheries Service.

MR. MILLARD: Abstain.

CHAIRMAN LUISI: Okay the vote was 4 in favor, 7 opposed with one abstention. Motion fails. That concludes our business under this. David.

MR. BORDEN: Not to delay this, Mr. Chairman. But is the opportunity here to make another motion, make the identical motion subject to the review and approval of the Technical Committee? Is that appropriate, in order?

CHAIRMAN LUISI: I would say it's a different motion, so if you want to make that motion.

MR. BORDEN: I would like to make a motion, the identical motion and at the end of the motion add a provision that it is subject to the review of and approval of the Technical Committee.

CHAIRMAN LUISI: Would you like to offer a date for that; since the discussion of the date seemed to be?

MR. BORDEN: No; as soon as possible.

CHAIRMAN LUISI: Can we modify what's on the board? Does that reflect your concern there? We have a motion that's the same motion but with Technical Committee review. John Clark would like to second that motion. Further discussion on the motion, I'm not going to entertain very many points, because I think we've debated it. But David, maybe you can offer your thoughts and then I'll go ask for one or two other comments.

MR. BORDEN: I've been sympathetic to New Jersey from the start. Everyone around the table knows this is a difficult situation. But my primary concern and the reason I voted no before was we need to adhere to our policies, from my perspective. It is one of the key components of this process. It maintains the integrity of the process.

I think it is important to get a technical review. I also would add which follows up on I think it was Kirby's point earlier. I think that New Jersey should provide specific information as part of this, and I'm not going to include that in the motion, on the methodologies they used; so that they are clear to the Technical Committee when the do the review. That is normal operating procedure.

CHAIRMAN LUISI: Any additional? Yes.

MR. O'BRIEN: Just clarification. I agree a lot with what Dave just said, and I can read the motion; but would it go to the Technical Committee first and then come back to the Board or are we voting on it prior to it going to the Technical Committee? We approve it, and pending their approval, or which way are we doing it with this motion?

CHAIRMAN LUISI: We're approving it pending approval of the Technical Committee. There would be no further discussion by the Board if the Technical Committee approves the

methodologies and the reductions that would come as a form or what's being proposed. Bob.

EXECUTIVE DIRECTOR BEAL: I think it should be clear on what happens if the Technical Committee does not endorse the reduction and these suites of measures being equivalent with the original suite. Just so everyone is clear on what happens if it doesn't add up.

CHAIRMAN LUISI: If it doesn't add up and it's not supported by the Technical Committee then since this motion is subject to that approval; the motion is not approved. That's how I would interpret what is being talked about here. Jay.

MR. McNAMEE: Here is my concern from the Technical Committee. I have not seen this proposal, I know nothing about it, other than what you've offered today; nor does the rest of the Technical Committee, except for potentially two members. There is a standard part, easy enough to review and do the math. Then there's a part that I don't understand.

If there is not something that is quantifiable in that part of it, we're going to have difficulty. I am hesitating a little bit, but this basically puts a Board decision now back on the Technical Committee; which I don't think is proper. I think if we give some recommendations, some advice, it absolutely should come back to the Board; because it does not seem right to put that type of decision on a Technical Committee.

CHAIRMAN LUISI: Thanks for offering that Jay. Adam, I'll come to you, Jim after Adam.

MR. NOWALSKY: I agree with Jay entirely. When we got to this point of the motion, the first question we had in discussing is what are we asking the TC to approve it relative to? I think this motion can be perfected by referencing the 19-inch, 3-fish, 128-day season; and by saying we're looking for the approval of what we put forward as being at least/or more conservative than that proposal.

We're very confident that at the very least the standard methodologies included therein, if you chose to evaluate it only on those merits, will demonstrate it's at least and more conservative than the 19-inch, 3-fish, 128-day season. Whether that just stays on the record here as useful information to the TC or whether you need the motion changed; that would be my recommended path forward.

CHAIRMAN LUISI: Yes that's been mentioned a couple times already that essentially a comparison between the Option 5 regulations as they would have been in place in New Jersey versus the option that you're presenting here today, would be the comparison of the two. If they're equivalent or more conservative that would force the agreement or approval by the Technical Committee. David Pierce.

DR. PIERCE: Yes I completely agree with Jason. I think it's inappropriate to have the Technical Committee make the call; so I would move to amend the motion. Scratch out as soon as possible, and put in its place followed by Board consideration and decision.

CHAIRMAN LUISI: We have an amended motion to remove "as soon as possible" and replace with "followed by Board consideration and decision." Do I have a second on that; Bob Ballou seconds that.

MR. BORDEN: In the interest of time I'll accept that as perfection, if John Clark will.

MR. CLARK: Sure, I'm just confused. Is this like a double board approval then, so we have to approve it now, goes to the TC then it comes back and we approve it again?

CHAIRMAN LUISI: We're going to approve it. It's going to go to the TC. We're basically approving it to go to the TC. The process is the one where the Board has to take two actions. The Board is either going to not even send it to the TC or we're going to send it to the TC and

revisit it to a follow up, and it is going to have to be some form of a webinar.

MR. CLARK: Sure that's cool.

CHAIRMAN LUISI: All right that's cool; I'll take that as an okay. Let me just see here. This is subject to review and approval by the Technical Committee and subsequent Board consideration and approval. I think that's fine, Bob. Does it sound okay to you? Any further discussion on this, do you need a minute to caucus? Anyone need a caucus time? Okay we'll have 30 seconds to caucus.

I'm not going to read this full motion back into the record; but I will just make the point that I just made that by approving this motion we're approving this methodology and accompanied by the regulations that are in front of us would go to the Technical Committee. The Technical Committee will review those in comparison to Option 5, and the Board would have another shot at approving that after Technical Committee review.

In sidebar while you were caucusing, we have no idea of the timeline of how this might happen. That is something that we're just going to have to do the best we can. I can't commit in any way as your chairman on when this action will be taken; but we'll have to start the process of scheduling meetings, webinars, and materials. That is just part of what this option is, okay.

That is 11 in favor, all those opposed; that is 1 opposed, null vote, abstentions, so 0, 0, motion carries. Are there any other agenda items regarding whatever we're talking about here; state compliance to come before us, before we move on to our final agenda item.

Okay seeing none; we are very late, Bob. I know you and I have had this conversation, and we talked about what might happen in the event that the sun starts to come up before we

leave. I will turn to you. Bob wants to offer a few thoughts regarding the white paper. I think what we ultimately will do as a result of Bob's presentation, which I know will be brief; it's looking for a path forward. That is what we kind of need to agree on as a Board as to what Bob's going to present, so Bob.

REVIEW WHITE PAPER ON SUMMER FLOUNDER RECREATIONAL SPECIFICATIONS

MR. BALLOU: I have about a three hour presentation; but I think I can cut it down and make it a little less than that. Seriously, I did develop some prepared remarks, because I knew it would be late. I knew our cerebral capacity would be severely compromised. With the Board's indulgence, five minutes.

Five minutes to just read some remarks into the record. I think it would be easier to do it this way, and then I assure you that would be all, I think; we need to do on this item. The impetus for the white paper is set forth in the introduction section of the document; and I'll begin by reading from that paraphrasing just a bit. Achieving the necessary harvest reductions in 2017 via the process undertaken to develop Addendum XXVIII, (dramatic pause) was not The addendum noted that the easv. management program for 2017 will have shortcomings, with regard to addressing the issues and challenges associated with managing the recreational fluke fishery.

It is thus intended to be an interim program, while focusing on the development of a more comprehensive solution for the future. Moving forward the Board should reconsider the framework that has allowed management under conservation equivalency in recent years, and develop an approach that is more workable. The paper then lays out in glorious detail the background for the current management program and the annual specification process.

It then highlights challenges and questions for the Board to consider moving forward. The paper concludes with a section titled "Moving Forward." I agreed to contribute to the writing of that section and did so in a rather cursory way, given time constraints. I just want to offer a very brief and slightly revised take on that section.

First it seems abundantly apparent to me, and I think just as apparent for everyone else in this room; that we lack a clear vision for what we want the recreational fluke fishery to look like. What is it that we want to achieve? Step one in the process of moving forward needs to be some sort of visioning exercise.

That exercise (dramatic pause) won't be easy. We have diverse perspectives. But we have to try and get on the same page, in terms of our ultimate goal, before we roll up our sleeves and start working towards it. Second, we need to chart a course to realize our vision. That course as I see it has both a short term and a long term track.

The short term track involves that which can be done via the annual specification process. We already have the mechanisms in place to assess a range of options tailored to move us forward in accordance with our vision; under the conservation equivalency framework. It is what we have done since 2001, and it is what we have done every year since 2014 via annual addenda.

It is what we're going to have to do again this year, to establish our management program for next year. The key difference this year, which relates directly to this agenda item at this meeting, is that we should start the process earlier. Instead of waiting until our fall Commission meeting and December joint meeting to start figuring out the types of options we want to consider for our next addendum, the suggestion being offered today via this white paper is to essentially begin now;

and allow the process to evolve and develop over the next eight months.

By the time we reach November or December, we have something that is well vetted and ready for public comment. The hope and expectation is that we'll be well positioned, or at least better positioned for final decision making in February; if not sooner. As set forth in the white paper, the key process related recommendation being offered today to the Board is to task the Board's recreational working group with the development of some preliminary management options; to be brought back before the Board for review and consideration at our next meeting in August.

As noted earlier, those options should ideally flow from a visioning exercise. I would leave open the question of how that visioning should be undertaken. One thought is to simply solicit input from the Board through Kirby; and that input could be taken up by the Working Group, massaged and reported out as part of our homework assignment or maybe it makes more sense to workshop the process. Again, I leave that piece open for discussion. Lastly, I'll just speak very briefly to the second, longer term track that I referenced earlier.

As we have learned via presentations given at past meetings by Kylie and Kirby, there is a set of recreational fisheries issues that cannot be addressed solely by the Commission via the conservation equivalency framework. If they are to be considered, they require broader action; likely joint action via an amendment or perhaps a new framework/addendum combo.

Then I've got a bunch of issues here that would fall under that category; they've already been provided in past meetings by Kylie. It includes such things as a new F-based approach to managing the recreational fishery, sector separation, et cetera. As we know, the Council has decided to delay addressing recreational issues under the Comp Amendment process;

based largely on the still pending updates to the MRIP data, which is likely to have a significant impact on the analysis of issues and options.

I suggest it would behoove the Board, with the support of its recreational working group and in coordination with the Council, to identify and stay focused on all management reforms needed to realize their vision for the fishery. Working through the CE process as our short strategy and teeing up complimentary, longer term issues requiring additional action by the Board and/or Council for consideration as soon as possible, ideally by next year. Although it is understood that the overall amendment process could take two or three years to fully complete.

The key is to move forward incrementally, with visioning and short term actions that map into our long game. With that Mr. Chairman and to everyone on the Board, I thank you for your time; particularly at this late hour, and this opportunity to sort of strategize a bit, and look forward to hearing other thoughts and perspectives, although maybe that's best done at a later time. But that is my presentation, thank you.

CHAIRMAN LUISI: Thank you Bob, for that. I think your short term path forward I think is something we can certainly do; and provide time for a discussion more so at the August meeting, when we convene again. But the recreational group that we've had, who's worked on issues, I think could meet sometime this summer. Is anybody opposed to following back up on this in August as the short term? David.

DR. PIERCE: Not opposed, but it seems to me that the Mid-Atlantic Council, with your leadership, Chris; that you've done a lot of work on this. You are already visioning regarding the recreational fishery. I don't recall where that ended up. But I think you did a lot of leg work on this already, and we can benefit from all that work that you and the Council did.

EXECUTIVE DIRECTOR MOORE: We did go through a visioning exercise about, how many years, three years ago? Yes, three four years ago that visioning project worked well. Bob was involved with that. That visioning project turned into a strategic plan, and that strategic plan drives the implementation plan that we use every year.

Some of the ideas that Bob has brought up are captured in that visioning document. I do think it's a good idea though to revisit those, and have a very specific sort of discussion with a larger group; including stakeholders to exactly what we're trying to do with the recreational fishery. I think that is a great idea. Some other things that you mentioned in your white paper, I've read it real quick, but we put an F-based, we've just put an RFP out for someone to do some of the work that you've talked about; including the step-based strategy for the recreational fishery.

We also have some ongoing work relative to looking at slot limits. You guys have heard Dr. Sullivan talk about it. We have another guy that's actually working on some of that as well. I think all that could coalesce into some really good ideas and some actions that could help, hopefully in 2018.

CHAIRMAN LUISI: All right thanks for that, Chris; any other thoughts? Adam.

MR. NOWALSKY: I just want to add Mr. Chairman that it's been a very long day. Despite feeling like I'm on the Oregon Trail with a broken down wagon, no food, no water, no bullets. That is what the recreational management process feels like at this point. But that being said, I think everyone that stayed here, gave this their full attention tonight.

I extend a word of thanks, and I feel like there are at least people working together on the issue. Despite the fact that my kids and I still haven't won that Oregon Trail card game, I will

have faith that we can find a way to make it to the end here. Thank you.

CHAIRMAN LUISI: Let's talk offline after the meeting about thoughts for moving forward, and we'll loop Chris and Bob in as well. Okay that takes us to Other Business, and I'm sorry to report Emerson, but I think we've run out of time. Do you want to make a comment, maybe just to put it back on the record as to what your expectations might be for a future discussion? Now would be the time. But we're not going to have time to discuss it.

MR. HASBROUCK: I agree. Considering the late hour, we can postpone this discussion to the next Board meeting. I just want to get a conversation started again about RSA.

ADJOURNMENT

CHAIRMAN LUISI: We can do that. Is there any other new business, or other items to come before the Board? Motion to adjourn a 7 hour and 43 minute Board meeting, I call the meeting adjourned. Have fun tomorrow.

(Whereupon the meeting adjourned at 8:43 o'clock p.m. on May 10, 2017)

These minutes are draft and subject to approval by the Summer Flounder, Scup and Black Sea Bass Management Board. The Board will review the minutes during its next meeting

Atlantic States Marine Fisheries Commission

Tautog Management Board

August 3, 2017 2:00 - 4:30 p.m. Alexandria, Virginia

Draft Agenda

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

1.	Welcome/Call to Order (A. Nowalsky)	2:00 p.m.
2.	 Board Consent Approval of Agenda Approval of Proceedings from May 2017 	2:00 p.m.
3.	Public Comment	2:05 p.m.
4.	 Consider Amendment 1 for Final Approval Final Action Review Public Comment and Management Options (<i>T. Kerns</i>) Review Advisory Panel Report Review Law Enforcement Report (<i>J. Snellbaker</i>) Consider Final Approval of Amendment 1 	2:15 p.m.
5.	Elect Vice-Chair Action	4:25 p.m.
6.	Other Business/Adjourn	4:30 p.m.

MEETING OVERVIEW

Tautog Management Board Meeting
August 3, 2017
2:00 p.m. – 4:30 p.m.
Alexandria, Virginia

Chair: Adam Nowalsky (NJ) Assumed Chairmanship: 05/15	Technical Committee Chair: Jason McNamee (RI)	Law Enforcement Committee Representative: Jason Snellbaker
Vice Chair: VACANT	Advisory Panel Chair: VACANT	Previous Board Meeting: May 9, 2017
Voting Members: MA, RI, CT, NY, NJ, DE, MD, VA, NMFS, USFWS (10 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2017
- **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 Amendment 1 for Final Approval (2:15-4:24 p.m.) Final Action

Background

- The Board approved Draft Amendment 1 for public comment in May 2017. (Briefing Materials)
- Draft Amendment I includes multiple management options to update the 1996 FMP and proposes a four-region management scenario. Additionally a commercial harvest tagging program was proposed in the document to combat illegal harvest and trade.
- Public Hearings were held in June 2017 (Briefing Materials) and public comments were gathered through July 14, 2017. (Supplemental Materials)

Presentations

- Review Public Comment and Management Options by T. Kerns
- Advisory Panel Report
- Law Enforcement by J. Snellbaker

Board Actions for Consideration

Select management options

- Approve final document
- 5. Elect a Vice-Chair Action
- 6. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

TAUTOG MANAGEMENT BOARD

The Westin Alexandria Alexandria, Virginia May 9, 2017

These minutes are draft and subject to approval by the Tautog Management Board

The Board will review the minutes during its next meeting

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INDEX OF MOTIONS

- Approval of Agenda by Consent (Page 1). 1.
- 2. Approval of Proceedings of January 2017 by Consent (Page 1).
- Move to remove 70% probability of achieving F target throughout the Draft Amendment 1 document (Page 19). Motion by Mark Alexander; second by Jim Gilmore. Motion carried (Page 19)
- Move to approve Draft Amendment I for public comment as amended today (Page 26). Motion by Emerson Hasbrouck; second by John Clark. Motion carried (Page 26)
- 5. Motion to adjourn by Consent (Page 26).

ATTENDANCE

Board Members

Dan McKiernan, MA, proxy for D. Pierce (AA)

Raymond Kane, MA (GA) Rep. Sarah Peake, MA (LA) David Borden, RI (GA)

Mark Gibson, RI, proxy for J. Coit (AA) Eric Reid, RI, proxy for Sen. Sosnowski (LA)

Sen. Craig Miner, CT (LA) Mark Alexander, CT (AA) Jim Gilmore, NY (AA)

Emerson Hasbrouck, NY (GA)

Russ Allen, NJ, proxy for L. Herrighty (AA)

Tom Fote, NJ (GA)

Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)

Roy Miller, DE (GA)

John Clark, DE, proxy for D. Saveikis (AA) Craig Pugh, DE, proxy for Rep. Carson (LA)

Rachel Dean, MD (GA) David Blazer, MD (AA)

Michael Luisi, MD, Administrative proxy Joe Cimino, VA, proxy for J. Bull (AA)

Cathy Davenport, VA (GA)

Kyle Schick, VA, proxy for Sen. Stuart (LA)

Peter Burns, NMFS Mike Millard, USFWS

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

Ex-Officio Members

Jason McNamee, Technical Committee Chair

Jason Snellbaker, Law Enforcement Representative

Staff

Bob Beal Toni Kerns Mike Schmidtke Jeff Kipp Katie Drew Ashton Harp

Guests

Bob Ballou, RI DEM Colleen Giannini, CT DEEP Nicole Lengyel, RI DEM

Jack Travelstead, CCA Arnold Leo, E. Hampton, NY The Tautog Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May, 9, 2017, and was called to order at 11:15 o'clock a.m. by Chairman Adam Nowalsky.

CALL TO ORDER

CHAIRMAN ADAM NOWALSKY: All right, good morning everybody we are going to convene the Tautog Management Board. I ask everyone who is here today to take your seats. Any other sidebar conversations, I appreciate if you can keep them to a dull roar. I am Adam Nowalsky; this is the Tautog Management Board.

APPROVAL OF AGENDA

CHAIRMAN NOWALSKY: The agenda has been provided. We'll start out with the agenda itself. We are going to make a couple of changes to the agenda as it was presented. Essentially what we're going to do with Agenda Item 4, Review the Consistent Management Measures, is we're going to insert that to after the bullet point of Review Management Options in Item 5.

The intention there is allow us to get started with discussion on the document, look at Section 2, which is some of the overarching items; such as goals and objectives. Then we can move into the meat, which is those management measures that will have a separate presentation for. With that modification, is there acceptance of the agenda as modified? Seeing no objections it will be modified and approved as such.

APPROVAL OF PROCEEDINGS

CHAIRMAN NOWALSKY: Second item of business would be the approval of the proceedings from the January, 2017 Board meeting, I believe. We met in January. We started the last Board meeting in January. Any objections to approving those proceedings as presented? Seeing none; they stand approved.

PUBLIC COMMENT

CHAIRMAN NOWALSKY: Next item of business is Public Comment for any items that are not on the agenda here today.

I don't believe we had any sign- ups for that. Is there anyone in the audience that wants to speak on anything not on the agenda? Okay seeing none; we'll move ahead. Before we get into the presentation from staff on the draft amendment, Just let me take a couple moments to kind of set the framework for what we're going to try to do today.

First I'll go through, we've got a 144 page document that most of us just got our first look at last week. I understand that's a heavy lift. I want to extend my thanks to staff, Ashton and everyone else, for putting the document together. Everyone involved has certainly been working very hard to get that document presented to us for our review here today.

In terms of paths forward, Ashton is going to present the timeline, the initial presentation of that would contemplate us releasing the document for public hearings today; and then taking final action on that at the August meeting. As we go through the document, if there are substantive changes that people want to make, or if there are other options that they want to have reviewed by the TC, we would need to develop those specific tasks today, get them on record, and have any preliminary discussion. We could potentially have the TC review those, bring a revised draft back to us in August for then final approval at the annual meeting; which should still provide for implementation for most states for the 2018 fishing year. I just wanted to lay those couple of paths out there, and we'll get through as much as we can. With that I will turn the presentation over to Ashton to begin the discussion of the document.

CONSIDER DRAFT AMENDMENT 1 FOR PUBLIC COMMENT

MS. ASHTON HARP: I would like to give a big thank you to the Tautog Technical Committee, Stock Assessment Subcommittee, and the PDT. This is a very meaty document, and going into four different regions, it's almost like creating an amendment for each region. We put a lot of thought into this, and look forward to your feedback today.

Let's start with the timeline for this document, so we're in the third year of creating this document. This all started in 2015 with the benchmark stock assessment that evaluated the species across three regions. The Board looked at that and saw that the stock was overfished and overfishing was occurring in some cases, and directed the Tautog PDT to develop the public information document, which went out for public comment in September of 2015.

It was a scoping document asking the public for feedback on regional management, a commercial harvest tagging program and goals and objectives moving forward. After that happened the Board then directed the PDT to develop Draft Amendment 1, which is presented to you today. But before that was fully developed, there were some changes regarding the regional breakdown.

Pretty much all of 2016 was spent reevaluating the stock status for tautog across four regions. To evaluate a four region scenario the Stock Assessment Subcommittee had to complete a benchmark stock assessment for Long Island Sound and New Jersey/New York Bight, which was presented last August.

Given a significant amount of time had lapsed between the first benchmark assessment the Board requested a stock assessment update of all four regions; which included 2015 data for all four regions. After stock status was evaluated the TC and the PDT worked on management measures and they were presented in February; this February, but they were state-specific reductions. Not regional reductions.

At the February Meeting the Board decided to use a more regional approach, so if the TC could go back and create regional options to the best of their abilities, then that should happen. The regional management measures are what is being presented here today, and Jay will present that section when we get to that section within the document.

Like Adam said, if the document is approved for public comment today then public comment and public hearings will happen over the summer and it could be approved as early as August.

Each person should have a handout in front of you that shows all of the options for consideration. There are 22 different issues and many different sub-options within each issue in front of you. It provides an overview of what we're going to look at, as well as the corresponding pages in the amendment to where you can find the full text for each option.

This is just an overview of the presentation. I'm going to review issues and options in Section 2.0. Then we're going to move into Section 4.0, which really gets into the regional management measures. This is where I'll present some of it and then Jay will present the regional management options. The regions that have to take harvest reductions are the Long Island Sound, recreational/commercial; and

New Jersey/New York Bight, recreational/commercial.

The DelMarVa region is presenting regional options because they would like to propose regional options, although they don't have to take specific reductions. Lastly, I will move into the last part of Section 4.0, where we'll discuss the commercial quotas and the commercial harvest tagging program.

We'll start with Section 2.0. As you know this is Draft Amendment 1. The goals in this document

are from 1996. That is when the FMP was first implemented. There are a lot of goals, A through E. The PDT looked at this and tried to pick out what are the main goals that we're trying to achieve for this species, and then summarized them into a revised goal statement; which is presented to you today.

The goal of Amendment 1 is to sustainably manage tautog over the long term, using regional differences in biology and fishery characteristics as a basis for management. Additionally the amendment seeks to promote the conservation and enhancement of structure habitat to meet the needs of all stages of tautogs life cycle. We were really trying to hit on the regional aspect of this fishery, as well as how important habitat is for the life cycle of tautog.

Originally the objectives were A through J, which was also a bit lengthy, and some of them overlapped. The PDT presented ways that we can modify the objectives, and we showed the revisions one-by-one. Options B through G outlines how we modified each objective or eliminated that objective or combined objectives.

Option H applies all of revised objectives. For example, an objective is to achieve regional management. There is also an objective to encourage EEZ management, as we know there is not a federal FMP for this species, but it's included as an objective to strive for in the future. There is an objective that acknowledges the importance of monitoring, so we can continue to do stock assessments to manage this fishery appropriately. An objective to diminish the illegal harvest as much as possible has been added.

Next we move into the biological reference points. Option A is status quo. Reference points can be modified via a management document; usually it has been done via an addendum. Option B says that reference points can be modified via Board action, so the Board can review the stock assessment and approve it for

management use, and say these are the new reference points that will be used for management. There is a bit more text in the document as well that basically says that the reference points would have to come from a peer reviewed document, it couldn't just come out of nowhere. It will need to come from a TC recommended peer reviewed document.

For the fishing mortality target, right now the fishery has gone back and forth on the target that it wants to meet. Most recently it's been 0.15, and that is equal to natural mortality, which was the original F Target for this fishery.

But now that we are proposing regional management there is different F mortality targets for each region. The sub text actually gets at more of the timing of when would the Board initiate a document and when would the Board begin implementation of the document if overfishing was occurring.

If the current F exceeds the regional threshold, that means there is overfishing, the Board must take corrective action via a management document, amendment or addendum, within an X year of receiving overfishing stock status. Right now there is no time requirement. As you this amendment timeline, this whole entire thing started in 2015. We're now in 2017 and still discussing whether or not, or how we want to move forward.

Sub-Option B2 is Board action within one year and then implementation the following year. Sub-Option B3 is Board action within two years and implementation the following year. It is just kind of constraining, so the Board knows when they need to make management decisions, and how quickly this process needs to move forward.

There is also the probability of achieving F target in this document. Right now there are no guidelines as to what the probability would be. When Jay starts going over the regional management options, you'll see there are regional management options that meet a 50

percent probability of achieving F target in 2021, and there are regional management options that have a 70 percent probability. Clearly the 70 percent options include more conservative measures.

There are options in here to streamline this approach. If the Board feels like one would be better than the other then they can codify that in this document, and there wouldn't be so many options for the TC to evaluate or for the public comment to evaluate. The probability options are really getting at what is the Board's level of risk with this species. We wanted to present options for the Board to consider that would codify the risk tolerance in this document.

For the F reduction schedule, right now the timeframe with which you have to initiate a harvest reduction management response is unclear. For this document a three-year timeframe was applied. Right now it says that the F must get back down to the target within three years. The management measures that are presented today have a 2018 through 2021 timeline. If states implement these management measures within this three-year timeline then we should meet the F target. The timeframe could be codified within this document, so it doesn't have to be a point of long belabored discussion. Option B is the management measures must meet the regional F within three years. Option C is within five years.

The stock rebuilding schedule. The Board very explicitly stated in, I believe it was February that they do not want to move forward with a stock rebuilding schedule for this species, but they would like to have it as of course an adaptive management tool.

There is Option B; stock rebuilding schedule can be developed to be an addendum at some future time when the Board designates it. Option C, is the same thing it can be developed to be an addendum, but putting a timeframe on it. When this addendum is created the rebuilding schedule cannot exceed 10 years.

It gives a little bit of guidance as to what the future PDT will have to work with if the stock rebuilding schedule was initiated. That was based on initial discussions for the TC just considering the life history of the species. That's where the ten year kind of came from, as well as what is the standard operating procedures for federal fisheries as well. That is the end of Section 2. Are there questions on the goals and objectives of this FMP?

CHAIRMAN NOWALSKY: Okay, so thank you, Ashton. We're going to go through, we'll ask any questions. Again, we do not have to select any preferred options here today. The goal is to get this document out for public comment at some point either this meeting or next. If there are requested changes to something, we can try to do those by consensus. If we don't have that then we'll take motions and votes on those items.

But we'll start with questions on those items that were presented by Ashton in Section 2. I'm going to take the liberty of asking the first one. For Section 2.7.1 with the timeframe for the Board actions, when we talk about the Board must take corrective action via a management document within a timeframe. Are we talking about initiating a management action or finalizing that management action in those Sections; understanding that it allows for an additional year for those measures to actually be put in place by the states?

MS. HARP: This was a point of discussion whenever we were putting this in. It currently says the Board must initiate corrective action within a year of receiving overfishing stock status, and then it must be implemented the following year.

CHAIRMAN NOWALSKY: Okay, so I would say we ought to clarify that in saying that it's initiating those management actions for Sub-Options B2 and B3 in the document. Additional questions on Section 2. Any comments, things people would like to see changed in Section 2 before a

document went out for public comment, or are they comfortable with these? The one item that I will bring up, so one of the things that staff's had to do a lot of work with is developing the options under the 50 and the 70 percent probabilities.

When we started out this discussion we had a number of different regions, we had a number of different probabilities. I think staff has been pretty consistent in their encouraging us as a board to try to minimize those options to as few as possible. Part of that being just clarity for the public's sake. This item here, the second part of 2.7.1, Options A, B, and C, status quo 50 percent probability of achieving F target, 70 percent probability of achieving F target. When we get into the perspective measures with Jay's presentation, we have those developed for presentation; but it has been staff's ask for consideration about taking either of those out of the document; which would then take those range of measures out of the document in the next section.

I'll just ask, is the Board willing to entertain any discussion about keeping both of those options in there, the 50 and the 70 percent probabilities or is the desire to keep them in, keeping in mind we'll see those perspective measures if you want to hold off. But if you want to have any discussion about it now, now would be a good time to do so.

Okay, seeing none; what we'll do next is I'll also ask if anybody, we're not specifically having a presentation related to any other sections in the document besides Sections 2 and Sections 4. There is a wealth of background information in Section 1 primarily. There is a lot of additional information in other sections, monitoring and other items.

I'll ask at any point during the day today, if somebody has questions about one of those sections or suggestions for revisions before the comment goes out, to please jump in and make those suggestions as well with those other sections. With that we'll go on to the discussion regarding Section 4, and a presentation from Jay.

MS. HARP: I was going to start out with just the regional part and then I'll turn it over to Jay. Regional management is new for the species. We've previously been managing tautog on a coastwide basis, so Option A is status quo, coastwide management. Option B is regional management.

This basically says the regional management option here is a four-region scenario. That could change in the future if there is new data to suggest that the regions should change, then the TC can evaluate that and bring new recommendations to the Board; although that would require a new management document to change the regions for tautog.

As they're listed now, the first region is Massachusetts-Rhode Island, the second one is Long Island Sound, the third one is New Jersey-New York Bight, and the fourth one is Delaware, Maryland, and Virginia, and all of the management options that Jay will review are based on this regional structure.

There have been considerable discussions around the Long Island Sound boundary lines. The Law Enforcement Committee met earlier today to discuss it, and Jason will review their feedback at the very end of this presentation, so I just wanted to present to you the two options that we're presenting for Long Island Sound here today.

Option B1, as you can see is also Long Island Sound Option 5 up there, is the one we were originally proposing, which is Montauk Point, New York to Watch Hill, Rhode Island. This boundary line includes the area of water that was assessed as part of the Long Island Sound stock assessment. New York staff had to go through and clearly separate the data in MRIP for Long Island Sound and the New York South Shore part. MRIP folks confirmed the MRIP data for

Long Island Sound includes Peconic Bay. This would be how the stock assessment was done.

This second option, B2 is Long Island Sound according to the colregs line. This goes from Orient Point, New York, over to again, Watch Hill, Rhode Island. As you can see, it excludes Peconic Bay. That would now go into the New Jersey/New York Bight region. The Long Island Sound includes more restrictive management measures versus the New Jersey/New York Bight area. That is one thing to always keep in mind. This could be a contentious line.

REGIONAL MANAGEMENT OPTIONS

MS. HARP: With that we will move into the regional management options.

MR. JASON McNAMEE: Thank you, Ashton. My name is Jason McNamee; I work for the Rhode Island Department of Environmental Management. I've got a series of these options. This just gives you a look at what the various conceptual options in the document look like by way of management in your state.

There are a lot of them. I'll do my best to; Ashton did a great job of trying to put them into forms that are kind of understandable, and I'll do my best to fumble my way through them. I'll look to Ashton to save me if I start messing anything up. But you'll see as we go through how they're broken up, and I'll do the best I can to explain them.

Just to start off, you've heard this already a couple times. We've got overfishing occurring in two of our areas; that's Long Island Sound and in the New Jersey-New York Bight Regions. In each case what you're going to see is a set of recreational options, and in those recreational options you're going to see two risk probabilities that we looked at.

There is a 50 percent probability of achieving your F target, and then a 70 percent probability of achieving your F target; the same for the

commercial in these two areas. Overfishing is not occurring in the Mass/Rhode Island or the DelMarVa regions, but there are still some options to take a look at.

Even though there was no requirement to take reductions, there was still interest from the Board originally, and also amongst the Technical Committee to take a look at some options to see what consistency looks like in those regions. We thought that would be informative for the Board. All right quick, we'll call them rules of engagement here.

You're going to see, you've got recreational and commercial options. What we are asking is to not choose separate risk probabilities when doing this. You're going to see, it gets confusing enough to keep track of everything. In particular, the way the analyses are done, the logic would not follow through if you chose different risk probabilities for the two different sectors. Just to continue on here, this would be the way to go, so just be consistent across both of your selections on that.

There is a slide here that says methodology; but really I'm not going to go into that. We don't have time. But even before we knew we didn't have time, I had gone through it last time we all met. It's pretty standard stuff. It's the same types of things you've seen in summer flounder and black sea bass; you know those same types of approaches. There are two differences though, and that is we've got some slot limit options in here. Those were done in two ways. The Long Island Sound version, Jacob, who is from the University of Connecticut, PhD student, was up here with me; if not last time the time before. He did a nice analysis; it is part of his dissertation work, actually. But his is based off the assessment.

He does a nice job. We could sit here all day and talk our way through that. We won't do that. But the Technical Committee did review it, and appreciated the work, and vetted the work. I also think the New Jersey-New York Bight, I know

they have a slot limit option in there. I think their analysis is slightly different, didn't use that modeling approach; used more of a standard approach to determine those.

I just wanted to make sure that's clear. I'm happy to try and answer any questions you have, but there are not a lot of slides, or any slides with equations or things like that; which you probably appreciate. Okay so here's a legend for some of the stuff you're going to see in the following slides. If you see this, the big box at the top there is just kind of - I'll call it gray.

If you see that in the table, you'll know that that is a closed, no fishing period of time. Then you've got these shades of – I'm going to call it purple. The reason for the different colors, are if a bag limit changes or something like that. You can see where that happens, the color will change. But basically any shade of purple means that that's a season that's open with a bag limit of some sort.

We're starting off; we're going north to south here, Massachusetts, Rhode Island. Again, no reductions are needed here. But we did put forward a couple of options to look at what consistent regulations might look like. Here is the structure you're going to see moving forward. We're going to have a table up front.

In most cases what you're looking at with the table is some of the changes that kind of move forward, not in a regional approach, but more in a standard approach; meaning each state just takes the reduction in the way that makes sense for that state alone. Here it didn't matter for Rhode Island, so what you're looking at in the first row of Option A that's our status quo regulation.

Massachusetts and Rhode Island each have 16-inch minimum size. We have different seasons, different bag limits; and again we don't need necessarily to take a reduction. We looked at one that matches up our seasons, and then

Rhode Island is the one that has a split bag limit. Massachusetts has three fish all year.

What we've done here is we've matched our seasons up. Massachusetts would implement a spawning closure, which Rhode Island has. Then Rhode Island would drop its fall bag limit from six down to four, and that would be an increase for Massachusetts in the fall. Then there is a final option that just makes everything really consistent, three fish with matching seasons.

This is the next type of table you're going to see for all of the subsequent stuff, and that is, I think it was Alexi from the DelMarVa region who had put together a table with these kind of shading, and it gives you a good visual look at the information, and so we carried that forward here. The A again that represents for the Mass/Rhode Island region that is our status quo measures. That's what it looks like. You can see that Massachusetts is open all year at three fish, so it's purple across the whole row with the three there designating that bag limit Rhode Island has two seasons with a spawning closure, so you can see that there as well. Then part of the season we have three fish, and then the tail end of the season we have six fish. That's what that Option A looks like in our little colored version here.

Then the next two rows show those consistent regional approaches. All right, so now we're going to jump into Long Island Sound. Here overfishing is occurring, because we still have both a 50 percent and a 70 percent probability of achieving the F target on the table, the range of needed reduction goes from 47.2 percent up to 52.6 percent.

Here are the recreational measures for Long Island Sound, so in this case, in this table, what you're seeing is a stand-alone set of options. It says status quo, but that's a trick. It's not really status quo. It's just using status quo idea of just taking the reductions within your state without consideration for the other members of the region, and that's what this table represents.

You can see Connecticut has a 17-inch fish; they've got two different periods of different bag limits, one period with one fish, one period with two fish. You can see the seasons there, so that one- fish bag limit period is broken up into two; and then they've got that fall season at two fish. That first one there achieves a 48.1 percent harvest reduction, and this is the option with the 50 percent probability of meeting the target.

For New York, same type of information. They have a 16-inch fish, they have a one-fish possession limit in this option, and one season that basically is only in the fall; Option 2, same idea, but in this case to meet the 70 percent reduction. That is kind of the stand-alone state-by-state version of the options.

Here is an attempt at trying to implement some ability to be a little more regional, and so the idea here was just to get the options as close to each other as possible, because of the magnitude of the restrictions here we weren't able to sync up completely here like you saw for Mass and Rhode Island. I'll just walk you across the top one there.

Again, we're still in recreational measures. You've got in the first three rows you have a 50 percent probability of meeting your F target. The bottom three rows is a 70 percent probability, and let's take Option B1. As you walk across there you have Connecticut and New York. They would sync up with a 16-inch fish and a one-fish bag limit.

Then Connecticut would have a spring season in the month of April. Then they would have a spawning closure, a really long spawning closure, and then they would open back up in mid-October through about mid-December. Then the New York version of that again, I am not able to shoehorn in that spring season, so they would open up at the beginning of October, and extend to about mid-December.

You can see, hopefully that makes sense, and then B2 and B3 are just different versions, just to give you a sense of if you go up in minimum size, you can get a little bit more of a season, particularly in Connecticut, and you can up that bag limit to another fish. The very last one there, not the very last one but B3, what you see is that would be an option that syncs them up. That would be the only one that you could have consistent regulations; and that's what that looks like. Then the bottom B4, B5, B6 that represents same concept, but trying to meet that 70 percent probability of meeting the target. I'll try to go a little quicker from here on out. I just wanted to make sure folks can follow along. Now what we're getting into is a set of commercial measures. Again, here are the options where we're just operating in a state-bystate version, taking the needed reductions.

There is minimum size, bag limit, and open season. One note I'll make here is there was not a lot of information to work with for the commercial fisheries, and so we're doing a lot of borrowing of information from the recreational fishery from MRIP, and applying it over. Just keep that in mind. That's one of the reasons, as I mentioned it would be problematic to choose different risk probabilities, because there is a lot of conflation between how the methods were calculated.

You have status quo to meet the 50 percent probability of reaching your target is A1, and A2 is to meet that 70 percent probability. Here is the more regional approach. A nuance on this slide is you've got, under the 50 percent probability what you have is a quota. In Connecticut you would have a 2,700 pound quota, and then a 39,000 pound quota for New York.

Instead of trying to manage it like we do the recreational fishery, turning the dials of size, bag, and season here, you would put in a quota to manage that fishery. Down below under the 70 percent probabilities, you have both versions. You've got a version that manages more like the

recreational fishery, and then one that again manages with a quota to meet those targets.

You can see this was as good as they could do with trying to sync up the seasons. Here you have Long Island Sound still, and now we're looking at recreational and commercial; recreational on the top and commercial on the bottom, I think. Is that right, Ashton? Oh that's right. It would be the same for recreational and commercial.

You're looking at different pieces of information of the same management in the top and bottom tables there. Here you would have a two-inch slot limit, so you would get some level of reduction from the slot limit; and then these are the seasons and the bags that you could have in Connecticut and New York.

Moving on to the next region, now we are in the New Jersey-New York Bight region. That is the outside of Long Island down through New Jersey. In this region overfishing is occurring. It's not as severe as was the case in the Long Island Sound. The needed reduction here, again because we have a 50 and 70 percent probability of reaching the target, you can be anywhere from a 2 percent to an 11 percent reduction needed.

This table again is your status quo state-by-state version of taking those needed reductions. The top table there shows what it looks like for a 2 percent reduction, and the bottom shows what it would look like for an 11 percent reduction. You've got in New Jersey a bunch of different, at this time several bag limits, kind of switched through the season.

In the New York Bight region you've got more consistent measures, 16-inch fish, four-fish bag, and then that fall season again. Here is an attempt at providing some consistency between the regions. Up on the top there you've got single contiguous seasons, this is recreational by the way, and so you can see each state would have a four-fish bag and the seasons do overlap, although the New Jersey season would be a little

bit longer. Then the 70 percent probability is that set of three options down on the bottom, and you can see there are different size limits as well that are coming into these options. Here is a slot limit analysis for this same region. This gives you a look at what those look like. You can see for instance, in C2, it kind of increases in consistency as you go down here.

Just so folks are aware, C1 would get you a 2 percent reduction, C2 would be an 11 percent reduction, and then C3 where they are completely synced up, would actually be a little bit more, a 13 percent reduction. Here is the commercial side. You've got again New York Bight and New Jersey, and the two variations, a 2 percent and an 11 percent.

This is just looking state specifically how those reductions could be met. New Jersey does not have a possession limit noted. There is no possession limit, what they have is, I'll call it, you guys can correct me if you call it something else, but it's sort of a soft quota. They've got a backstop, where when they get to a certain level of harvest they would potentially stop their fishery or curtail their fishery in some way. But there is no bag limit for them at this time for the commercial sector.

Then again looking at the region, here what you can see is what they're attempting to do here is to implement that spawning closure; and so that's why the seasons are split there. They are trying to get at different variations where they take their closure, and that closure would occur during the spawning time for tautog.

Then this is a variation that does a commercial slot limit, just like we had for recreational. I'm sorry if I neglected to say this here. This slot is a little bit larger; it is three-inches, 15 to 18 inches, so part of the reduction is coming from that slot limit. Then C4 and C5 are different in that C4 meets that 2 percent reduction, and C5 meets the 11 percent reduction.

You can see not a lot of variation there, a little bit more, a longer closure for New Jersey. We are now down the coast here in DelMarVa, no reductions are needed here but again this region, some options were put together just to get a look at what consistent, or as consistent as possible management would look like.

Here are your current measures. These are status quo in Delaware, Maryland, and Virginia. Maryland and Virginia have that 16-inch size, 15-inches in Delaware. Then there are different variations of bag limit and season combinations for the different states. This is what it looks like. This is not now any new scenario; this is just a visual representation of your status quo measures.

Then here is a version that syncs everything up exactly. Let me walk you through what each of them represent. Option B would actually be a liberalization by about 8.5 percent, so that would be an increase in harvest. C and D represent reductions. C would be an 11.9 percent reduction, and D would be an 11.6 percent reduction; pretty close to each other there.

That is the end of the management options. I'm going to flip to the next slide, I'm not sure if I'm exactly supposed to, but just to reiterate, I think Adam offered the question very overtly. I was going to do more of a Jedi mind trick kind of thing, but in any case it would be, you saw how convoluted, how many options there are here for this. A lot of that has to do with you've got two versions of risk. I guess my personal opinion, not a statement from the Technical Committee. I don't know what kind of feedback on your risk policy you would get from public feedback. Maybe you think you will. But I offer that it would cut down the many options that we just walked through, if you were to select one of these 50 percent, or 70 percent probability of reaching the target; rather than going out with two. I think trying to indicate that nuance to the public would be difficult, and with that I will pause for any questions.

CHAIRMAN NOWALSKY: Okay, so Jay you did a wonderful job. That took us through 20 pages of the document; that was impressive. Before I take questions, okay, I'm going to break just slightly from how we typically do this.

What I'm going to do is I'm first going to turn to Law Enforcement, who has got comments on boundary issues, enforcing regulations within a state where there are different regulations, consistency of state measures; to comment on some of those items.

Then what we're going to do is we're going to go through each of these items 4.1 and then each of the ones, 4.2 and all of the sub-options in there, bring them up one at a time and have questions and discussion about each of them as we go through, so we're not all trying to remember 20 pages back.

LAW ENFORCEMENT REPORT

CHAIRMAN NOWALSKY: Let me first turn to Captain Snellbaker, and we'll get a Law Enforcement Committee report on some of these options, and then we'll start getting into questions and discussion, about how we want to move forward with the document for this section; Captain.

CAPTAIN JASON SNELLBAKER: The memo dated March 28, 2017 is based on March 17, the Law Enforcement Committee met to talk over the issues with the Long Island Sound. The Law Enforcement Committee members were briefed on the possibility of two sets of management measures for tautog in the state of New York. A split would provide the different management measures between Long Island Sound and the ocean shore of Long Island.

The LEC discussed a number of concerns and difficulties enforcing such a management plan. I'm going to pull out some of the highlights of that discussion. As far as defining a boundary line between areas, the Law Enforcement Committee had concerns where there were no clear markers or references.

A boundary line over the water without clearly visible landmarks or demarcations is almost completely unenforceable. We also see an increase of accidental navigation in these areas. We prefer boundaries such as a colregs demarcation line. From an enforcement standpoint too, we also have to do verification, you know e-Navs, to make sure that the officers are in fact where they are, to be able to prove beyond a reasonable doubt in court.

That's a little more effort on our part. As far as enforcing different regulations in close proximity, the Law Enforcement Committee as a whole, we've seen a shift in anglers; anglers will shift their efforts and go where there are less liberal regulations, which sometimes causes a problem with strict possession and enforcement.

It's not always clear to people that we apply the regulation where in fact that inspection occurs. It just creates a lot of confusion, and again we do see a significant shift in fishing effort, depending on where there is more fish to be caught, because the regulations are less restrictive. We also discussed the establishment of a buffer zone, or a safe zone as it was put. Such a zone would simply add to the confusion for the fishermen and enforcement officers on the water. We felt that a buffer zone would not provide any significant benefit, it would just add to the confusion. We also had a concern of in that buffer zone we would hesitate to go check other people taking the resource, because you may run into a situation where there is an egregious tautog violation, and we wouldn't be able to enforce it because of the buffer zone.

Like I said, it would prohibit us from potentially checking other types of people partaking of other fisheries. The Law Enforcement Committee strongly recommends consistent regulations amongst the states. The Law Enforcement Committee particularly stresses the importance of uniform size limits.

Again the issues, when somebody gets back to the dock, it makes the issues with size and bag limit less enforceable, because we don't really know where those fish were caught. With the limited resources we have, it just makes enforcement very difficult. Again, we stress the consistency amongst the states.

Also when it comes to commercial enforcement, remember if we're at a market or an inland area, we don't know where those fish came from. Again, consistency makes our job a lot easier. We also had a discussion this morning. It was noted that Option 5, I don't know if you have the map up there. We though Option 5 would be better for compliance for fishermen coming from Connecticut.

I think we would get buy-in from our Connecticut fishermen. But at the same time Option 6 was a clear and concise boundary, which would actually be better for Rhode Island fishermen. Like I said before, we do like where there is a clear boundary. Our colregs demarcation line is actually on most GPS chart plotters, versus not having a clear definitive boundary where it just adds to confusion and less enforceability. That's all I had, if anybody had any questions I would be more than welcome to answer them.

NEW YORK LETTER TO THE BOARD REGARDING THE LONG ISLAND SOUND BOUNDRIES

CHAIRMAN NOWALSKY: Okay, thank you very much, Captain. That takes us to questions and discussion. I'll just begin with first presenting the concerns of New York. As many of you know there was a letter that was sent to the Board, reiterating some of New York's concerns with a lot of the items that are included in this section, including the demarcation line, and including the separate regulations within the state.

Staff was generous enough to devote some time to a phone call, with myself, Jim Gilmore, Steve Heins, John Maniscalco from New York. As an outcome from that call, were the sub-options for splitting the Long Island Sound line at the colregs

line. Additionally what came out of it was some additional feedback from enforcement on that as well as getting staff from New York in touch with ASMFC staff, to answer some additional questions about the calculations.

I'm sure Jim will have some more comment about that. But I just wanted to let the Board know where we stood with that. What I'll do, I'll ask staff to go back to the beginning of the Section 4 presentation. We're going to roll through each of the items here; questions about them or any comments or modifications to these options.

The first item we've got is the regional boundaries, which presents two options, the coastwide management that we've used in the past, status quo if you will, as well as the new regional management with the four regions that this Board previously agreed to utilize; and also incorporates the two options for dividing the Long Island Sound and New York Bight areas. Are there questions for Jay, staff, or Law Enforcement, or comments, discussion on this section of the document? All right, seeing none; those options will remain in the document. Those options will remain in the document as they presently exist.

Apparently you all got wind that we get lunch when we're done here. I will tell you that the schedule said we're done at 12:30. I have had that negotiated to 12:45, so you're going to be stuck here for a little bit longer. The next section is regional management measures. We've got the options that were presented for both, what was referred to in the document as status quo, then with 50 and 70 percent reductions those don't apply for a couple of the regions.

What I asked staff to do was to update the document. Instead of using the term status quo, which doesn't refer to status quo measures, but refers to the same mechanism of state specific regulations that differ from neighboring states; to refer to that in the document as state-specific as opposed to status quo.

Do we have any questions or discussion for the Mass-Rhode Island proposed management measures that are in the document? Okay, seeing none; that section will remain as is with the modification from the status quo term to state-specific. Section 4.2.3 is Long Island Sound, proposed recreational and commercial regulations, as well as the options for 50 and 70 percent reductions.

Jay made another attempt to have some discussion about having only one of those in the document, I'm getting the sense we're fighting an uphill battle there, or I think I'm ready to throw in the towel on that one, unless somebody else feels otherwise. But let's go ahead and turn to questions and comments on this section. Mark.

MR. MARK ALEXANDER: I have two questions. The first is the Genesis of this amendment predates my time on the Board, so pardon if I'm missing some information here. But how were the commercial quotas derived for Long Island Sound?

CHAIRMAN NOWALSKY: I'll turn to Jay for that.

MR. McNAMEE: What I believe they did or Jacob did, was just to take the average harvest that has been occurring under the commercial sector, it was the average for the last three years, and then make the adjustment from that average harvest level.

MR. ALEXANDER: I just want to comment that Connecticut took some very conservative management measure changes following the 2011 assessment. I think we've been penalized for that and I would appreciate an opportunity to maybe reconsider how those quotas were determined. Katie, do you have a response to that?

DR. KATIE DREW: Yes, The quota that is being proposed here under the commercial regulation section is basically based on how much of the cut the region needs to take to come down to the F

target. For the overall commercial side, we're not saying these are set in stone, but there are a couple things you would have to consider, which is number one, do you want to split the reduction equally between the commercial and the recreational side? Our direction was, yes we want the recreational to take the same percent cut the commercial does. That limits how much, the amount of fish you can actually take out, in order to reach your F target; which is therefore that's the commercial quota that is shared with Connecticut and New York. Now that doesn't mean that you guys can't negotiate how much goes to Connecticut and how much goes to New York. But there is a limit on sort of the upper bound, if you want to make that target and if you want to keep the allocation between commercial and recreational the same.

That average of the three years was the amount that went into the projections to come to how much of a cut you need to take overall, to meet your target by that time point. There is kind of an upper limit on the amount of the quota that can be attributed to the commercial, unless you want to make some of these allocation decisions here at the Board level.

MR. ALEXANDER: Thank you Mr. Chairman, I have one more question.

CHAIRMAN NOWALSKY: Please go ahead, Mark.

MR. ALEXANDER: Given the small quota that we have in Connecticut, our interest would be in maximizing the value of that quota; and given that there is a premium on small fish in the live market, and there is a premium on large fish in the spawning population.

Was any consideration given to having a small minimum size, say 12-inches or something like that in the commercial fishery; especially if we're going to be under quota management, where a limited number of tags would be issued? I'm just wondering if something like that the feasibility of something like that was discussed?

CHAIRMAN NOWALSKY: Jay, Katie, tag team?

MR. McNAMEE: I guess the way I will answer is to say, the closest we got to what you're interested in is that slot limit analysis. That does account for, in particular because Jason was using the stock assessment information and projecting from that. It is considering things like the yield loss from taking that smaller fish.

But to get all the way to 12-inches, we did not consider that in our analysis. Were that to be something that the state of Connecticut or whoever wanted to see, we would have to go back and redo those analyses, because it would cascade through all of the other metrics that we used. Keep in mind that even though it's commercial, at this point it's being managed very much like a recreational fishery, so we're operating under a lack of a lot of solid information.

CHAIRMAN NOWALKSY: Just also, Mark touched on a couple items, quota and tagging. We have those items for discussion after these sections as well. Next on the list I had Emerson.

MR. EMERSON HASBROUCK: I had two questions, one was the same question that Mark asked about quota, and my second question was relative to the tagging program; which you said will be discussed a little bit later, so I pass.

CHAIRMAN NOWALSKY: Okay, do I have any other questions or discussion on this? Mark, did you have any specific requests you wanted to ask the TC to review? Obviously again, those tasks would result in delay of sending this document out for public comment. Was there anything you wanted to have jotted down here at this point?

MR. ALEXANDER: I wouldn't mind having the feasibility of a smaller possession limit in the commercial fishery under a quota situation be examined, just to see if that's even possible, or how it would impact the magnitude of the quota.

DR. DREW: Just a quick comment on that. The projections in these calculations are done in terms of number of fish, and then for a commercial quota translated into weight, based on the average size of the fish in your fishery, so the number of fish probably will not change, although there are certainly considerations to be given to the fact that how close 12-inches is to a mature fish versus 15-inches.

But what would happen is the quota would probably go down, because you would be catching a smaller average fish. If you multiply that through the quota might come down. But understanding that it's also a market consideration, and I think it's something we could look at.

CHAIRMAN NOWALSKY: Any other discussion on this section? Okay seeing none; we'll move on to New Jersey/New York Bight, 4.2.4; questions for Jay, Katie, Law Enforcement, discussion? Okay, seeing no hands up; we'll move on to the DelMarVa region. I believe I saw a couple hands up for that Section 4.2.5, John Clark.

MR. JOHN CLARK: A clarification and a question. Jay, do you have the options up for Options B through D on there, because what you showed on the screen the closed seasons for B and D are identical, yet in the document they are off by a month. Option D has a closure from June 1st through July 31st, while Option B is May 1st through June 30th. I was just curious as to which is correct.

MS. HARP: Sorry about that. I did mean to explain that. The presentation is correct. What's in the document is not, and that was an oversight on my part. Alexi did send the options which included proposed spawning closures in May and June, and it just wasn't adjusted. Status quo crept back in, but now this is correct. All options have a May and June spawning closure in them.

MR. CLARK: Then the only, the second question I had there was just because I'm sure the question would come up in Delaware. If we go

to a 16-inch Option D, results in a reduction in landings. Do you know what the result would be if the closed season was one month instead of two months there? Is that something that could be calculated? I'm just curious; because I'm pretty sure the question would come up.

MR. McNAMEE: Off the top of my head I can't give you a number. But we can certainly calculate that, John.

CHAIRMAN NOWALSKY: Okay, so just to confirm that change is, has been made in the electronic document, but wasn't in the document in the meeting materials. Okay, are there any other questions or discussion about that section? I'll give them a moment to discuss what they're doing here.

Let me turn to Jim, just with regards to the letter from New York. We had the call. Hopefully that was informative, you got some of the information you were looking for. I'll turn back to Toni here in just a moment. Understanding your position and New York's previous voting history was there any other discussion or anything you wanted to have before the Board, with respect to the letter. We went through that section, didn't have any more comment here, so I'm assuming that you're okay with the options that we have in here; at least as okay as you're going to be. I wanted to give you that opportunity, and just for the Board's edification, let you know where we stand with having responded to the letter with a phone call.

MR. JAMES J. GILMORE, JR.: Yes, I think probably that's a way to characterize it, as good as I'm going to be. I think I went from what started out as a headache is turning into a migraine, because now after I saw Jay's combinations with different percentages, and then remember when you're looking at those regional things that's within the region, and then again you get to the east end of Long Island; and now you've got the border between two regions, three states, four water bodies.

I think the only thing I'll maybe summarize in the letter there we're very concerned about, and kind of it was a summary of it. It's like; you know we can make this work on paper. That will be great, and we'll all go home and pat ourselves on the back and say we've got a great plan. But it's not going to work on the water.

I think the reality is that when you get to the east end of Long Island from the LEC report, is we're going to have what's probably the best way to characterize it, the least restrictive rule. Whatever the best set of limits are is what they're going to be fishing for, because law enforcement's going to throw their hands up and go, we can't figure out where they caught these fish.

Just so you know the courts in New York in particular are very, very supportive of fishermen over enforcement. A lot of cases just get thrown out, with black and white arguments from law enforcement, just because they just tend to side with the fishermen. I just see a state where they're going to take the best set of limits they can get, and if they get a ticket they're just going to get it defeated.

We're going to have to be able analyze this based upon the least restrictive rule. Assume that if say for arguments sake it was a 15-inch size limit, and the longest and the highest bag limit. That is what everybody's going to be fishing. I think we need to factor that into the landings, which gets to the last part. Then we're using MRIP.

Now we've been using MRIP for summer flounder and black sea bass, and we've been having headaches in the sampling size, it's dramatically much larger than what we're going to be doing for black sea bass. Now we're taking MRIP, and we're about to do this again. We're going to take MRIP and extend it well past what it was designed to do, to try to manage this fishery.

As I said, I've gone from a headache to a migraine as I see this going forward. I think what Ashton

had said before. We have that option that when we get down the road that we can tweak these regions and make a new addendum or new amendment to try to get regions that actually work. I just want to emphasize that. Because I think we're going there after we implement this thing. I'll stop.

CHAIRMAN NOWALSKY: If I understood Captain Snellbaker with regards to Option 1 being the line for Montauk Light House northward versus Option 2. You're kind of on the fence with that; because Option 2 provides the benefit of the colregs line, but Option 1 presents more of an obvious line for Connecticut fishermen, if I heard you correctly. There's not clear winner out of those options for Law Enforcement.

MR. SNELLBAKER: That's correct. It was mentioned that this is where public comment is going to weigh in heavily.

CHAIRMAN NOWALSKY: All right so with that I am going to close the book on the 4.2.4 discussion. Toni wanted to address something with the DelMarVa discussion.

MS. TONI KERNS: Actually two clarifying questions, and one for the DelMarVa. It is my understanding that the May and June are spawning closures, and the Board had asked for spawning closures to be included in these options. Spawning closure is the way it's written out in the document as you read on further.

Those are sort of non- negotiable closures. You asked for them to tell you what we need to open up one of those months; but if it's a spawning closure that would be problematic. For curiosities sake, do you want them to run those at values for you, or?

MR. CLARK: No that's all right. I don't know how closely it corresponds right now to when tautog are actually spawning off of DelMarVa, but anyhow, I was just curious.

CHAIRMAN NOWALSKY: Well Toni, let me ask you this. Is there more flexibility given to modify those if we don't specifically reference spawning closure in the document? I mean are we hamstringing ourselves by using that term, and that those then become fixed months of closure with no opportunity for modification, and some equivalency? Are we better off just leaving those as closed months, possibly referencing spawning, but not specifically calling it a spawning closure?

MS. KERNS: The spawning closures were based off of scientific information. We referenced where we got it from in the document. I can't remember off the top of my head, but Katie might be able to tell me. She's looking at me like yeah. Yes, you are allowed to change those through the addendum process; but you are not allowed to change spawning closures through the conservation equivalency process, because they were based on the scientific information. If you don't' want to say your rationale is spawning closures then you would need to change that direction.

The more changes you're asking for, the more we will probably come back and tell you you're going to end up delaying this document for public comment. Because in the document there are several sections that are sort of tied to this being spawning closures, and the way we presented it to the public. My other question, because I'm not clear is did Mark ask specifically for us to create an option in the document for both the 50 and the 70 percent risk for a smaller size limit?

CHAIRMAN NOWALSKY: I was definitely going to come back to that one. Well since you ended with that I'll just go back. Mark, after what you heard from Katie, are you looking at something specific being changed there?

MR. ALEXANDER: Actually what I was thinking of doing, since that would heap more work upon the TC, I thought I would throw you a bone and offer up an option under Section 2.7.1 that we

eliminate Option C, the 70 percent probability of achieving the F target from the analysis and from the document.

CHAIRMAN NOWALSKY: Okay, so let's try to deal with the DelMarVa question then first on the spawning closure; and then we'll come back to that. Let me turn to DelMarVa and their thoughts about, are you interested in removing the spawning closure references to gain the benefit of the flexibility of conservation equivalency. I've got John Clark and Mike Luisi. John.

MR. CLARK: Yes, I just brought that up just because I saw the reduction there. But if we explain it as the spawning closure, I don't think there's a problem there. It was just more of as I said curiosity there. But given the explanation, we can leave it alone.

MR. MICHAEL LUISI: I was going to suggest to be able to have a little flexibility is always nice, specifically for Maryland. We currently have an open season during that time period, and the thoughts from our fishermen; they're suggesting that we do not. Black sea bass opens on the 15th, I believe of May.

There was a hope that any closure period would allow for the tautog fishery to run up to the beginning of the black sea bass fishery, so there wasn't a two week period of time where the headboats that fish for both of those species would have nothing to fish for. Having a bit of flexibility to modify the dates, I'm not suggesting we eliminate the first 15 days of May, and not add into July. That's something we may want to talk as a region about, to make sure that we're not causing some problems with the business end of the charter headboat fleets.

CHAIRMAN NOWALSKY: Well, do you have a specific request for modifying the document? You basically heard that if we keep all of the labels in as spawning closure and associated sections, it would likely be limiting in that flexibility. The option would be to modify the

document to remove those specific references and labels as calling them that and giving you that flexibility. What's your pleasure? If we get none then the document will stay as is.

MR. LUISI: Well I would suggest removing those labels, and I don't know if you can specifically do that just for our region. I'm not trying to cause any problems here. That's the last thing I want to do is to create a problem that finds its way weaving through all the different regions and the entire plan. But I was just hoping for a little added flexibility. I'll look to you, Mr. Chairman as to, I don't think it's going to be a big deal one way or the other, but I'm not trying to cause problems here.

CHAIRMAN NOWALSKY: No problem at all. From my perspective this is 21 years in the making. This is Amendment 1 from the original FMP, 1996. We spent three years on it. I made the comment on another species. Let's do it right. I think that's what the important thing is, as opposed to going back and saying wow, we could have done this, because then what do we wind up with?

We spend another two or three meeting cycles going through some addendum process. I'll turn to staff and get their thoughts on are you clear on the request from the Board, and my recommendation would be not just limit this to DelMarVa, make it for all the regions that we have these proposed closures; but not specifically label them spawning closures, provide some reference to we're using spawning as guidelines for recommending these closing periods. But we're not specifically closing these time because of that. Is that enough direction? Toni.

MS. KERNS: It's enough direction, but I would ask the Technical Committee Chair. These spawning closures in some of these areas are put in place because of the need for the stock to rebuild. Interrupting spawning has the potential to affect rebuilding. My question would be to the TC Chair. For the areas that need rebuilding,

by allowing us to alter the spawning closures to allow fishing to occur. How is that going to impact the rebuilding of the stock?

CHAIRMAN NOWALSKY: Jay and specifically I think I would like to hear an answer with regards to any calculations that have been done; if they're going to be affected by that.

MR. McNAMEE: No calculations. The way that I understand Toni's question is, if you interrupt or impact a portion of the spawning period. You know that's difficult to know, the spawning period does change year to year. Not shockingly, meaning it might be a week earlier or a week later that sort of thing.

Could I offer one other thing though, Mr. Chair. It is just for consideration. I mean when we were going through this, we were talking about spawning closures. But at no point was there ever really specific guidance. In other words, no one ever said, and we want you to capture 85 percent of all of the spawning that is in the scientific literature or 50 percent or we want you to bound the maximum peak by a month on each side.

We did the best we could to capture what looked to be the spawning period going back, looking at ichthyoplankton data and egg data and stuff like that. But we're not working under very specific guidelines in that case. My thought is I wonder if there is already flexibility inherent in the fact that we didn't have a strong definition for spawning closure.

CHAIRMAN NOWALSKY: Well, I'll go one step further in that I think this Board has made clear in past discussions, discussion today, development of this document that spawning periods are clearly important. Any regulation that comes forward that is modified for conservation equivalency is ultimately going to have to be approved by this Board.

This Board is going to have that final say, and if a state brings forward a proposal that we look at

and simply say, this conflicts with what our goals have been, our discussion has been. I think it would then incumbent on the Board to go back to the state and say, no this doesn't work and here's the reason why.

I think we have that backstop. I think it wouldn't be completely true to simply say, if we took out the spawning closure designation that all states could just freely open during spawning. If they do so, I don't think that's necessarily the case. But I appreciate those comments. I'll turn to Toni for one more comment on it.

MS. KERNS: That's fine, Adam. I think that if the Board is still stressing the importance of spawning and spawning closures as a tool. But you're okay with having them altered through conservation equivalency, and then we could just remove that reference that you can alter spawning closures through conservation equivalency. Then that gives Maryland and Delaware the flexibility to alter their season closure through a conservation equivalency plan. Does that work?

CHAIRMAN NOWALSKY: I'm seeing thumbs up from that side of the room, and heads nodding, so I think the answer to your question is yes. That works. Okay, where we are just to frame up where we are is we've got a number of other options to get through for Section 4.3, but Mark Alexander brought up after seeing these options that he's now reconsidering; and I'll turn to him for your comments and potential motion about the 70 percent reduction options in the document.

MR. ALEXANDER: Yes, I offer up that motion. I think that 50 percent is conservative and not unprecedented as a probability of achieving an F target like that. I know in particular in Long Island Sound the harvest reduction that we're contemplating here is large with either of those two options. Based on that I would like to offer a motion that Amendment 1 to the Tautog Fishery Management Plan; consider only a 50 percent target of achieving F.

CHAIRMAN NOWALSKY: I think that could be clear by saying in Section 2.7.1, remove Option C, the 70 percent probability.

MR. ALEXANDER: Yes sir that's fine with me.

CHAIRMAN NOWALSKY: A second by that by Jim Gilmore. To be clear for the Board, what that would then also do is that would remove all of the 70 percent reduction options, both recreational and commercial across all the regions from the final document. Let's try to get that up on the board and then we'll have discussion. Do I have any discussion, any hands up for further discussion on it? Okay, I got one hand up. I'll turn to you in just a minute, Joe. Give me just a moment to sidebar. Okay, Joe.

MR. JOE CIMINO: I guess this question would be for maybe Jay or Katie. When we were looking at the reference points and Long Island Sound decided to go with MSY reference points. My recollection was, were they more conservative than the SPR reference points that were being proposed? Do either of you recall?

DR. DREW: For the Long Island Sound the MSY reference points were very slightly less conservative than the SPR. They were almost indistinguishable for Long Island Sound. The big difference was in the Massachusetts, Rhode Island region, and we already picked that option. But for the Long Island Sound region there was practically no difference in terms of the numbers or the reduction that needed to be taken.

CHAIRMAN NOWALSKY: Okay so the motion that's up on the board, Motion to remove the 70 percent probability of achieving F target throughout the Amendment 1 document. That would again just to be clear, remove Option C from 2.7.1 and then throughout Section 4, remove all of those options; any further discussion? Okay, I'll give you 15 second to caucus.

Okay times up. The motion before the Board, all those in favor please raise your right hand. Keep your hands up for another moment. All those opposed, abstentions, null votes, the motion carries by a vote of 7 to 3 to 0 to 0. Okay so next we'll continue with Ashton's presentation for the remainder of Section 4. I believe your presentation covers all of the additional decision points that might need to be made. Ashton.

MS. HARP: Okay, we will pick up again with the commercial quota. The document doesn't mandate a commercial quota for any of the regions; it just says that a state may consider a commercial quota and it gives procedures within which to do that. There are two different options.

You could have a regional quota, and basically if a quota decision is made moving forward it would involve a regional working group among those states within the region to decide if it is state specific and how are you going to carve out the state specific quota within that larger region?

If it's a regional quota, how are you going to allocate it such that the states gets a certain percentage of it or is it just whenever the quota gets hit then its closed? Those are all decisions that will be made at a future point in time. This document gives a decision making process. The section also includes quota rollovers and quota transfers, and any quota overage.

For the commercial harvest tagging program, Option A is status quo, which is no tagging program. Option B would be to implement a commercial harvest tagging program; whereby all states would have to be included in this program.

De minimis status does not preclude a state from the requirements of the commercial harvest tagging program. It would be a single-use tag. The tag would include the year of issue, the state of issues, and a unique number that would be linked back to the permit holder. States would distribute the tags and the cost for the tags would be whatever the state wanted to decide.

It would be on the onus of them to decide if that would be the harvester bears the cost or the state, and it would be unlawful to sell or purchase commercially caught tautog alive or dead without a commercial tag. There is a Suboption within the tagging program, and the LEC Subcommittee has had significant discussion on this; which is when do you actually apply the tag to the fish?

Right now there are two options in the document. Option A is harvester application would be at harvest or upon landing. This was seen as a kind of a compromise. The LEC would very much prefer that tautog is tagged immediately upon harvest. This really reduces any loopholes or funny business, as to where the fish goes and when the tags are applied.

When we did commercial interviews with some fishermen, they discussed that there is a stress that occurs with some of these fish when your catching the fish, and they didn't want to tag immediately upon harvesting the fish; because they wanted to make sure the fish stays alive, so they can get the better price for the fish.

This option also allows the harvester to apply the tag upon landing the fish. Option B would be application by the dealer. All commercially caught tautog will be tagged by a licensed dealer. We had a discussion about this. There are a lot more dealers in some cases than harvesters, and not for every state; but in some cases there are a lot more dealers, so this would be possibly a little bit more difficult to implement, so the tag would be applied to the fish immediately after the dealer buys the fish from the harvester.

Then the rest of the commercial harvest, it is a long section. It does go over, you know what the reporting process is like, there would be an annual tag compliance report within there.

When should the tag be given back? If there are extra tags, how should they be given back, so there is kind of a lot of guidance within this commercial harvest tagging program; which is kind of just one lump section to really consider, and there are multiple subsections in there for you guys to review and to make sure that you're comfortable with all of the language in there.

In general there is, I would say for a lot of this document, includes guidance for the states. There is a lot of flexibility for the states to then decide how they want to implement a program. Like right now this doesn't say how the allocation of tags would be implemented. It does say that there is a quota that is presented in this document.

The quota could be used to determine what the cap would be for the tags. The states wouldn't necessarily have to implement the quota, but the quota would be used to derive the commercial tagging cap. We just had a lengthy discussion on spawning closures, so I'm just going to really quickly go through this.

At the regional working groups there was a request for spawning closures to be included in this document, so when the TC prepared all of those options, they already had these very specific spawning closures within it. The Massachusetts, Rhode Island, and New Jersey-New York Bight, tautog fisheries will be closed from June through July.

The Long Island Sound would be closed from May through July, and the DelMarVa region would be closed from May through June. But as was previously mentioned, that there is a request for, it says the spawning closure intended to reduce disruption on tautog pairing, to protect spawning females in perpetuity, meaning that these spawning closures are kind of fixed in time; unless an addendum has been created as Toni went over.

There is one sentence in here that says the measure is not subject to conservation

equivalency. We just heard that that is not the preference of the Board, so we can just delete out that sentence. If any state does want to allow fishing during what would be termed a spawning closure, then that can be done.

Those management measures will be brought before the Board, and the Board can decide if they want to move forward with that. It could be done via conservation equivalency.

This conservation equivalency option that is linked to spawning closures will be completely removed from the document, because we've heard that it is the will of the Board. This would be just one less option in the document; it will only be 21 options.

The last part is this is not necessarily an option, but it is something that was discussed at the Law Enforcement Committee earlier this morning; it was that there is, in Addendum 6 there was inclusion of language about states need to really use the term possession when regulating tautog, not the landing of tautog. There was some PDT discussion about possibly including, in federal waters a vessels possession limit is respective to the home port. Jason can chime in here, and there was feedback over what does home port mean? How do you define that?

Do recreational fishermen really have a home port, or is that really more geared at commercial fishermen? Whether or not this one sentence should stay in there, because that's an addition, it's up for debate. It can be removed.

It would be all right within the document, but it could be explicitly stated that if you're fishing in federal waters, whenever you come into land that fish you will need to abide by the possession limit for the state in which you're landing. That is already what fishermen should be doing, but it could just be more explicitly stated that that is what needs to be done.

Some thought does need to be taken when fishing in federal waters, it's not just a free for

all, and then we're not sure where the fish goes when you land. There is a limit on the amount of fish you can take in federal waters, and that is the possession limit of the state waters in which you will land. That can be adjusted.

That is all the options in the document. If you have any questions on the quotas or the commercial harvest tagging program, please let me know.

CHAIRMAN NOWALSKY: We're going to go through this the same way we did the other sections is we'll hit on each of the 4.3 through 4.11 items, take any questions or discussion about those. We'll go back to 4.3, the commercial quota. We've got the two options that are in the document right now; including elements of quota within region, rollover, transfer, and overages; any questions or discussion about that section? Okay seeing none; that will remain as is.

The next item is Section 4.4, which is the commercial harvest tagging program. Option A is status quo of no tagging program. Option B would be to implement a harvest tagging program. Then with there, we've got a handful of other items that would also include the options for tag application as well; so questions, discussion in this section? Dan McKiernan.

MR. DAN McKIERNAN: This is just a subtle issue, but I think the word landing might need to be clarified. If a fisherman brings in a holding car full of tautog, and he puts it over the side of his boat, has he landed it? I look at Jason, and this is always a sensitive issue for when you enforce some rule. I would ask that maybe we clarify that a little bit more if we can. But I don't want to delay this issue or the amendment.

CHAIRMAN NOWALSKY: You would be looking at that clarification in the title of Option A for tag application 4.4.3?

MR. McKIERNAN: Yes that's right. When does one have to tag the fish upon landing?

CHAIRMAN NOWALSKY: LEC is suggesting changing that to offloading; Captain.

CAPTAIN SNELLBAKER: It could be land or it could be offload, but you have to make a choice.

MR. McKIERNAN: No doubt in Massachusetts we'll be enacting our regulations for the Commonwealth, so we'll probably be clarifying it then. But I just want to point out that that is always an area of debate.

CHAIRMAN NOWALSKY: Is there any Board objection to, for 4.4.3 the harvester application option of the tag referencing offloading in lieu of landing? Okay seeing no objection, we'll go that route; Captain.

CAPTAIN SNELLBAKER: I don't know what each individual state's definition of land is. In New Jersey it is enter port. From a New Jersey perspective, I'm okay with land. But not knowing the other definitions for land in the other states, then I would say to answer your question, it would have to be prior to offloading. If you don't have a definition for land, i.e. enter port. I don't know if that needs more discussion or a clarification.

CHAIRMAN NOWALSKY: Does prior to offloading work in our state as well, where we have that definition?

CAPTAIN SNELLBAKER: Either one would work in New Jersey. But I'm not sure about the other states.

CHAIRMAN NOWALSKY: Okay, so I didn't see any objection to prior to offloading, so I think we'll go with that. Okay that brings us to Section 4.5, which has no options in it, 4.6 is spawning closures. What I would suggest we do here is just make this informational; and not actually make these options here. Toni.

MS. KERNS: Adam, from what we said before that we were going to hold onto these, but they could be revised through conservation equivalency. But if you want to change that then we can do that. Because these are, it's spawning closures that are based on the scientific information that's out there.

We would revise them through conservation equivalency to allow for flexibility in how much percentage that you're capturing during a time period, or if the science shows that there is new spawning closures. But if you don't want us to have them at all then we would just delete the section.

CHAIRMAN NOWALSKY: I guess I'm just wondering, what's the benefit of having it in here as another option, another decision point. I think that is what I'm asking here at this point.

MS. KERNS: Because it's based on the direction that we received from the working groups that were developing the management measures.

CHAIRMAN NOWALSKY: I'll turn to the Board. Our options here are to leave the two options; boy it gets hard when people bring food in front of us here. Our two options are to leave this section as is, but change the first paragraph to remove the line that says this measure is not subject to conservation equivalency. We would just strike that line. Where the other alternative is to just simply turn them into an informational paragraph, and I need direction from the Board about which way they would like to go. I would love to see a hand. Eric Reid.

MR. ERIC REID: I'm good with the informational paragraph.

CHAIRMAN NOWALSKY: Okay, we have a suggestion for informational paragraph. I have another thumbs up, do I have any objection to just making that informational in nature? Okay seeing none, 4.6 will reduce us to 20 decision points in the document; and will become informational in nature. I threw in the towel on some of this. That's great. All right, 4.7 was the last slide Ashton had put up, which referred to possession limit, regulatory language. We've

had a lot of discussion over time about complementary measures in federal waters.

We have this line in the document highlighted, in federal waters a vessels possession limit is respective to the home port. That brings up the question of definitions of home port. I believe the Summer Flounder Plan goes into some detail about how this actually works. Let me first turn to staff, to see if they have any thoughts after hearing from Law Enforcement about how best to proceed, and then I'll turn to the Board about concerns about this.

MS. HARP: My initial thought, after the very informative feedback this morning from the Law Enforcement Committee was to strike that sentence from the document, and just reiterate that when you're in federal waters you have to land according to the states restrictions upon which you're landing; that there is some kind of cap that one should acknowledge when in federal waters, but to strike the sentence currently in the document.

CHAIRMAN NOWALSKY: Is there any objection to striking the last sentence from 4.7? Go ahead, Captain.

CAPTAIN SNELLBAKER: Again, I think we all know there is no federal regulations for tautog, which kind of makes enforcement difficult when you go to check a sea bass boat and all of a sudden there is a huge number of undersized black fish, you know laying on the deck of the boat or in a hold, or in a live bag; and there is nothing you can do from an enforcement perspective.

I think the home port issue is really, again reiterating that we do enforce strict possession, so if you're in the EEZ, you may not be in violation of any state regulations, but wherever you come back and there is the regulation that is the regulation that is going to be enforced. To me it's not a home port issue, as much as it is a strict possession issue.

I would also say that as far as home port is concerned, many boats are transient boats. Like I said before, most people will shift to where the regulations are more liberal. You basically have a New Jersey or a New York or a Massachusetts or Rhode Island registration. It doesn't mean that's where you're going to be going back to. Also, as far as on the commercial end, we do have vessels that aren't documented vessels. They don't have a home port; they just have a state registration. To me this is more of an issue of, again strict possession.

MR. REID: Possession in federal waters is a different animal. But of course if the harvester is actually going to be the one that tags the fish, they will have onboard, I would hope the tags of their point of sale. There is a lot of discussion in my mind, in my own head, about how many states tags can you have and all this other stuff, which we can I suppose work through public comment. I think you have to take that line out.

CHAIRMAN NOWALSKY: Peter Burns.

MR. PETER BURNS: Just a question and clarification for my own benefit. I just want to make sure that this would allow state enforcement to enforce possession limits in federal waters; is that correct?

CHAIRMAN NOWALSKY: Well, I think this section just highlights that the enforcement is going to occur where possession is, and couldn't actually occur until that vessel was in some state waters, where some regulation applied. I think the section is highlighting the fact that right now there is no possession limit in federal waters; recreationally or commercially.

When a vessel is inspected in federal waters, no enforcement can occur, because there is nothing to enforce; and enforcement isn't sure where that vessel is going to go back to. I think it's an ongoing issue. I don't think we've clearly fixed it here. But I think it is something that we need to continue to work on moving forward. Follow up.

MR. BURNS: Yes thanks for that clarification. This would not be a recommendation for any complementary federal regulations, as far as this section is concerned.

CHAIRMAN NOWALSKY: I don't believe there is anything in this document that has specifically highlighted that.

MS HARP: One point of clarification. There is a section, it's later on, and it's not an option, because it's just carrying forward language from a previous addendum. It does recommend federal management, and that the federal government applies the minimum size and possession limits in federal waters. That was just a recommendation.

CHAIRMAN NOWALSKY: That was in Section? Give us a minute to find it.

MR. CLARK: It's 4.15.

CHAIRMAN NOWALSKY: Okay, so thank you, so 4.15, recommendations to the Secretary for complementary action in federal jurisdictions. **ASMFC** recommends the federal The government promulgate all necessary regulations to implement compatible measures in the EEZ. Specifically the Commission recommends that the Secretary fully implement regulations of tautog in the EEZ that are in accordance state with minimum sizes. possession limits, closed seasons and other possession requirements.

Okay, any other questions on that? No objection to removing the last sentence from 4.7, okay. Then the last item we have here is in Section 4.11, we're removing that entire section or we're leaving the paragraph but eliminating the options?

MS. HARP: Yes, we're just eliminating the options. We'll still have a paragraph in there to describe the conservation equivalency for this plan.

CHAIRMAN NOWALSKY: Okay, so let me run down the list of modifications that we've discussed here today. Then I'll have two questions after that. One, throughout Section 2.7.1 we'll use the term initiate, referring to the timeline for management document. Throughout Section 4 in the options that reference status quo, we'll clarify that those are the state specific options with the reductions. In the DelMarVa options, the document was clarified with regards to May and June. We'll remove the spawning closure references there, or labeling them as such. In 4.4.3 we'll change the term landing to prior to offloading. Section 4.6 will become informational in nature without an option, 4.7 will remove the last seconds, and 4.11 will become an informational paragraph without an option.

Those are the list of changes that I have. The two questions that I have is first, I'll turn to Mark from Connecticut, with the – oh and then we also went ahead and moved to remove all of the 70 percent reduction options. Let me first turn to Connecticut, moving to remove those 70 percent options. Does that eliminate your need for any other measures to be evaluated by the TC, and inserted in the document before you would vote for it going out to public comment?

MR. ALEXANDER: No, I wish to explore the possibility of a smaller minimum size in the commercial fishery under a tagging program.

CHAIRMAN NOWALSKY: I think I heard that analysis could be done, but without a doubt that would certainly delay this to at least the next meeting. Do we have some level of confidence that we could get that analysis for our next board meeting?

MR. ALEXANDER: Katie, is that something that could be considered under conservation equivalency?

CHAIRMAN NOWALSKY: Toni would like to jump in on that.

MS. KERNS: I think Katie wants to add something after I'm done. But I think that if we can work with Jarred to do the analysis, to make it feasible. It potentially could impact both the commercial and recreational, because I'm assuming we're holding the 50/50 percent, 50 percent reduction to the commercial, 50 percent reduction to the recreational.

You're just asking for in that sense, but maybe Katie can clear that up for me. If we can get Jarred to do the analysis relatively quickly, then we can just add it as an additional option in the document. However long it takes him to do that analysis, if it doesn't delay into our timeframe that we have.

You know there are very specific timeframes that we have to have the document out before it goes out for public comment. If that fits into the schedule still, then we can bring you public comment back at the August meeting. If it doesn't fit into the schedule, from how much time it takes him then it would delay us.

DR. DREW: Also, I would want to clarify. Is this only for the Long Island Sound region, or are other states interested in our other regions, would want to see that lower size limit? I mean I don't really want to open up that can of worms, but I also don't want to get here to be like, well why did they get a 12-inch minimum size and we have to do a 16-inch minimum size.

MR. ALEXANDER: I guess I did open a can of worms. My interest was only for Long Island Sound. I'm not even sure that New York is interested in it yet. I would like to proceed with this in the most expeditious and simplest manner though. I mean if it's something that we could develop on our own as a conservation equivalent to the commercial option that's been submitted already, then there is no need to prolong the publication of the amendment.

CHAIRMAN NOWALSKY: Okay, so let me jump to my second question. The Connecticut issue notwithstanding, all of the other changes we talked about could be made in a timely enough manner. Maybe just send the document around to everybody for 48 hours, or maybe not even necessary. I can review it and it could go out.

MS. KERNS: That's correct, and I think if Mark wants to do conservation equivalency and he works it out with New York, because it is a regional approach, then we can do that.

CHAIRMAN NOWALSKY: Okay, so with the Connecticut issue, what I'm hearing is two potential paths forward. One, that this Board would either have to agree by consensus without objection, to have the additional item put in the document; and it couldn't be done by consensus. We're not without objection, then we would need a motion from Connecticut, a second and be voted on; or what I'm hearing the second path is that that option could be forward in the future, for Connecticut's commercial fishery under conservation equivalency. How am I doing?

MS. KERNS: Good.

CHAIRMAN NOWALSKY: Mark.

MR. ALEXANDER: Mr. Chairman, I'll proceed with your second option there, to make things simple.

CHAIRMAN NOWALSKY: Okay, so we've got recorded discussion of that and that option would be considered, looked at under conservation equivalency, and wouldn't need further Board action as an inclusion in the document. Okay, so at this point is there any other discussion on the document? Seeing none; what I would need is a motion to release the document for public comment, with the changes made here today. I have a hand up from Emerson Hasbrouck.

Do I have a second? John Clark. Okay while we're getting the maker and seconder up. I would just ask that you reflect that motion to include with the changes made here today. I'll quickly just ask, is there any public comment on

this motion? Seeing none; I'll come back to the Board. You have five seconds to caucus.

Okay, is there any objection to the motion? Okay, I've got an objection, so given an objection I'm going to go ahead and ask for a show of hands then as a vote. All those in favor of the motion to approve Draft Amendment 1 for public comment as amended today, please raise your right hand, all those opposed, abstentions, null votes; motion passes 7 to 0 to 2 to 1.

One more digit and we'd have a zip code. Okay, are there any other items to come before the Board today? All right, thank you everyone. Again, I have to extend a great deal of amount of thanks to staff fort their work on this. I'll also ask do you want to see a show of hands for states that want public hearings? No, not needed. I'm sure that will get addressed.

ADJOURNMENT

CHAIRMAN NOWALSKY: All right, having concluded the business of the agenda, we stand adjourned. Thank you everybody.

(Whereupon the meeting adjourned at 1:12 p.m. on May 9, 2017.)

Atlantic States Marine Fisheries Commission

DRAFT AMENDMENT 1 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR TAUTOG FOR PUBLIC COMMENT



ASMFC Vision: Sustainably Managing Atlantic Coastal Fisheries

Atlantic States Marine Fisheries Commission Seeks Your Input on Tautog Management

The public is encouraged to submit comments regarding this document during the public comment period. Comments will be accepted until **July 14, 2017.** Regardless of when they were sent, comments received after that time will not be included in the official record.

You may submit public comment in one or more of the following ways:

- 1. Attend public hearings held in your state or jurisdiction.
- 2. Refer comments to your state's members on the Tautog Management Board or Tautog Advisory Panel, if applicable.
- 3. Mail, fax, or email written comments to the following address:

Ashton Harp
1050 North Highland St., Suite 200 A-N
Arlington, VA 22201
Fax: (703) 842-0741
aharp@asmfc.org (subject line: Tautog Draft Amendment I)

If you have any questions please call Ashton Harp at 703.842.0740.

Draft Amendment 1 Timeline

Winter 2015	Board Reviews the 2015 Benchmark Stock Assessment that Evaluates Stock Status Across Three Regions
Fall 2015	Board Solicits Public Comment on a Public Information Document (PID)
November 2015	Board Reviews PID Comments and Tasks Plan Development Team (PDT) to Develop Draft Amendment I
Spring 2016	Board Tasks Technical Committee to Develop a Regional Assessment to Evaluate Stock Status Across Two Additional Regions
August 2016	Board Reviews Regional Assessment and Tasks TC to Develop a Four-Region 2016 Stock Assessment Update that Includes Data through 2015
Winter 2016/17	Board Tasks TC and PDT to Develop Management Measures for Each Region Respective to Regional Stock Status
May 2017	Board Reviews Draft Amendment 1 and Considers Approval for Public Comment
June/July 2017	Board Solicits Public Comment on Draft Amendment 1 and States Conduct Public Hearings
August 2017	Board Reviews Public Comment, Selects Management Options and the Commission Considers Final Approval of Amendment I

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1.0 INTRODUCTION

The Atlantic States Marine Fisheries Commission (ASMFC) is responsible for managing Tautog (*Tautoga onitis*), under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACFMA). The management unit consists of the coastal states from Massachusetts through Virginia. ASMFC has coordinated interstate management of tautog in state waters (0-3 miles) since 1996. Responsibility for compatible management action in the Exclusive Economic Zone (EEZ) from 3-200 miles from shore lies with the Secretary of Commerce through ACFCMA in the absence of a federal fishery management plan. If approved, Amendment 1 would consolidate the fishery management plan (FMP), subsequent addenda (Addendum I-VI) and new management measures into a single document.

1.1 STATEMENT OF THE PROBLEM

Since the Tautog FMP was implemented, in 1996, the resource has experienced changes in stock status, as well as management measures used to control harvest. Based on the 2015 Benchmark Stock Assessment and Peer Review Report (2015 assessment), tautog is overfished and overfishing is occurring on a coastwide scale.

The 2015 assessment suggested the delineation of separate, regional stock units as management areas to reduce the risk of overfishing and account for tautog's very limited coastwide movement. It explored multiple regional definitions for management purposes, including a three-region delineation of Massachusetts-Rhode Island-Connecticut, New York-New Jersey, and Delaware-Maryland-Virginia. The Tautog Management Board (Board) accepted the 2015 assessment for management use, but expressed concern with the proposed three-region stock delineation that would split Long Island Sound (LIS) into two assessment and management areas. This was seen as an issue because recent landings indicate a concentration of the effort in the LIS and fishermen from Connecticut and New York routinely cross states lines when fishing.

Therefore the Board requested a new regional assessment that would examine the population dynamics in Connecticut-New York-New Jersey in more detail. This regional assessment proposed two additional stock unit boundaries for consideration at a finer regional scale: Long Island Sound (LIS), which consists of Connecticut and New York waters north of Long Island, and New Jersey-New York Bight (NJ-NYB), which consists of New Jersey and New York waters south of Long Island. The Board approved the regional assessment for management use and selected a four-region management approach (Table 13) for inclusion in Draft Amendment 1.

Draft Amendment 1 updates the 1996 FMP with new fishery management principles and consolidates associated addenda into a single document. The document proposes regional management for tautog to address overfishing and overfished stock status present in some regions. In addition, a commercial harvest tagging program is proposed to address an illegal, unreported and undocumented fishery that has persisted for more than a decade. If approved,

Draft Amendment 1 would be the comprehensive management document for tautog management in state waters.

1.2 BENEFITS OF IMPLEMENTATION

Unlike previous assessments, which assessed the stock on a coastwide basis, the 2015 benchmark stock assessment and 2016 regional assessment evaluated stock status regionally to reflect differences in life history characteristics and harvest patterns. Regional management of the species has been suggested since the onset of management, however the tools and data to run a regional stock assessment to determine regional stock status were not available until recently. The 2015 benchmark stock assessment peer review panel, 2016 regional assessment peer review panel and tautog technical committee consider the regional assessments to be a significant advancement from prior assessments.

The regional stock unit definitions are based on localized biological and socioeconomic trends, which allow managers to better address the management needs of each region. Evaluating stock status by regions allows managers to develop targeted management measures that restrict effort only where necessary. Whereas a coastwide assessment and management measures, required the entire coastwide fishery to take reductions regardless of where fishing effort was highest. Regional management is expected to have a positive impact on the resource and fishery.

1.2 DESCRIPTION OF THE RESOURCE

Tautog, a member of the wrasse (*Labridae*) family, is a stout fish with an arched head, large lips broad tail and a lack of scales on the gill covers. They are regionally referred to as blackfish, in reference to its common overall coloration. Juveniles and females more often exhibit a mottled and brown toned appearance, while males are most often grayish in color. Adults can live more than thirty years and stay close to a preferred home site moving only short distances longitudinally, if at all, during seasonal migrations. A sedentary life history and aggregation around structure makes tautog relatively easy to catch, even when biomass levels are low. Catchability and slow growth rate make tautog highly susceptible to overfishing and slow to rebuild.

1.2.1 Species Life History

1.2.1.1 Distribution

Tautog are distributed along the northeast Atlantic coast of North America (Figure 1) from the outer coast of Nova Scotia to Georgia (Collette and Klein-MacPhee 2002, Parker et al. 1994); although, most abundant from Cape Cod to Cape Hatteras (Bigelow and Schroeder 1953). They inhabit coastal and estuarine waters throughout this range. North of Cape Cod, they are usually found within 4 miles of shore in waters less than 60 feet deep (Bigelow and Schroeder 1953). South of Cape Cod, they can be found up to 40 miles offshore and at depths up to 120 feet (Hostetter and Munroe 1993).



Figure 1. Tautog Distribution

1.2.1.2 Life History Stages

Eggs and larvae have been collected on the inner continental shelf and within estuaries from May through August (Berrien et al. 1978, Colton et al. 1979, Ferraro 1980, Bourne and Govoni 1988, Monteleone 1992, Able and Fahay 1998, Witting et al. 1999). Viable eggs are 1 millimeter (mm) in diameter, buoyant and are found in the greatest numbers at the water surface. Hatching occurs in 81 hours at 15°C and 42 hours at 20°C (Auster 1989, Perry 1994). The larvae (2 mm at hatching) stay near the surface during the day and may go deeper at night (Malchoff 1993). After approximately 3 weeks, larvae undergo metamorphosis and settle out of the water column as juveniles (Sogard et al. 1992, Dorf 1994).

As juveniles, tautog begin a bottom dwelling (demersal) existence that continues for the remainder of their lives. Newly settled juveniles look similar to miniature adults and assume the color (green to mottled or striped brown) of the habitat they occupy. It is unknown if tautog

larvae settle out of the water column in offshore locations or if small juvenile tautog are found in offshore habitats.

Tautog are attracted to some type of structure in all post larval stages of their life cycle. These habitats include both natural and man-made structures, such as submerged vegetation, shellfish beds, rocks, pilings, jetties, shipwrecks and artificial reefs (Olla et al. 1974, Briggs 1975, Briggs and O'Connor 1971, Orth and Heck 1980, Sogard and Able 1991, Dorf and Powell 1997, Steimle and Shaheen 1999). Juvenile tautog are found in estuaries and bays where newly settled individuals are reported to prefer areas less than 1 meter (m) deep (Sogard et al. 1992, Dorf and Powell 1997), and vegetated areas to unvegetated regions. Vegetation can include sea grass and various types of macroalgae (Briggs and O'Connor 1971, Sogard et al. 1992). With growth, these young-of-the-year move to deeper waters but are not usually found deeper than around 25 feet (Cooper 1964).

Larger juveniles become associated with various reef-like habitats and hard surfaces as long as the main habitat requirement of shelter is met. Young tautog may establish home sites, ranging within a few feet during the day and returning at night when they become dormant (Olla et al, 1979). Dixon (1994) found juvenile tautog showed a size-specific preference when choosing a shelter. Juvenile tautog remain inshore during the winter (Cooper 1964, Stolgitis 1970, Olla et al. 1974). When water temperatures drop below 4.5°C some large juveniles may move to deeper, more protected locations. Juveniles remaining inshore in shallow water can be found in a variety of shelters including grass and macroalgal beds, shells, discarded soda cans and bottles, fish pots, crevices and bottom depressions covered with silt (Cooper 1964, Olla et al. 1978, Olla et al. 1980). By the end of their first year juveniles reach a length of around 60 mm in Rhode Island waters (Cooper 1967) and 140 mm in Virginia waters (Hostetter and Munroe 1993).

During summer months, adult tautog are found in both inshore embayments and coastal waters in habitats similar to those of large juveniles (Cooper 1966, Briggs 1969, Briggs 1977, Steimle and Shaheen 1999, Arendt et al. 2001). They can be found in a variety of complex, structured locations including vegetation, rocks, natural and artificial reefs, pilings, jetties and groins, mussel and oyster beds, shipwrecks, submerged trees, logs and timbers (Steimle and Shaheen, 1999). Tautog exhibit diurnal activity and enter a torpid state at night during which they seek refuge in some type of structure. Adults stay relatively close to their preferred home site and, while moving away during the day to feed, they return to the same general location at night where they become dormant (Olla et al. 1974).

The mouths of estuaries as well as other inlets and artificial reefs may be extremely important habitats for tautog (Zawacki 1969, Briggs 1975), particularly south of Long Island where there are fewer natural rocky outcrops to provide shelter than in the more northern portion of the range. Localized populations form during the summer, in co-existence with large juveniles (Olla et al. 1974).

1.2.1.3 Age and Growth

Larval growth rates have been estimated to be between 0.25 - 0.76 mm per day (Malchoff 1993, Dorf 1994). During summer, young-of-the-year juveniles grow around 0.5 mm per day (Sogard et al. 1992, Dorf 1994). The size attained at the end of the first year increases along the coast from north to south. Since juvenile daily growth rates appear to be similar in all areas during the summer, size differences may be due to the longer duration of warmer water temperatures in southern portions of the species range (Sogard et al. 1992, Dorf 1994). Juvenile growth rates have been observed to be higher in vegetated than in unvegetated habitats. Among vegetated habitats, juvenile growth was higher in sea lettuce beds than in eelgrass beds in New Jersey (Sogard et al 1992).

Adult male tautog grow faster in length than adult females (Cooper 1967, Simpson 1989, Hostetter and Munroe 1993). In Rhode Island waters (Cooper 1967), the mean length of a seven year old male was 358 mm (14.1 inches), while a female was 335 mm (13.2 inches). Faster adult male growth has also been documented in Long Island Sound (Simpson 1989) and Virginia waters (Hostetter and Munroe 1993). Adult growth is relatively slow and varies with the season. Slowest body growth rates occur during maturation of the gonads in the spring prior to spawning. Maximum body growth occurs after spawning during the summer and fall followed by a period of slow or no winter growth associated with reduced water temperatures and feeding activity during the torpid period (Hostetter and Munroe 1993).

Mean adult growth rates are similar for tautog in northern and southern waters until the age of 13. After that age, growth rates decrease more rapidly in the northern part of the species range, with growth rates in Virginia being almost double those of tautog in Rhode Island waters (Hostetter and Munroe 1993). In Rhode Island, male annual growth rates were reduced to less than 12 mm (0.5 inches) per year after age 12 and to 2–4 mm per year after age 20. For females, annual growth decreased to less than 10 mm per year after age 13 and to 3–4 mm per year after age 17 (Cooper 1967) Tautog are long-lived fish with males living longer than 30 years and females around 25 years (Cooper 1966, Hostetter and Munroe 1993). Fish as old as 30 years have been caught in Rhode Island, Connecticut, and Virginia, but the majority of fish caught are four to eight years old.

As stated above, many variables may affect the observed length of an individual tautog at a given age. Age-length keys show significant overlap of age groups by length. On average, Table 1 provides a reasonably accurate guide.

Table 1. Tautog length-at-age relationship

Length (Inches)	Age (Years)
3	1
5.5	2
9	3
10.5	4
12.5	5
14	6
15.5	7
17	8
18	9
19	10
21	15
22	20

1.2.1.4 Spawning

Adult tautog generally migrate inshore in the spring from offshore wintering locations to spawn in April through July (Chenoweth 1963, Cooper 1966, Stolgitis 1970, Olla et al. 1974, Hostetter and Munroe 1993, White et al. 2003). Spawning usually occurs within estuaries or in nearshore marine waters (Chenoweth 1963, Sogard et al. 1992, Hostetter and Munroe 1993, White et al. 2003).

Surveys and tagging data suggest tautog spawn seasonally at specific locations. In Rhode Island, tagging studies showed that adults returned to the same spawning locations over a period of several years (Cooper 1966, Lynch 1991) and spawn in discrete groups in May and June (Cooper 1964, 1967). Studies in New York waters suggest adults from different populations may mix at specific spawning locations from year to year (Olla et al. 1980). Tautog collected from offshore hard bottom sites in Maryland and Virginia were found to be in spawning condition seasonally (Eklund and Targett 1990, Hostetter and Munroe 1993).

Some adults remain offshore throughout the year, particularly in the southern part of the range (Olla and Samet 1977, Eklund and Targett 1990, Adams 1993, Hostetter and Munroe 1993). Eggs and larvae collected in continental shelf waters from Georges Bank to North Carolina, with especially high concentrations off of southern New England and New York, suggest tautog spawn offshore as well as inshore locations (Ferraro 1980, Sogard et al. 1992, Hostetter and Munroe 1993, White et al. 2003). Tautog have been found in spawning condition 12 miles off the coast of Virginia in 60 feet of water (White et al. 2003).

1.2.1.5 Reproduction

Tautog normally reach sexual maturity at 3 to 4 years of age and 177 to 304 mm in length (7 to 12 inches), although there are some sexually mature 2 year old fish (Chenoweth 1963, Olla and Samet 1977, Hostetter and Munroe 1993). Tautog in Rhode Island waters reach sexual maturity

at a smaller size of 190 to 200 mm (7.5 - 7.9 inches, Cooper 1966) than in New York at 215 to 241 mm (8.5 - 9.5 inches, Briggs 1977) or Chesapeake Bay waters at 271 to 289 mm (10.7 - 11.4 inches, Hostetter and Munroe 1993). The difference in size is likely related to the length of time which the water remains warm and growth occurs (Hostetter and Munroe 1993).

Spawning occurs in heterosexual pairs or in groups of a single female with several males. In laboratory studies, the type of spawning depends on the number of mates available for the female, the male dominance hierarchy, and the availability of shelter and food. Pair spawning is usually the dominant process (Olla and Samet 1977).

Spawning begins in the spring when water temperatures reach at least 9° C. Peak spawning varies annually with temperature. Generally spawning reaches peak in June, and continues throughout the summer (Bigelow and Schroeder 1953, Cooper 1964, Colton et al. 1979, Eklund and Targett 1990, Sogard et al. 1992, Hostetter and Munroe 1993). Chenoweth (1963) reported peak spawning in Narragansett Bay during the first two weeks of June 1961 and the last two weeks of May 1962, when average water temperatures were 13-14°C. Malchoff (1993) reported peak spawning in the New York Bight during July 1988. In Maryland and Virginia, reported peak spawning is between April and June (Eklund and Targett 1990, Hostetter and Munroe 1993, White et al. 2003). GSI off the south shore of New York has been found to peak in mid-June to mid-July when temperatures reached 11-12°C (Dumais 2005).

Tautog are batch spawners with a prolonged spawning season (White et al. 2003, Dumais 2005, LaPlante and Schultz 2007). Batch fecundity varies with female size (Chenoweth 1963, White et al 2003, Dumais 2005, LaPlante and Schultz 2007). In Rhode Island waters, estimates of batch fecundity for tautog between 200-685 mm were 5,000 to 637,500 mature eggs. (Chenoweth 1963). Similar results were found in Long Island Sound with batch fecundity for females 250 – 600 mm estimated between 8,000 and 600,000 eggs (LaPlante and Schultz 2007). Off the south shore of Long Island, batch fecundity for females 213 – 455 mm was estimated as 778 to 69,500 eggs (Dumais 2005). Batch fecundity in Virginia was estimated to be between 2,800 and 181,200 eggs for females 259 - 516 mm.

Larger females were found to spawn more frequently than smaller females and have a longer spawning season (LaPlante and Schultz 2007). During the peak part of the season, larger females were found to spawn almost daily (White et al. 2003, LaPlante and Schultz 2007).

Total annual fecundity has been found to vary yearly as well as with fish size (LaPlante and Schultz 2007, White et al 2003). Estimates of annual fecundity were higher in Long Island Sound (LaPlante and Schultz 2007) than those reported for Virginia waters (White et al. 2003). In Long Island Sound, female tautog in the 500 mm size range produced around 26 to 55 million eggs where as a female in the 250 mm size range produced 0.6 to 1 million eggs. In Virginia, annual fecundity ranged from 160,000 eggs to 10 million eggs for females 259 mm and 511 mm respectively.

1.2.1.6 Migration

Tautog typically migrate offshore when water temperatures drop below approximately 50°F in the late fall. Migration behavior includes schooling to rugged bottom topography 80-150 feet deep. Tautog do not appear to make extensive long-shore migrations, although some fish from Long Island bays have been reported to overwinter in New Jersey coastal waters (Briggs 1977).

Seasonal migration is not uniformly exhibited. Some adults remain inshore and active throughout the year, particularly in the southern portion of the range (Auster 1989, Eklund and Targett 1991, Adams 1993, Hostetter and Munroe 1993, Arendt et al. 2001). Juvenile tautog have been collected in Maryland's Coastal Bays submerged aquatic vegetation (SAV) in September (Doctor et al 2015), and spawning tautog have been collected on artificial reefs near Ocean City in May. In Maryland and Virginia, populations of adults have been observed 12 - 40 miles offshore in 30 - 225 feet of water throughout the year (Eklund and Targett 1990, Hostetter and Munroe 1993). Offshore distributions decline toward the northern part of the species range (Chesapeake Bay Program 1994).

When water temperatures are very low, adults become torpid (Cooper 1966, Briggs 1977). This may allow tautog, a member of a mostly tropical family, to survive cold winter conditions in northern regions (Curran 1992). Suboptimal conditions (i.e., high water temperature, decline in mussel abundance) will cause adult and large juvenile tautog to leave an area (Olla et al. 1979, Adams 1993, Steimle and Shaheen 1999).

1.2.1.7 Feeding

Juvenile tautog feed primarily on small benthic and pelagic invertebrates including copepods, amphipods, isopods, ostracods, polychaetes, crabs and mussels (Olla et al. 1975, Festa 1979, Grover 1982, Sogard et al. 1992, Dorf 1994). The composition of the juvenile diet changes with fish size. In Narragansett Bay, Rhode Island, small young-of-the-year (20 - 50 mm total length) primarily consumed amphipods and copepods. Juveniles 50 - 68 mm in length consumed a variety of invertebrates. The largest young-of-the-year (68 - 99 mm) ate mainly small shrimp and crabs (Dorf 1994). Similar diets were reported in New Jersey (Festa 1979, Sogard et al. 1992), Chesapeake Bay (Orth and Heck 1980) and Connecticut waters (Clark et al. 2006). In New York waters, juveniles 104 - 205 mm in length fed primarily on blue mussels (*Mytilus edulis*) throughout the year (Olla et al. 1975). Larger juveniles (200 - 320 mm) in New Jersey were observed to feed on xanthid crabs (Festa 1979).

Adult tautog feed primarily on the blue mussel and other shellfish throughout the year. The diet can be extremely varied depending on location and availability. The following items have been found in the diets of adult tautog: hydroids, barnacles, various crabs, sand dollars, amphipods, isopods, polychaete worms, shrimp, lobster, periwinkles, jingle shells, scallops, soft shell clams and razor clams (Bigelow and Schroeder 1953, Olla et al. 1974, Steimle and Ogren 1982, Auster 1989, Dumais 2005).

Tautog have been found to select a limited size range of blue mussels as prey (Lankford 1999) which is 45-50% smaller than the size mussel the fish is capable of ingesting. Adults grasp

mussels using their large canine teeth, tearing them from the surrounding surface by shaking their heads. Small mussels are swallowed whole, while larger, hard-shelled ones are crushed by the pharyngeal teeth prior to swallowing. The canine teeth are not used for crushing shells (Olla et al. 1974).

Tautog are visual predators and therefore, do not feed at night (Olla et al. 1974, Deacutis 1982). Tautog leave their home sites and begin actively searching for food at dawn (Briggs 1969, Olla et al. 1974, 1975). Generally venturing up to 1,500 feet away, although there have been reports of tautog traveling as far away as 10 kilometers from their home site (Olla et al. 1974, Arendt et al. 2001). Tautog have been observed to follow an incoming tide above low water levels to feed on concentrations of mussels in the intertidal, returning to deep water as the tide ebbs (Bigelow and Schroeder 1953). Most fish move to areas with large concentrations of mussels during the day and return to their home site at evening twilight (Olla et al. 1974). Food intake may be reduced due to high water temperatures (Olla et al. 1978), low winter temperatures (Cooper 1966), and during spawning (Bridges and Fahay 1968).

Tautog's high dependence on blue mussels creates an important trophic link influencing distribution, behavior, and perhaps, growth and survival. Periodic recruitment failure of mussels in tautog habitat can cause tautog to move to other feeding areas (Steimle and Shaheen, 1999). If they do not move, or the failure is widespread, tautog inhabiting the area may suffer some effects of an inadequate diet. Heavy consumption of mussels can cause a depletion of this food source before new prey recruitment occurs, especially if tautog are concentrated in an area for some climatological, water quality, or behavioral reason.

1.2.2 Stock Assessment Summary

The first tautog stock assessment was performed in 1995 using the ADAPT virtual population analysis (VPA) model (available through NMFS NEFSC toolbox, http://nft.nefsc.noaa.gov/). In order to incorporate perceived regional differences in biology and fishery characteristics throughout the range of the species, the Technical Committee (TC) attempted separate regional models for northern (Massachusetts to New York) and southern (New Jersey to Virginia) states. The assessment underwent peer review through the NMFS NEFSC Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC) process. Although the assessment was not accepted by the peer review panel, the resulting fishing mortality estimate from the assessment was incorporated into the initial FMP (ASMFC 1996).

The next benchmark stock assessment, performed in 1999, was also conducted using the ADAPT VPA. The regional approach was used for data consolidation, application of age keys, and preliminary VPA runs of the model. Unfortunately, results for the southern region were unreliable. The preferred run, therefore, was based on catch at age (CAA) developed separately for north (MA-NY) and south (NJ-VA) regions and combined for a total coastwide CAA. The assessment derived coastwide estimates of F, spawning stock biomass, and recruitment. In addition, tag based survival estimates were included in the assessment as corroborative

evidence. A peer review of the model through the SAW/SARC process determined the model was suitable for management purposes. That assessment indicated the terminal F rate had dropped to 0.29, which was attributed to increases in minimum size required in the original FMP. This terminal F was close to the interim FMP target of 0.24, but well above the final plan target of F = 0.15.

A stock assessment update conducted in 2002 using the methods from the 1999 assessment found that recreational catch rates had returned to levels observed prior to the minimum size limit increase, and F had increased to F = 0.41. The Board responded by implementing reductions in recreational harvest in 2003, in an attempt to return F to the FMP target value. The target was revised to $F_{SSB\ 40\%}$ = 0.29 by Addendum III (ASMFC 2002), based upon updated recruitment and weight at age parameters and a desire to adopt a target with more management flexibility.

A benchmark stock assessment conducted and peer-reviewed in 2005 (ASMFC 2006) continued the use of the coastwide ADAPT VPA model based on separate regional (north/south) CAA. The assessment indicated the coastwide population of tautog had declined about four-fold from 1982 to 1996 and had then remained relatively stable through the terminal year. The stock was considered overfished and overfishing was occurring with a 2003 coastwide fishing mortality estimate of F=0.299. In response to concerns from the Management Board and TC regarding the utility of a coastwide model on a mostly sedentary species, the 2006 assessment also presented results of state-specific assessments (primarily catch curves) of local tautog populations. The peer review panel generally agreed local or regional methods were more appropriate given the life history of the species, but expressed reservations about the paucity of data available at small regional scales and the use of catch curves for management purposes. The panel approved the coastwide model for use in management, encouraging further development and refinement of more localized models for future use (ASMFC 2006).

A "turn of the crank" update assessment was completed in 2011 using the same methodology as the 2006 assessment, with data through 2009. Fishing mortality was estimated as F = 0.23 in 2009, with the three-year average F = 0.31. Both estimates were above the Addendum IV target of $F_{\text{target}} = 0.20$. SSB was estimated to be 10,663 MT in 2009, well below Addendum IV's target of 26,800 MT and threshold of 20,100 MT. Therefore, the 2011 stock assessment update concluded tautog was overfished and experiencing overfishing.

A benchmark stock assessment was completed and peer-reviewed in 2014 (ASMFC 2015). The assessment was conducted at a regional level. The TC used life history information, tagging data, fishery characteristics, and data availability considerations to split the coastwide population into three regions. Each region was assessed independently using the statistical catch-at-age model ASAP. All three regions were found to be overfished, with overfishing occurring in two regions (Massachusetts-Rhode Island and Connecticut-New York-New Jersey).

While the three-region approach in the benchmark stock assessment was applicable, there was interest in assessing and managing the Long Island Sound as a discrete area. A regional stock

assessment was completed and peer-reviewed in 2016 (ASMFC 2016a). This regional assessment analyzed two additional regions (Long Island Sound and New Jersey-New York Bight) to comprise a four-region management scenario. The Long Island Sound (LIS) region includes harvest in Connecticut and New York LIS. The New Jersey-New York Bight (NJ-NYB) region includes harvest in New York's south shore and New Jersey. The two regions were found to be overfished and overfishing was occurring.

In 2016, the Board reviewed stock status across the three and four region management scenarios, ultimately electing to separate management into four regions. A four region stock assessment update was conducted using data through 2015 (ASMFC 2016b). The assessment estimated the maximum level of harvest (per region) in order to achieve the F target for each region by 2021 (Table 2). Spawning potential ratio (SPR) based reference points were utilized for all regions, except LIS, which used maximum sustainable yield (MSY) based reference points (See Section 2.5).

Table 2. 2013-2015 Average Landings Compared to the Proposed Maximum Removals by Region when Applying a 50% Probability of Achieving F Target in 2021. Parenthesis indicates the necessary harvest reduction to achieve the associated level of harvest. (ASMFC 2016b)

Region	Status quo (mt) 3 yr avg: 2013-2015	50% Probability of Achieving F Target (mt)
Massachusetts-Rhode Island	390	-
Long Island Sound	500	264 (-47%)
New Jersey-New York Bight	461	450 (-2)
Delaware-Maryland-Virginia	77	-

1.2.2.1 Massachusetts-Rhode Island

The 2016 stock assessment update indicates the Massachusetts – Rhode Island (MARI) stock is not overfished and overfishing is not occurring.

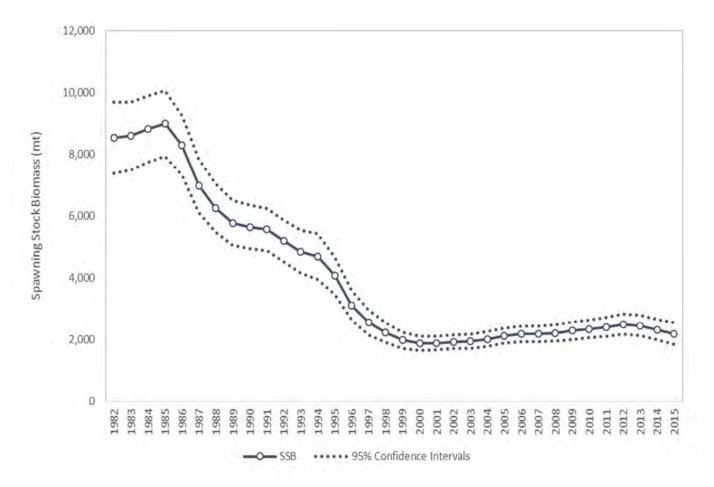
<u>Fishing Mortality:</u> For SPR estimates, the 3-year average value of $F_{3yr} = 0.23$ was below both $F_{Target} = 0.28$ and $F_{threshold} = 0.49$, this stock is not experiencing overfishing and the fishing mortality rate is below the target.



Figure 2. Fishing mortality estimates for the MARI region.

<u>Spawning Stock Biomass</u>: For SPR estimates, the point estimate of $SSB_{2015} = 2,196$ mt is below the $SSB_{Target} = 2,684$ mt but is above the $SSB_{threshold} = 2,004$ mt, indicating the stock is not overfished but is not yet rebuilt to the SSB target. Total abundance and spawning stock biomass declined rapidly from 1982 until 2000. Spawning stock biomass decreased from 8,994 mt in 1985 to the current estimate of 2,196 mt in 2015.

Figure 3. Spawning stock biomass estimates for the MARI region.



<u>Recruitment</u>: Recruitment was generally highest in the early years of the time-series, with a couple of average recruitment years in the mid-2000s. Observed recruitment has increased from time series lows during the 2013 - 2015 period, but remain below average in general.

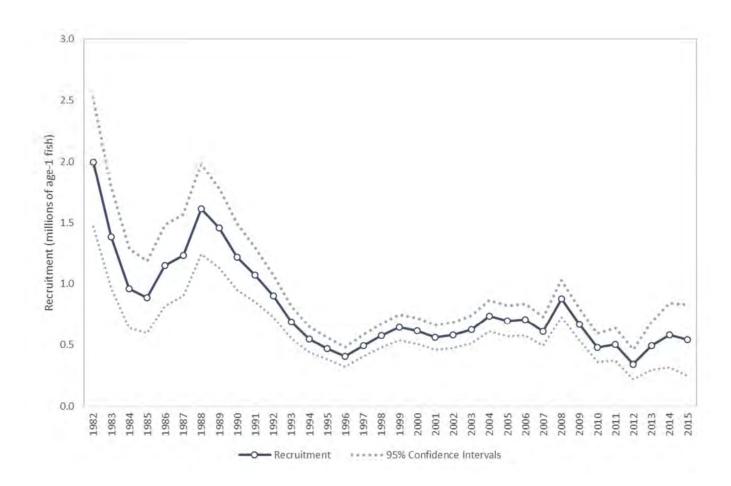


Figure 4. Recruitment estimates for the MARI region.

<u>Abundance</u>: Total abundance and spawning stock biomass declined rapidly from 1982 until 2000. Despite a period of slightly increased abundance in the early to mid-2000s, the overall trend has been flat from 2000 until 2015. Total abundance declined from a high of 10.9 million fish to the current estimate of 2.8 million fish in 2015.

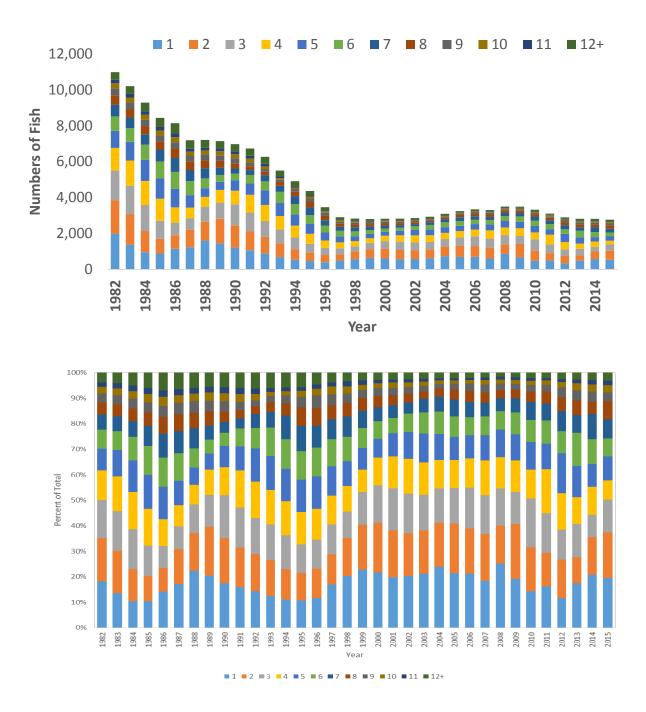


Figure 5. The top graph is the abundance at age for the MARI region in total numbers of fish. The bottom graph illustrates the data in terms of the overall percentage of fish at age within each year.

1.2.2.2 Long Island Sound

The 2016 stock assessment update indicates the LIS stock is overfished and overfishing is occurring.

<u>Fishing Mortality:</u> F_{target} is defined as F_{MSY} and $F_{threshold}$ is defined as the F rate that would maintain the population at 75%SSB_{MSY}. F_{target} for LIS was 0.28 and $F_{threshold}$ was 0.49. In 2013-2015, F ranged from 0.35 to 0.59. The 3 year-average estimates of F ($F_{3yr} = 0.51$) exceeded the MSY target and threshold.

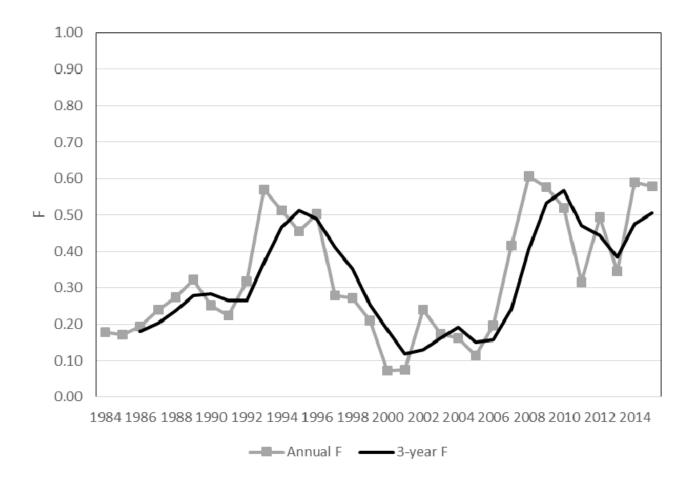


Figure 6. Annual fishing mortality (F) and 3-year average for LIS

<u>Spawning Stock Biomass:</u> SSB_{2015} (1,603 mt,) is below MSY target and threshold ($SSB_{MSY} = 2,865$ mt and $SSB_{75\%MSY} = 2,148$ mt), indicating the stock is overfished.

Total abundance and spawning stock biomass declined rapidly from 1984 until the mid to late 1990s. Spawning stock biomass decreased by more than 75%, from over 6,350 mt at the beginning of the time-series to the current estimate of 1,551 mt.

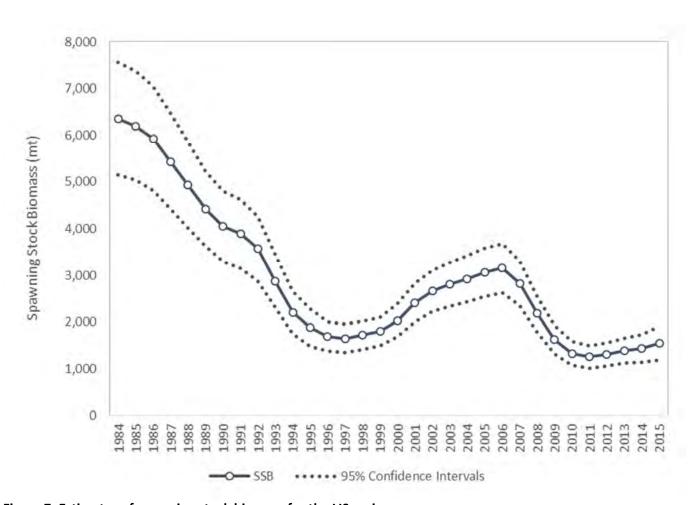


Figure 7. Estimates of spawning stock biomass for the LIS region.

<u>Recruitment:</u> Recruitment was highest in the early years of the time series and again in 2013 and 2015. The two recent peaks in recruitment bracketed the lowest recruitment year on record.

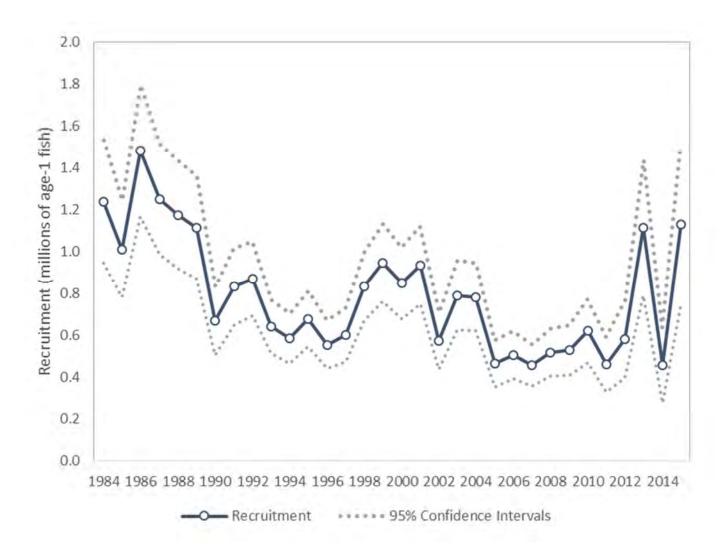


Figure 8. Recruitment estimates for LIS region

<u>Abundance</u>: Total abundance and spawning stock biomass declined rapidly from 1984 until the mid to late 1990s. Despite a period of slightly increased abundance in the early to mid-2000s, the overall trend has been a slower but consistent decline since 1995. Total estimated abundance declined by more than half, from 8 million fish (1984) to 3.5 million fish (2015). Abundance at age in the stock of the terminal year (2015) shows a dominance of fish aged 1 and 3, fewer age 2 fish and declining abundance from age 4 through age 12.

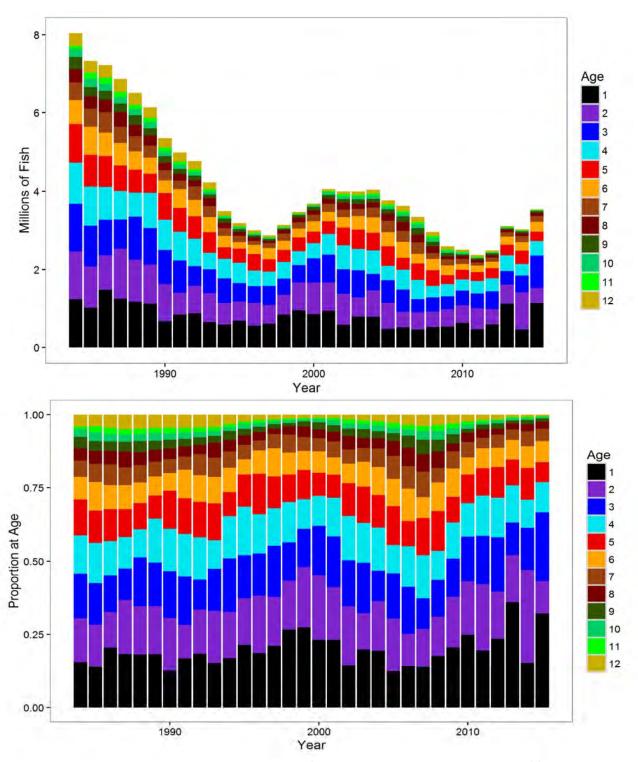


Figure 9. The top graph is the abundance at age for the LIS region in total numbers of fish. The bottom graph illustrates the data in terms of the overall percentage of fish at age within each year.

1.2.2.3 New Jersey - New York Bight

The 2016 stock assessment update indicates the New Jersey-New York Bight (NJ-NYB) stock is overfished and overfishing is occurring.

<u>Fishing Mortality:</u> Fishing mortality target and threshold reference points in the NJ-NYB region are defined as $F_{40\%SPR}$ and $F_{30\%SPR}$, respectively. ASAP model estimated values for the target and threshold are $F_{40\%} = 0.20$ and $F_{30\%} = 0.34$. The ASAP model runs indicated overfishing was occurring in the NJ-NYB region in 2015. Both the point estimate of $F_{2015} = 0.45$ and the 3-year average value of $F_{3yr} = 0.54$ were above the fishing mortality threshold.

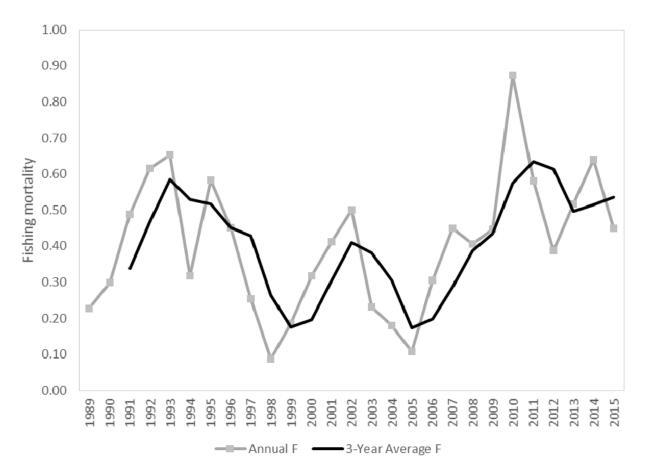


Figure 10. Fishing mortality estimates for the NJ-NYB region.

<u>Spawning Stock Biomass:</u> SSB₂₀₁₅ was estimated at 1,809 mt, approximately 23% below the SSB threshold (2,351 mt) and 43% below the target (3,154 mt), indicating the stock is overfished.

SSB shows a general decline from approximately 6,000 mt in 1989 to around 1,900 mt by 1996. Regulations in 1997 and 2003 allowed slight increases in SSB in subsequent years, but these gains were short lived as F rebounded. From 2006 to 2011, SSB declined from around 2,000 mt to 1,000 mt, but has since recovered to 1,835 mt (90% confidence intervals 1,352 - 2,489 mt).

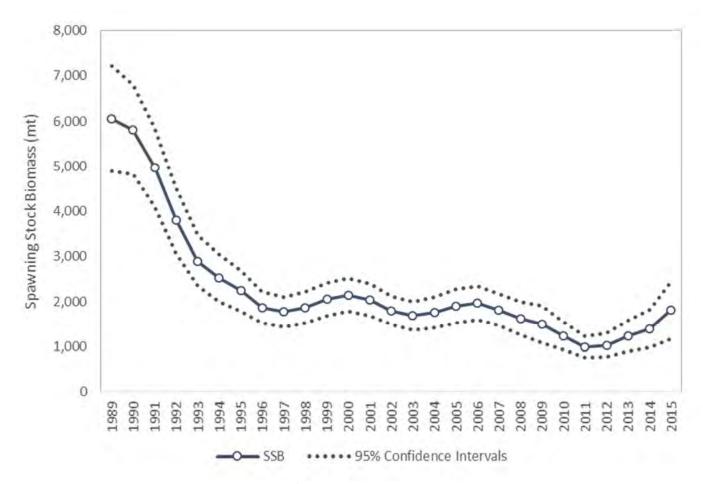


Figure 11. Spawning stock biomass estimates for the NJ-NYB region.

<u>Recruitment:</u> During the early 1990s, recruitment (age 1) follows a similar pattern as SSB, declining from 1.5 million in 1989 to less than 1 million by 1993. From 1993 to 2011, recruitment varied without trend between approximately 560,000 and 1,010,000 fish annually. Estimates of recruitment in the last four years of the model were above 950,000 fish, with an apparent strong year class in 2014, estimated at 2.26 million.

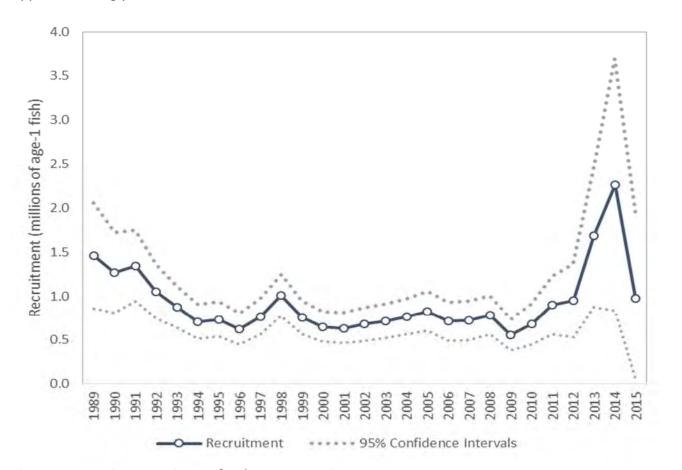


Figure 12. Recruitment estimates for the NJ-NYB region

<u>Abundance</u>: Abundance at age in the stock of the terminal year shows a dominance of fish aged 1 through 3 with declining numbers from age 4 through age 12.

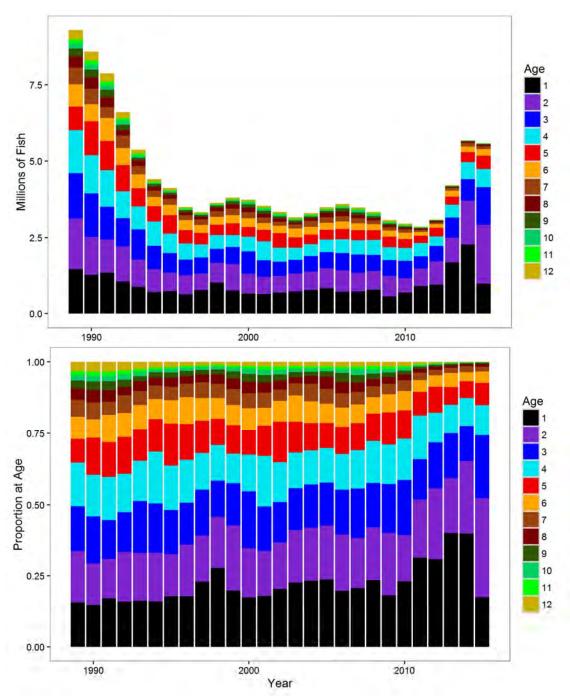


Figure 13. The top graph is the abundance at age for the NJ-NYB region in total numbers of fish. The bottom graph illustrates the data in terms of the overall percentage of fish at age within each year.

1.2.2.4 Delaware-Maryland-Virginia

The 2016 stock assessment update indicates the Delaware-Maryland-Virginia (DelMarVa) stock is overfished and overfishing is not occurring.

<u>Fishing Mortality:</u> F_{target} is defined as $F_{40\%SPR} = 0.16$, and $F_{threshold}$ is defined as $F_{30\%SPR} = 0.24$. The three year average F from 2013-2015 was 0.16, equal to the target and below the threshold, indicating overfishing is not occurring.

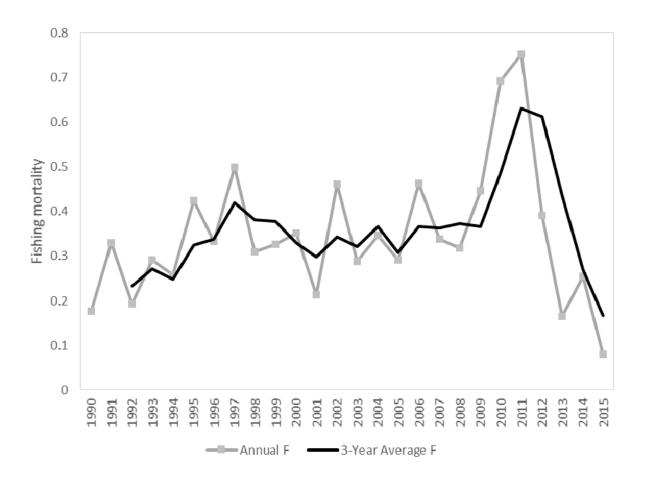


Figure 14. Fishing mortality estimates for the DelMarVa region

<u>Spawning Stock Biomass:</u> The SSB target for DelMarVa is the long-term equilibrium SSB associated with $F_{40\%SPR}$, equal to 1,919 mt. The SSB threshold is the SSB associated with $F_{30\%SPR}$ = 1,447 mt. Terminal year SSB 2015 estimate is 620.9 mt, below both the target and the threshold, indicating the stock is overfished.

Both total abundance and spawning stock biomass have declined steadily in the DelMarVa region since 2009, and SSB reached historically low level of 609 mt in 2015.

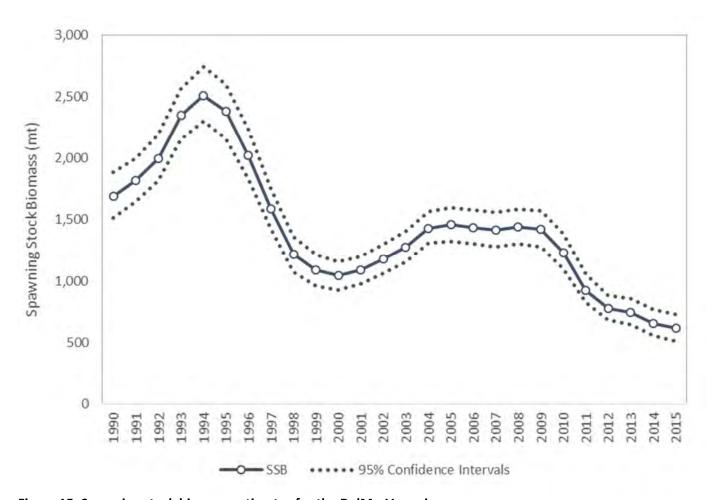


Figure 15. Spawning stock biomass estimates for the DelMarVa region

<u>Recruitment:</u> Recruitment appears to have been on the decline since 2009, reaching the lowest level in 2013 at 110,620 fish, but began to increase thereafter. Overall, recruitment has exhibited low variability and a lack of sharp inter-annual changes.

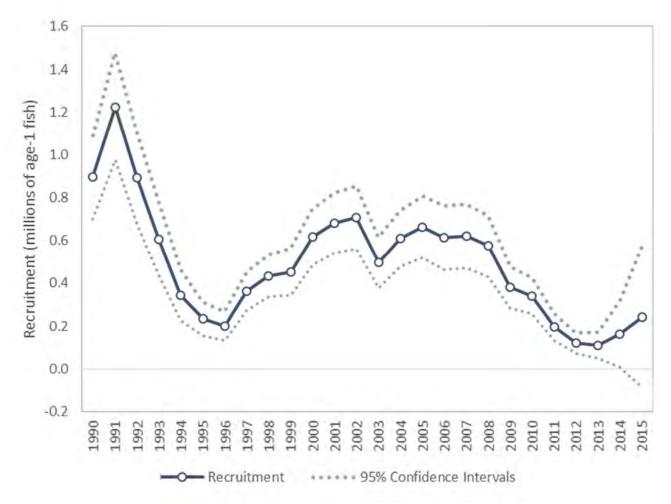


Figure 16. Recruitment estimates for the DelMarVa region

<u>Abundance</u>: Both total abundance and spawning stock biomass have declined steadily in the DelMarVa region since 2009. Total abundance declined from a stable level of about 2.5 million fish in 2002-2009 period to the current low of 0.86 million fish in 2015.

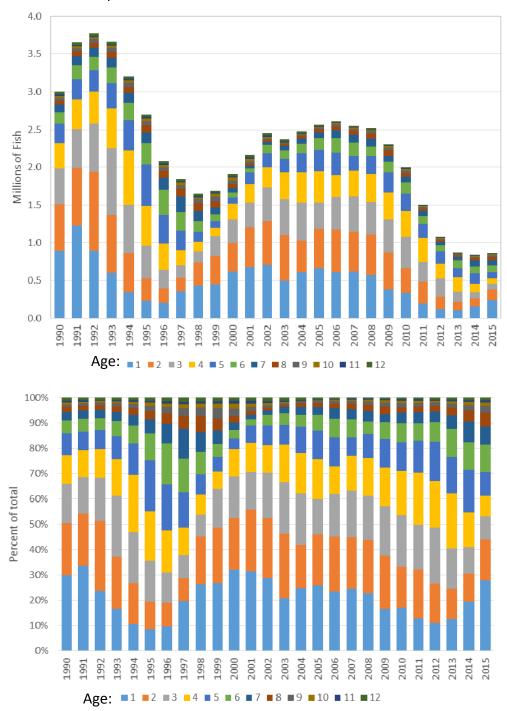


Figure 17. The top graph is the abundance at age for the DelMarVa region in total numbers of fish. The bottom graph illustrates the data in terms of the overall percentage of fish at age within each year.

1.3 DESCRIPTION OF THE FISHERY

The proportion of harvest from each region has fluctuated somewhat over the years (Figure 18), with the DelMarVa's proportion declining in recent years and the LIS region's proportion growing. From 2013-2015, MARI accounted for 27% of coastwide removals, LIS accounted for 35%, NJ-NYB accounted for 32%, and DMV accounted for 5%.

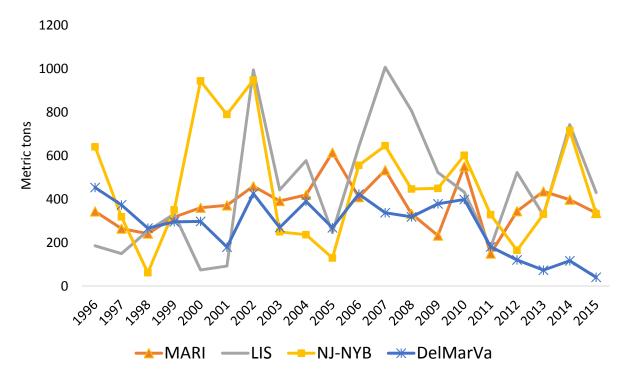


Figure 18. Harvest by Region (1996-2015); including recreation harvest, recreational release mortality, and commercial landings

Coastwide recreational harvest peaked in 1986 at over 7 million fish and since declined. Average recreational harvest from 2013-2015 was 708,136 fish, with 2014 nearly double the harvest of 2013 and 2015. In 2014, over 1 million fish were harvested compared to approximately 545,282 fish in 2015. The 2014 estimate was also more uncertain than the 2013 and 2015 estimates, with a PSE of 24.7% compared to 16-17% in 2013 and 2015.

Coastwide commercial harvest showed a similar pattern to recreational harvest, although the magnitude is smaller, representing approximately 9% of the total harvest over the entire time series. It peaked in the late 1980s at 1.2 million lbs (525 mt), and declined to an average of 273,373 lbs (124 mt) in 2013-2015. Commercial harvest in 2014 was 284,396 lbs (129 mt), not significantly different from the 2015 harvest of approximately 260,000 lbs.

1.3.1 Massachusetts and Rhode Island

Recreational anglers account for upwards of 90% of landings in this region. In the MARI region, recreational landings peaked in 1986 at nearly 2.7 million fish and fell sharply to about 13% of

its peak by the mid-1990s. Since then landings have remained low and have varied in the range of approximately 52,000 to 242,000 fish. The 2013-2015 average recreational landings are 167,085 fish. The majority (nearly 75%) of tautog recreational harvest in the MARI region comes from the private/rental boat mode. The remaining 25% is split relatively evenly among the shore and for-hire (party/charter boat) modes.

Commercial landings in the MARI region peaked in 1991 at approximately 725,300 lbs (329 mt), declined to 97,000 lbs (44 mt) in 1996, and since then has varied in the range of 110,000 – 200,000 lbs (50 to 90 mt). The 2013-2015 average landings in the MARI region were approximately 121,250 lbs (55 mt).

Total removals in the MARI region, including recreation harvest, recreational release mortality, and commercial landings averaged 390 mt from 2005-2015; 337 mt were taken in 2015 (Figure 19).

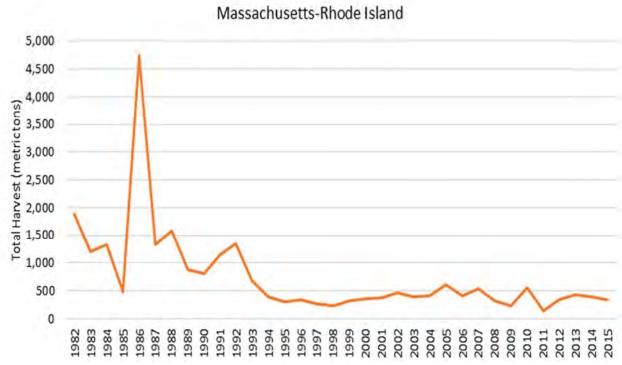


Figure 19. MARI Harvest; including recreation harvest, recreational release mortality, and commercial landings

1.3.2 Long Island Sound

Recreational anglers account for approximately 88% of harvest in this region (landings and dead discards). In the LIS region, recreational landings peaked in 1988 at 667,000 fish and declined to 29,000 fish in 2000. Since then landings have increased and have varied in the range from 76,000-514,000 fish. The 2013-2015 average recreational landings are 220,000 fish.

Commercial harvest accounts for approximately 12% of total harvest. In the LIS region, commercial landings peaked in 1987 at 350,535 lbs (159 mt), declined to 33,069 lbs (15 mt) in

1999 and 2000, and since then have stabilized in the range of 88,185 lbs (40 mt). The 2010-2014 average landings in LIS are 82,894 lbs (37.6 mt).

Total removals in the LIS region, including recreation harvest, recreational release mortality, and commercial landings averaged 1.16 million lbs (530 mt) from 2005-2015; 950,192 lbs (431 mt) were taken in 2015 (Figure 20).

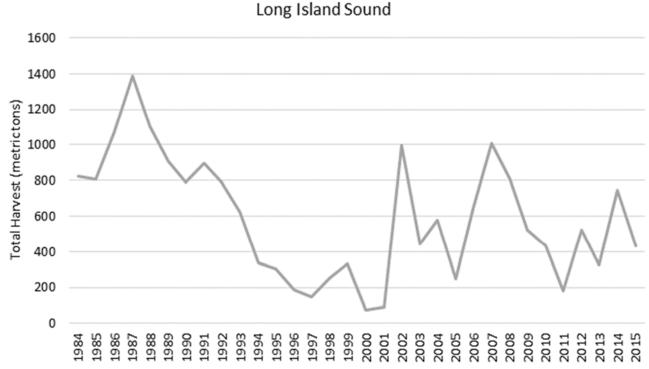


Figure 20. LIS Harvest; including recreation harvest, recreational release mortality, and commercial landings

1.3.2 New Jersey - New York Bight

Recreatinal harvest accounts for approximately 90% of landings within the NJ-NYB region. Recreational harvest exceeded one million fish per year in most years between 1988 and 1993, with a peak of 1.56 million fish in 1991. Harvest dropped quickly following the peak, however, reaching a time series low of just 24,000 fish in 1998 with an average annual harvest of 415,000 fish between 1994 and 2002. Recreational landings dropped again in 2003, falling below 200,000 fish before recovering slightly by 2006. Between 2006 and 2015, annual landings had high inter-annual variability without a trend, ranging from approximately 70,000 to 400,000 fish, with an average of 268,000 fish.

In the NJ-NYB region, commercial harvest during the late 1980s to mid-1990s fluctuated around 154,324 lbs (70 mt) annually, but declined rapidly to 44,092 lbs (20 mt) by 1999. Landings rebounded to 132,277 lbs (60 mt) by 2007 and 2008, and since then fell to 88,185 lbs (40 mt) and below. Commercial harvest during 2013 to 2015 has shown a declining trend falling from

99,207 lbs (44 mt) in 2013 to nearly 86,000 lbs (39 mt) in 2015 with an average harvest of 90,389 lbs (41 mt) for this time period.

Total removals in the NJ-NYB region, including recreation harvest, recreational release mortality, and commercial landings averaged 947,988 lbs (430 mt) from 2005-2015; 736,344 (334 mt) were taken in 2015 (Figure 21).

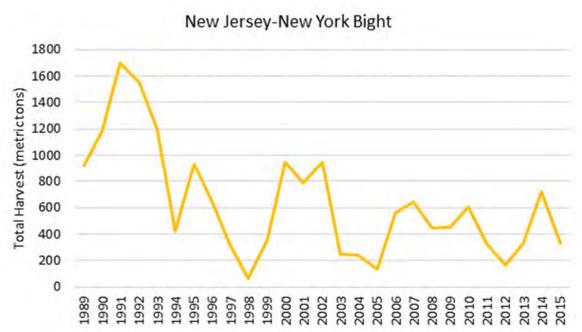


Figure 21. NJ-NYB Harvest; including recreation harvest, recreational release mortality, and commercial landings

1.3.3 Delaware, Maryland, Virginia

Recreational harvest peaked in 1988, 1989 and 1995 at more than half a million fish. After the FMP was implemented, harvest levels decreased by half. Average recreational harvest from 2000-2009 was 188,000 fish and average harvest from 2010-2015 was 92,000 fish. Recreational harvest in DelMarVa has declined from 241,064 fish in 2010 to 22,215 fish in 2015. The decline coincided with the protective regulatory measures (minimum size increase and seasonal closures) instituted in 2012 to reduce fishing mortality. Recreational landings in 2015 were the lowest in time series. Recreational discards have also declined from 686,392 released fish in 2010 to 125,258 released fish in 2015.

Commercial landings have declined in recent years, primarily due to a decline in Virginia, which accounts for the majority of commercial effort. Average commercial landings for 2000-2009 were approximately 17,000 lbs. Average commercial landings for 2013-2015 were 10,740 pounds (4.9 mt), with 2015 being much lower at 6,233 lbs (2.8 mt). Data on commercial discards were not available, but discards are believed to be minimal.

Total removals in the DelMarVa region, including recreation harvest, recreational release mortality, and commercial landings averaged 529,109 lbs (240 mt) from 2005-2015; 90,390 lbs (41 mt) were taken in 2015 (Figure 22).

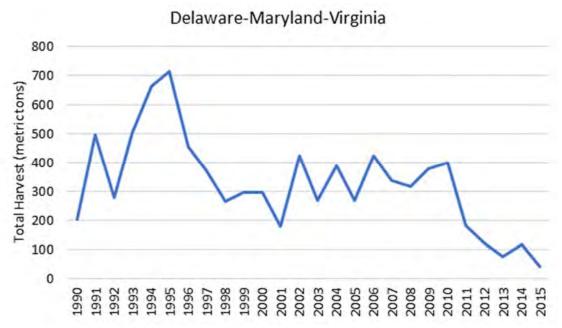


Figure 22. DelMarVa Harvest; including recreation harvest, recreational release mortality, and commercial landings

1.4 HABITAT CONSIDERATIONS

1.4.1 Description of the Habitat

Tautog are attracted to many types of structured habitat in all stages of their life cycle after their three-week planktonic larval stage. Suitable structures include both natural and manmade, such as submerged vegetation, shellfish beds, rocks, pilings, shipwrecks and artificial reefs (Olla et al, 1974; Briggs 1975; Briggs and O'Connor 1971; Orth and Heck 1980; Dorf and Powell 1997; Steimle and Shaheen 1999). North of Long Island, New York, rocks and boulders left by glacial deposition are abundant and provide rock-reef habitat, especially for larger tautog. South of Long Island, natural rocky habitats are rare (Flint 1971) and tautog in southern areas commonly inhabit shellfish beds, coastal jetties, pilings, shipwrecks, and artificial reefs. Tautog are principally coastal fish, occurring most commonly inshore from the intertidal zone to within about 50km from shore (Collette and Klein-MacPhee 2002).

Eggs and Larvae: Studies have collected them on the inner continental shelf and within estuaries from May through August (Berrien et al. 1978, Colton et al. 1979, Ferraro 1980, Bourne and Govoni 1988, Monteleone 1992, Able and Fahay 1998, Witting et al. 1999). Viable eggs are 1 millimeter (mm) in diameter, buoyant and are found in the greatest numbers at the water surface. Hatching occurs in 81 hours at 15°C and 42 hours at 20°C (Auster 1989, Perry 1994). The larvae (2 mm at hatching) stay near the surface during the day and may go deeper

at night (Malchoff 1993). After approximately 3 weeks, larvae undergo metamorphosis and settle out of the water column as juveniles (Sogard et al. 1992, Dorf 1994).

Juveniles: Juvenile tautog require sheltered areas for feeding and protection from predators. They are most often found in shallow nearshore vegetated areas such as eelgrass (*Zostera marina*) or algal beds, (commonly sea lettuce *Ulva lactuca*), growing equally well in all of these habitat types (Kuropat et al. 2002). However, environmental factors associated with temperature and dissolved oxygen appear to influence growth rates in these shallow habitats (Phelan et al. 2000). Other studies have found that newly settled individuals prefer areas less than one meter deep (Sogard et al 1992, Dorf and Powell 1997), but move out to deeper water as they grow. Juvenile tautog have been shown to have size specific preference when choosing a shelter (Dixon 1994) and appear to have a strong affinity to their home site, rarely venturing more than a few meters away (Olla et al. 1974, Able et al. 2005).

Adults: Tautog of all sizes exhibit diurnal activity and enter a torpid state at night during which they seek refuge in some type of structure. Soon after morning twilight, tautog have been observed leaving their night time shelter to feed throughout the day (Olla et al. 1974; 1975). When tautog are not feeding during the day, they can be found resting on sand or within shelter, lying on their sides, often grouped together (Bigelow 1974). Elevated temperatures also evoke shelter seeking behavior and depress feeding (Olla and Studholme 1975, Olla et al. 1975a, 1978).

Adult tautog undertake seasonal inshore-offshore migrations in the northern part of their range (New York and north), moving into deeper water when temperatures drop to 8-12°C (Collette and Klein-MacPhee 2002). However a study of the seasonal occurrence of tautog in the lower Chesapeake Bay indicated that most fish tagged and released in these southern waters remained inshore for the winter rather than moving offshore (Arendt et al. 2001). When water temperatures fall between 5-8°C, tautog enter a torpid state and hide in some type of structured habitat (Cooper 1966, Olla et al. 1974, 1979). Juvenile tautog have been observed overwintering in shallow water, lethargic or torpid and partially buried in silt when water temperatures fell below 6°C (Olla et al. 1974). During winter, juveniles appear to remain inshore at perennial sites and disperse during the spring (Stolgitis 1970; Olla et al. 1979).

Tautog are sight feeders, feeding during the day on mollusks, especially mussels (*Mytilus edulis* in the north and *Brachiodontes exustus* in the south), barnacles, decapods including lobster, and echinoderms (Collette and Klein-MacPhee 2002). Juveniles feed primarily on copepods, amphipods, and small decapods (Dorf 1994).

1.4.2 Physical Habitat Characteristics

1.4.2.1 Dissolved Oxygen (DO) levels

No information is available on the effects of low DO levels on eggs or larval tautog. Juvenile tautog are considered to be "hypoxia-tolerant" (LC50 less than or equal to 1.6 mg/L) based on laboratory studies (D. Miller, EPA, Narragansett, Rhode Island, 1995, personal communication).

No laboratory information is available on effects of hypoxia on adult tautog. A field study showed that catch rates declined by half when DO levels drop below 3.0 mg/l and were absent in areas with DO below 2 mg/l (Howell and Simpson 1994). Tautog are capable of leaving low oxygen areas (Ogren and Chess 1969), although some adult mortality has been reported in association with major anoxic events (Perlmutter 1952, Azarovitz et al. 1979).

1.4.2.2 Temperature

High water temperatures (such as those that can result from passing through a power plant cooling water system) can result in egg mortality (Smith et al. 1979) as well as larval mortality or deformity (Olla and Samet 1978). At higher water temperatures larval metabolic rate and yolk usage increases. The resulting larvae may be smaller and at a competitive disadvantage with larger larvae, or other planktivores, when first required to feed on plankton (Laurence 1973). This may slow growth and reduce success in reaching the protected habitats required for settlement.

Adults seek shelter during the day at high water temperatures, and reduce their feeding and aggressive activities (Olla and Studholme 1975, Olla et al. 1978, Olla et al. 1980). Extended periods of high water temperatures may cause large adults to move to cooler water (Adams 1993).

Water temperature serves as the primary trigger for adult tautog seasonal migrations (Olla et al. 1980). At very low water temperatures, adult tautog become torpid (Cooper 1966, Olla et al. 1974). Some adults remain active throughout the year, particularly in the more southerly portion of the species range (Eklund and Targett 1991, Adams 1993, Hostetter and Munroe 1993).

1.4.2.3 Salinity

Although reported from brackish water, tautog have not been collected in freshwater (Bigelow and Schroeder 1953).

1.4.3 Present Condition of Habitats

Besides over exploitation, which primarily affects adult tautog, other sources of mortality can reduce abundance. Very little information is available on disease effects, although finrot has been reported in some locations (see Steimle and Shaheen, 1999). Tautog occur near areas immediately associated with human activity (shallow estuarine areas, rocky and artificial reefs, and submerged stormwater and sewage outfall pipes, etc.) which has resulted in past and current changes in habitat availability and quality. Development of nearshore areas through such activities as dredging of material for channel maintenance, marine construction and other shoreline development resulting in pollutant discharges will impact tautog populations at all life history stages. Shipwreck salvage or reduction in reef height and complexity (shelter sites) may reduce their value as adult tautog habitat. Use of "rock-hopper" roller trawling gear over wrecks, low profile reefs and mussel beds also threatens the quality of these habitats. Declining oyster beds is yet another threat to the estuarine habitat needs of juvenile tautog and other species with similar needs (Chesapeake Bay Program 1994).

Loss or destruction of vegetated bottom areas eliminates juvenile nursery areas. Increased turbidity and siltation due to dredging activities may inhibit feeding in larvae, degrade submerged aquatic vegetation beds used as nursery habitat, as well as damage adult spawning areas. Contaminants, disturbed in the dredging process, and brought into the water column could affect egg, larval and juvenile survival directly, or indirectly, through their food sources.

Entrainment of eggs and larvae in power plant intakes may result in physical damage to early life history stages and heated effluent from these and other industrial outfalls may also result in thermal stress. Discharge of treated sewage effluent and industrial wastes may have direct effects on fish as well as indirect effects on habitat and potential food sources through eutrophication. Results could include alterations of community composition (animal and vegetation) due to nutrient enrichment, and resulting anoxic and hypoxic environments.

Contaminants in the environment can affect tautog directly through contact and indirectly through ingestion of contaminated food. Reductions in growth and reproductive success, as well as direct mortality, are possible effects due to metals, oil, or other chemicals, which often remain in natural environments for long periods of time without degradation to less harmful forms. Biological sources of contamination could include direct contact with or ingestion of food associated with noxious or toxic phytoplankton blooms.

No information is available on direct pollution effects in tautog, however chromium, copper, and nickel levels in New Jersey coastal adult tautog liver tissue decreased significantly with increasing body length (Mears and Eisler 1977). Hall et al. (1978) found low to average levels of 15 metals in tautog muscle tissue (unknown collection site). Recently, the National Marine Fisheries Service (1995) found metal concentrations (silver, cadmium, chromium, copper, nickel, lead, zinc, arsenic and mercury), as well as PCB, PAH and pesticide concentrations below FDA action concentrations in adult tautog collected from Manasquan Inlet, New Jersey. In a laboratory study, Deacutis (1982) found that adult tautog showed little tendency to avoid oil contaminated feeding locations and would readily consume fuel oil contaminated bivalve meat.

Greater direct contaminant effects could occur with eggs and larvae, but because tautog feed on bottom-dwelling organisms, juveniles and adults could experience trophic transfer, resulting in indirect effects and long-term accumulation of contaminants in edible flesh.

Prevention of habitat loss through the species range should be a high priority for restoration of the tautog resource.

1.5 IMPACTS OF THE FISHERY MANAGEMENT PROGRAM

1.5.1 Biological and Environmental Impacts

The implementation of Amendment 1 should improve management of tautog. As proposed, the Amendment will create regional boundaries which allow the species to be managed according to localized population structures and harvesting patterns. The intent is to manage based on biology and behavior of the species including movement patterns. As indicated in tagging studies, tautog display strong site fidelity and limited north-to-south migration. If regional

management is approved then the strategies to minimize overexploitation can be tailored to the unique circumstances of each region, thereby largely eliminating the problem of management generalization that can be associated with managing tautog as a coastwide stock. Any biological impacts resulting from this document are expected to be positive.

1.5.2 Social Impacts

1.5.2.1 Recreational Fishery

Tautog is a highly prize game fish targeted by anglers fishing at natural and manmade structures. The recreational fishery accounts for approximately 90 percent of the coastwide harvest. In a 2013 National Saltwater Angler Survey, conducted by NMFS, 591 east coast anglers identified tautog as a frequently targeted species (Lovell, 2015). When asked in the survey about attitudes toward broad-level management objectives, 93% of angler respondents prefer a minimum size to some degree, and 90% prefer a bag limit. Eight-one percent of respondents identified recovering fish stocks that have been depleted as an 'extremely important' fisheries management objective. The actions proposed in this Amendment overlap with desired management approaches identified in the survey, additional proposed actions are an outcome of stakeholder discussions.

1.5.2.2 Commercial Fishery

In recent years, commercial landings accounted for up to 40% of the catch in some states, largely due to the market for live fish. Steady demand has increased the price for live tautog and has further incentivized the black market for undersized, out-of-season, or illegal quantities of tautog. There is a preference for plate sized fish up to 12 inches, which is below the 15-16 inch size limits set by states.

The proposed management changes, such as the commercial harvest tagging program, were designed with input from the law enforcement community and feedback from commercial fishermen. The intent of the program is to minimize illegal, unreported and unregulated fishing that has perforated the fishery since the 1990s. It is an attempt to eliminate the backdoor practice of selling underpriced tautog by unlicensed fishermen in the black market. Desired outcomes from this management action are higher prices for those commercial fishermen that follow established regulations and greater accountability in the commercial fishing sector.

1.5.2.3 Subsistence Fishery

A subset of illegal activity occurs among individuals and small groups harvesting fish for personal consumption or subsistence. These individuals may not even be aware they are violating specific regulations. Additional information on the subsistence fishery is not available at this time.

1.5.3 Economic Impacts

As described elsewhere in Amendment 1, the recreational component of the fishery accounts for the majority of harvest compared to the commercial harvest. In order to evaluate how dividing the current single coast-wide stock into regional stocks would affect anglers and commercial fisherman, information on how this would affect their behavior or the amount of

fish they catch is needed. For recreational anglers, the information needed would include how the number of fishing trips for tautog change, if they keep taking the same number of trips but make substitutions for target species and/or change fishing mode (private boat, shore, forhire), and if they travel to different locations as a result. Changes in the number of fish, size of fish, and species composition would also be important aspects of how they might be impacted.

1.5.3.1 Recreational Fishery

There are no published or unpublished studies (as of 2016) that document the economic impacts or economic value of the recreational tautog fishery. Without specific information on how the proposed changes to the FMP would affect the number of recreational trips taken for tautog and/or the catch per angler, it is not possible to estimate any economic impacts or effects at this time.

However, there are a few recent socio-economic surveys and publications by the National Marine Fisheries Service, Office of Science and Technology, with limited data on anglers who fish for tautog. These may be useful to understand in general the socio-economic aspects of anglers who fish for tautog and may be useful in a future analysis of specific management options once those are better defined.

National Saltwater Angler Survey

The first of these is the 2013 National Saltwater Angler Survey that asked recreational anglers about their attitudes and preferences for recreational fishing trips, management strategies and management objectives. An analysis of the data shows that 226 anglers who responded to the survey from the North Atlantic region (Maine to Connecticut) and 365 from the Mid-Atlantic (New York to Virginia) replied they frequently targeted tautog (Lovell 2013). For this document, the data on these 591 anglers was analyzed to understand their preferences for trip characteristics and management options and objectives. In the survey, respondents were asked to rate the importance of each characteristic listed below using a five-point scale, ranging from "Extremely important" to "Not important at all" (Figure 23).

- A. Catch fish
- B. Catch as many fish as I can for consumption
- C. Catch-and-release as many fish as possible
- D. Catch a trophy-sized fish
- E. Target a particular species
- F. Catch the bag limit of a species I am targeting
- G. Know that I will encounter abundant fish
- H. Fish in an area that is not heavily congested
- Be close to amenities such as parking, restrooms, cleaning stations, boat launches, etc.
- J. See information concerning fishing regulations clearly posted
- K. Have access to staff (park staff, marine operators, etc.) to answer questions or provide information
- L. Have easy access to weather and tide information
- M. Fish in a scenic area

N. Fish with family or friends
O. Teach others about fishing

100%
90%
80%
70%
60%
50%
Westral
Neutral
Somewhat important
Neutral
Not important at all

Figure 23. Fishing Trip Characteristics Important to Tautog Anglers (Maine to Virginia)

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87% of the surveyed anglers fishing for tautog rated both "fishing with family or friends" and "catching fish" as important (defined as either somewhat or extremely important on the scale). Having easy access to weather and tide information was important to 82% of tautog anglers, and 78-79% rated "teach others about fishing" and "fish in an area that is not heavily congested" as important. Of concern to managers, the characteristics "catch the bag limit of a species I am targeting" was ranked as important by only 37% of anglers. In comparison to all anglers across the country as well as in the North Atlantic and Mid-Atlantic, these results are fairly consistent in terms of percentages ranking the various characteristics as important (Brinson and Wallmo 2013; Rubio et al 2014).

To help understand attitudes toward different types of management strategies, anglers were also asked to rate their preferences for a list of management strategies. Respondents rated each of a series of strategies using a five-point scale of "Strongly prefer," "Somewhat prefer," "Slightly prefer," "Do not prefer at all," and "I am unsure." Results for a select group of management strategies relevant to the proposed changes in the tautog FMP are presented in Figure 24.

- Establish minimum size limits of the fish you can keep
- Limit the total number of fish you can keep

20%

10%

0%

C

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F

G

Increase the recreational harvest limit by decreasing the commercial harvest limit

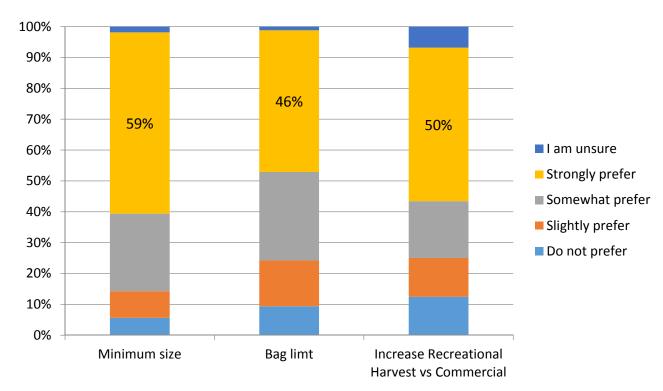


Figure 24. Management Preferences of Tautog Anglers (Maine to Virginia)

Another question the survey asked anglers included attitudes toward broad-level management objectives. Respondents were asked to rate each of several objectives using a six-point scale of "Extremely important," "Somewhat important," "Neutral," "Somewhat unimportant," "Not important at all," and "I am unsure." Results for some of the relevant objectives to the tautog FMP are presented in Figure 25.

- a. Ensure that large quantities of fish are available to catch
- b. Allocate some quota from commercial fisheries to recreational fisheries
- c. Recover fish stocks that have been depleted

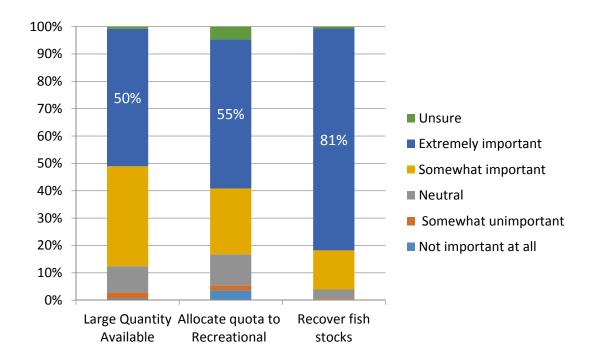


Figure 25. Preferences of Tautog Anglers (Maine to Virginia) For Different Management Objectives

Recovering fish stocks that have been depleted was extremely important to 81% of tautog anglers. Ensuring large numbers of fish to catch was ranked extremely important by 50% of tautog anglers. 55% said reallocating some of the quota from commercial to recreational anglers was extremely important, however, it is important to note the question did not ask about specific species in this context. The above responses to the survey can be useful in understanding what motivates recreational tautog anglers in general and how they may respond to changes in the tautog FMP.

Recreational Bait and Tackle Economic Survey

The most recent NMFS survey was conducted in 2014. The survey obtained information from independently owned bait and tackle stores and other independent stores selling marine recreational bait and tackle in coastal areas. Store owners were asked a series of questions on what type of bait and tackle they sold, their cost and earnings, and questions on the top species targeted by customers. The information collected was used to estimate the economic impacts of these stores to the regions.

For the North Atlantic Region, independent bait and tackle stores supported 958 jobs and contributed toward \$140 million in regional economic output from sales of marine recreational bait and tackle (Hutt et al 2015). For the Mid-Atlantic region, bait and tackle stores supported 1,922 jobs and \$293 million in output. In the Mid-Atlantic and New England, Bait and Tackle and Other Store owners indicated tautog (8.6%; 11.9%) was the sixth and fourth highest generators of sales for their business, respectively (Table 3). The information in this survey may be used to

analyze economic impacts to bait and tackle shops in the management areas if a clear link between changes in the tautog FMP and changes in sales of bait and tackle can be made.

Table 3. Saltwater recreational fisheries that generated the greatest sales of bait and tackle for retail stores in the Mid-Atlantic and New England as identified by store owners and/or managers. Percentages exceed 100% as respondents were asked to select the top three fisheries (Hutt et al, 2015). N is the number of store owners that participated in the survey.

Fisheries Management Region: Mid-Atlantic							
	<u>To</u>	<u>tal</u>	·	Bait & Tackle Stores		Other Stores	
Fishery	N	%	N	%	N	%	
Striped bass/Bluefish	118	72.4	58	76.3	60	69	
Summer or Winter flounder	83	50.9	46	60.5	37	42.5	
Atlantic croaker/Spot/Scup	49	30.1	19	25	30	34.5	
Black seabass	16	9.8	9	11.8	7	8	
Marlin/Tuna	9	5.5	9	11.8	0	0	
Tautog/Triggerfish	14	8.6	8	10.5	6	6.9	
Red or Black drum	10	6.1	5	6.6	5	5.7	
Weakfish	10	6.1	4	5.3	6	6.9	
Other	30	18.4	13	17.1	17	19.5	
Fisheries Management Region: Ne	w England						
	<u>To</u>	tal		<u>Tackle</u> ores	<u>Ot</u>	<u>her</u>	
Fishery	N	%	N	%	N	%	
Striped bass/Bluefish	80	67.8	52	78.8	28	53.8	
Summer or Winter flounder	29	24.6	22	33.3	7	13.5	
Scup	21	17.8	16	24.2	5	9.6	
Tautog	14	11.9	11	16.7	3	5.8	
Atlantic cod	14	11.9	8	12.1	6	11.5	
Atlantic mackerel	20	16.9	7	10.6	13	25	
Bluefin tuna	12	10.2	6	9.1	6		
	12		U			11.5	
Bonito	1	0.8	1	1.5	0	11.5 0	

National Marine Recreational Fishing Expenditure Survey

The 2011 National Marine Recreational Fishing Expenditure Survey provides information on mean trip expenditures by state, fishing mode, and resident status (Lovell et al 2013). The number of directed trips for tautog by state and mode can be used together with mean trip expenditure to estimate the total expenditures on tautog trips and the resulting economic impacts to the coastal states from changes in the tautog FMP. This assumes such changes would affect the number and distribution of trips across the management area. Caution is noted however, because if anglers switch to fishing for other species with no or little change in

the number, location, or type of trips taken, there will be no resulting impacts. Table 4 shows the 2014 mean expenditures by state, mode, and resident status using the 2011 estimates and inflating them to 2014 dollars using the Consumer Price Index. NMFS has developed state level economic impact models that can be used to estimate the economic impacts resulting from changes in fishing trips (Lovell et al 2013).

Aside from changes in economic impacts resulting from potential changes in the number of trips taken by anglers, data from the MRIP program on numbers of directed trip and catch of tautog could be used to develop a revealed preference model on the economic value of catching different numbers of tautog. The results can be used to show how changes in management measures would change the economic value, or benefits, anglers receive from fishing for and/or catching tautog. It would require some time to develop these models by an experienced economist.

Table 4. Mean Trip Expenditures by State, Mode, and Resident Status, 2014

State	Mode	Resident Status	Mean
Connecticut	For-Hire	Non-Resident	\$151.80
Connecticut	For-Hire	Resident	\$173.21
Connecticut	Private Boat	Non-Resident	\$29.71
Connecticut	Private Boat	Resident	\$32.03
Connecticut	Shore	Non-Resident	\$13.33
Connecticut	Shore	Resident	\$19.18
Delaware	For-Hire	Non-Resident	\$199.34
Delaware	For-Hire	Resident	\$124.56
Delaware	Private Boat	Non-Resident	\$42.74
Delaware	Private Boat	Resident	\$39.48
Delaware	Shore	Non-Resident	\$72.52
Delaware	Shore	Resident	\$30.82
Maryland	For-Hire	Non-Resident	\$394.78
Maryland	For-Hire	Resident	\$147.88
Maryland	Private Boat	Non-Resident	\$37.12
Maryland	Private Boat	Resident	\$46.55
Maryland	Shore	Non-Resident	\$70.75
Maryland	Shore	Resident	\$45.86
Massachusetts	For-Hire	Non-Resident	\$473.54
Massachusetts	For-Hire	Resident	\$178.38
Massachusetts	Private Boat	Non-Resident	\$79.08
Massachusetts	Private Boat	Resident	\$63.18
Massachusetts	Shore	Non-Resident	\$152.17
Massachusetts	Shore	Resident	\$42.20
New Jersey	For-Hire	Non-Resident	\$138.41
New Jersey	For-Hire	Resident	\$116.31
New Jersey	Private Boat	Non-Resident	\$94.07
New Jersey	Private Boat	Resident	\$58.44

State	Mode	Resident Status	Mean
New Jersey	Shore	Non-Resident	\$53.49
New Jersey	Shore	Resident	\$30.81
New York	For-Hire	Non-Resident	\$122.19
New York	For-Hire	Resident	\$165.72
New York	Private Boat	Non-Resident	\$40.77
New York	Private Boat	Resident	\$61.95
New York	Shore	Non-Resident	\$46.92
New York	Shore	Resident	\$20.90
Rhode Island	For-Hire	Non-Resident	\$216.18
Rhode Island	For-Hire	Resident	\$98.34
Rhode Island	Private Boat	Non-Resident	\$38.50
Rhode Island	Private Boat	Resident	\$42.97
Rhode Island	Shore	Non-Resident	\$17.47
Rhode Island	Shore	Resident	\$16.06
Virginia	For-Hire	Non-Resident	\$189.54
Virginia	For-Hire	Resident	\$113.05
Virginia	Private Boat	Non-Resident	\$79.75
Virginia	Private Boat	Resident	\$59.42
Virginia	Shore	Non-Resident	\$104.20
Virginia	Shore	Resident	\$27.77

1.5.3.2 Commercial Fishery

From 2009 to 2015, the states with the highest number of vessels and fisherman fishing for tautog on average are Rhode Island, Massachusetts, and New York. Table 5 shows the number of vessels, number of fishermen, total pounds, total revenue and average price per pound from 2009 to 2015 where data is available. For these vessels and fisherman, tautog is not the only species they catch. The top five species as measured in pounds for the vessels also reporting tautog were scup (#1), black sea bass (#3), longfin inshore squid (#4), and skates (#5). Tautog was second in terms of pounds. In terms of average pounds caught, the states with the highest catch are New York, Massachusetts, and Rhode Island.

Table 5. Commercial Tautog Effort by State. Confidential data has been excluded.

				Landings		Price Per
Year	State	Vessels	Fishermen	(lbs)	Revenue	Pound
2009	MA	73	164	54,703	\$137,062	\$2.51
2010	MA	95	192	75,317	\$210,114	\$2.79
2011	MA	122	181	57,787	\$179,683	\$3.11
2012	MA	156	219	67,870	\$212,688	\$3.13
2013	MA	187	250	70,165	\$236,224	\$3.37
2014	MA	179	222	63,191	\$230,697	\$3.65
2015	MA	196	213	61,752	\$268,529	\$4.35

				Landings		Price Per
Year	State	Vessels	Fishermen	(lbs)	Revenue	Pound
2009	RI	157	253	50,920	\$98,854	\$1.94
2010	RI	219	233	44,054	\$101,427	\$2.30
2011	RI	228	228	47,426	\$124,862	\$2.63
2012	RI	239	247	50,126	\$151,008	\$3.01
2013	RI	236	235	53,428	\$168,471	\$3.15
2014	RI	240	232	53,384	\$182,347	\$3.42
2015	RI	234	226	47,140	\$172,694	\$3.66
2009	CT	69	45	21,194	\$44,178	\$2.08
2010	CT	82	47	16,948	\$41,842	\$2.47
2011	CT	76	66	14,787	\$38,693	\$2.62
2012	CT	64	35	6,233	\$18,501	\$2.97
2013	CT	60	36	5,887	\$15,950	\$2.71
2014	CT	55	34	5,164	\$14,647	\$2.84
2015	CT	56	48	7,249	\$22,774	\$3.14
2009	NY	118	183	87,289	\$276,169	\$3.16
2010	NY	126	187	93,153	\$299,080	\$3.21
2011	NY	120	174	82,761	\$261,467	\$3.16
2012	NY	132	171	76,373	\$254,907	\$3.34
2013	NY	140	181	110,849	\$359,138	\$3.24
2014	NY	153	206	121,538	\$375,909	\$3.09
2015	NY	137	179	111,925	\$401,668	\$3.59
2009	NJ	17	16	14,591	\$45,316	\$3.11
2010	NJ	23	20	49,213	\$122,781	\$2.49
2011	NJ	24	20	45,865	\$129,285	\$2.82
2012	NJ	20	17	20,831	\$66,577	\$3.20
2013	NJ	19	17	21,999	\$73,941	\$3.36
2014	NJ	12	11	31,655	\$101,049	\$3.19
2015	NJ	15	16	17,538	\$57,373	\$3.27
			_			4
2009	DE	8	5	2,116	\$4,649	\$2.20
2012	DE	5	4	1,444	\$4,968	\$3.44
2015	DE	4	5	2,107	\$8,446	\$4.01
2000		4.0	^	4.500	60.050	40.00
2009	MD	13	9	1,638	\$3,659	\$2.23
2010	MD	11	11	1,285	\$2,780	\$2.16
2015	MD	7	8	1,181	\$4,619	\$3.91

				Landings		Price Per
Year	State	Vessels	Fishermen	(lbs)	Revenue	Pound
2009	VA	35	15	11,132	\$19,169	\$1.72
2010	VA	35	10	6,081	\$13,819	\$2.27
2011	VA	34	9	14,590	\$42,050	\$2.88
2012	VA	36	10	13,870	\$33,611	\$2.42
2013	VA	24	8	11,776	\$88,407	\$7.51
2014	VA	26	9	7,545	\$26,378	\$3.50
2015	VA	27	23	6,937	\$25,569	\$3.69

1.5.3.3 Subsistence Fishery

No information exists on the subsistence fishery for tautog.

1.5.4 Other Resource Management Efforts

1.5.4.1 Artificial Reef Development/Management

Artificial reefs can enhance fish habitat, provide more access to quality fishing grounds, benefit fishermen, divers, and the economies of shore communities, and increase total biomass in a given area. Tautog rely on reef structures for protection, and reef-dependent species such as *Mytilus edulis* form a large portion of the diet of both juveniles and adults (Olla et al 1975).

Individual Atlantic states started deploying artificial habitat after the 1950s. Efforts became more formalized after the release of the 1985 National Artificial Reef Plan, which enhanced coordination and development of artificial reefs with state, interstate and federal agencies including ASMFC and the National Marine Fisheries Service. As shown in Table 6, the majority of states within tautog's distribution have state-administered artificial reef programs, and Rhode Island's artificial reef program is in development (McNamee, personal communication).

Table 6. Number of artificial reefs by state in 2016

State	# of artificial reefs inshore	# of artificial reefs offshore	Total # of artificial reefs built	Acres
Massachusetts	5	ı	5	<160
Rhode Island	-	-	Artificial Reef	
			Program in	
			development	
Connecticut	1	-	1	<6.4
			no formal program	
New York	4	7	11	2,539
New Jersey	2	13	15	16,000
Delevione	0	4	12	7.000
Delaware	8	4	12	7,080
Maryland	22	11	33	13,613
Virginia	18	5	23	487

Artificial reefs are built out of hard, durable structures such as rock, concrete, and steel, usually in the form of surplus or scrap materials (vessels, dredge rock, military vehicles, etc.). All harmful substances are removed from the material prior to deployment. Various design approaches are used for Atlantic artificial reefs. New Jersey has sunken old ships and barges to create 16,000 acres of artificial reefs. Delaware has used donated concrete for eight bay sites, and ballasted tire units and sunken ships for ocean sites. Most Maryland reefs are constructed from concrete materials of opportunity, including rubble from bridge and pier demolition projects, and reef balls built with the help of volunteers (Michael Malpezzi, MDNR, personal communication, 2016).

Some states are monitoring the impact of artificial reefs on fishery performance and biological diversity. In New Jersey, party boat fishing effort on artificial reefs increased from 3 percent in 1970 to 47 percent in 2000 in conjunction with an extensive increase in reef building efforts during that period (Figley 2001). In Maryland, volunteer angler surveys carried out on artificial and nearby natural reefs confirm that artificial reefs provide fishing experiences equivalent to the natural reefs (Michael Malpezzi, MDNR, personal communication, 2016). New and continued monitoring and research on the effects of existing artificial reef sites will be most informative for habitat-orientated species like tautog.

1.5.4.2 Bycatch

Tautog is often listed as a bycatch species in trap and pot fisheries targeting lobster and black sea bass (ASMFC 1997, Skrobe and Lee 2004, Hasbrouck et al. 2007, NEFMC et al. 2007, NEFMC et al. 2015). In the federally permitted Mid-Atlantic fish pot fishery, on average tautog accounted for 5% of harvest from 2000-2004 and 8% of harvest from 2007-2011 (Table 7). Tautog catch, as bycatch, is of value, and is often harvested and sold (Skrobe and Lee 2004). Many lobstermen target tautog when the inshore lobster fishery slows simply by using longer sets of traps without bait (ASMFC 1996, personal communication Peter Clarke, NJDEP). In a 1994 study, tautog was the second most abundant species (23% of finfish bycatch) after scup in New York's lobster pot fishery (ASMFC 1996).

Table 7. Average Landings in the Mid-Atlantic Fish Pot Fishery (Pounds)
Source: Northeast Region Standardized Bycatch Reporting Methodology (NEFMC 2007 & 2015)

Species	2000-2004	2007-2011
Tautog	49,000	56,000
Black Sea Bass	723,000	472,000
Lobster	17,000	37,000
Channeled Whelks	35,000	31,000
Eels	21,000	20,000
Other	60,000	116,000
Total	905,000	732,000

1.6 LOCATION OF TECHNICAL DOCUMENTATION FOR FMP

1.6.1 Review of Resource Life History and Biological Relationships

See Section 1.2.1

1.6.2 Stock Assessment Document

See Section 1.2.2

1.6.3 Habitat Background Document

See Section 1.4

2.0 GOALS AND OBJECTIVES

2.1 HISTORY OF PRIOR MANAGEMENT MEASURES

Prior to adoption of the Interstate FMP, tautog had been managed on a state-by-state basis. For the majority of states, tautog were largely unmanaged although some states had commercial and/or recreational regulations, such as minimum size limits, possession limits, and effort controls. An increase in fishing pressure in the mid-1980s through early 1990s, and a growing perception of the species' vulnerability to overfishing, stimulated the need for a coastwide FMP. Accordingly, in 1993 the ASMFC recommended a plan be developed as part of its Interstate Fisheries Management Program. The states of Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland Virginia, and North Carolina declared an interest in jointly managing this species through the ASMFC. The FMP was implemented in 1996, with the goals of conserving the resource along the Atlantic coast and maximizing long-term ecological benefits, while maintaining the social and economic benefits of recreational and commercial utilization.

Follwing is a brief history of tautog management activities to date:

Fishery Management Plan (FMP) (March 1996)

The FMP established a 14" minimum size limit and a target fishing mortality of F = M = 0.15. The target F was a significant decrease from the 1995 stock assessment terminal year fishing mortality rate in excess of F = 0.70, so a phased in approach to implementing these regulations was established. Northern states (Massachusetts through New Jersey) were to implement the minimum size and achieve an interim target of F = 0.24 by April 1997, while southern states (Delaware through North Carolina) had until April 1998 to do the same. All states were required to achieve the target F = 0.15 by April 1999.

Addendum I (May 1997)

In response to northern states' difficulty in achieving the interim F by their deadline, Addendum I delayed implementation of the interim F and target F for all states until April 1998 or April 2000 depending on the state. It also established *de minimis* specifications.

Addendum II (November 1999)

The 1999 stock assessment incorporated data through 1998, which included only nine months

of data under the Addendum I regulations. Given the life history of the species, the Board was concerned the assessment provided limited advice on the effects of Addendum I regulations. Addendum II further extended the deadline to achieve the F=0.15 target until April 2002. It also clarified the fishing mortality targets in the FMP with respect to individual state management program flexibility.

Addendum III (February 2002)

This addendum established a new target fishing mortality rate of $F_{target} = F_{40\%SSB} = 0.29$ and mandated states collect a minimum of 200 age samples per year.

Addendum IV (January 2007)

Addendum IV revised the target fishing mortality rate to F = 0.20, a 28.6% reduction in overall fishing mortality, and established biomass reference points for the first time. The biomass reference points were ad hoc, based on the average of the 1982-1991 SSB (target; 26,800 MT) and 75% of this value (threshold; 20,100 MT). It also required states to achieve the new target F by reductions in recreational harvest only.

Addendum V (April 2007)

Addendum V allowed state flexibility in achieving $F_{target} = 0.20$ through reductions in commercial harvest, recreational harvest, or some combination of both. A Massachusetts-Rhode Island model indicated regional F was lower than the coastwide target, therefore these two states were not required to implement management measures to reduce F.

Addendum VI (April 2011)

Addendum VI established a new F_{target} of F = M = 0.15 on the basis that stock biomass had not responded to previous F levels. The new F_{target} required states to take a 39% reduction in harvest. As in Addendum IV, a regional assessment of Massachusetts and Rhode Island demonstrated a lower regional F using ADAPT VPA model, and these states were not required to implement tighter regulations. To achieve the required harvest reduction, all other states adopted higher minimum size limits exceeding the FMP's minimum requirement of 14" in addition to other measures, such as possession limits, seasonal closures, and gear restrictions.

2.2 GOALS

If approved, Amendment 1 replaces the 1996 Tautog FMP and its addenda.

The Board is considering modifications to the goals that were enacted in 1996 to meet the current needs of the species and fishery.

Option A. Status Quo. Maintain the 1996 Goals

- A. To perpetuate and enhance stocks of tautog through interstate fishery management so as to allow a recreational and commercial harvest consistent with the long-term maintenance of self-sustaining spawning stocks
- B. To maintain recent (i.e. 1982-1991) utilization patterns and proportions of catch taken by commercial and recreational harvesters
- C. To provide for the conservation, restoration, and enhancement of tautog critical habitat for all life history stages
- D. To maintain a healthy age structure
- E. To conserve the tautog resource along the Atlantic coast to preserve ecological benefits such as biodiversity and reef community stability, while maintaining the social and economic benefits of commercial and recreational utilization

Option B. Revised Goal Statement

The goal of Amendment 1 is to sustainably manage tautog over the long-term using regional differences in biology and fishery characteristics as the basis for management. Additionally, the Amendment seeks to promote the conservation and enhancement of structured habitat to meet the needs of all stages of tautog's life cycle.

2.3 OBJECTIVES

The following objectives are being considered by the Board to support the goals of this amendment:

Option A. Status Quo: Maintain the 1996 Objectives

- A. To establish criteria, standards, and procedures for plan implementation as well as determination of state compliance with FMP provisions
- B. To allow harvest that maintains spawning stock biomass (SSB) in a condition that provides for perpetuation of self-sustaining spawning stocks in each spawning area, SSB, size and age structure, or other measures of spawning success at or above historical levels as established in the plan
- C. To achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit
- D. To enact management recommendations which apply to fish landed in each state, so that regulations apply to fish caught both inside and outside of state waters
- E. To promote cooperative interstate biological, social, and economic research, monitoring and law enforcement
- F. To encourage sufficient monitoring of the resource and collection of additional data, particularly in the southern portion of the species range, that are necessary for development of effective long-term management strategies and evaluation of the management program. Effective stock assessment and population dynamics modeling require more information on the status of the resource and the

- biology/community/ecology of tautog than is currently available, in particular to facilitate calculation of F and stock trends
- G. To identify critical habitats and environmental factors that support or limit long-term maintenance and productivity of sustainable tautog populations
- H. To adopt and promote standards of environmental quality necessary to the long-term maintenance and productivity of tautog throughout their range
- To develop strategies that reduce fishing mortality, restore stock size composition and the historical recreational/commercial split, consider ecological and socio-economic impacts.
- J. To identify problems associated with the offshore fishery. Compatible regulations between the states and the EEZ are essential

Option B. Remove Objective A and B from Section 2.3 of the 1996 FMP

These objectives are inherent within the FMP or included in other objectives, and therefore redundant.

Option C. Modify Objective C in Section 2.3 of the 1996 FMP to the following:

 Adopt compatible management measures among states within a regional management unit

Option D. Combine Objectives D and J in Section 2.3 of the 1996 FMP to the following:

• Encourage compatible regulations between the states and the EEZ, which includes enacting management recommendations that apply to fish landed in each state (i.e., regulations apply to fish caught both inside and outside of state waters).

Option E. Combine Objectives G and H in Section 2.3 of the 1996 FMP to the following:

 Identify important habitat and environmental quality factors that support the long-term maintenance and productivity of sustainable tautog populations throughout their range.

Option F. Modify Objectives I in Section 2.3 of the 1996 FMP to the following:

• Develop and implement management strategies to rebuild tautog stocks to sustainable levels (reduce fishing mortality to the target and restore spawning stock biomass to the target), while considering ecological and socio-economic impacts.

Option G. Add the following objective to Section 2.3 of the 1996 FMP:

Work with law enforcement to minimize factors contributing to illegal harvest.

Option H. Accept Options B through G into Section 2.3 of the 1996 FMP:

This option will insert all modifications identified under Options B through G into Section 2.3. If adopted, the objectives will be:

- Develop and implement management strategies to rebuild tautog stocks to sustainable levels (reduce fishing mortality to the target and restore spawning stock biomass to the target), while considering ecological and socio-economic impacts.
- Adopt compatible management measures among states within a regional management unit
- Encourage compatible regulations between the states and the EEZ, which includes enacting management recommendations that apply to fish landed in each state (i.e., regulations apply to fish caught both inside and outside of state waters).
- Identify important habitat and environmental quality factors that support the long-term maintenance and productivity of sustainable tautog populations throughout their range.
- Promote cooperative interstate biological, social, and economic research, monitoring and law enforcement
- Encourage sufficient monitoring of the resource and collection of additional data, particularly in the southern portion of the species range, that are necessary for development of effective long-term management strategies and evaluation of the management program.
- Work with law enforcement to minimize factors contributing to illegal harvest.

2.4 SPECIFICATION OF A MANAGEMENT UNIT

The management unit consists of all coastal states from Massachusetts through Virginia. The management unit is defined as all U.S. territorial waters of the northwest Atlantic Ocean, from the shoreline to the seaward boundary of the exclusive economic zone, and from US/Canadian border to the southern end of the species range. Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service have declared an interest in tautog.

2.5 BIOLOGICAL REFERENCE POINTS

Threshold reference points are the basis for determining stock status (i.e., whether overfishing is occurring or a stock is overfished). When the F exceeds the F-threshold, then overfishing is occurring; the rate of removal of fish by the fishery exceeds the ability of the stock to replenish itself. When the reproductive output (measured as spawning stock biomass or population fecundity) falls below the biomass-threshold, then the stock is overfished, meaning there is insufficient mature female biomass (SSB) or egg production (population fecundity) to replenish the stock.

Reference points are recalculated during an update and benchmark stock assessment, see the latest stock assessment for reference points and stock status determination (ASMFC 2016b). In 2016, the Technical Committee recommended maximum sustainable yield based reference points and spawning potential ratio based reference points, depending on the region, based on data availability. The proposed biological reference tables are highlighted in Tables 8 and 9, and the two types of reference points are summarized below.

Maximum sustainable yield (MSY) based reference points

MSY-based reference points are estimated from ASAP, which uses a combination of spawning potential ratio, yield-per-recruit (YPR), and the stock-recruitment relationship to calculate the SSB_{MSY} and F_{MSY} . 75% F_{MSY} is calculated by projecting the population forward assuming the same stock-recruitment (S-R) relationship and finding the fishing mortality (F) that maintains the population at 75% SSB_{MSY}. SSB X% is calculated by projecting the population forward while fishing at F X%SPR with recruitment randomly drawn from the observed historical recruitment. MSY-based reference points are used in the LIS region because it has a longer time-series.

Spawning potential ratio (SPR) based reference points

SPR-based reference points estimate the reproductive potential of a fished stock relative to its unfished condition. SPR based reference points are used in the MARI, NJ-NYB and DelMarVa regions.

Table 8. Tautog Spawning Stock Biomass Status by Region When Compared to Proposed Reference Points. Source: ASMFC Stock Assessment Update, 2016

	Proposed SSB Reference Points			Status as of	the 2016 Assessment
Stock Region	MSY or SPR	SSB Target (mt)	SSB Threshold (mt)	SSB 2015 (mt)	Stock Status
Massachusetts – Rhode Island	SPR	2,684	2,004	2,196	Stock Not Overfished
Long Island Sound	MSY	2,865	2,148	1,603	Overfished
New Jersey – New York Bight	SPR	3,154	2,351	1,809	Overfished
Delaware – Maryland – Virginia	SPR	1,919	1,447	621	Overfished
Coastwide	MSY	14,944	11,208	6,014	Overfished
	SPR	9,448	7,091	6,014	Overfished

Table 9. Tautog Fishing Mortality Status by Region When Compared to Proposed Reference Points. Source: ASMFC Stock Assessment Update, 2016

	P	roposed F Referenc	Status as of the	2016 Assessment	
Stock Region	MSY or SPR	Fishing Mortality Target	Fishing Mortality Threshold	3-year Average (2013-15)	Stock Status
Massachusetts – Rhode Island	SPR	0.28	0.49	0.23	Overfishing Not Occurring
Long Island Sound	MSY	0.28	0.49	0.51	Overfishing
New Jersey – New York Bight	SPR	0.20	0.34	0.54	Overfishing
Delaware – Maryland – Virginia	SPR	0.16	0.24	0.16	Overfishing Not Occurring
	MSY	0.17	0.24	0.38	Overfishing
Coastwide	SPR	0.25	0.43	0.38	Overfishing Not Occurring

Option A. Status Quo - Reference Points can be Modified via a Management Document

The Tautog Technical Committee or Stock Assessment Subcommittee can recommend alternative reference points (i.e. other than MSY or SPR), as long as modifications to the status determination criteria, and their associated values, are the result of the most recent peer-reviewed stock assessments for tautog. In response, the Board may initiate a management document to incorporate the new, peer-reviewed stock status determination criteria.

Option B. Reference Points can be Modified via Board Action (i.e., Management Document Not Required)

The Tautog Technical Committee or Stock Assessment Subcommittee can recommend alternative reference points (i.e. other than MSY or SPR), as long as modifications to the status determination criteria, and their associated values, are the result of the most recent peer-reviewed stock assessments for tautog. In response, the Tautog Management Board may allow for the incorporation of new, peer-reviewed stock status determination criteria, when available, through Board action (at a Board Meeting).

Scientific advice, with respect to status determination criteria modifications, could follow three scenarios. First, the peer-review panel may reach consensus with respect to maintaining the current definitions of status determination criteria. There may be updates to the values associated with those same definitions based on the input of more recent (i.e., additional year's data) or updated information as well; however, the Board is not required to undertake any specific action when this occurs, as using the updated values is implied in this provision of the FMP. In this case the scientific advice can then move forward such that management advice can be developed.

Under the second potential scenario for scientific advice, the peer-review panel can recommend changes or different definitions of the status determination criteria. If the panelists reach consensus as to how these status determination criteria should be modified or changed then the scientific advice can move forward such that management advice can be developed. Under these first two potential scenarios, consensus has been reached and therefore the scientific advice moving forward to the Section's management advisory groups should be clear.

The third potential scenario is the peer review scientific advice with respect to the incorporation to status determination criteria are split (consensus is not reached) or uncertain recommendations are provided (weak consensus). The scientific advice provided by the reviewers may be particularly controversial. In addition, the scientific advice may not be specific enough to provide adequate guidance as to how the maximum fishing mortality threshold and/or minimum stock size threshold should be defined or what resulting management advice should be developed from these changes. Under these circumstances, the Board may engage their TC to review the information and recommendations provided by the peer-review group. Based on the terms of reference provided to the TC, they may prepare a consensus report clarifying the scientific advice for the Board as to what the status determination criteria should be (e.g., modify, change, or maintain the same definitions). At that point the scientific advice on how the status determination criteria should be defined will be clear, and can move forward such that management advice can be developed.

2.6 DEFINITION OF OVERFISHING AND OVERFISHED

Overfishing is defined relative to the rate of removals from the population as determined by the fishing mortality on the stock. The level of spawning stock biomass in a stock as the result of fishing mortality is the basis for determining if a stock has become overfished. A biomass target or threshold determines the condition of the stock whereas the mortality rate determines how fast the population is moving toward achieving the appropriate level of biomass.

2.7 MAINTENANCE OF STOCK STRUCTURE

2.7.1 Fishing Mortality (F) Target

Option A. Status quo

Coastwide fishing mortality cannot exceed F_{target}=0.15

Option B. Managing to the Regional Target F

The Management Board will evaluate the current estimates of F, as determined by the most recent stock assessment, with respect to its regional reference points (Section 2.5) before proposing any additional management measures. If the current F exceeds the regional threshold level (overfishing), the Board will take steps to reduce F to the regional target level; if current F exceeds the regional target, but is below the regional threshold, the Board should consider steps to reduce F to the regional target level. If current F is below the regional target F, then no action would be necessary to reduce F. At this time, the only way to assess the progress towards achieving the regional target F is through future stock assessments.

Sub-option B1. No time requirement

If the current F exceeds the regional threshold level (overfishing), the Board must take corrective action within a reasonable amount of time.

Sub-option B2. Board action within One Year

If the current F exceeds the regional threshold level (overfishing), the Board must initiate corrective action, via a management document, within one year of receiving the overfishing stock status. Alternative management measures must be implemented in the second year. Each region and/or state must identify specific measures (e.g., possession limit, minimum size and seasonal closures, quota, etc.) to achieve necessary harvest reductions (if applicable) in the management document.

Sub-option B3. Board Action within Two Years

If the current F exceeds the regional threshold level (overfishing), the Board must initiate corrective action, via a management document, within two years of receiving the overfishing stock status. Alternative management measures must be implemented by the third year. Each region and/or state must identify specific measures (e.g., possession limit, minimum size and seasonal closures, quota, etc.) to achieve necessary harvest reductions (if applicable) in the management document.

The Board can codify the level of risk for the TC to use when developing alternative management measures to achieve the reference points. The chosen probability impacts the percent reduction necessary.

Option A. Status Quo.

The Board will select the probability of achieving F Target when modified management measures are necessary.

Option B. 50% Probability of Achieving F Target

Management measures will be developed based on at least a 50% probability of achieving F Target. For example, the harvest reductions presented in this document have a 50% probability of achieving F Target by 2021.

2.7.2 F Reduction Schedule

If F exceeds the regional threshold level (overfishing), the Board will take corrective action, as described under *Section 2.7.1*. The Board will provide the Technical Committee with a timeframe in which F must be brought down to the regional target level using harvest reductions. The Technical Committee will then develop short-term projection scenarios to determine the constant harvest levels necessary to achieve the regional F target within X years.

The following management options refer to the harvest reduction timeframe:

Option A. Status Quo

Draft Amendment 1 does not specify a time frame to reduce fishing mortality to the regional target F level. The time frame will be established when the Board initiates a harvest reduction management response.

Option B. Three Years

Fishing mortality will be reduced to the regional target F level in a time frame that is no longer than 3 years.

Option C. Five Years

Fishing mortality will be reduced to the regional target F level in a time frame that is no longer than 5 years.

2.7.3 Stock Rebuilding Target

The Management Board will evaluate the current estimates of SSB with respect to its regional reference points (Section 2.5) before proposing any additional management measures. If the current SSB is below the regional threshold level, the Board may take steps to increase SSB to the regional target level (Section 2.7.4); if current SSB is below the regional target, but above the regional threshold, the Board may consider steps to increase SSB to the regional target level. If current SSB is above the regional target SSB, then no action would be necessary to increase SSB.

2.7.4 Stock Rebuilding Schedule

Option A. Status Quo (from Addendum IV)

No required management responses if SSB is below the threshold level.

Option B. A Stock Rebuilding Schedule can be Developed via an Addendum

The Management Board will evaluate the current estimates of SSB with respect to the regional reference points (Section 2.5). The Board can initiate a regional SSB rebuilding plan via an addendum (Section 4.12).

Option C. A Stock Rebuilding Schedule can be Developed via an Addendum, Not to Exceed 10 Years

The Management Board will evaluate the current estimates of SSB with respect to the regional reference points (Section 2.5). The Board can initiate a regional SSB rebuilding plan via an addendum (Section 4.12). The only limitation imposed under Amendment 1 is that the rebuilding schedule is not to exceed 10 years.

2.8 RESOURCE COMMUNITY ASPECTS

Tautog are an important recreational species for fishermen and a valuable resource in the live commercial market.

2.9 IMPLEMENTATION SCHEDULE

As part of the final approval of Amendment 1, the Management Board will establish an implementation schedule.

3.0 MONITORING PROGRAM SPECIFICATIONS/ELEMENTS

3.1 STOCK ASSESSMENT

A tautog stock assessment will be performed every five to seven years, or sooner if necessary. The technical committee will meet to review the stock assessment and all other relevant data sources. The stock assessment report shall follow the general outline as approved by the ISFMP Policy Board for all Commission-managed species. In addition to the general content of the report as specified in the outline, the stock assessment report will also address the specific topics detailed in the following sections.

3.1.1 Assessment of Annual Recruitment

Annual recruitment of tautog will be estimated by examination of a variety of data sources. The first is the estimate of recruitment from the model. Second will be the examination of various fishery-independent data sources, including the juvenile abundance indices that are integrated in to the statistical modeling process. Although many of these surveys are not designed to specifically target tautog, continued examination of these surveys in the future is worthwhile. In addition, surveys designed to specifically monitor tautog abundance along the coast are needed, including the use of gears that are more appropriate for structure oriented species.

3.1.2 Assessment of Spawning Stock Biomass

Spawning stock biomass (SSB) will be estimated from the model every five to seven years or sooner if necessary. Model estimates will be used for evaluating stock status versus the approved reference points.

3.1.3 Assessment of Fishing Mortality Target and Measurement

Fishing mortality (F) rates will be estimated by the model every five years or sooner, if necessary. Fishing mortality will be estimated for each age-class estimated by the model, but the metric used for comparison to the reference point values will be full F, or the comprehensive fishing mortality rate for all ages of the entire regional stock. Because of the inherent variability in some of the important data sources for the model (namely recreational catch estimates), a three-year running average of F should be developed and used as the reference estimate for the current state of the stock. Terminal year estimates for tautog generated by the model are subject to variability as additional data are added. Therefore, terminal year estimates may not accurately depict current conditions. The three-year running average is deemed to be more reflective of overall trends in fishing mortality and will reduce the risk of implementing management measures based on a false terminal year signal.

3.1.4 Assessment of Age Structure

Age structure will be estimated by the model every five to seven years or sooner, if necessary. Age structure will be estimated by the model, and is based off of the biological sampling done in each state, so is a good representation of the population structure in each region. Because of the inherent variability of age data it is important to use the model estimated age structure as the model synthesizes multiple sources of information to produce its estimates of numbers and weight at age, and therefore is accounting for some of this variability in its calculations. Additionally samples available for age analysis are affected by things such as the selectivity of the fisheries operating on the stock, which is another dynamic the model can account for in its estimates. As opposed to other population metrics, the population age structure can be used as an indicator of a healthy population if the age structure is robust and spans multiple ages including some of the oldest ages, and can also indicate when a population is becoming stressed as older ages are truncated or as there are multiple runs of low recruitment. Age structure may not immediately necessitate a management action, but can be viewed to preempt future problems in the population.

3.2 SUMMARY OF MONITORING PROGRAMS

In order to achieve the goals and objectives of Amendment 1, the collection and maintenance of quality data is necessary.

3.2.1 Catch and Landings Information

3.2.1.1 Recreational Catch and Effort Data Collection

Tautog is predominantly a recreationally caught species, with anglers accounting for about 90% of landings coastwide. The Marine Recreational Fisheries Statistics Survey (MRFSS) contains estimated tautog catches from 1981-2003 and the Marine Recreational Information Program (MRIP) contains estimated tautog catches from 2004 - present.

Recreational effort data is collected through phone surveys, but this will fully transition to mail surveys by 2018. Recreational catch data is collected through an access-site intercept survey. Interviewers routinely sample for biological data during angler intercepts by collecting length and weight measurements when possible. Sampling during night time and accounting for zero-

catch trips are conducted to more accurately capture fishing behaviors. MRIP also leverages logbook reporting and tournament sampling to improve quality of data on the distinct for-hire fleet.

Tautog are not well-sampled by the MRFSS/MRIP program, resulting in higher percent standard errors (PSEs, approximately 20-25% in recent years at the regional level) and large year-to-year swings in catch estimates, often driven by small numbers of intercepts. When disaggregated by state, PSEs for the MRFSS/MRIP estimates of harvest and releases were generally high (>0.30), indicative of the low number of intercepts obtained by survey interviewers. Recreational catch information can be downloaded at: http://www.st.nmfs.noaa.gov/st1/recreational/queries/.

The recreational tautog fishery occurs throughout the year. The majority of the landings are captured through MRIP, which is administered by the National Marine Fisheries Service. However, MRIP does not sample landings during January and February (Wave 1). This amendment recommends the states initiate a sampling program to estimate the recreational harvest of tautog during January and February.

3.2.1.2 Commercial Catch and Effort Data Collection

The ASMFC, NMFS, U.S. Fish & Wildlife Service, the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils, and all the Atlantic coastal states have developed a coastwide fisheries statistics program, known as the Atlantic Coastal Cooperative Statistics Program (ACCSP). All harvesters and dealers are required to report a minimum set of standard data elements by the 10th of the following month (refer to the ACCSP Program Design document for details, http://www.accsp.org/data-collectionstandards). Landings are reported to NMFS and available online at http://www.st.nmfs.noaa.gov/commercial-fisheries/index.

Harvesters are required to report all commercial trips regardless of catch. Trips that yield no catch are still considered trips. Therefore, all data elements for effort must be reported. Dealers are required to submit monthly negative, or no activity, reports in the states where they are licensed. A single negative report may be submitted in advance to cover multiple negative reporting periods. Harvesters with no reported commercial landings during the previous license period are required to certify that fact at the time of license renewal.

New Jersey has a limited access tautog commercial fishery. As of 2016, there are 40 directed fishery and 22 non-directed fishery permittees in New Jersey. All permittees are required to submit monthly reports identifying tautog landings by day, gear, and location, as well as any bycatch.

3.2.2 Biological Information

3.2.2.1 Fishery Dependent Information—Biological Sampling from the Recreational Fishery Length and weight samples are collected from the recreational fishery through MRIP. As a less commonly encountered species, sample sizes are often low, and average approximately 350-500 intercepts per year depending on the region.

In addition, states have dedicated short term sampling programs for specific fisheries in New York (head boat mode), New Jersey (head boat and shore mode), and Virginia (a directed fishing mortality study) and in some states that have a significant head boat or shore mode component to their recreational tautog catch. Most state's age samples come from a combination of state-run recreational, commercial and fisheries independent surveys.

In 2004, MRIP implemented observers on headboats to collect lengths of released alive fish (Type 9 measurements). Prior to 2004, the only information on the size of released fish came from the American Littoral Society's (ALS') volunteer angler tagging program, which provides lengths of fish that anglers report they have released alive. These two data sources provide the length frequency information used to develop the catch-at-age for released fish.

Wave 1 Sampling

Historically, only about five percent of the annual recreational catch on the Atlantic and Gulf coasts is taken during Wave 1 (Jan/Feb). Costs to sample these months are very high due to low fishing activity. With a few exceptions the recreational statistics program (MRFSS/MRIP) has not collected data in Jan/Feb on the Atlantic coast north of Florida since 1980.

3.2.2.2 Fishery Independent Information—Biological Sampling Program

All states in the stock unit are required to collect a minimum of 200 age and length samples annually (five fish per centimeter), within the range of lengths commonly caught by the fisheries. Specific sources are not mandated, therefore most states fulfill their obligations through a combination of fishery-dependent and fishery-independent sampling. This intent of this requirement, imposed in 2002, was to collect data necessary to support regional assessments and/or regional approaches to management. A summary of data collection efforts should be included in the annual compliance report.

The state marine fisheries agencies from Massachusetts through New Jersey conduct fisheries independent surveys that encounter tautog to record biological information such as age, length, sex, weight, and some measures of maturity. As shown in Table 10, data availability varies by region; northern states have more data from the earlier parts of the time series, when older, larger fish were present in the samples. The more southern states lack data from fishery-independent sources and thus have limited numbers of samples of the youngest, smallest fish.

Table 10. Ongoing fishery independent surveys, as of 2016

State	Areas Surveyed	Survey Type	# of Survey Stations	Dates of Survey	
MA	MA territorial waters	Trawl	1 station per 19 square nautical miles	May and September	
	Narragansett Bay	Trawl	13 stations per month	June through October	
	Narraganset Bay, Rhode Island Sound and Block Island Sound	Trawl	44 stations	Spring (April-May) Fall (Sept/October)	
RI	Narragansett Bay Beach	Seine	18 stations per month	June through October	
	Coastal Ponds	Seine	24 stations in 8 coastal ponds per month	May through October	
	Narragansett Bay	Trap	10, 5 pot trawls set per month	April through October	
СТ	Long Island Sound (CT and NY waters)	Trawl	40 stations per month	Spring (April-June) Fall (Sept-Oct)	
	Peconic Bay	Trawl	16 stations per week	May through October	
NY	Western Long Island Sound (Little Neck, Manhasset Bay, Jamaica Bay)	Seine	5-10 sites, semimonthly	May through October	
	Long Island Sound	Trap	35 stations per week	May through October	
NJ	Nearshore ocean waters between Cape May and Sandy Hook	Trawl	30 tows in Jan; 39 tows per month in Apr, Jun, Aug & Oct	Jan, Apr, June, Aug & Oct	
DE	Fisheries independent surveys do not collect tautog in quantities needed for monitoring purposes				
MD	Fisheries independent surveys do not collect tautog in quantities needed for monitoring purposes				
VA	Fisheries independent sur purposes	veys do not collec	t tautog in quantities n	eeded for monitoring	

3.2.3 Social Information

No ongoing sociological data collection or monitoring is planned. Anecdotal information and insight on the fishery and regulatory changes are provided by the Tautog Advisory Panel, which

maintains active participation. ACCSP is currently developing standards for collecting sociological data in all fishing sectors.

3.2.4 Economic Information

Currently there are no programs designed specifically to collect economic data pertaining to the tautog fishery. The ACCSP is currently developing standards for collecting economic data in all fishing sectors. See Section 1. 5.3 for a review of economic information that references tautog, but is not designed specifically for the tautog fishery.

3.2.5. Observer Program

As a condition of state and/or federal permitting, vessels are required to carry at-sea observers when requested. ACCSP currently has at-sea observer programs modeled after the NOAA Fisheries National Observer Program, adopting their standards and training protocols. A minimum set of standard data elements is defined through the ACCSP for biological or bycatch sampling data (refer to the ACCSP Program Design document for details: http://www/accsp.org/programdocument.htm#prog).

Observer data obtained from the Northeast Fisheries Observer Program for the years 1989-2012 indicates the overall sample size of observed trips that either retained or discarded tautog was low (Table 11 and Table 12). The data represents estimates of primarily incidental catch, not targeted tautog trips. Length sampling was also inconsistent and had a low sample size by year, but where available showed that discarded fish were smaller on average than retained fish (ASMFC 2015).

Table 11. Sample size of gear of observed commercial trips that caught tautog (1989-2012)

Gear	# of Trips
Gillnet	710
Otter Trawl	604
Scallop Dredge	23
Fish pot/trap	19
Longline	6
Lobster pot/trap	4
Scottish Seine	1
Troll Line	1

Table 12. Sample size by state of observed commercial trips that caught tautog (1989-2012)

State	# of Trips
ME	2
NH	9
MA	456
RI	620
CT	7
NY	59
NJ	113
DE	1
MD	43
VA	47
NC	11

Discarded-to-observed ratios from the observer data were supplemented with Vessel Trip Report (VTR) data for some gears and regulatory periods when sample size was less than ten observed trips. VTR data are self-reported by fishermen and are not considered as reliable as observer data. Overall there is high uncertainty in the estimates of commercial discards, and they are a small component of total removals of tautog. In addition, observer data is provided by vessels that hold federal permits, therefore the information presented is incomplete because it does not include data from fishermen with state permits only.

As an example of a program that could benefit our understanding of tautog and improve fishery dependent data collection for this species, in 2008, New Jersey began a collaboration with ACCSP personnel for an at-sea monitoring and sampling program targeting both the recreational party/charter boat and commercial fisheries for various species including tautog. Through 2014, data has been collected from this program on over 4,000 tautog (harvest and discard) sampled on nearly 200 trips targeting tautog. Programs such as these are an important source of valuable fisheries dependent data, and their continuation and expansion should be encouraged beyond New Jersey. In particular, a focus on observer information in recreational and commercial fisheries could provide robust estimates of discards (abundance, weights, and lengths) where there are currently gaps.

3.3 STATE TAGGING PROGRAMS

The Commission's Interstate Tagging Committee (ITC) was created in 1999 to improve the quality and utility of fish tagging data. A subcommittee of ITC members with expertise in tagging program design was established to review and certify interested tagging programs. In addition, it serves as a technical resource for jurisdictions other than the ASMFC, including private, non-profit tagging groups who plan to tag tautog. Protocols have been developed by the Committee as a source of information, advice and coordination for all Atlantic coast tagging programs; more information can be found at www.fishtag.info.

There are tautog tagging programs in the waters of Massachusetts, Maryland, and Virginia. The methods used to capture, tag, and track recaptures are described below.

Massachusetts

Massachusetts Division of Marine Fisheries tagged adult tautog using Floy internal anchor tags (model # FM-84). Tag anchors were implanted into the abdominal cavity, on the left side of fish just ventral and posterior to the pectoral fin apex. Tag number, total fish length in mm and sex was recorded for each fish, along with the latitude and longitude of the release point. Sex was determined by external examination of prominent morphological features. Subsequent recapture information on total length, recapture site, capture method, catch disposition (released, retained) was solicited from tag returnees.

Release and recapture sites were plotted on MapTech chart facsimiles for calculation of predicted straight line travel distance and travel vectors. Daily growth intervals were calculated using the difference between initial capture length and recapture length divided by the days at large, and compared to growth intervals of similar aged fish from the annual DMF Age and Growth Study.

Maryland

Tautog tagging in Maryland and adjacent federal waters is conducted by volunteer anglers for the American Littoral Society (ALS). A yellow dorsal loop tag with the serial number is applied to the fish behind the dorsal fin (Figure attached). Information on the area of capture and release, date and fish size is sent to the ALS. ALS tagging began in 1982 and continues today throughout a number of the Atlantic states, including Maryland. There are about 8,000 records available for tautog tagged in Maryland. There is no specific tagging design, tags are applied to fish on ad hoc basis. No tagging is conducted by the MD Department of Natural Resources.

Virginia

The Virginia Game Fish Tagging Program is a cooperative program of the Virginia Saltwater Fishing Tournament (Marine Resources Commission) and VIMS Marine Advisory Program. Initiated in 1995, it has been funded primarily by Saltwater Recreational Fishing License Funds and matching VIMS funds. This program provides annual training and enables a corps of ~200 experienced anglers to direct tagging effort on select target species important to VA's marine recreational fisheries. Through 2014, this program's database (used by researchers, fishery managers, anglers, etc.) includes over 240,000 records for fish tagged and over 25,900 fish recapture records (an overall >11% recapture rate). There are ten target species: black and red Tautog Stock Assessment Report 34 drum, black sea bass, cobia, flounder, gray triggerfish, sheepshead, spadefish, speckled trout, and tautog. There have been 17,705 tautog tagged since 1995 with 2,692 recaptures through 2013.

3.4 BYCATCH REDUCTION

The extent of bycatch in the tautog fishery is minimized through gear restrictions including pot and trap degradable fasteners to reduce the mortality of fish in lost or abandoned pots or traps, see Section 4.5. In addition, New York has prohibited the possession of tautog caught using fish pots or traps, unless there is one circular vent measuring 3 1/8 inch opening diameter. States have implemented other gear restrictions and modifications to reduce overall bycatch in

pots and traps that indirectly benefit tautog. Escape vent provisions mandated to reduce the catch of undersized lobster, black sea bass and scup have likely allowed juvenile tautog to escape. However, as the minimum sizes for tautog are larger than those for the other species, some adult tautog may be too large to fit through these escape panels. Increasing the size of the escape panels to accommodate the larger size of the tautog may increase the rate of escapement for other species, rendering the utilization of such pots unfeasible for commercial fishing. Research into retention of tautog along with the other associated species harvested in lobster/fish pots using varying sizes of escape panels may be informative to determine a commercially feasible maximum.

Several bycatch reduction devices have been researched for trawl nets, a gear involved in the harvest of tautog in the more northern states along the Atlantic coast. These devices utilize escape panels of larger mesh, grills allowing escape of smaller fish, or the use of different color net material to increase the selectivity of the nets (Glass 2000). Investigations on the behavior of tautog to trawl gear may be informative toward the possible utilization of these devices in the trawl fishery.

3.5 HABITAT MONITORING PROGRAM

To enhance habitat for reef-associated fish and invertebrates, especially in the relatively featureless sand bottoms typical of ocean waters south of New England, artificial reefs have been created along the Atlantic coast, see Table 6. The construction of wide arrays of artificial reef sites reduce habitat fragmentation and act as networks supporting migratory movements of structure dependent species (Steimle and Zetlin 2000).

4.0 MANAGEMENT PROGRAM IMPLEMENTATION

4.1 REGIONAL BOUNDARIES

Option A. Status Quo - Coastwide Management

Currently, tautog are managed on a coastwide basis. If *Option A. Status Quo* is chosen then this section will be removed. The coastwide management unit is summarized under Section 2.4.

Option B. Regional Management

The Board reviewed multiple regional approaches and stock assessment analyses prior to proposing a four-region approach (Table 13). This option includes a sub-option to delineate the Long Island Sound boundary.

In the 1996 FMP, the document notes "there are apparent regional differences in the tautog fishery", but did not specify regional boundaries due to limited biological data. In the 2015 Benchmark Stock Assessment, the TC identified a regional structure based on life history information, fishery characteristics, and data availability. Tagging data suggest strong site fidelity across years with limited north-south movement, although they undergo seasonal inshore-offshore migrations in the northern end of their range. Based on the analyses of

biological and fisheries information, the TC determined the "coastwide" stock unit is inappropriate.

Draft Amendment 1 proposes delineating the stock into four regions due to differences in biology and fishery characteristics, as well as limited coastwide movement (Table 13 and Figures 26-30). Regional management is likely to reduce the risk of overfishing and acts upon prior research recommendations. The TC can recommend alternative regional boundaries as more data become available. In response, the Board may adjust the regional boundaries via *Adaptive Management, Section 4.12*.

Table 13. Four-Region Management Approach

- 1) Massachusetts Rhode Island
- 2) Long Island Sound (CT and NY LIS)
- 3) New Jersey New York Bight (NJ and NY South Shore)
- 4) Delaware Maryland Virginia

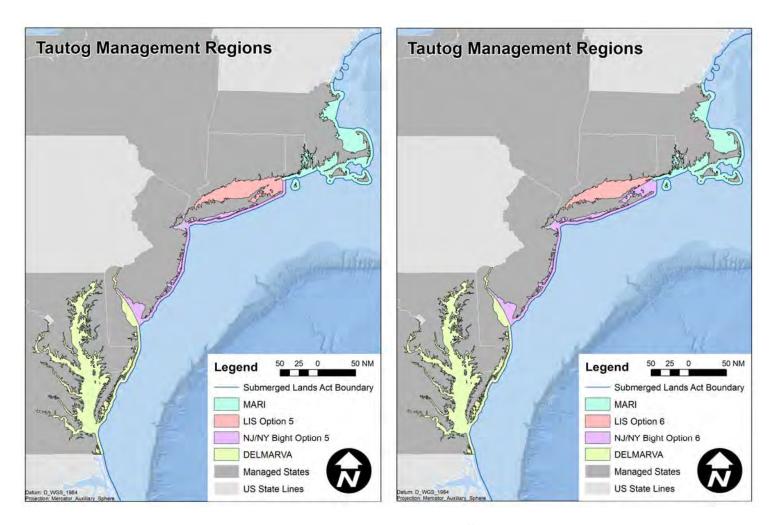


Figure 26. Proposed Tautog Management Regions; Showing Different LIS Boundaries

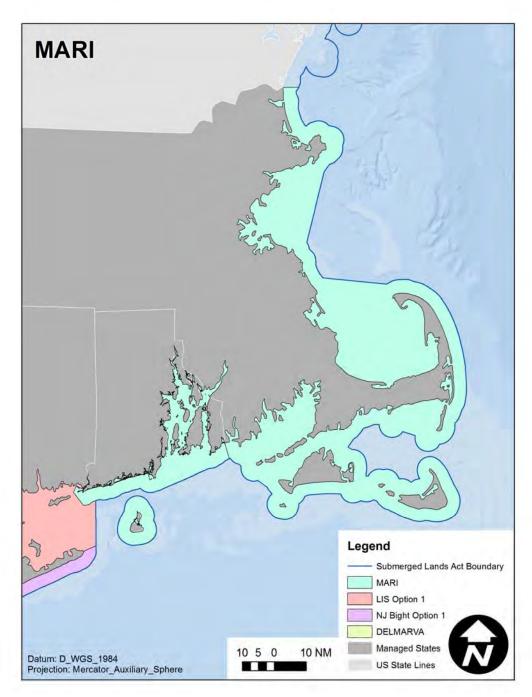


Figure 27. Proposed Massachusetts and Rhode Island Management Area

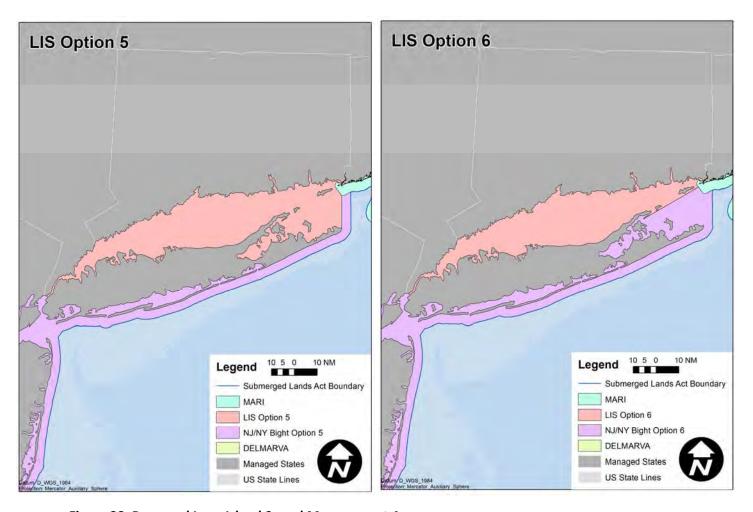


Figure 28. Proposed Long Island Sound Management Area

When Amendment 1 is finalized, the appropriate boundaries/maps will be included in the document.

Sub-Option B1 (map on the left): Long Island Sound is delineated by a line that runs from Montauk Point, New York to Watch Hill, Rhode Island. All waters west of the line will follow the Long Island Sound management measures. The MRIP data that was used to evaluate the LIS stock status is aligned with this option.

Sub-Option B2 (map on the right). Long Island Sound is delineated by a line that runs from Orient Point, New York to Watch Hill, Rhode Island. All waters west of the line will follow the Long Island Sound management measures.

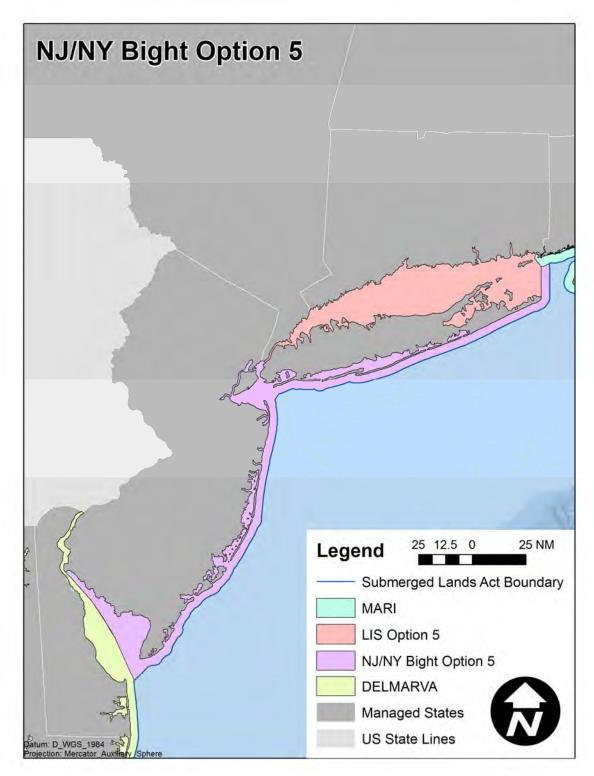


Figure 29. Proposed New Jersey-New York Bight Management Area

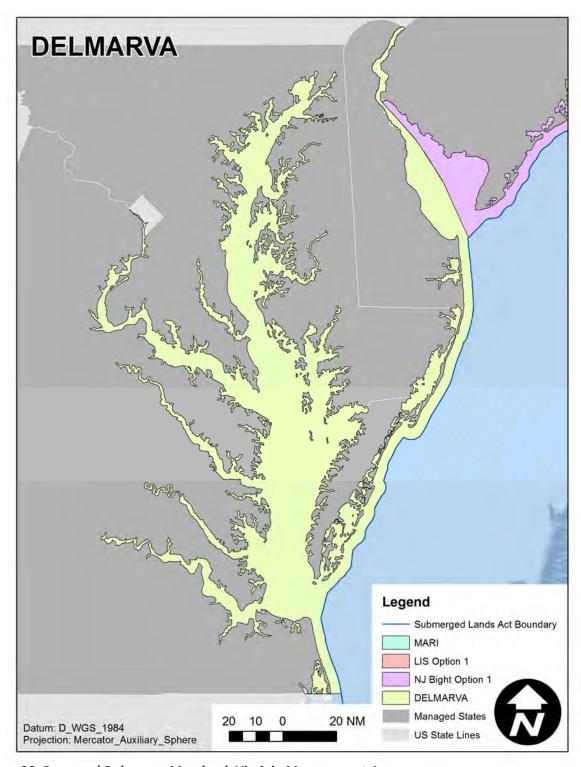


Figure 30. Proposed Delaware, Maryland, Virginia Management Area

4.2 REGIONAL MANAGEMENT MEASURES

Management options by region were developed by the TC in response to the 2016 stock assessment update. Two regions would be required to take harvest reductions to due to the regional stock status: LIS and NJ-NYB. Two regions would not have to take harvest reductions, but are proposing regional measures: MARI and DelMarVa.

4.2.1 Procedure to Develop Regional Management Measures

Compatible regulations between adjacent states are desirable to prevent the shift of fishing effort to areas with more liberal regulations, or to an area with an open season. If a region is considering consistent measures across for all states within a region then a regional working group will be developed to discuss appropriate alternatives. A regional working group consists of representatives from each member state within the region. It is recommended that the regional working group decisions are made by consensus.

If a state within a region wants to implement different management measures than those within the region, the general procedure within *Section 4.11, Conservation Equivalency* will be followed. It is recommended that the state convene the regional working group to discuss and review the proposed management measures.

All modifications to management measures (e.g., bag limit, minimum size, seasonal closures, quota, etc.) will be reviewed by the TC and approved by the Management Board. Once approved by the Board, the management measures can be implemented.

4.2.2 Massachusetts-Rhode Island (MARI)

Historically, tautog management measures in MARI have been state-specific (Tables 14 and 15). In response to the 2016 stock assessment update, managers are proposing regional management options for the public to consider (Table 16). If the regional management measures are modified at a future date, all states will agree to the new regulations prior to regional implementation (See Section 4.2.1).

Table 14. 2017 MARI Recreational Regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/person/day)	OPEN SEASONS
Massachusetts	16"	3	Jan 1 – Dec 31
		3 (up to 10/private vessel)	Apr 15 – May 31
Rhode Island	16"	3 (up to 10/private vessel)	Aug 1 – Oct 14
		6 (up to 10/private vessel)	Oct 15- Dec 15

Table 15. 2017 MARI Commercial Regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/vessel/day)	OPEN SEASONS	2017 QUOTA (lbs.)
Massachusetts	16"	40	Sept 1 - Oct 31	64,643
			Apr 15 - May 31	17,116
Rhode Island	16"	10	Aug 1 - Sept 15	13,390
			Oct 15 - Dec 31	17,116

4.2.2.1 Massachusetts-Rhode Island Proposed Recreational Management Measures

The following tools were used by MARI to calculate harvest reductions to achieve similar regulations between the two states. The methods described below all use MRIP recreational data for the years of 2013 - 2015, only waves 2 - 6 are available for analysis in these states during these years.

Four methods of estimating future recreational tautog harvest were employed. These included; 1) seasonal reductions calculated from daily harvest rates based on MA and RI harvest from 2013 - 2015 waves 2-6 according to MRIP data; 2) bag limit reduction calculations based on MA and RI harvest from 2013 - 2015 waves 2-6 according to MRIP data; 3) reductions achieved from increasing the minimum size based on MRIP size distribution data from 2013 - 2015 waves 2-6, and 4) a methodology for combining size, bag, and season harvest reduction calculations based on MA and RI harvest from 2013 - 2015 waves 2-6 according to MRIP data.

Table 16. Proposed MARI Recreational Regional Management Measures

Option	Minimum	Possession Open Season		% Harvest
	Size	Limit		Reduction
A. Status Quo	16"	See Table 14		NA
B. All Measures		2	March 1 - May 31;	
Consistent	16"	3	Aug 1 - Oct 14	9%
		4	Oct 15 - Dec 31	
C. All measures	16"	3	March 1 - May 31;	19%
consistent	10	3	Aug 1 – Dec 31	19%

4.2.2.2 Massachusetts-Rhode Island Proposed Commercial Management Measures

There are no proposals to adjust the commercial regulations for MA-RI. The regulations in Table 15 would continue to be enforced unless a state or region adjusts the measures following the procedures set forth in *Section 4.2.1 or 4.3*.

4.2.3 Long Island Sound

Based on the 2016 stock assessment update, the LIS region is overfished and overfishing is occurring. The region will need to reduce commercial and recreational harvest by a minimum of 47.2% to achieve the F Target by 2021. The current management measures (Table 17 & 18) will be adjusted to meet the required reductions.

Table 17. 2017 LIS Recreational Regulations

STATE	SIZE LIMIT	POSSESSION LIMITS (number of	OPEN SEASONS
	(inches)	fish/person/day)	
		2	Apr 1-Apr 30
Connecticut	16"	2	July 1 – Aug 31
		4	Oct 10 – Dec 6
New York	16"	4	Oct 5 – Dec 14

Table 18. 2017 LIS Commercial Regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/vessel/day)	OPEN SEASONS	2017 QUOTA (lbs.)
Connecticut	16"	10	Apr 1- Apr 30 Jul 1 - Aug 31 Oct 8 - Dec 24	-
New York	15"	25 (except, 10 per vessel when fishing lobster pot gear and more than six lobsters are in possession)	Jan 1 – Feb 28 Apr 8 – Dec 31	-

4.2.3.1 Long Island Sound Proposed Recreational Management Measures

Recreational options were developed by adjusting season, size and possession limit regulations using MRIP data from 2013 to 2015. Length analysis included data from MRIP, the CT Volunteer Angler Survey (> 16") and the NY Headboat Survey (> 16"). Alterations in season length were evaluated by converting percent of annual harvest by wave to percent of annual harvest by day in each wave. Due to limited data (driven by minimal harvest) from the CT spring fishery (Waves 2 and 4), analysis focused on projected harvest reductions in response to changes in bag limit and minimum size at current season length for Wave 4.

The following LIS options were developed using a 50% probability of achieving F target, which is associated with a minimum harvest reduction of 47.2%.

Table 19. LIS recreational harvest reduction (of 47.2% or more) options to the status quo state-bystate measures

	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
A1 Ctata anasifis	СТ	17"	1	Apr. 1-30, Aug. 1-31	48.1%
A1. State-specific	Ci	17	2	Oct 10-Nov 30	40.1%
Reduction	NY	16"	1	Oct. 5-Dec. 14	49.5%

Table 20. LIS recreational regional harvest reduction (of 47.2% or more) options

Regional Options	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
B1. Consistent	СТ			Apr. 1-30,	
Minimum Size &		16"	1	Oct. 6-Dec. 6	47%
Possession Limit	NY			Oct. 1-Dec. 14	
B2. Consistent	СТ			Apr 1-30, Aug 1-31,	
Minimum Size &		17"	2	Oct. 10-Nov. 30	48.9%
Possession Limit	NY			Oct. 10-Nov. 30	
B3. All measures consistent	Regional	16"	1	Oct. 1-Nov. 9	47.1%

4.2.3.2 Long Island Sound Proposed Commercial Management Measures

Commercial options were developed based on seasonal closures. Connecticut's current commercial fishery has three open seasons and New York's commercial fishery has two open seasons. Total reported harvest from trip level reporting in 2013-2015 was calculated for each open season and converted to percent of total annual harvest. This was divided by the number of days in the season to provide an average daily percent of total annual harvest. It was then possible to look at seasonal closures that would reduce cumulative harvest by the required amount.

The following LIS option was developed using a 50% probability of achieving F target, which is associated with a minimum harvest reduction of 47.2%.

Table 21. LIS commercial harvest reduction (of 47.2% or more) options to the status quo state-by-state measures

Option	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
	СТ	16"	10	Apr. 1-30, Aug. 1- 31, Oct. 21-Dec. 4	47.3%
A1. State-specific Reduction	NY	15"	25 (except, 10 per vessel when fishing lobster pot gear and more than six lobsters are in possession)	Jan. 1-Feb. 28, Apr. 1-30, Aug. 1-Dec. 31	51.3%

Table 22. LIS commercial regional harvest reduction (of 47.2% or more) option

Regional Option	State	Minimum Size	Possession Limit	Open Season	Quota (lbs)	% Harvest Reduction
P1 Ouetes	СТ	16"		Jan.1 – Apr 30,	2,785	47.20/
B1. Quotas	NY	10	-	Aug. 1-Dec.31	39,021	47.2%

4.2.3.3 Long Island Sound Proposed Slot Limit for the Commercial and Recreational Fisheries

Harvest slot scenarios were calculated for Long Island Sound for recreational and commercial fisheries, combined. These calculations were based on the same catch and harvest length distributions used in the Long Island Sound stock assessment update for the years 2013-2015. Catch and harvest lengths were scaled by the mean number of fish caught and harvested in LIS in the given years. The proportion of catch in a size class (P_L) was calculated (catch in length/total catch). As the proportion harvested in legal size classes was nearly 1, the proportion harvested was set to 1 for all subsequent calculations. Given that, the yield (Y_L) in a size class was calculated:

$$Y_L = C \times P_L$$

The sum of Y_L for all the lengths of interest in a slot results in the yield (Y, number of fish harvested).

$$Y = \sum_{i=\text{slot min}}^{n=\text{slot max}} Y_i + Y_{i+1} + \dots + Y_n$$

The number of dead discards was estimated by the product of the discard mortality (2.5%) and the sum of all Y_L outside of the harvest slot and was included in the percent reduction. Y_L was also calculated based on the biomass by converting length to mean weight.

$$Y_L = C \times P_L \times W_L$$

Yield in biomass (Yb) was calculated as above.

All harvest reductions for slot limits include season closures from May to July.

Harvest slots provide the opportunity to protect the large female spawners which produce exponentially more eggs (which are potentially of higher quality) than smaller females (LaPlante and Schultz, 2007). As tautog have a relatively low discard mortality rate (2.5%) harvest slots provide an opportunity for implementing harvest reductions without increasing the minimum size.

There are no viable harvest reduction options for slot limit for recreation and commercial fishery, with a size range of 14"- X" using status quo bag and seasonal closures. This is largely because of a high proportion of fish under 16" in the current size structure of the population. Reducing bag size and additional seasonal closures would be required to achieve these harvest reductions with such a slot limit.

A harvest slot between 16" and 18" is possible with no reductions in bag size (Table 23). This option includes a season closure for May, June and July. It would have no significant impact on these harvest reductions if bonus fish (recreational sector) within one inch of the state record (34" for CT and 32" for NY) were allowed. Reductions are shown in number of individuals and biomass (Table 23).

Table 23. LIS regional management harvest reduction scenarios with harvest slot limits for commercial and recreational fisheries.

Slot Limit Option	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
C. 16"-18"	СТ	16-18"	Status quo (See Tables 17 & 18)	Apr. 1-30, Aug. 1- 31, Oct. 10-Dec 6	51.3%
harvest slot NY	NY		(See Tables 17 & 18)	Oct. 5-Dec. 14	

4.2.4 New Jersey-New York Bight

Based on the 2016 stock assessment update, the NJ-NYB region is overfished and overfishing is occurring. The region will need to reduce commercial and recreational harvest by a minimum of 2% to achieve the F Target by 2021. The current management measures (Table 24 & 25) will be adjusted to meet the required reductions.

Table 24. 2017 NJ-NYB recreational regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/person/day)	OPEN SEASONS
New York	16"	4	Oct 5 – Dec 14
		4	Jan 1 – Feb 28
Now Jorsov	15"	4	Apr 1 – Apr 30
New Jersey		1	Jul 17 – Nov 15
		6	Nov 16 – Dec 31

Table 25. 2017 NJ-NYB commercial regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/vessel/day)	OPEN SEASONS	2017 QUOTA (lbs.)
New York	15"	25 (except, 10 per vessel when fishing lobster pot gear and more than six lobsters are in possession)	Jan 1 – Feb 28 Apr 8 – Dec 31	-
New Jersey	15"	> 100 lbs requires directed fishery permit	Jan 1 - 15 June 11 - 30 Nov 9 - Dec 31	103,000

4.2.4.1 New Jersey-New York Bight Proposed Recreational Management Measures

Data for this analysis were obtained from MRIP raw length and catch frequency data by wave from 2013 through 2015 using only records showing legal size, bag and season harvests (data excludes Long Island Sound harvests). Percent savings estimates by wave for size and bag limit options were calculated through an R code program. Wave (season) savings were estimated by calculating the percent harvest by wave of the total annual harvest for the sum of the years 2013 through 2015.

NJ-NYB region chose a 15-18 inch slot limit proposal as a way for fishermen to keep a good percentage of current harvests (between 73 – 80%) while allowing the largest fish (those equal

to or greater than 18.5 inches) to remain in the population since research has shown larger tautog are the greatest contributors to the reproductive potential of the stock. The percent reductions for this slot limit were calculated by taking the proportion of total harvest of the fish legally landed in the recreational fishery in New Jersey and New York's south shore which exceeded 18 inches. The resulting reduction percentages were 19.6% and 26.9% for New Jersey and New York Bight respectively. These percentage savings were applied to both the recreational and commercial sectors due to the lack of length frequency data for commercial catches. The data were obtained from the MRIP length frequency and Type 9 information, New Jersey Volunteer Angler Survey, and the south shore component of New York's DEC Headboat Survey.

The following NJ-NYB options were developed using a 50% probability of achieving F target, which is associated with a minimum harvest reduction of 2%.

Table 26. NJ-NYB recreational harvest reduction (of 2% or more) options to the status quo state-bystate measures

Option	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
	NYB	16"	4	Oct 6 - Dec 13	
A1 State angeifie	NJ 15"	15"	4	Jan 1 – Feb 28	
A1. State-specific Reduction			4	Apr 1 - 18	2%
Reduction		15	1	Aug 21 – Nov 15	
			6	Nov 16 – Dec 31	

Table 27. NJ-NYB recreational regional harvest reduction (of 2% or more) options

Regional Options	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction	
B1. Consistent	NYB	4="	_	Oct 10 - Dec 12	201	
Minimum Size & Possession Limit	NJ	15"	4	Sep 17 - Dec 31	2%	
B2. Consistent	NYB		4	Oct 6 - Dec 14		
Minimum Size	NII	16"	4	Jan 1 – May 31	4%	
	NJ		6	Aug 31-Dec 31		

C1. Slot Limit	NYB			Oct 2 - Dec 26	
with Consistent	NII	15-18"	4	Jan 1 - Mar 31;	2%
Possession Limits	NJ			Aug 20 - Dec 31	

4.2.4.2 New Jersey-New York Bight Proposed Commercial Management Measures

Length frequencies from the recreational sector were used for both the commercial and recreational sectors due to the lack of commercial length frequencies and to reflect the predominance of the recreational harvest (~90%) in the tautog fisheries for both New Jersey (NJ) and the south shore of New York (NYB). For NJ, the data were pulled from the MRIP NJ harvest expanded length frequencies, the state's Volunteer Angler Survey's kept length frequencies, and the Type 9 MRIP records. For NYB, the raw MRIP length frequency data were used due to the necessity of pulling out the records obtained from Long Island Sound. These data were supplemented by the New York State DEC Headboat Survey length frequencies and MRIP Type 9 data from the non-Long Island Sound records.

The following NJ-NYB options were developed using a 50% probability of achieving F target, which is associated with a minimum harvest reduction of 2%.

Table 28. NJ-NYB commercial harvest reduction (of 2% or more) options to the status quo state-bystate measures

Option	State	Minimum Size	Possession Limit	Open Season	% Harvest Reduction
A1. State-specific Reduction	NYB	15"	25	Jan 1 - Feb 28; Apr 14 - Dec 31	2%
	NJ	13	-	Jan 1 - 15; Jun 11 - 30; Nov 12 - Dec 31	270

Table 29. NJ-NYB commercial regional harvest reduction (of 2% or more) options

Regional	State	Minimum	Possession	Open Season	Quota	% Harvest					
Options	State	Size	Limit	Open Season	(lbs)	Reduction					
	NYB		28	Jan 1 - May 31;							
B1. Consistent	INTD	15"	20	Aug 1 - Dec 31	-	2%					
Minimum Size	NJ	15		Jan 1 - May 1;		270					
	147		-	Sep 19 - Dec 31	-						
	NYB		31	Jan 1 - May 31;		2%					
B2. Consistent	INTO	16"		Aug 1 - Dec 31	_						
Minimum Size	NJ	NH	NH	NII	NII	NII	10		Jan 1 - May 11;		270
			_	Aug 1 - Dec 31	_						
B3. Quotas	NYB	NYB 15"			65,486	2%					
bs. Quotas	NJ	13	_	_	23,259	270					
	NYB		34	Jan 1 - May 31;	_						
C4. 15"- 18"	INTD	15-18"		Aug 1 - Dec 31	_	2%					
harvest slot	NJ	12-10		Jan 1 - Apr 21;		∠ /0					
	147		-	Aug 11 - Dec 31	-						

4.2.5 Delaware - Maryland - Virginia

Historically, tautog management measures in DelMarVa have been state-specific (Tables 30 and 31). In response to the 2016 stock assessment update, managers are proposing regional management options for the public to consider (Table 32). If the regional management measures are modified at a future date, all states will agree to the new regulations prior to regional implementation (See Section 4.2.1).

Table 30. 2017 DelMarVa recreational regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/person/day)	OPEN SEASONS
		5	Jan 1 – Mar 31
Dolawaro	15"	3	Apr 1 – May 11
Delaware	15	5	July 17 – Aug 31
		5	Sept 29 – Dec 31
		4	Jan 1- May 15
Maryland	16"	2	May 16 – Oct 31
		4	Nov 1 – 26
Virginia	16"	2	Jan 1 – April 30
Virginia	10	3	Sept 20 – Dec 31

Table 31. 2017 DelMarVa commercial regulations

STATE	SIZE LIMIT (inches)	POSSESSION LIMITS (number of fish/vessel/day)	OPEN SEASONS	2017 QUOTA (lbs.)												
		5	Jan 1 - Mar 31													
Dolawara	15"	3	Apr 1 - May 11													
Delaware		5	July 17 - Aug 31	-												
		5	Sept 29 - Dec 31													
		4	Jan 1- May 15													
Maryland	16"	2	May 16 - Oct 31	-												
															4	Nov 1 - 26
			Jan 1 – Jan 21													
Virginia	15"	- Mar 1 – Apr 30	Mar 1 – Apr 30	-												
			Nov 1 – Dec 31													

4.2.5.1 Delaware-Maryland-Virginia Proposed Recreational Management Measures

Table 32. Proposed DelMarVa Recreational Regional Management Measures

Option	State	Minimum	Possession	Open Season	% Harvest
		Size	Limit		Reduction/
					Liberalization
A. Status Quo			See Table 3	30	NA
B. Consistent	DE	15"			
Possession	MD		4	Jan 1 – Apr 30;	8.5%
Limit &	VA	16"	4	July 1 – Dec 31	Liberalization
Seasons	VA				
			5	Jan – Mar 31	
	DE		3	Apr 1 – 30	
C. Consistent			5	July 1 – Dec 31	11.9%
Minimum Size	MD	16"	4	Jan 1 – Apr 30	Reduction
William Size	MD		4	Aug 1 – Dec 31	Reduction
	VA		3	Jan 1 – Apr 30	
	VA		3	Sept 20 – Dec 31	
D. All				lan 1 April 20:	11.6%
measures	Regional	16"	4	Jan 1 – April 30; July 1 – Dec 31	Reduction
consistent				July 1 – Dec 31	Reduction

4.2.5.2 Delaware-Maryland-Virginia Proposed Commercial Management Measures

There are no proposals to adjust the commercial regulations for DelMarVa. However, Delaware and Maryland have traditionally adopted the recreational measures as the commercial measures; and could continue to do this if the recreational measures are changed (Option B). If the region would like to make this decision at a later date then it can do so following the procedures set forth in *Section 4.2.1 or 4.3.*

Option A. Status Quo measures, as shown in Table 31

Option B. The modified recreational measures for Delaware and Maryland will be implemented as commercial measures (Section 4.2.5.1); Virginia commercial measures will remain status quo.

4.3. COMMERCIAL QUOTA

Option A. Status Quo. No specific commercial quota procedures.

Option B. Commercial Quota Procedures (Option B includes Sections 4.3.1 – 4.3.5)

A state or region may implement an annual commercial quota if the following procedures are met and Board approval is granted.

For the purposes of this section, a regional working group consists of representatives from each member state within the region. Regional working group decisions related to commercial quotas should be made by consensus.

Quota proposals will be reviewed by the TC according to *Sections 4.3.1* or *4.3.2*.; and develop a recommendation for the Board. The Board will meet to review and consider approval of the quota. Once approved by the Board, the regional quota can be implemented.

4.3.1 Commercial Quota within a Region

A regional working group will be developed to discuss the parameters of a regional quota across one or more states and develop rationale to justify the proposed quota. The proposal must include an agreed upon allocation method (by all member states within the region) and data to justify the quota must include the most recent 10 years of data. For example, a 2017 quota can include any combination of data from 2006-2016.

4.3.2 State-Specific Quota within a Region

If a state within a region wants to implement a quota and some or none of the other states have a quota then the proposed quota will need to be brought to the regional working group. Data to justify the quota must include the most recent 10 years of data. For example, a 2017 quota can include any combination of data from 2006-2016.

4.3.3 Quota Rollover

Due to the current stock condition, the PDT does not recommend the use of quota rollovers. If stock condition changes this management tool can be re-evaluated. Unused quota may not be rolled over from one fishing year to the next.

4.3.4 Quota Transfer

States can transfer quota to another state within the same region. The quota transfer must be finalized within the current fishing year. Quota cannot be transferred outside of a region.

States have the responsibility to close the tautog commercial fishery in their state once the quota has been reached. The Executive Director or designated ASMFC staff will review and approve all transfer requests before the quota transfer is finalized.

Once quota has been transferred to a state, the state receiving quota is responsible for any overages of transferred quota. That is, the amount over the final quota (that state's quota plus

any quota transferred to that state) for a state will be deducted from the corresponding state's quota the following fishing season.

4.3.5 Quota Overage

If a region or state exceeds the quota in a fishing season, the overage will be deducted from the corresponding region or state in the subsequent fishing year.

4.4 COMMERCIAL HARVEST TAGGING PROGRAM Option A. Status Quo.

No commercial harvest tagging program.

Option B. Implement a Commercial Harvest Tagging Program

(Includes a sub-option under Section 4.4.3)

If a commercial harvest tagging program is implemented then a state would not need to adopt the proposed commercial effort controls (e.g., changes to the size limit, season length, etc.) to achieve the necessary reductions, but would simply use a cap on the number of tags distributed. The cap could be derived from the proposed regional quota.

Law enforcement officials have evidence that indicates there is a significant illegal harvest of tautog, primarily in the live market. Reports of illegally harvested fish have been documented in cases against fishermen, fish houses and at retail markets and restaurants. In Massachusetts there have been a number of large cases made against licensed commercial fishermen, whereas in Delaware, New Jersey and New York illegal harvest seems mostly concentrated in the recreational fishery. Regardless of the source, most undersized, out-of-season or illegal quantities of live tautog are associated with the demand for tautog at ethnic food markets or restaurants. These markets are often found in large cities such as New York City and Philadelphia. To a lesser degree, illegal activity does occur among individuals and small groups harvesting fish for personal consumption or subsistence. This latter group may not even be aware they are violating specific regulations.

A commercial harvest tagging program was recommended to increase accountability in the fishery and curb illegal harvest. The tagging program would accommodate both the live and dead commercial markets. To evaluate the merits of such a program a Law Enforcement Subcommittee (Subcommittee), comprised of Tautog Board members and law enforcement representatives, was developed in 2015. As agreed upon by the Subcommittee, the tag should be easy to attach, secure and have minimal to no impact on the appearance or condition of live fish for the amount of time that live, tagged fish are maintained until consumption. The Subcommittee evaluated multiple tag types and fishermen were interviewed to describe the handling process from catch to market. A tautog tag trial was conducted to investigate the efficacy of a commercial tag that serves as a tool for law enforcement, while minimizing impact to the resource. The 30-day trial concluded with no mortality or degradation to fish health (Dumais et al 2016).

4.4.1 Objectives

The intent of the Commercial Harvest Tagging Program is to provide accountability in the commercial fishery and minimize illegal, unreported and unregulated (IUU) fishing, while utilizing methods that are easy for fishermen to use and do not detract from fish quality or marketability, and serve as a tool for law enforcement to evaluate compliance. To achieve these goals, the Subcommittee developed the following objectives:

Objective 1: Implement a verifiable tagging system that can aid enforcement and help identify IUU fish from reaching markets.

Objective 2: Use tags of a consistent type and style among all states that include standardized identifiers of year, state, and tag number.

Objective 3: Employ tags that are single-use only. Tags must be difficult to replicate. All unused tags will be returned or otherwise accounted for annually.

Objective 4: Implement a tagging program that will accommodate both the live and dead commercial fish markets. The tags used must be easy to attach, secure and have minimal to no impact on the appearance or condition of live fish for the amount of time that live, tagged fish are maintained until consumption.

4.4.2 Commercial Tagging

All states within a regional management unit are required to participate in the commercial harvest tagging program. *De minimis* status does not preclude a state from the requirements of the commercial harvest tagging program.

All states will use the same single-use tag. The tag will be inscribed with the year of issue, state of issue and a unique number. The **unique number will be linked back to the permit holder**. States will distribute tags to participants. It is unlawful to sell or purchase commercially caught tautog (alive or dead) without a commercial tag. The cost of the tag will be financed by states or fishermen at the discretion of each state or jurisdiction.

4.4.3 Tag Application

Option A. Harvester Application at Harvest or Prior to Offloading

All commercially caught tautog will be tagged by the commercially-permitted harvester at the time of harvest or prior to offloading. Tautog must be landed in the state that is identified on the tag.

Option B. Application by Dealer

All commercially caught tautog will be tagged by a licensed dealer. The location (state) of the sale must correspond to the state identified on the tag. The tag will be applied to the fish immediately after the dealer buys the fish from the harvester.

4.4.4 Tag Allowance (Biological Metric)

States are required to allocate commercial tags to the recipients described in Section 4.4.3 based on a biological metric, which will be described in the Annual Commercial Tag Report (Section 4.4.7). This metric is an estimate to determine the number of fish tags that will be required per year; the goal is to avoid surplus tags. For example, the majority of states in the striped bass commercial tagging program use the average commercial weight per fish from the previous year, or some variation thereof as the biological metric.

4.4.5 Tag Accounting

All states will require the recipients described in Section 4.4.3 to return unused tags from the previous fishing year no later than **February 15**. The return method will be further described by each state. The number of unused tags will be included in the Annual Commercial Tag Report (Section 4.4.7), along with the disposition of other returned tags (e.g., used, broken, lost, etc). Tag recipients who do not comply with this section may be subject to penalties set forth in Section 4.4.6.

4.4.6 Penalties

It is recommended that states strengthen their penalties for tautog violations and include counterfeit tag operations, in order to deter illegal harvest of tautog. License revocation or suspension is supported as a primary penalty for state or federal violations. Civil and/or criminal penalties can be also effective deterrents. It is recommended that cases of undocumented "lost" tags should result in a 1-year suspension from the commercial tautog fishery (for the subsequent fishing year).

4.4.7 Annual Commercial Tag Report

The existing compliance report will be modified to include a Commercial Tag section that must be completed by each state. The report must include the following information. The Board may modify the sections of the report via Board action.

- Describe the biological metric
- Number of tag violations.
- Complete the following table:

State	MA	RI	СТ	NY (LIS)	NY (south shore)	NJ	DE	MD	VA
Quota (if applicable)									
Maximum Commercial Harvest per Region									
Avg. Commercial Weight									
Number of Participants									
Number of Tags Issued									
Number of Tags Returned									

4.5 Gear Restrictions

Tautog pots and traps are required to have hinges and fasteners on one panel or door made of one of the following degradable materials:

- 1) Untreated hemp or jute string of 3/16 inch (4.8mm) in diameter or smaller;
- 2) Magnesium alloy fasteners, timed float releases (pop-up devices) or similar magnesium alloy fasteners;
- 3) Ungalvanized or uncoated iron wire of 0.094-inch (2.39mm) diameter or smaller.

4.6 SPAWNING TIME PERIODS

After consideration of mandated spawning closures, the Board determined to leave the authority with the individual states. Each region reviewed the Estuarine Living Marine Resources Database https://products.coastalscience.noaa.gov/elmr/ to determine peak spawning as well as scientific articles that are summarized in Section 1.2.1 Species Life History. The management measures presented in this document include measures intended to reduce disruption on tautog pairing and to protect spawning females. A state can modify future management measures to allow harvest during spawning time periods via conservation equivalency. The TC recommends implementing spawning closures during the following time periods:

- Massachusetts-Rhode Island: June through July
- Long Island Sound: May through July (See Appendix 1 for more biological information)
- New Jersey-New York Bight: June through July
- Delaware-Maryland-Virginia: May through June

4.7 POSSESSION LIMIT REGULATORY LANAGUAGE

Concern has been raised that the absence of tautog regulations in federal waters allows for loopholes that potentially contribute to overfishing. Possession restrictions have been used successfully to control federal waters fisheries for other species. While landing restrictions are enforceable, prohibiting possession allows for a larger area where marine enforcement can intercept vessels carrying tautog in amounts or sizes that violate state regulations. This Amendment requires that all state tautog regulations to prohibit *possession*. Therefore, harvesters should be aware of the strict possession limits that will apply once the vessel enters state waters.

4.8 FISHERY REGULATION ENFORCEMENT

The tautog fishery has many unique harvest, transportation, and marketing characteristics, which increase demand for small live fish. This Amendment emphasizes the need for state and federal enforcement agencies to place a high priority on the enforcement of tautog regulations. In addition, the public may also play an important role by reporting information on illegal harvest and sale of tautog to their state's marine fishery enforcement agency.

4.9 DATA COLLECTION

The recreational fishery occurs throughout the year. The majority of the landings are captured through the Marine Recreational Information Program (MRIP) administered by the National Marine Fisheries Service. However, the MRIP does not sample landings during January and February (wave 1). This Amendment recommends states initiate a sampling program to estimate the recreational harvest of tautog during January and February.

4.10 HABITAT CONSERVATION AND RESTORATION RECOMMENDATIONS 4.10.1 Preservation of Existing Habitat

Management of existing habitat on a sustainable basis requires a thorough knowledge of essential habitat types, their distribution, and their use by all life history stages of tautog. Currently, additional research is needed to determine the extent and condition of essential tautog habitats on a coastwide basis. Once the locations and abundance of essential tautog habitats are determined, refuges and special fishery management zones (SMZ) that limit fishing access and gear types are one potential method of habitat management.

4.10.2 Habitat Restoration, Improvement, and Enhancement

Restoration should be considered where well-known, historically "productive" tautog habitat has been degraded or lost.

Restoration could be directed specifically toward tautog habitat or it could occur as a component of other efforts. South of Cape Cod, restoration of lobster habitat should also consider the needs of tautog because habitat usage by the two species overlaps. Response plans for accidental toxic spills in coastal waters should focus on tautog as well as shellfish resources, because tautog are localized and depend on specific habitats and associated food

sources that are susceptible to chemical contamination. Point source contamination and hypoxia near nursery grounds can be improved by minimizing sewage discharges and increasing wastewater treatment levels. Non-point source toxic contamination of groundwater and nearshore coastal habitats can be reduced by redirecting storm water runoff into catch basins.

Habitat enhancement requires the creation or expansion of essential habitat where little or none presently exists. Creation of artificial reef habitats (see *Section 1.5.4.1*) and breakwaters could mitigate habitat losses. Both intentional reef construction and accidental creation through shipwrecks may be expanding tautog habitat in open, sandy coastal areas where tautog would not normally be found.

4.10.3 Avoidance of Incompatible Activities

Each state should establish windows of compatibility for activities known, to adversely affect tautog habitat, including projects involving water withdrawal, entrainment of eggs and larvae in cooling water systems and mortality from thermal effects, dredging, bulk-heading and channel construction. As a preventative measure, buffer zones could be established around important nursery areas.

4.10.4 Fishery Practices

Certain gear types may disrupt tautog habitat, however, insufficient information is available to quantify effects at this time. Derelict lobster traps are known to entrap tautog, resulting in unquantified mortality. Any fishing gear having an unacceptable impact on tautog habitat should be prohibited within essential habitats.

4.11 ALTERNATIVE STATE/REGION MANAGEMENT REGIMES/MANAGEMENT PROGRAM EQUIVALENCY

Once approved by the Tautog Management Board, states are required to obtain prior approval from the Board of any changes to their management program for which a compliance requirement is in effect. Other measures must be reported to the Board but may be implemented without prior Board approval. A state can request permission to implement an alternative to any mandatory compliance measure only if that state can show to the Board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in this amendment or any addenda prepared under *Adaptive Management (Section 4.12)*. States submitting alternative proposals must demonstrate that the proposed action will not contribute to overfishing of the resource. States may submit alternative region/state proposals under this section following the procedures outlined in the Commission's Conservation Equivalency Policy and Technical Guidance Document.

4.11.3 De Minimis Fishery Guidelines

4.11.3.1 Criteria for De Minimis Consideration

To be eligible for *de minimis* consideration, a state must prove that its commercial landings in the most recent year for which data are available did not exceed *the greater of* 10,000 pounds or 1% of the regional landings.

4.11.3.2 Plan Requirements if De Minimis is Granted

If *de minimis* status is granted, the *de minimis* state is required to implement the minimum size provisions, the pot and trap degradable fastener provisions, and regulations consistent with those in the recreational fishery (including possession limits and seasonal closures). The state must monitor its landings on at least an annual basis and provide a compliance report as outlined in *Section 5.1.2* of the Tautog FMP. If the FMP is altered through adaptive management as specified in *Section 4.12* of the Tautog FMP the Management Board will specify by motion which measures *de minimis* states must adopt.

4.11.3.3 Procedure to Apply for De Minimis Status

States must specifically request *de minimis* status each year. Requests for *de minimis* status will be reviewed by the Tautog Plan Review Team (PRT) as part of the annual FMP review process. Requests for *de minimis* must be submitted to the ASMFC Tautog FMP Coordinator as a part of the state's yearly compliance report. The request must contain the following information: commercial landings for the most recent year, commercial regulations for the current year, and the proposed management measures the state plans to implement for the year *de minimis* status is requested. The FMP Coordinator will then forward the information to the PRT and, if necessary, the Tautog Technical Committee and Stock Assessment Subcommittee.

In determining whether or not a state meets the *de minimis* criteria, the PRT will consider the information provided with the request, the most recent available coastwide landings data, any information provided by the Technical Committee and Stock Assessment Subcommittee, and projections of future landings. The PRT will make a recommendation to the Board to either accept or deny the *de minimis* request. The Board will then review the PRT recommendation and either grant or deny the *de minimis* classification.

The Board must make a specific motion to grant a state *de minimis* status. By deeming a given state *de minimis*, the Board is recognizing that: the state has a minimal tautog fishery; there is little risk to the health of the tautog stock if the state does not implement the full suite of management measures; and the overall burden of implementing the complete management and monitoring requirements of the FMP outweigh the conservation benefits of implementing those measures in the particular state.

If commercial landings in a *de minimis* state exceed the *de minimis* threshold, the state will lose its *de minimis* classification, will be ineligible for *de minimis* in the following year, and will be required to implement all requirements of the FMP. If the Board denies a state's *de minimis* request, the state will be required to implement all the requirements of the FMP. When a state

rescinds or loses its *de minimis* status the Board will set a compliance date by which the state must implement the required regulations.

4.12 ADAPTIVE MANAEGMENT

The Tautog Management Board may vary the requirements specified in this amendment as a part of adaptive management in order to conserve the tautog resource. The elements that can be modified by adaptive management are listed in *Section 4.12.2*. The process under which adaptive management can occur is provided below.

4.12.1 General Procedures

The Plan Review Team (PRT) will monitor the status of the fishery and the resource and report on that status to the Tautog Management Board annually, or when directed to do so by the Section. The Plan Review Team may consult with the Technical Committee, the Stock Assessment Committee or the Advisory Panel, if any. The report may contain recommendations concerning proposed adaptive management revisions to the management program. If the PRT makes a recommendation, the Tautog Management Board will review the report and may consult further with Technical Committee, the Stock Assessment Committee or the Advisory Panel.

If an addendum is initiated, then the Board will provide guidance on the specific issues that the Plan Development Team (PDT) should address. The PDT will be convened after members are nominated and approved by the Board.

A public hearing will be held in any state that requests one. The PDT will also request comment from federal agencies and the public at large. The PDT will summarize the comments and prepare a final version of the addendum for the Board. The Board will consider the public comments received and the recommendations of the Technical Committee, the Stock Assessment Committee or the Advisory Panel. The Section shall then decide whether to adopt, or revise and then adopt, the addendum. The addendum shall contain a schedule for the states to implement its provisions.

Upon adoption of an addendum implementing adaptive management by the Board, states shall prepare plans to carry out the addendum, and submit them to the Board for approval according to the schedule contained in the addendum.

4.12.2 Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the Tautog Management Board:

- 1. Rebuilding targets and schedules
- 2. Fishing season including seasonal closures
- 3. Trip limits/bag limits
- 4. Minimum size

- 5. Commercial harvest tagging program
- 6. Reporting requirements
- 7. Gear restrictions
- 8. Management areas/regions
- 9. Recommendations to the Secretary for complimentary actions in federal jurisdictions
- 10. Research or monitoring requirements
- 11. Or any other management action

4.13 EMERGENCY PROCEDURES

Emergency procedures may be used by the Tautog Management Board to require any emergency action that is not covered by or is an exception or change to any provision in Amendment 1. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(11) (ASMFC 2016).

4.14 MANAGEMENT INSTITUTIONS

The management institutions for tautog shall be subject to the provisions of the ISFMP Charter (ASMFC, 2016). The following is not intended to replace any or all of the provisions of the ISFMP Charter. All committee roles and responsibilities are included in detail in the ISFMP Charter and are only summarized here.

4.14.1 Atlantic States Marine Fisheries Commission and ISFMP Policy Board

The ASMFC (Commission) and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's fisheries management activities. The Commission must approve all fishery management plans, and amendments, including this Amendment 1, and must also make all final determinations concerning state compliance or noncompliance.

4.14.2 Tautog Management Board

The Tautog Management Board Section is generally responsible for carrying out all activities under this Amendment. It establishes and oversees the activities of the Plan Development or Plan Review Team, the Technical Committee and the Stock Assessment Subcommittee and requests the establishment of the Commission's Tautog Advisory Panel. Among other things, the Board makes changes to the management program under adaptive management and approves state programs implementing the amendment and alternative state programs under Sections 4.12.

4.14.3 Tautog Plan Development Team / Plan Review Team

The Tautog Plan Development Team (PDT) and the Tautog Plan Review Team (PRT) will be composed of a small group of scientists and/or managers whose responsibility is to provide all of the technical support necessary to carry out and document the decisions of the Tautog Management Board. The ASMFC FMP Coordinator chairs both. The PDT/PRT is directly responsible to the Section for providing information and documentation concerning the

implementation, review, monitoring and enforcement of Amendment 1. The PDT/PRT shall be comprised of personnel from state and federal agencies who have scientific and management ability and knowledge of tautog. The PDT will be responsible for preparing all documentation necessary for the development of Amendment 1, using the best scientific information available and the most current stock assessment information. The PDT will either disband or assume inactive status upon completion of Amendment 1. Alternatively, the Board may elect to retain PDT members as members of the PRT or appoint new members. The PRT will provide annual advice concerning the implementation, review, monitoring, and enforcement of Amendment 1 once the Commission has adopted it.

4.14.4 Tautog Technical Committee

The Tautog Technical Committee will consist of representatives from state or federal agencies, Regional Fishery Management Councils, Commission, university or other specialized personnel with scientific and technical expertise and knowledge of the tautog fishery. The Board will appoint the members of the Technical Committee and may authorize additional seats as it sees fit. Its role is to act as a liaison to the individual state and federal agencies, provide information to the management process, and review and develop options concerning the management program. The Technical Committee will provide scientific and technical advice to the Management Board, PDT, and PRT in the development and monitoring of a fishery management plan or amendment.

4.14.5 Tautog Stock Assessment Subcommittee

The Tautog Stock Assessment Subcommittee shall be appointed by the Technical Committee at the request of the Management Board, and will consist of scientists with expertise in the assessment of the tautog population. Its role is to assess the tautog population and provide scientific advice concerning the implications of proposed or potential management alternatives, or to respond to other scientific questions from the Board, Technical Committee, PDT or PRT. The Stock Assessment Subcommittee will report to the Technical Committee.

4.14.6 Tautog Advisory Panel

The Advisory Panel is established according to the Commission's Advisory Committee Charter. Members of the Advisory Panel are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about tautog conservation and management. The Advisory Panel provides the Board with advice directly concerning the Commission's tautog management program.

4.14.7 Federal Agencies

4.14.7.1 Management in the Exclusive Economic Zone (EEZ)

Management of tautog in the EEZ is within the jurisdiction of the Regional Fishery Management Councils under the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). In the absence of a Council Fishery Management Plan, management is the responsibility of the NMFS as mandated by the Atlantic Coastal Fishery Conservation and Management Act (16 U.S.C. 5105 et seq.)

4.14.7.2 Federal Agency Participation in the Management Process

The Commission has accorded the United States Fish and Wildlife Service (USFWS) and the NMFS voting status on the ISFMP Policy Board and the Tautog Management Board in accordance with the Commission's ISFMP Charter. The NMFS also participates on the Tautog Plan Development Team, Plan Review Team, Technical Committee and Stock Assessment Subcommittee.

4.14.7.3 Consultation with Fishery Management Councils

At the time of adoption of Amendment 1, none of the Regional Fishery Management Councils had implemented a management plan for tautog nor have they indicated an intention to develop a plan.

4.15 RECOMMENDATIONS TO THE SECRETARY FOR COMPLIMENTARY ACTIONS IN FEDERAL JURISDICTIONS

The ASMFC recommends the federal government promulgate all necessary regulations to implement compatible measures in the exclusive economic zone (EEZ). Specifically, the ASMFC recommends that the Secretary of Commerce fully implement regulations for tautog in the EEZ that are in accordance with state minimum sizes, possession limits, closed seasons, as well as other possession requirements for both the commercial and recreational fishery (Section 4.2).

4.16 COOPERATION WITH OTHER MANAGEMENT INSTITUTIONS

The Board will cooperate, if necessary, with other management institutions during the implementation of this amendment, including the National Marine Fisheries Service and the New England, Mid-Atlantic, and South Atlantic Fishery Management Council.

5.0 COMPLIANCE

Full implementation of the provisions of this amendment is necessary for the management program to be equitable, efficient and effective. States are expected to implement these measures faithfully under state laws. Although ASMFC does not have authority to directly compel states to implement these measures, it will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan. The Board sets forth specific elements that the Commission will consider in determining state compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fishery Management Program Charter (ASMFC 2016).

5.1 MANDATORY COMPLIANCE ELEMENTS FOR STATES

A state will be determined to be out of compliance with the provision of this fishery management plan according to the terms of Section Seven of the ISFMP Charter if:

- It fails to meet any schedule required by Section 5.1.2, or any addendum prepared under adaptive management (Section 4.12); or
- It has failed to implement a change to its program when determined necessary by the Tautog Management Board; or
- It makes a change to its regulations required under Section 4 or any addendum prepared under adaptive management (Section 4.12), without prior approval of the Tautog Management Board.

5.1.1 MANDATORY ELEMENTS OF STATE PROGRAMS

To be considered in compliance with this amendment, all state programs must include management measures for tautog fisheries consistent with the requirements listed throughout *Section 4.0 and Section 3.2.2.2 Fishery Independent Information—Biological Sampling Program*, except that a state may propose an alternative management program under Section 4.12, which, if approved by the Management Board, may be implemented as an alternative regulatory requirement for compliance.

5.1.1.1 Regulatory Requirements

States shall begin to implement Amendment 1 after final approval of the state's implementation proposal by the Commission. Each state must submit its required tautog regulatory program to the Commission through the ASMFC staff for approval by the Atlantic Tautog Management Board. During the period from submission and until the Management Board makes a decision on a state's program, a state may not adopt a less protective management program than contained in this amendment or contained in current state law.

Once approved by the Tautog Management Board, states are required to obtain approval from the Board prior to making any changes to their management program for which a compliance requirement is in effect. Other measures must be reported to the Board, but may be implemented without prior Board approval. A state can request permission to implement an alternative to any mandatory compliance measure only if that state can show to the Board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in this management plan or any addenda prepared under Adaptive Management (Section 4.12). States submitting alternative proposals must demonstrate that the proposed action will not contribute to overfishing of the resource. All changes in state plans must be submitted in writing to the Board and to the Commission either as part of the annual FMP Review process or the Annual Compliance Reports.

5.1.1.2 Monitoring Requirements

All state programs must include the mandatory monitoring requirements contained in Sections 3.1, 3.2, and 3.3 and 4.4.7. States must submit proposals for all intended changes to required

monitoring programs, which may affect the quality of the data or the ability of the program to fulfill the needs of the fishery management plan. State proposals for making changes to required monitoring programs will be submitted to the Technical Committee at least two weeks prior to its spring or fall meeting. Proposals must be on a calendar year basis. The Technical Committee will make recommendations to the Management Board concerning whether the proposals are consistent with Amendment 1.

In the event that a state realizes it will not be able to fulfill its fishery independent monitoring requirements, it should immediately notify the Commission in writing. The Commission will work with the state to develop a plan to secure funding or plan an alternative program to satisfy the needs outlined in Amendment 6. If the plan is not implemented 90 days after it has been adopted, the state will be found out of compliance with Amendment 1.

5.1.1.3 Research Requirements

A prioritized list of research needs for tautog was created during the development of this FMP and can be found in Section 6.0. The PDT and Technical Committee will re-prioritize the research needs for tautog as part of the FMP Review or Stock Assessment process. Appropriate programs for meeting these needs may be implemented under *Section 4.12 (Adaptive Management)* through the Commission's addendum process including the opportunity for public comment.

5.1.1.4 Law Enforcement Requirements

All state programs must include law enforcement capabilities adequate for successfully implementing a state's tautog regulations. The adequacy of a state's enforcement activity will be monitored annually by reports of the ASMFC Law Enforcement Committee to the Tautog Plan Review Team.

5.1.2 Compliance Schedule

To be determined by the Tautog Management Board.

5.1.3 Compliance Report Content

Each state must submit an annual report concerning its tautog fisheries and management program for the previous fishing year. Reports should follow the tautog report outline as sent by the PRT chair each year. The report shall cover:

- the previous fishing year's fishery and management program including activity and
 results of monitoring (including the results of 200 age and length samples), a copy of
 regulations that were in effect and harvest broken down between recreational and
 commercial, including estimates of non-harvest losses; and
- commercial harvest tagging program requirements as described in Section 4.4.7
- the planned management program for the current fishing year summarizing regulations that will be in effect and monitoring programs that will be performed, highlighting any changes from the previous year.

5.2 PROCEDURES FOR DETERMINING NON-COMPLIANCE

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section 7 (ASMFC 2016). The following summary is not intended to replace the language found in the ISFMP Charter.

The Plan Review Team will continually review the status of state implementation, and advise the Management Board at any time that a question arises concerning state compliance. The PRT will review state reports submitted under Section 5.1.3 and prepare a report by May 1 for the Management Board summarizing the status of the resource and the fishery and the status of state compliance on a state-bystate basis.

Upon review of a report from the Plan Review Team, or at any time by request from a member of the Management Board, the Management Board will review the status of an individual state's compliance. If the Management Board finds that a state's approved regulatory management program fails to meet the requirements of this section, it may be recommended that the state be found out of compliance. The recommendation must include a specific list of the state's deficiencies in implementing and enforcing this Amendment and the actions that the state must take in order to come back into compliance.

If the Management Board recommends that a state be found out of compliance, as referred to in the preceding paragraph, it shall report that recommendation to the ISFMP Policy Board for further review according to the Commission's Charter for the Interstate Fisheries Management Program. The state that is out of compliance or subject to a recommendation by the Management Board under the preceding paragraph may request at any time that the Management Board reevaluate its program. The state shall provide a written statement concerning actions which justify a reevaluation. The Management Board shall promptly conduct such reevaluation, and if it agrees with the state, shall recommend to the ISFMP Policy Board that the noncompliance finding be withdrawn. The ISFMP Policy Board and Commission shall deal with the Management Board's recommendation according to the Commission's Charter for the Interstate Fisheries Management Program.

5.3 ANALYSIS OF ENFORCEABILITY OF MANAGEMENT MEASURES

The Law Enforcement Committee will, during the implementation of this amendment, analyze the enforceability of conservation and management measures as they are proposed.

6.0 MANAGEMENT AND RESEARCH NEEDS

The Technical Committee identified the following research recommendations in the 2015 benchmark stock assessment to improve future stock assessments and our understanding of tautog population and fishery dynamics. Research recommendations are organized by topic and level of priority. Research recommendations that should be completed before the next benchmark assessment are underlined.

6.1 FISHERY-DEPENDENT PRIORITIES

High

- Expand biological sampling of the commercial catch for each gear type over the entire range of the stock (including weight, lengths, age, sex, and discards).
- Continue collecting operculum from the tautog catch as the standard for biological sampling in addition to collecting paired sub-samples of otoliths and operculum.
- <u>Increase catch and discard length sampling from the commercial and recreational fishery for all states from Massachusetts through Virginia.</u>
- Increase collection of effort data for determining commercial and recreational CPUE.
- Increase MRIP sampling levels to improve recreational catch estimates by state and mode. Current sampling levels are high during times of the year when more abundant and popular species are abundant in catches, but much lower in early spring and late fall when tautog catches are more likely.

6.2 FISHERY-INDEPENDENT PRIORITIES

High

- Conduct workshop and pilot studies to design a standardized, multi-state fishery independent survey for tautog along the lines of MARMAP and the lobster ventless trap survey.
- Establish standardized multi-state long-term fisheries-independent surveys to monitor tautog abundance and length-frequency distributions, and to develop YOY indices.
- Enhance collection of age information for smaller fish (<20 cm) to better fill in agelength keys.

Low

• Investigate a nonlethal method for age determination based on pelvic-fin spines based on the Elzey and Trull, 2016 article.

6.3 LIFE HISTORY, BIOLOGICAL AND HABITAT PRIORITIES

Moderate

• Define local and regional movement patterns and site fidelity in the southern part of the species range. This information may provide insight into questions of aggregation versus

- recruitment to artificial reef locations, and to clarify the need for local and regional assessment.
- Assemble regional reference collections of paired operculum and otolith samples and schedule regular exchanges to maintain and improve the precision of age readings between states that will be pooled in the regional age-length keys.
- Calibrate age readings every year by re-reading a subset of samples from previous years before ageing new samples. States that do not currently assess the precision of their age readings over time should do so by re-ageing a subset of their historical samples.

Low

- Evaluate the potential impacts of climate change on tautog range, life history, and productivity.
- Conduct a tag retention study to improve return rates, particularly in the northern region.
- Define the status (condition and extent) of optimum or suitable juvenile habitats and trends in specific areas important to the species. It is critical to protect these habitats or to stimulate restoration or enhancement, if required.
- Define the specific spawning and pre-spawning aggregating areas and wintering areas of
 juveniles and adults used by all major local populations, as well as the migration routes
 used by tautog to get to and from spawning and wintering areas and the criteria or
 times of use. This information is required to protect these areas from damage and
 overuse or excessive exploitation.
- Define larval diets and prey availability requirements. This information can be used as determinants of recruitment success and habitat function status. Information can also be used to support aquaculture ventures with this species.
- Define the role of prey type and availability in local juvenile/adult population dynamics over the species range. This information can explain differences in local abundance, movements, growth, fecundity, etc. Conduct studies in areas where the availability of primary prey, such as blue mussels or crabs, is dependent on annual recruitment, the effect of prey recruitment variability as a factor in tautog movements (to find better prey fields), mortality (greater predation exposure when leaving shelter to forage open bottom), and relationship between reef prey availability/quality on tautog condition/fecundity.
- Define the susceptibility of juveniles to coastal/anthropogenic contamination and resulting effects. This information can explain differences in local abundance, movements, growth, fecundity, and serve to support continued or increased regulation of the inputs of these contaminants and to assess potential damage. Since oil spills seem to be a too frequent coastal impact problem where juvenile tautog live, it may be helpful to conduct specific studies on effects of various fuel oils and typical exposure concentrations, at various seasonal temperatures and salinities. Studies should also be conducted to evaluate the effect of common piling treatment leachates and common antifouling paints on YOY tautog. The synergistic effects of leaked fuel, bilge water, treated pilings, and antifouling paints on tautog health should also be studied.

- Define the source of offshore eggs and larvae (in situ or washed out coastal spawning).
- Confirm that tautog, like cunner, hibernate in the winter, and in what areas and temperature thresholds, for how long, and if there are special habitat requirements during these times that should be protected or conserved from damage or disturbance.
 This information will aid in understanding behavior variability and harvest availability.

6.4 MANAGEMENT, LAW ENFORCEMENT AND SOCIOECONOMIC PRIORITIES

Moderate

Collect data to assess the magnitude of illegal harvest of tautog.

Low

• Collect basic sociocultural data on tautog user groups including demographics, location, and aspects of fishing practices such as seasonality.

6.5 RESEARCH RECOMMENDATIONS THAT HAVE BEEN MET

- ✓ Sample hard parts for annual ageing from the catches of recreational and commercial fisheries and fishery-independent surveys throughout the range of the stock. *Being conducted by all participating states*.
- ✓ Conduct hard part exchange and ageing workshop to standardize techniques and assess consistency across states. Conducted May 2012, report available at http://www.asmfc.org//uploads/file/2012_Tautog_Ageing_Workshop_Report.pdf

7.0 PROTECTED RESOURCES

In the fall of 1995, Commission member states, the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) began discussing ways to improve implementation and enforcement of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in state waters. In November 1995, the Commission, through its Interstate Fisheries Management Program (ISFMP) Policy Board, approved an amendment of its ISFMP Charter (section 6(b)(2)) so that protected species and their interactions with ASMFC managed fisheries are addressed in the Commission's fisheries management planning process. Specifically, the Commission's fishery management plans (FMP) will describe impacts of state fisheries on certain marine mammals and endangered species (collectively termed "protected species"), and recommend ways to minimize these impacts. The following section outlines: (1) the federal legislation that guides protection of marine mammals and sea turtles, (2) the protected species with potential fishery interactions; and (3) the specific type(s) of fishery interaction.

7.1 MARINE MAMMAL PROTECTION ACT (MMPA) REQUIREMENTS

The 1994 amendments to the MMPA established both short- and long-term goals for reducing mortality and serious injury, or bycatch, of marine mammal's incidental to commercial fisheries. The amendments also established take reduction plans (TRPs) and stakeholder-based take reduction teams (TRTs) as the mechanisms for achieving these goals. The MMPA requires NMFS to convene TRTs to develop TRPs for each strategic stock that interacts with a Category I or II fishery, fisheries with "frequent" or "occasional" marine mammal bycatch, respectively. (Fisheries that have a remote likelihood of or no known bycatch of marine mammals are classified in Category III.) A strategic stock is defined as a stock: (1) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR)¹ level; (2) which is declining and is likely to be listed under the ESA in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA. In the short-term (within six months of implementation), TRPs must reduce marine mammal bycatch to levels below a marine mammals stock's potential biological removal level. In the long-term (within five years of implementation), TRPs must reduce marine mammal bycatch to insignificant levels approaching a zero mortality and serious injury rate taking into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans.

The 1994 amendments also required fishermen in Category I and II fisheries to register under the Marine Mammal Authorization Program (MMAP), the purpose of which is to provide an exception for commercial fishermen from the general taking prohibitions of the MMPA; to take on board an observer if requested to do so by the Secretary of Commerce; and to comply with any applicable TRP or emergency regulations. All commercial fishermen, regardless of the category of the fishery in which they participate, must report all marine mammal bycatch.

7.2 ENDANGERED SPECIES ACT REQUIREMENTS

The taking of endangered sea turtles and marine mammals is prohibited under section 9 of the ESA. NMFS may issue section 4(d) protective regulations necessary and advisable to provide for the conservation of threatened species. There are several mechanisms established in the ESA that exempt take prohibitions set forth in section 9. First, a 4(d) regulation may include less stringent requirements intended to reduce incidental take and thus allow for the exemption from the taking prohibition. Section 10(a)(1)(B) of the ESA authorizes NMFS to permit, under prescribed terms and conditions, any taking otherwise prohibited by section 9 of the ESA, if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Finally, section 7(a)(2) requires NMFS to consult with each federal agency to ensure that any action that is authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species. Pursuant to Section 7(b), formal consultation will be

¹ PBR is the number of human-caused deaths per year each stock can withstand and still reach an optimum population level. This is calculated by multiplying "the minimum population estimate" by "½ stock's net productivity rate" by "a recovery factor ranging from 0.1 for endangered species to 1.0 for healthy stocks."

completed on any action that may adversely affect and/or result in the destruction or adverse modification of critical habitat. Formal consultation will conclude with NMFS issuing a Biological Opinion which will include an incidental take statement containing reasonable and prudent measures and terms and conditions that minimize take and must be complied for otherwise prohibited take to be authorized.

7.3 PROTECTED RESOURCES IN THE MANAGEMENT UNIT

Numerous protected species inhabit the environment within the tautog management unit (Table 33). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 33. Species protected under the ESA and/or MMPA that may occur in the affected environment of the tautog fishery. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.¹

Species	Status ²	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	Endangered	Yes
Humpback whale, West Indies DPS (Megaptera novaeangliae)	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	Endangered	Yes
Sei whale (Balaenoptera borealis)	Endangered	Yes
Minke whale (Balaenoptera acutorostrata)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.) ³	Protected (MMPA)	Yes
Risso's dolphin (Grampus griseus)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (Lagenorhynchus acutus)	Protected (MMPA)	Yes
Short Beaked Common dolphin (<i>Delphinus delphis</i>) ⁴	Protected (MMPA)	Yes
Spotted dolphin (Stenella frontalis)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus) ⁵	Protected (MMPA)	Yes
Harbor porpoise (Phocoena phocoena)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (Dermochelys coriacea)	Endangered	Yes
Kemp's ridley sea turtle (Lepidochelys kempii)	Endangered	Yes
Green sea turtle, North Atlantic DPS (Chelonia mydas)	Threatened	Yes
Loggerhead sea turtle (<i>Caretta caretta</i>), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (Eretmochelys imbricate)	Endangered	No

Endangered	No
Endangered	Yes
Threatened	Yes
Endangered	Yes
Candidate	Yes
Protected (MMPA)	Yes
ESA (Protected)	No
	Endangered Threatened Endangered Candidate Protected (MMPA) Protected (MMPA) Protected (MMPA) Protected (MMPA)

Notes:

Cusk are a NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing, the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, this species will not be discussed further in this and the following sections; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on cusk from any

¹ A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).

² The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment), or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.

³ There are two species of pilot whales: short finned (G. melas melas) and long finned (G. macrorhynchus). Due to the difficulties in identifying the species at sea, they are often just referred to as Globicephala spp. 4 Prior to 2008, this species was called "common dolphin."

⁵ This includes the following Stocks of Bottlenose Dolphins: Western North Atlantic Offshore, Northern Migratory Coastal (strategic stock), and Southern Migratory Coastal (strategic stock).

⁶ Originally designated June 3, 1994 (59 FR 28805); Expanded on January 27, 2016 (81 FR 4837).

proposed action. Additional information on cusk can be found at http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm

7.4 SPECIES AND CRITICAL HABITAT NOT LIKELY AFFECTED BY THE FMP

Based on available information, it has been determined that the FMP is not likely to affect multiple ESA listed and/or marine mammal protected species or any designated critical habitat (see Table 33). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or there have never been documented interactions between the species and the primary gear type (i.e., hook and line and pot/trap) used to prosecute the tautog fishery (see Waring et al. 2014, 2015, 2016; NMFS NEFSC FSB 2015, 2016; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of North Atlantic right whale critical habitat and therefore, will not result in the destruction or adverse modification of this species critical habitat (NMFS 2015a,b).

7.5 SPECIES POTENTIALLY AFFECTED BY THE FMP

Table 33 provides a list of sea turtle, marine mammal, and fish species present in the affected environment of the tautog fishery, and that may also be affected by the operation of this fishery. Of primary concern is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species. To understand the potential risk of an interaction, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types. Information on species occurrence in the affected environment of the tautog fishery is provided in this section, while information on protected species interactions with specific fishery gear is provided in Section 7.6.

7.5.1 Sea Turtles

Green (North Atlantic DPS), Kemp's ridley, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtle are the four ESA listed species of sea turtles that occur in the area of operation for the 13 GAR fisheries (see Table 33). Three of the four species are considered hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). Additional background information on the range-wide status of the other four species, as well as a description and life history of the species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; Conant *et al.* 2009; NMFS and USFWS 2007a,b, 2013, 2015; Seminoff *et al.* 2015), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992), Kemp's ridley sea turtle (NMFS *et al.* 2011), and green sea turtle (NMFS and USFWS 1991).

Hard-shelled Sea Turtles

Distribution

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida (FL) to Cape Cod, Massachusetts (MA), although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992; Epperly et al. 1995a, 1995b; Braun and Epperly 1996; Mitchell et al. 2003; Braun-McNeill et al. 2008; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, they are known to occur in the Gulf of Maine (GOM). Loggerheads, the most common hard-shelled sea turtle in the GAR, feed as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7 °C to 30 °C, but water temperatures ≥11 °C are most favorable (Shoop and Kenney 1992; Epperly et al. 1995b). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Mitchell et al. 2003; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Blumenthal et al. 2006; Hawkes et al. 2006; McClellan and Read 2007; Mansfield et al. 2009; Hawkes et al. 2011; Griffin et al. 2013).

Seasonality

Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina (NC) and south. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Epperly *et al.* 1995a, 1995b, 1995c; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Griffin *et al.* 2013), occurring in Virginia (VA) foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop and Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, sea turtles have migrated south to waters offshore of NC, particularly south of Cape Hatteras, and further south (Shoop and Kenney 1992; Epperly *et al.* 1995b; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Leatherback Sea Turtles (Non-Hard Shelled Sea Turtles)

Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al.* 2005; James *et al.* 2006; Dodge *et al.* 2014). They are found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005; James *et al.* 2006; Dodge *et al.* 2014).

7.5.2 Marine Mammals

7.5.2.1 Large Whales

As provided in Table 34, as North Atlantic right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean, these species will occur in the affected environment of the tautog fishery. In general, these species follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41°N; Waring et al. 2014; Waring et al. 2015; Waring et al. 2016; NMFS 1991, 2005, 2010, 2011a, 2012). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring et al. 2014; Waring et al. 2015; Waring et al. 2016; Khan et al. 2009, 2010, 2011, 2012; Brown et al. 2002; NOAA 2008; Cole et al. 2013; Clapham et al. 1993; Swingle et al. 1993; Vu et al. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Mayo and Marx 1990; Kenney et al. 1986, 1995; Baumgartner et al. 2003; Baumgartner and Mate 2003; Payne et al.1986, 1990; Brown et al. 2002; Kenney and Hartley 2001; Schilling et al. 1992). For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring et al. 2014; Waring et al. 2015; Waring et al. 2016; NMFS 1991, 2005, 2010, 2011a, 2012.

To further assist in understanding how the tautog fishery may overlaps in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the area of operation for the tautog fishery is provided in the following table (Table 34).

Table 34. Large whale occurrence in the area of operation for the tautog fishery

Species	Prevalence and Approximate Months of Occurrence
North Atlantic	• Distributed throughout all continental shelf waters from the GOM to the South Atlantic Bight (SAB) throughout the year; however, increasing evidence of year round presence in the GOM.
Right Whale	 New England waters (GOM and GB regions) = Foraging Grounds (January through October)). Seasonally important foraging grounds include, but not limited to: Cape Cod Bay (January-April);

Species	Prevalence and Approximate Months of Occurrence
	› Great South Channel (April-June);
	› western Gulf of Maine (April-May, and July-October);
	› Jordan Basin (August-October);
	> Wilkinson Basin (April-July); and
	> northern edge of GB (May-July);
	• Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern calving grounds.
	• Increasing evidence of wintering areas (approximately November – January) in:
	› Cape Cod Bay;
	› Jeffreys and Cashes Ledges;
	› Jordan Basin; and
	› Massachusetts Bay (e.g., Stellwagen Bank).
	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year.
	 New England waters (GOM and GB regions) = Foraging Grounds (March- November).
Humpback	• Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds.
	• Increasing evidence of whales remaining in mid- and high- latitudes throughout the winter. Specifically, increasing evidence of wintering areas (for juveniles) in Mid-Atlantic (e.g., waters in the vicinity of Chesapeake and Delaware Bays; peak presence approximately January through March) and Southeastern coastal waters.
	Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year.
	Mid-Atlantic waters:
Fin	 Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; and
	> Possible offshore calving area (October-January).
	 New England(GOM and GB)/SNE waters = Foraging Grounds (greatest densities March-August; lower densities September-November). Important foraging grounds include:
	> Massachusetts Bay (esp. Stellwagen Bank);

Species	Prevalence and Approximate Months of Occurrence
	> Great South Channel;
	> Waters off Cape Cod (~40-50 meter contour);
	> GOM;
	> Perimeter (primarily eastern) of GB; and
	> Mid-shelf area off the east end of Long Island.
	Evidence of wintering areas in mid-shelf areas east of New Jersey (NJ), Stellwagen Bank; and eastern perimeter of GB.
	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance.
Sei	Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks.
	• Spring through summer, found in greatest densities in offshore waters of the GOM and GB; sightings concentrated along the northern, eastern (into Northeast Channel) and southwestern (in the area of Hydrographer Canyon) edge of GB.
	Widely distributed throughout continental shelf waters (<100m deep) of the Mid- Atlantic (SNE included), GOM, and GB.
Minke	Most common in the EEZ from spring through fall, with greatest abundance found in New England waters.

Sources: NMFS 1991, 2005, 2010, 2011a, 2012; Hain *et al.* 1992; Payne *et al.* 1984; Good 2008; Pace and Merrick 2008; McLellan *et al.* 2004; Hamilton and Mayo 1990; Schevill *et al.* 1986; Watkins and Schevill 1982; Payne *et al.*1990; Winn *et al.* 1986; Kenney et al. 1986, 1995; Khan *et al.* 2009, 2010, 2011, 2012; Brown *et al.* 2002; NOAA 2008; 50 CFR 224.105; CETAP 1982; Clapham *et al.* 1993; Swingle *et al.* 1993; Vu *et al.* 2012; Baumgartner *et al.* 2011; Cole *et al.* 2013; Risch *et al.* 2013; Waring *et al.* 2014; Waring *et al.* 2015; Waring *et al.* 2016; 81 FR 4837(January 27, 2016); NMFS 2015b; Bort et al. 2015.

7.5.3 Small Cetacean

As provided in Table 35, as Atlantic white sided dolphins, short and long finned pilot whales, Risso's dolphins, short beaked common dolphins, harbor porpoise, and several stocks of bottlenose dolphins are found throughout the year in the Northwest Atlantic Ocean, these species will occur in the affected environment of the tautog fishery (Waring *et al.* 2014; Waring *et al.* 2015; Waring *et al.* 2016). Within this range; however, there are seasonal shifts in species distribution and abundance. To further assist in understanding how fisheries may overlap in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the area of operation for the tautog fishery is provided in the following table (Table 35). For additional information on the biology, status, and range wide distribution of each species please refer to Waring *et al.* (2014), Waring *et al.* (2015), and Waring *et al.* (2016).

Table 35. Small cetacean occurrence in the area of operation of the tautog fishery.

Species	Prevalence and Approximate Months of Occurrence
	Distributed throughout the continental shelf waters (primarily to 100 meter isobath) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM; however, most common in continental shelf waters from Hudson Canyon (~ 39°N) to GB, and into the GOM.
	January-May: low densities found from GB to Jeffreys Ledge.
Atlantic White Sided Dolphin	June-September: Large densities found from GB, through the GOM.
	October-December: intermediate densities found from southern GB to southern GOM.
	South of GB (SNE and Mid-Atlantic), low densities found year round, with waters off Virginia (VA) and NC representing southern extent of species range during winter months.
	Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 meter isobaths) of the Mid-Atlantic, SNE, and GB (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons).
Short Beaked Common Dolphin	 Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia (GA)/South Carolina (SC) border.
	• January-May: occur from waters off Cape Hatteras, NC, to GB (35° to 42°N).
	Mid-summer-autumn: Occur primarily on GB with small numbers present in the GOM; Peak abundance found on GB in the autumn.
	Spring through fall: Distributed along the continental shelf edge from Cape Hatteras, NC, to GB.
Risso's Dolphin	Winter: distributed in the Mid-Atlantic Bight, extending into oceanic waters.
	Rarely seen in the GOM; primarily a Mid-Atlantic continental shelf edge species (can be found year round).

Species	Prevalence and Approximate Months of Occurrence
Harbor Porpoise	 Distributed throughout the continental shelf waters of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM. July-September: Concentrated in the northern GOM (waters < 150 meters); low numbers can be found on GB. October-December: widely dispersed in waters from NJ to Maine (ME); seen from the coastline to deep waters (>1,800 meters). January-March: intermediate densities in waters off NJ to NC; low densities found in waters off New York (NY) to GOM. April-June: widely dispersed from NJ to ME; seen from the
	coastline to deep waters (>1,800 meters).
	 Western North Atlantic Offshore Stock Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from GB to FL. Depths of occurrence: ≥40 meters Western North Atlantic Northern Migratory Coastal Stock Warm water months (e.g., July-August): distributed from the coastal waters from the shoreline to approximately the 25-meter isobaths between the Chesapeake Bay mouth and Long Island, NY.
Bottlenose Dolphin	Cold water months (e.g., January-March): stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border.
	Western North Atlantic Southern Migratory Coastal Stock
	October-December: stock occupies waters of southern NC (south of Cape Lookout)
	January-March: stock moves as far south as northern FL.
	April-June: stock moves north to waters of NC.
	July-August: stock is presumed to occupy coastal waters north of Cape Lookout, NC, to the eastern shore of VA.

Species	Prevalence and Approximate Months of Occurrence						
	Short- Finned Pilot Whales						
	• Except for area of overlap (see below), primarily occur south of 40°N (Mid-Atl and SNE waters); although low numbers have been found along the southern flank of GB, but no further than 41°N.						
	 May through December (approximately): distributed primarily near the continental shelf break of the Mid-Atlantic and SNE; individuals begin shifting to southern waters (i.e., 35°N and south) beginning in the fall. 						
Pilot Whales: Short- and Long-Finned	Long-Finned Pilot Whales						
	 Except for area of overlap (see below), primarily occur north of 42°N. 						
	Winter to early spring (November through April): primarily distributed along the continental shelf edge-slope of the Mid-Atlantic, SNE, and GB.						
	Late spring through fall (May through October): movements and distribution shift onto/within GB, the Great South Channel, and the GOM.						
	Area of Species Overlap: between approximately 38°N and 41°N.						

Notes:

presented in table is representative of small cetacean occurrence in the Northwest Atlantic continental shelf waters out to the 2,000 meter isobath.

Sources: Waring *et al.* 1992, 2007, 2014, 2015, 2016; Payne and Heinemann 1993; Payne *et al.* 1984; Jefferson *et al.* 2009.

7.5.4 Pinnipeds

As provided in Table 36, harbor, gray, harp, and hooded seals will occur in the affected environment of the tautog fishery. Specifically, pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. They are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35°N) (Waring *et al.* 2007, 2014, 2015, 2016). To further assist in understanding how the tautog fishery may overlap in time and space with the occurrence of

pinnipeds, a general overview of species occurrence and distribution in the area of operation of the tautog fishery is provided in the following table. For additional information on the biology, status, and range wide distribution of each species of pinniped please refer to Waring et al. (2007), Waring et al. (2014), Waring et al. (2015), Waring et al. (2016).

Table 36. Pinniped occurrence in the area of operation of the tautog fishery.

Species	Prevalence							
Harbor Seal	 Primarily distributed in waters from NJ to ME; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, NC (35°N). Year Round: Waters of ME September-May: Waters from New England to NJ. 							
Gray Seal	 Distributed in waters from NJ to ME. Year Round: Waters from ME to MA. September-May: Waters from Rhode Island to NJ. 							
Harp Seal	Winter-Spring (approximately January-May): Waters from ME to NJ.							
Hooded Seal	Winter-Spring (approximately January-May): Waters of New England.							
Sources: Waring et al. 2007 (for hooded seals); Waring et al. 2014; Waring et al. 2015; Waring et al. 2016.								

7.5.5 Atlantic Sturgeon

Table 37 lists the 5 DPSs of Atlantic sturgeon that occur in the affected environment of the tautog fishery and that may be affected by the operation of this fishery. The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range; in fact, results from genetic studies show that, regardless of location, multiple DPSs can be found at any one location along the Northwest Atlantic coast (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010; Dunton et al. 2012; Dunton et al. 2015; Erickson et al. 2011; Wirgin et al. 2012; O'Leary et al. 2014; Waldman et al. 2013; Wirgin et al. 2015a,b).

Table 37. Atlantic Sturgeon DPSs that occur in the area of operation for the tautog fishery

Species	Listed Under the ESA				
Gulf of Maine (GOM) DPS	threatened				
New York Bight (NYB) DPS	endangered				
Chesapeake Bay (CB) DPS	endangered				
Carolina DPS	endangered				
South Atlantic (SA) DPS	endangered				

Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al.* 2004 a,b; Erickson *et al.* 2011; Dunton *et al.* 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein *et al.* 2004a,b; Dunton *et al.* 2010; Erickson *et al.* 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that some Atlantic sturgeon may undertake seasonal movements along the coast (Erickson *et al.* 2011; Dunton *et al.* 2010; Wipplehauser 2012). For instance, tagging and tracking studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths greater than 20 meters, during winter and spring, while in the summer and fall, Atlantic sturgeon concentrations shifted to the northern portion of the Mid-Atlantic Bight at depths less than 20 meters (Erickson *et al.* 2011).

Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard (i.e., waters off North Carolina, Chesapeake Bay, and Delaware Bay; New York Bight; Massachusetts Bay; Long Island Sound; and Connecticut and Kennebec River Estuaries); depths in these areas are generally no greater than 25 meters (Bain *et al.* 2000; Savoy and Pacileo 2003; Stein *et al.* 2004a; Laney *et al.* 2007; Dunton *et al.* 2010; Erickson *et al.* 2011; Oliver *et al.* 2013; Waldman *et al.* 2013; O'Leary *et al.* 2014; Wipplehauser 2012; Whipplehauser and Squiers 2015). Although additional studies are still needed to clarify why these particular sites are chosen by Atlantic sturgeon, there is some indication that they may serve as thermal refuge, wintering sites, or marine foraging areas (Stein *et al.* 2004a; Dunton *et al.* 2010; Erickson *et al.* 2011).

7.5.6 Atlantic Salmon (Gulf of Maine DPS)

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM), to the coast of Greenland (Fay et al. 2006; NMFS

& USFWS 2005, 2016). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al.* 2006; Hyvarinen *et al.* 2006; Lacroix & Knox 2005; Lacroix & McCurdy 1996; Lacroix *et al.* 2004; NMFS & USFWS 2005, 2016; Reddin 1985; Reddin & Friedland 1993; Reddin & Short 1991). For additional information on the on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon, refer to NMFS and USFWS (2005, 2016); Fay *et al.* (2006).

7.6 INTERACTIONS BETWEEN GEAR AND PROTECTED RESOURCES

Protected species in Table 33 are all known to be vulnerable to interactions with various types of fishing gear. Available information on gear interactions with a given species (or species group) is provided in the sections below. These sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the tautog fishery (i.e., hook and line and pot/trap gear).

7.6.1 Marine Mammals

Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions; 82 FR 3655 (January 12, 2017)). In the Northwest Atlantic, the 2017 MMPA LOF (82 FR 3655 (January 12, 2017) categorizes commercial Northeast and Mid-Atlantic bottom trawl, and Atlantic mixed species trap/pot fisheries as Category II fisheries.2 General hook and line gear associated with rod and reel fishing has not been categorized as it is primarily prosecuted by recreational fisheries.

7.6.2 Large Whales

7.6.2.1 Hook and Line Gear

Large whales are known to interact with hook and line gear; however, in the most recent (2010-2014) mortality and serious injury determinations for baleen whales, the majority of cases identified with confirmed hook and line or monofilament entanglement did not result in the serious injury or mortality to the whale (89.5% observed/reported whales had a serious injury value of 0; 10.5% had a serious injury value of 0.75; none of the cases resulted in mortality; Henry *et al.* 2016).³ In fact, 85.0% of the whales observed or reported with a hook/line or monofilament entanglement were resighted gear free and healthy; confirmation of the health of the other remaining whales remain unknown as no resightings had been made over the timeframe of the assessment (Henry *et al.* 2016). Based on this information, while large whale

² Atlantic mixed species trap/pot fisheries include, but are not limited to: crab (red, Jonah, and rock), hagfish, finfish (black sea bass, scup, tautog, cod, haddock, pollock, redfish (ocean perch), and white hake), conch/whelk, and shrimp

³ Any injury leading to a significant health decline (e.g., skin discoloration, lesions near the nares, fat loss, increased cyamid loads) is classified as a serious injury (SI) and will result in a SI value set at 1 (Henry *et al.* 2016).

interactions with hook and line gear are possible, there is a low probability that an interaction will result in serious injury or mortality to any large whale species.

7.6.2.2 Bottom Trawl Gear

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear. To date, bottom trawl interactions with minke whales have only been observed in the MMPA LOF Category II Northeast bottom trawl fisheries. From the period of 2008-2012, the estimated annual mortality attributed to this fishery was 7.8 minke whales for 2008, and zero minke whales from 2009-2012; no serious injuries were reported during this time (Waring et al. 2015). Based on this information, from 2008-2012, the estimated annual average minke whale mortality and serious injury attributed to the northeast bottom trawl fishery was 1.6 (CV=0.69) whales (Waring et al. 2015). Lyssikatos (2015) estimated that from 2008-2013, mean annual serious injuries and mortalities from the northeast bottom trawl fishery were 1.40 (CV=0.58) minke whales. Based on above information, bottom trawl gear is likely to pose a low interaction risk to any large whale species. Should an interaction occur, serious injury or mortality to any large whale is possible; however, relative to other gear types discussed below (i.e., fixed gear (pot/trap)), bottom trawl gear represents a low source serious injury or mortality to any large whale.

7.6.2.3 Pot/Trap Gear

The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., sink gillnet and trap/pot gear) comprised of lines (vertical or ground) that rise into the water column. Any line can become entangled in the mouth (baleen), flippers, and/or tail of the whale when the animal is transiting or foraging through the water column (Johnson et al. 2005; NMFS 2014; Kenney and Hartley 2001; Hartley et al. 2003; Whittingham et al. 2005a,b). For instance, in a study of right and humpback whale entanglements, Johnson et al. (2005) attributed: (1) 89% of entanglement cases, where gear could be identified, to fixed gear consisting of pot and gillnets and (2) entanglement of one or more body parts of large whales (e.g., mouth and/or tail regions) to four different types of line associated with fixed gear (the buoy line, groundline, floatline, and surface system lines).⁴ Although available data (e.g., Johnson et al. (2005), Waring et al. (2016); Henry et al. (2016))provides insight into large whale entanglement risks with fixed fishing gear, determining which part of fixed gear creates the most entanglement risk for large whales is difficult (Johnson et al. 2005). The difficulties arise from uncertainties surrounding the nature of the entanglement event, as well as unknown biases associated with reporting effort and the lack of information about the types and amounts of gear being used (Johnson et al. 2005). As a result, any type or part of fixed gear is considered to create an entanglement risk to large whales and should be considered potentially dangerous to large whale species (Johnson et al. 2005).

⁴ Buoy line connects the gear at the bottom to the surface system. Groundline in trap/pot gear connects traps/pots to each other to form trawls; in gillnet gear, groundline connects a gillnet, or gillnet bridle to an anchor or buoy line. Floatline is the portion of gillnet gear from which the mesh portion of the net is hung. The surface system includes buoys and high-flyers, as well as the lines that connect these components to the buoy line.

Table 38 summarizes confirmed human-caused injury and mortality to humpback, fin, sei, minke, and North Atlantic right whales along the Gulf of Mexico Coast, U.S. East Coast, and Atlantic Canadian Provinces from 2010 to 2014 (Henry *et al.* 2016); the data provided in Table Z5 is specific to confirmed injury or mortality to whales from entanglement in fishing gear. As many entanglement events go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, it is important to recognize that the information presented likely underestimates the rate of large whale serious injury and mortality due to entanglement. Further studies looking at scar rates for right whales and humpbacks suggests that entanglements may be occurring more frequently than the observed incidences indicate (NMFS 2014; Robbins 2009; Knowlton *et al.* 2012).

Table 38. Summary of confirmed human-caused injury or mortality to fin, minke, humpback, sei, and North Atlantic right whales from 2010-2014 due to entanglement in fishing gear.¹

Species	Total Confirmed Entanglement: Serious Injury ²	Total Confirmed Entanglement: Non-Serious Injury	Total Confirmed Entanglement: Mortality	Entanglement Events: Total Average Annual Injury and Mortality Rate (US waters/Canadian waters/unassigned waters)			
North Atlantic Right Whale	16	31	8	4.65 (0.4/0/4.25)			
Humpback Whale	30	53	8	6.85 (1.55/0/5.3)			
Fin Whale	6	1	4	1.8 (0.2/0.8/0.8)			
Sei Whale	0	0	0	0			
Minke Whale	20	11	16	6.4 (1.7/2.45/2.25)			

Notes:

Source: Henry et al. 2016

Pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injurious and mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). Large whales, in particular, humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the (Northwest) Atlantic Ocean. In addition, as provided in Table

¹Information presented is based on confirmed human-caused injury and mortality events along the Gulf of Mexico Coast, US East Coast, and Atlantic Canadian Provinces; it is not specific to US waters only.

² NMFS defines a serious injury as an injury that is more likely than not to result in mortality (for additional details see: http://www.nmfs.noaa.gov/pr/pdfs/serious_injury_procedure.pdf)

38, humpback, fin, and North Atlantic right whales are considered strategic stocks under the MMPA. Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP or Plan)) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear. In 1997, the ALWTRP was implemented; however, since 1997, the Plan has been modified; recent adjustments include the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).

The TRP consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area-and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries (http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/; 73 FR 51228; 79 FR 36586; 79 FR 73848; 80 FR 14345; 80 FR 30367). The TRP recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the Plan. For further details on the ALWTRP please see:

http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/

7.6.3 Small Cetacean and Pinnipeds

7.6.3.1 Hook and Line and Pot/Trap Gear

Over the past several years, observer coverage has been limited for fisheries prosecuted with hook and line or trap/pot gear. In the absence of extensive observer data for these fisheries, stranding data provides the next best source of information on species interactions with hook and line or trap/pot gear. It is important to note, however, stranding data underestimates the extent of human-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in human interactions are discovered, reported, or show signs of entanglement. Additionally, if gear is present, it is often difficult to definitively attribute the animal's death to the gear interaction, or if pieces of gear are absent, attribute the death or serious injury to a specific fishery or fishing gear type. As a result, the conclusions below should

⁵ The measures identified in the ALWTRP are also beneficial to the survival of the minke whale, which are also known to be incidentally taken in commercial fishing gear.

⁶ The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet (NMFS 2014c).

be taken with these considerations in mind, and with an understanding that interactions may occur more frequently than what we are able to detect at this time.

Table 39 provides a list of small cetacean and pinniped species that may be affected by the tautog fishery. Of these species, only several bottlenose dolphin stocks have been identified as species at risk of becoming seriously injured or killed by hook and line or trap/pot gear. For each dolphin stock identified, stranding data provides the best source of information on species interaction history with pot/trap and hook and line gear types. Specifically, based on stranding data from 2007-2013, estimated mean annual mortality for each stock due to interactions with trap/pot gear was approximately one animal;, interactions with hook and line gear also caused approximately one annual mortality for each stock (Waring *et al.* 2014; Waring *et al.* 2016).⁷ Based on this and the best available information, hook and line or trap/pot gear is not expected to pose an interaction risk to pinniped species. Interaction risks to small cetaceans (specifically bottlenose dolphins) are expected to be low. Should an interaction with a small cetacean occur, serious injury or mortality to the animal is possible; however, relative to other gear types discussed below (i.e., trawl or gillnet gear), hook and line or trap/pot gear represents a low source serious injury or mortality to any small cetacean.

7.6.3.2 Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with bottom trawl gear. Species that have been observed incidentally injured and/or killed by MMPA LOF Category II (occasional interactions) Northeast bottom or Mid-Atlantic trawl fisheries are provided in Table 39 (Waring et al. 2014; Waring et al. 2015; Waring et al. 2016; 82 FR 3655 (January 12, 2017)). Of the species provided, short-beaked common dolphins and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in Northeast bottom trawl gear, followed by gray seals, long-finned pilot whales, and risso's dolphins (Lyssikatos 2015). In the Mid-Atlantic, the most frequently observed bycaught marine mammal species in Mid-Atlantic bottom trawl gear was common dolphins, followed by Risso's dolphins, gray seals, offshore bottlenose dolphins, and harbor seals (Lyssikatos 2015).

⁷ Stranding data provided in Waring *et al.* (2015) was not considered in estimating mean annual mortality as not all bottlenose dolphin stocks are addressed in this stock assessment report. As all bottlenose dolphin stocks are considered in Waring *et al.* (2014) and Waring *et al.* (2016), these stock assessment reports were used to estimate mean annual mortality. Estimates of mean annual mortality were calculated based on the total number of animals that stranded between 2007-2013, and that were determined to have incurred serious injuries or mortality as result of interacting with hook and line or trap/pot gear. Please note, for bottlenose dolphin stocks, Waring *et al.* (2014) and Waring *et al.* (2016) provides two categories for trap/pot gear: (Atlantic Blue) Crab Pot, and Other Pot gear. We combined the two to get an overall number of interactions associated with trap/pot gear in general. In addition, any animals released alive with no serious injuries were not included in the estimate. Also, if maximum or minimum number of animals stranded were provided, to be conservative, we considered the maximum estimated number in calculating our mean annual estimate of mortality.

Table 39. Small cetacean and pinniped species observed seriously injured and/or killed by Category II bottom trawl fisheries in the affected environment of the tautog fishery.

		reported Injured/Killed
Northeast Bottom Trawl	II	Harp seal Harbor seal Gray seal Long-finned pilot whales Short-beaked common dolphin White-sided dolphin Harbor porpoise Bottlenose dolphin (offshore) Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin Pilot whales (spp) Short-beaked common dolphin Risso's dolphin Bottlenose dolphin (offshore) Gray seal Harbor seal

7.6.4 Sea Turtles

7.6.4.1 Hook and Line Gear

ESA-listed species of sea turtles are known to interact with hook and line gear and are more commonly reported in nearshore, southern waters (Sea Turtle Disentanglement Network; NMFS 2013). Hook and line gear can cause injury and mortality to sea turtles, and therefore, can pose a risk to these species. However, the extent to which these interactions impact sea turtle populations is still under investigation and, therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of sea turtle populations.

7.6.4.2 Bottom Trawl Gear

Sea turtle interactions bottom trawl gear have been observed in the Gulf of Maine, Georges Bank, and the Mid-Atlantic; however, most of the observed interactions have occurred in the Mid-Atlantic (see Murray 2011; Murray 2013; Murray 2015; Warden 2011a, b). As few sea turtle interactions have been observed in the Gulf of Maine and Georges Bank regions of the Northwest Atlantic, there is insufficient data available to conduct a robust model-based analysis

on sea turtle interactions with bottom trawl gear in these regions or produce a bycatch estimate for these regions. As a result, the bycatch estimates and discussion below are based on observed sea turtle interactions bottom trawl gear in the Mid-Atlantic.

Bottom trawl gear poses an injury and mortality risk to sea turtles, specifically due to forced submergence (Sasso and Epperly 2006). Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting (e.g.,, bycaught) with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a,b) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic8 was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but released through a Turtle Excluder Device. The 292 average annual observable loggerhead interactions equates to approximately 44 adult equivalents (Warden 2011a,b). Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic10 was 231 (CV=0.13, 95% CI=182-298); this equates to approximately 33 adult equivalents (Murray 2015b). Bycatch estimates provided in Warden (2011a) and Murray (2015) are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated at 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). This decrease is likely due to decreased fishing effort in high-interaction areas (Warden 2011a, b).

7.6.4.3 Pot/Trap Gear

Leatherback, loggerhead, green, and Kemp's ridley sea turtles are known to interact with trap/pot gear, with interactions primarily associated with entanglement in vertical lines, although sea turtles can also become entangled in groundline or surface systems. Records of stranded or entangled sea turtles indicate that fishing gear can wrap around the neck, flipper, or body of the sea turtle and severely restrict swimming or feeding (Balazs 1985, STDN 2016). As a result, sea turtles can incur injuries and in some cases, mortality immediately or at a later time.

NMFS Northeast Region Sea Turtle Disentanglement Network's (STDN) database, a component of the Sea Turtle Stranding and Salvage Network, provides the most complete dataset of sea entanglements. Based on information provided in this database, a total of 333 sea turtle entanglements in vertical line gear were reported to the STDN and NMFS GARFO between 2002 and 2016 (STDN 2016). Of the 333 reports, 316 were classified as probable or confirmed vertical line gear entanglement with a high confidence rating. Out of the 316 confirmed and

⁸ Warden (2011a) defined the Mid-Atlantic as south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border.

⁹ Turtle Excluder Devices (TEDs) allow sea turtles to escape the trawl net, reducing injury and mortality resulting from capture in the net. TEDregulations can be found at: 50 CFR 223.206, 68 FR 8456, and 50 CFR 223.206.

10 Murray 2015 defined the Mid-Atlantic as the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71°W to the North Carolina/South Carolina border)

¹¹ Data for 2016 was only available through September; data through the remainder of 2016 is still being processed.

probable entanglement events, there were 147 cases in which the gear type associated with the entanglement could be assigned to a specific fishery. The majority of interactions involved leatherback sea turtles (130) followed by loggerhead (16), and green (1) sea turtles. Of the 130 leatherbacks, 68.5 % of the vertical line interactions involved gear associated with the lobster fishery (vertical line), 17.7 % the whelk fishery, 7.7% the seabass fishery, 2.3 % the crab fishery, 1.5 % the conch fishery, 1.5% research , and 0.77 % whelk and lobster fishery (both trap/pots present). Of the 16 loggerheads, 56.3% involved interactions with vertical line associated with the whelk fishery and 43.8% the crab fishery. The one green sea turtle case involved an interaction with vertical line associated with the whelk fishery.

7.6.5 Atlantic Sturgeon

7.6.5.1 Hook and Line Gear

ESA-listed species of Atlantic sturgeon are known to interact with hook and line gear, particularly in nearshore waters from the Gulf Maine to Southern New England (NMFS 2013). Injury and mortality to Atlantic sturgeon can be incurred by hook and line gear interactions, and therefore, can pose a risk to these species. However, the extent to which these interactions are impacting Atlantic sturgeon DPSs is still under investigation and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of Atlantic sturgeon DPSs (NMFS 2013; NMFS 2011b).

7.6.5.2 Bottom Trawl Gear

Atlantic sturgeon interactions (i.e., bycatch) with bottom trawl gear have been observed since 1989; these interactions have the potential to result in the injury or mortality of Atlantic sturgeon (NMFS NEFSC FSB 2015, 2016). Three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program to describe bycatch of Atlantic sturgeon in gillnet and bottom trawl gear: Stein et al. (2004b) for 1989-2000; ASMFC (2007) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; none of these documents provide estimates of Atlantic sturgeon bycatch by Distinct Population Segment. Miller and Shepard (2011), the most of the three documents, analyzed fishery observer data and VTR data in order to estimate the average annual number of Atlantic sturgeon interactions in gillnet and otter trawl in the Northeast Atlantic that occurred from 2006 to 2010. This timeframe included the most recent, complete data and as a result, Miller and Shepard (2011) is considered to represent the most accurate predictor of annual Atlantic sturgeon interactions in the Northeast gillnet and bottom trawl fisheries (NMFS 2013).

Based on the findings of Miller and Shepard (2011), NMFS (2013) estimated that the annual bycatch of Atlantic sturgeon in bottom otter trawl gear to be 1,342 sturgeon. Miller and Shepard (2011) observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes. Based on NEFOP observed sturgeon mortalities, Miller and Shepard (2011) concluded that, gillnet gear, in general, posed a greater risk of mortality to Atlantic sturgeon than did trawl gear. Estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0% (Miller and Shepard 2011; NMFS 2013). Similar conclusions were reached in Stein *et al.* (2004b) and ASMFC (2007) reports; after review of

observer data from 1989-2000 and 2001-2006, both studies concluded that observed mortality is much higher in gillnet gear than in trawl gear. However, an important consideration to these findings is that observed mortality is considered a minimum of what actually occurs and therefore, the conclusions reached by Stein *et al.* (2004b), ASMFC (2007), and Miller and Shepard (2011) are not reflective of the total mortality associated with either gear type. To date, total Atlantic sturgeon mortality associated with gillnet or trawl gear remains uncertain.

7.6.5.3 Pot/Trap Gear

To date, there have been no observed/documented interactions with Atlantic sturgeon and pot/trap gear (NMFS NEFSC FSB 2015, 2016). Based on this information, pot/trap gear is not expected to pose an interaction risk to any Atlantic sturgeon and therefore, is not expected to be a source of injury or mortality to this species.

7.6.6 Atlantic Salmon

7.6.6.1 Pot/Trap and Hook and Line Gear

To date, there have been no observed/documented interactions with Atlantic salmon and hook and line or pot/trap gear (NMFS NEFSC FSB 2015, 2016). Based on this information, these gear types are not expected to pose an interaction risk to any Atlantic salmon and therefore, are not expected to be source of injury or mortality to this species.

7.6.6.2 Bottom Trawl Gear

Atlantic salmon interactions (i.e., bycatch) with bottom trawl gear have been observed since 1989; in many instances, these interactions have resulted in the injury and mortality of Atlantic salmon (NMFS NEFSC FSB 2015, 2016). According to the Biological Opinion issued by NMFS Greater Atlantic Regional Fisheries Office on December 16, 2013, NMFS Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Observer and At-Sea Monitoring Programs documented a total of 15 individual salmon incidentally caught on more than 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013; Kocik *et al.* 2014). Of these fifteen Atlantic salmon, four were observed bycaught in bottom otter trawl gear (Kocik (NEFSC), pers. comm (February 11, 2013) in NMFS 2013). Since 2013, no additional Atlantic salmon have been observed in bottom trawl gear (NMFS NEFSC FSB 2015, 2016). Based on the above information, bottom trawl interactions with Atlantic salmon are likely rare (NMFS 2013; Kocik *et al.* 2014).

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Appendix 1.

Millstone Entrainment Sampling

Samples have been taken since 1976 at the Millstone Nuclear Power Plant in Waterford, Connecticut. Sampling frequency varies seasonally; over the period in which tautog eggs and larvae are collected, samples are taken day and night three times (May) or twice (June through August) a week. A conical plankton net $(1.0 \times 3.6 \text{ m}, 335 \text{ microns mesh size})$ collects samples at outflow sites at the Millstone Nuclear Power Plant. Readings from four flowmeters mounted in the mouth of the net account for variations in horizontal and vertical flow. Sample volume is typically about 200 m^3 . All ichthyoplankton collections are immediately fixed in 10% formalin.

Samples are split repeatedly in the laboratory using a NOAA Bourne splitter. Successive splits are sorted and counted until at least 50 larvae (and 50 eggs for samples processed for eggs) are found, or until one half of the sample volume was processed. Tautog eggs are enumerated in all samples collected from April through October. Tautog and Cunner have eggs of similar appearance and were distinguished on the basis of a weekly bimodal distribution of egg diameters (Williams 1967).

Means of annual cumulative sum of egg entrainment for the years 2013 - 2015 show that 63% of the eggs are captured between weeks 18 and 30 (May 1 - July 31), 71% are captured between weeks 18 and 32 (May 1 - mid-August), and 78% are captured between weeks 18 and 34 (Figure 1). As Tautog eggs hatch between 42-48 hours after spawning (Kuntz and Radcliffe, 1918), the presence of eggs is a good indicator of spawning activity.

Other resources

Other studies of Tautog in southern New England indicate that the majority of spawning takes place between May and end of July, with continued spawning through the end of August (LaPlante and Schultz, 2007; Berrien and Sibunka, 1999).

References

Berrien, Peter and Sibunka, John (1999) Distribution patterns of fish eggs in the U.S. Northeast Continental Shelf Ecosystem, 1977-1987. Seattle, WA, NOAA/National Marine Fisheries Service, (NOAA Technical Report NMFS, 145)

Kuntz A., Radcliffe L. (1918) Notes on the embryology and larval development of twelve teleostean fishes. U.S. Bulletin of the Bureau of Marine Fisheries, 35, 87–134.

LaPlante L.H., Schultz E.T (2007) Annual Fecundity of Tautog in Long Island Sound: Size Effects and Long-Term Changes in a Harvested Population. Transactions of the American Fisheries Society 136:1520–1533.

Tautog egg entrainment at Millstone 2013-2015

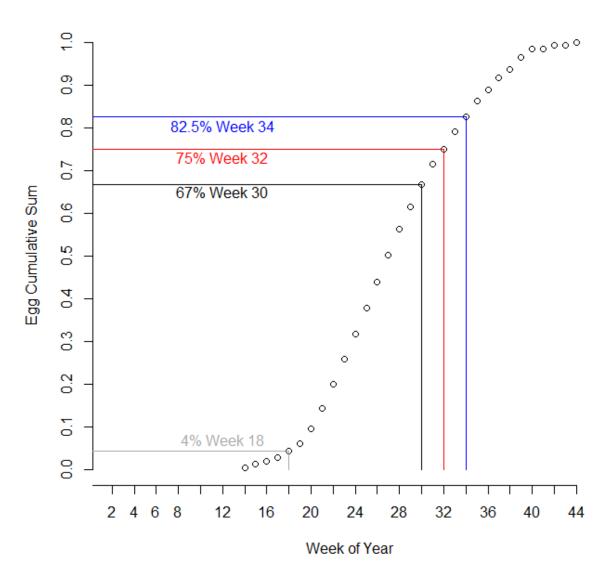


Figure 1: Mean annual cumulative sum of Tautog egg entrainment at the Dominion Millstone Power Station (Waterford, CT) for the years 2013-2015

ATLANTIC STATES MARINE FISHERIES COMMISSION

TAUTOG DRAFT AMENDMENT 1

PUBLIC HEARING MEETING SUMMARIES

Bourne, Massachusetts | June 21, 2017 | 11 Total Participants

Meeting Staff (3): Ashton Harp (ASMFC), Dan McKiernan, Raymond Kane, Tiffany Vidal

Meeting participants (8): Drew Kolek, John Amaral, Nathan Matthews, Chris Corinos, Mike Pierdinock, Pat Moran, 2 unidentified people

SECTION 2: GOALS AND OBJECTIVES

Goals, Objectives and Biological Reference Points: No preference

F Mortality Target

General consensus in favor of *Option B3*, which requires the Board to initiate a management document within two years of an overfishing stock status

Probability of Achieving F Target

One participant in favor of *Option B. 50% Probability of Achieving F Target*.

F Reduction Schedule

General consensus in favor of Option B. Three years.

Stock Rebuilding Schedule

General consensus in favor of Option B, A rebuilding schedule can be built via an addendum.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

General consensus in favor of regional management.

MA-RI Recreational Measures

After reviewing the proposed regional measures, the participants suggested additional revisions:

• One participant noted that tautog is generally caught in the spring, specifically at the end of April and early May (before scup show up); and in the fall during October and

November. If the fishery is closed in the summer months (June – August) then it won't have to much of an impact.

- Another participant said the month of September was of importance.
- Other fisheries are of importance in the summer, although if a tautog is hooked then fishers would like to keep at least one.
- The group suggested the following regional measures be considered:

Suggested Regional Recreational Measures

	Size	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MA	16"	0			3		0 or 1				6		
RI		0			3		0 or 1				6		

Commercial Harvest Tagging Program

Participants are not opposed to the tags, but had questions about implementation. It was noted that states will address implementation details if the program is approved.

The group was not sure that the tag applicator could withstand salt water.

One participant said the live market for tautog is small. During the months that tautog are landed more frequently it becomes hard to sell them because the market is flooded. Fishers generally have to hold onto the fish for a bit of time to sell at a higher price (i.e. sell at the beginning of the year).

Tag Application

The preference was for *Option B. Dealer Application*. Harvesters did not want to be burdened with picking up the tags, learning how to tag a fish and/or taking the time to apply the tag on the water. They felt it was the responsibility of the dealer. There was also concern that the tags would come off because the fish are in close quarters (i.e., in a live well or net) after being caught.

Narragansett, Rhode Island | June 22, 2017 12 Total Participants

Meeting Staff (3): Ashton Harp (ASMFC), Jason McNamee, Nicole Aires

Meeting participants (9): David Monti, Andy Dangelo, Russell Benn, Robert Smith, Pat Heaney, Frank Blunt, John Rainone, Charlie Donilon, Aaron Scripps

SECTION 2: GOALS AND OBJECTIVES

Goals

No objections to *Option B, revised goal statement*.

Objectives

One participant would like to see an objective that encourages electronic reporting. The forhire fleet in RI is required to report via e-trips and the other states should have the same requirements. It is a more accurate source of recreational harvest than MRIP.

In addition, the participant would like to emphasize that compatible regulations should be encouraged, not required.

Biological Reference Points

No objections to Option B.

F Mortality Target

One participant is in favor of *Option A, status quo*. No comment on Option B.

Probability of Achieving F Target

General consensus in favor of Option B.

F Reduction Schedule

One participant in favor of *Option B, three years*. Two participants wanted an option that was less than 3 years; they want overfishing to be stopped immediately because the species is slow growing.

Stock Rebuilding Schedule

One participant questioned why Option C has a 10 year timeframe given the life history of the species. If a rebuilding schedule is initiated then they would like species specific research to justify the timeframe.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

General consensus in favor of regional management as shown (i.e., the four region scenario).

MA-RI Recreational Measures

General consensus for *Option A, status quo*. Participants did not see the need to regionalize management measures with MA if the stock is in good health. The states have had different regulations for years and there have never been any complaints.

Commercial Quota

Two participants in favor of Option B.

Commercial Harvest Tagging Program

General consensus in favor of *Option B*; a tagging program worked for striped bass and it will likely help with tautog.

Tag Application

Three participants are in favor of *Option A, harvester tagging*. They do not think it will be a burden for fishermen because tautog is not a high volume fishery. They would prefer the wording to say the tag must be attached "prior to offloading".

General Comments

There was concern that the LIS restrictions will result in increased effort in RI. There was discussion of requiring a tautog permit or endorsement to fish for tautog in RI waters. However, current RI regulations only allow for commercial fishermen to have permits, if it were to be done recreationally then it would require a change in regulations which could take years.

There was support for fishermen caught harvesting tautog illegally to receive consequences that would deter future illegal behavior. If a fishermen is caught twice then they should lose their license to fish for tautog permanently.

One participant was in favor of requesting a federal permit to fish for tautog in federal waters. The request would not ask for Council involvement, just the creation of a federal permit. This could greatly decrease illegal fishing offshore.

Old Lyme, Connecticut | June 26, 2017 35 Total Participants

Meeting Staff (7): Ashton Harp (ASMFC), Mark Alexander, Colleen Giannini, Greg Wojcik, Justin Davis, Peter Aarrestad, Robert LaFrance

Meeting participants (28): Robert Granfield (Granfield Fisheries), Peter Consiglio (Poppa-C), T.J. Karbowski (party charter fisherman), Eric Schultz (UCONN), Jacob Kasper (UCONN), Preston Glass (party charter fisherman), Lauren Griffith (party charter fisherman), Mike Piri (party charter fisherman), James Schneider (party charter fisherman), Chris Kepler (party charter fisherman), Chris Parizzi (party charter fisherman), Sid Holbook, Michael Gambardella (Gambardella Wholesale Fish Inc.), Greg Dubrule (party charter fisherman), Karen Westerbay, James Schnider, Marc Bay, Dave Nolan, Ted Nozizis, Kevin Mace

SECTION 2: GOALS AND OBJECTIVES

Goals, Objectives, Biological Ref Points, F Target, F Probability, F Reduction Schedule, Stock Rebuilding Schedule

Participants did not want to comment on each issue, instead general comments were taken. They felt going issue by issue was too confusing and many had individual comments already prepared they wanted to read. There were no comments on issues in Section 2.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

Multiple people are not in favor of regional management because they question the stock assessment data.

One participant was in favor of regional management.

There was discussion about what regional management would look like, specifically if there would be cooperative research among the states within a region. A manager responded that there are no additional funds for new surveys. The existing surveys would continue.

LIS Recreational Measures

General consensus not to change the management measures (see reasoning under general comments). The 39% reductions in 2012 were severe enough and the fishermen believe there is an uptick in abundance. They are seeing bigger fish than they ever saw before and there is a strong belief that the fishery is coming back. Any further reductions would put many fishermen and supporting companies (bait and tackle stores, local delis, etc.) out of business.

One or two fish possession limit is equivalent to a moratorium. Therefore, the 4 fish possession limit should remain.

One participant said available fishing days are needed in the spring, summer and fall.

Spearfishing should be considered when developing new regulations. It operates differently than the above water fishery. A small slot limit is not feasible when spear fishing.

There is not a very big fishery for tautog in April. The tautog recreational fishery has grown by a lot over the years. To maintain a viable fishery the fall possession limit of 4 fish cannot be changed.

LIS Commercial Regulations

Multiple participants were not in favor of a commercial quota. It would not be beneficial for fishermen or the resource.

One participant is concerned a commercial quota could lead to the "disastrous situation" that has unfolded with fluke. Fishers cross into other state water to fish, therefore if a quota was required then it should be a regional quota.

General Comments

A petition was given at the hearing; it is provided under written comments.

Multiple participants said any fishermen should question the data and science supporting a 47% reduction. The MRIP PSE for tautog is far too high to be used in a stock assessment. There should have been more vetting of the proposed options and science prior to public comment. As a result, the Board should continue to use status quo management measures.

Multiple participants said there should have been more thought and time given to the economic impact. The proposed LIS reductions are too severe to not have undertaken an economic analysis. Said economic impact of this amendment to his business would be about 35 trips or 25% of his income

Multiple participants are in favor of requiring electronic reporting for all charter boats. The data would then be vetted by a third party and it would be more accurate than MRIP estimates.

- Seventeen fishermen are currently reporting electronically through SAFIS (50% of the Party Charter Association membership). He calculated the economic impact of this amendment and found he would lose 15-20 trips in the fall, equating to a loss of \$10-\$15k, not including secondary impact on the marina where he buys fuel, bait and tackle shop he uses or restaurants.
- Another party charter license holder pointed out the flaws with MRIP. Stated that for the party charter industry to land 57k fish in 2014 would mean 2,300 six pack trips that maxed out on the creel.

One participant asked why Connecticut created an open access fishing permit in 2016 if the stock was declining and questioned if the permit would remain open access. In response,

managers said the process to create the permit started before the amendment was initiated and the permit is not going away.

One participant voiced concern that further fishery reductions will vastly reduce fishing opportunities for young people.

Tautog fishing is best from October 20 through Thanksgiving weekend; that is a very short window to fish (and it is further reduced by bad weather days). Given the season is so short it is not possible for fishermen to put as big of dent in the fishery as the stock assessment claims.

One participant requests a more active artificial reef program for the region because the wrecks that were offshore are gone after Hurricane Sandy.

Given this is a slow growing fishery, the stock assessments should be spaced out to allow more time for regulations to take effect. A stock assessment 3 years after a major reduction is too soon.

One participant suggested recreational volunteer to take part in gather data for the fishery via logbooks.

One participant displayed pictures of a 7" female laying eggs and felt smaller fish generated better eggs. Felt all outreach material should state to never release a fish using a rag, as it removes the slime layer, making them more susceptible to disease. They also felt MRIP staff need to better encourage accurate reporting by those they interview.

East Setauket, New York | June 20, 2017 80 Total Participants

Meeting Staff (3): Ashton Harp (ASMFC), James Gillmore, John Maniscalco, Emerson Hasbrouck Meeting participants (80 counted; 69 signed in): See attached signature list.

SECTION 2: GOALS AND OBJECTIVES

There were no comments on the issues/options within Section 2.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

All participants, except one person, are strongly opposed to regional management. Comments included:

- Did not want to separate the sound versus south shore; it would be pitting the locations against each other
- Did not believe in the data used to separate the regions or population estimates.
- Regional management resulted in unfair, crippling management measures for New York fisheries.

LIS Boundary

Participants questioned the economic impact the boundary line would create, especially for charter boat fishermen. They did not believe it could be effectively enforced.

Recreational Management Measures

General comments

The participants are strongly not in favor of any alternatives that would change the current New York management measures, with one exception. The participants are in favor of reinstating a spring fishery.

The proposal to reduce the possession limit to 1 fish is equivalent to a moratorium. Charter boat fishermen commented that nobody will come on the boat to only keep 1 fish.

Multiple participants commented on the current state of fisheries management. The fishermen have too many restrictions on other fisheries (e.g., striped bass, blackfish, fluke etc.) They can't keep taking reductions and remain in business. It seems like the state and federal agencies want to push the small boats out of business so they can heavily regulate the large boats.

A few fishermen voiced support for spawning closures for the recreational and commercial fishery.

One participant noted that they started using larger hooks that are designed to catch large (16" +) tautog.

One participant said the number of pots in the water should be counted and then restricted. The pots are fishing all the time. ASMFC should lead a study to count the thousands of pots in the water.

One participant said the new food fish license has inadvertently reduced landings, those reductions were not accounted for in the proposed management measures, but they should be.

One participant said fishing is a right and they are strongly opposed to paying for a fishing license (this was not a proposed option).

Suggested revisions

Fishermen stated that they catch tautog mid-October through December 5th. Therefore, the options look like a longer season on paper, but the fish are not there for the majority of the proposed fall season. They would like to move the extra fall days, which could allow for a spring fishery. Specifically the fishermen would like ~20 fishing days in April.

Survey estimates

One participant noted that after days out of the fishery due to weather, the fall fishery is really only 20 days. As a result, there were strong concerns that the population estimates from the stock assessment were not accurate. They questioned how the fishermen could have such a large impact in a small amount of time. They recommend hook and line surveys be developed to gauge population estimates.

Multiple fishermen said there are more and more tautog each year. In 2016, tautog were everywhere. Therefore the surveys are not indicative of actual abundance and should be dismissed until NY DEC includes hook and line surveys.

The NY DEC pot surveys over the summer cannot accurately estimate abundance because there are no tautog during those months; the surveys need to be re-designed.

One participant did not believe in the morality estimates because these are very hardy fish.

One participant wants full transparency in data collection in the future, which would include professional video of all collection efforts.

Artificial Reefs

Multiple participants were in favor of funding artificial reefs to create additional tautog habitat. One participant voiced support for the Commission to seek sponsorship funding to create artificial reefs (e.g., Pepsi funding to create the Pepsi reef).

Commercial Measures

One participant said the NY law does not allow for a possession limit above 25 fish, however the options include higher possession limits. Would the law have to change?

One participant said NY law does not allow landings data to be used to create a commercial quota.

Commercial Harvest Tagging Program

General consensus in opposition to a commercial harvest tagging program.

General comments

One participant questioned why the tags would have to be applied to dead fish if the problem is the live market.

One participant questioned how the tags would reduce the black market. The restaurants would ignore the tagging law just like they ignore the minimum size limits.

Suggested alternative

Save money and reduce effort on behalf of commercial fishermen by requiring all recreational fishermen to kill tautog while in possession. The majority of participants said there is no reason to have a live tautog when fishing recreationally—the only reason would be that you want to sell the fish illegally on the black market.

Commercial fishermen should be given a decal that identifies their boat and allows them to keep live tautog.

NY ASMFC Tautog Draft Amendment 1 Public Hearing

6/20/2017	NYSDEC Marine	Resources	East	Setauket

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NY ASMFC Tautog Draft Amendment 1 Public Hearing 6/20/2017 NYSDEC Marine Resources East Setauket

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NY ASMFC Tautog Draft Amendment 1 Public Hearing 6/20/2017 NYSDEC Marine Resources East Setauket

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Toms River, New Jersey | June 27, 2017

7 Total Participants

Meeting Staff (2): Ashton Harp (ASMFC), Tom Fote, Jeff Brust, Lindy Barry

Meeting participants (3): Jack Fullmer, Paul Huertel, Ken Warcharl

SECTION 2: GOALS AND OBJECTIVES

Goals, Objectives, Biological Ref Points, F Target, F Probability, F Reduction Schedule, Stock Rebuilding Schedule

Participants did not want to comment on each issue, instead general comments were taken. There were no comments on issues in Section 2.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

Two participants are in favor of regional stock assessments, however not necessarily the same management measures as New York.

LIS Boundaries

General consensus in favor of *Sub-Option B1*. They don't want the Peconic Bay to be included in the NJ-NYB (Sub-Option B2).

NJ-NYB Recreational Measures

General consensus favor status quo measures, they believe New Jersey has done a good job of creating measures that reflect the fishery needs.

In the proposed state-specific reduction and the regional measures, there was concern about losing July for a spawning closure (and/or August and September) because there is a small fishery in the summer months. They would prefer a lower bag limit from Nov 1-15 (prime season) rather than closing all of July, August or September. Those months are important for spear diving fishermen and they should be allowed to have at least 1 fish. One participant was also in favor of increasing the minimum size limit to 16" to keep those summer months open.

They are not in favor of a slot limit because that is only necessary if the fishery is in real trouble. A 4" slot limit is not feasible for a spear diver. They practice safe sizing meaning they fish about 3" above the minimum size; a slot limit would make this impossible.

Commercial Harvest Tagging Program

General consensus in favor of a tagging program because the illegal activity out of New York is blatant.

Tag Application

All participants are in favor of *Option A. Harvester tagging*. They would prefer the language for Option A require harvesters to apply the tag prior to landing. Option B was not seen as being effective.

General Comments

Two people are in favor of a recreational and commercial spawning closure.

There was a discussion about the management measures being proposed in the Long Island Sound. The participants do not think the data is reliable enough to move forward with such a large reduction. There is too much uncertainty in the data.

Lewes, Delaware | June 28, 2017

7 Total Participants

Meeting Staff (2): Ashton Harp (ASMFC), John Clark, Roy Miller

Meeting participants (4): Rich King, Barry Quinn, Michael Saba, Michael Stallings

SECTION 2: GOALS AND OBJECTIVES

Goals, Objectives, Biological Ref Points, F Target, F Probability, F Reduction Schedule, Stock Rebuilding Schedule

Participants did not want to comment on each issue, instead general comments were taken. There were no comments on issues in Section 2.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

General consensus to move forward with regional stock assessments and regional management measures.

DELMARVA Recreational Measures

General consensus in favor of Option D. Consistent minimum size, possession limit and seasons.

Participants emphasized that they want Delaware measures to mirror the Maryland measures. For example if Maryland were to submit a conservation equivalency request to fish during the month of the May and it was granted then Delaware wants the same measures. Any conservation equivalency requests should first work through the regional working group.

One participant wants 1 or 2 fish during May and June (the proposed spawning closure time period). They would prefer an April/May spawning closure.

Commercial Harvest Tagging Program

General consensus in favor of a tagging program.

Tag Application

All participants are in favor of *Option A. Harvester tagging*. They would prefer the language for Option A require harvesters to apply the tag prior to landing. Option B was not seen as being effective.

General Comments

One participant is in favor of recreational and commercial spawning closures.

Given overfishing is not a problem, there was a discussion about why the stocks have declined. The abundance declines are due to a lack of habitat and food. The participants would like to see more efforts to create artificial reefs with blue mussels. As spear diving fishermen they have noticed that tautog are only at wrecks that have an abundance of blue mussels.

Berlin, Maryland | June 15, 2017 10 Total Participants

Meeting Staff (2): Ashton Harp (ASMFC), Angel Willey (MD DNR)

Meeting participants (8): Finn McCabe, Victor Bunting, John Prather, Dick Nieman, Budd Hein, Ron Smith, Monty Hawkins, Kane Bounds

SECTION 2: GOALS AND OBJECTIVES

Goals

No objection to Option B.

Objectives

No objection to *Option H* which incorporates all the revised objectives into the document.

Biological Reference Points

One participant was in favor of *Option A* because don't have time to go to a Commission meeting to make a public comment and one participant was in favor of *Option B* because they can still comment on the issue even if there is no hearing.

F Mortality Target

Five participants were in favor of Option B. Managing to the Regional F Target.

One participant was in favor of *Sub-Option B2* which requires the Board to initiate a management document within one year of an overfishing stock status and requires implementation the following year. The participant felt immediate action was the best use of time.

Three participants were in favor of *Sub-Option B3*. *Board Action within Two Years*. This would provide more time and flexibility for managers and the Technical Committee to develop effective management alternatives using new or revised data. They didn't want a rushed management decision, especially if the data was faulty.

Probability of Achieving F Target

Two participants were in favor of *Option A. Status quo*. They had concerns with the accuracy of MRIP estimates and think managers should not be constrained to a prescriptive probability. They wanted managers to have more flexibility when making decisions, not less.

F Reduction Schedule

Three participants were in favor of *Option C. Five years*. They prefer restrictions (if necessary) to be spread over a longer period of time to minimize disruption to businesses. A longer time period was also seen as giving more flexibility to managers.

Stock Rebuilding Schedule

Three participants were in favor of *Option B,* which would allow a regional stock rebuilding schedule to be developed via an addendum. There was a request for the rebuilding schedule to be developed regionally, which is the intent of the alternative. If an addendum is developed then it should include targets for artificial reef development, which are seen as key determinants for healthy tautog populations.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

All are in favor of *Option B. Regional management*. They would like to see regional management that is fair for all states because fishermen travel throughout the region. A minimum size limit of 16 inches was seen as the most important regional management measure to obtain.

There was a discussion about the interplay between the black sea bass and tautog fisheries. Generally tautog is caught as bycatch while fishing for black sea bass. When developing tautog regulations managers should reference the black sea bass measures that are available—the seasons should overlap.

One participant noted that Delaware and Virginia each have more fishing opportunities (i.e., bays). Maryland is already more restricted due to location.

DelMarVa Recreational Measures

The participants were not in favor of any option in its entirety, especially any option that would result in a harvest reduction (Option C and D) given the region is 'not overfishing'. Option B was off the table because the minimum size would not be uniform.

There was strong support for Option D to be modified as follows (shown in Table 1):

- 16" minimum size for all states (highest priority)
- No spawning closures; a May/June closure is not viable given the current black sea bass restrictions. It also applies unnecessary harvest restrictions on the industry.
- The bag limit should be lower in the summer months, anything higher than a 2 fish bag limit would create a summer fishery where there is currently not a fishery. It would expand the fishery.

Revised version of Option D in Draft Amendment 1

	Size	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE		4				2					4		
MD	16"	4				2					4		
VA		4				2					4		

DelMarVa Commercial Measures

No objection to *Option B*. There was concern that Virginia has a competitive advantage because they are no possession limits for the commercial fishery. The seasons when the Virginia commercial fishery is open are seen as favorable fishing months. They recommend a commercial quota or possession limits be applied.

Commercial Quota

One participant was in favor of Option B.

Commercial Harvest Tagging Program

There was no objection to $Option\ B$ – at this time it is seen as the best opportunity to minimize the black market fishery. Some participants said it won't completely eliminate illegal fishing because there will always be loop holes. If possible changing the tag colors each year would prevent people from making their own tags.

Tag Application

All participants were in favor of *Option A. Harvest tagging*. They would prefer the language for Option A require harvesters to apply the tag prior to landing. Option B was not seen as being effective.

Newport News, Virginia I June 14, 2017 5 Total Participants

Meeting Staff (3): Ashton Harp (ASMFC), Joe Cimino (VMRC), Katie May Laumann (VMRC)

Meeting participants (2): David Agee, Wes Blow

SECTION 2: GOALS AND OBJECTIVES

Goals

No comment.

Objectives

One participant was in favor of *Option H* which incorporates all the revised objectives into the document.

Biological Reference Points

One participant was in favor of *Option B* which allows the Board to change the reference point via Board Action.

F Mortality Target

One participant was in favor of *Option B, Managing to the Regional F Target*. There was preference for *Sub-Option B2* which requires the Board to initiate a management document within one year of an overfishing stock status and requires implementation the following year. The participant felt immediate action was best and any further delay would only exacerbate the problem.

Probability of Achieving F Target

One participant was in favor of *Option B*, applying at least a 50% chance of achieving F Target.

F Reduction Schedule

One participant was in favor of *Option B. Three years*. Overfishing should be reduced as soon as possible. The individual commented that the fishery inside the Bay Bridge is almost dead, there is some fishing at the bridge. If catch data says that is not the case then it is not accurate.

Stock Rebuilding Schedule

One participant was in favor of *Option C*, which would allow a regional stock rebuilding schedule to be developed via an addendum and the rebuilding timeframe would be set at 10 years. There was concern that the DelMarVa region had limited data to apply towards a rebuilding schedule and/or the stock assessment.

SECTION 4: MANAGEMENT PROGRAM

Regional Management

One participant was in favor of *Option B, regional management*. There was a strong concern that the document outlined no consequences for a state/region that exceeded F Targets. Specific examples where states have exceeded targets with no consequences were discussed.

DelMarVa Recreational Measures

One participant was in favor of *Option D, regionally consistent measures* for bag, season and minimum size limit. There was a preference for all states to have regionally consistent measures, and a concern that conservation equivalency negate any regional efforts.

There was support for extending the sapwnign closure from April – June (instead of May/June). This would protect (ravenous) pre-spawing fish and spawners.

There was also support for the Board to consider different regulations for the Chesapeake Bay versus offshore tautog fisheries.

DelMarVa Commercial Measures

One participant was in favor of Option B.

Commercial Quota

One participant was in favor of Option B.

Commercial Harvest Tagging Program

Two participants were in favor of *Option B* because it is the only way to control the black market fishery. They also supported applying the tagging program to all states, even if commercial effort was minimal.

Tag Application

Two participants were in favor of *Option A, harvest tagging*. Option B was seen as a flawed, ineffective strategy.



Atlantic States Marine Fisheries Commission

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MEMORANDUM

July 11, 2017

To: Tautog Management Board

From: Law Enforcement Committee

RE: Enforcement Issues for Tautog Draft Amendment 1

The Law Enforcement Committee (LEC) of the Atlantic States Marine Fisheries Commission (ASMFC) met via conference call on June 29, 2017 to review and provide comments on proposed management measures of The ASMFC Draft Amendment 1 for Tautog. The following members were in attendance:

LEC: Chairman, Lt. Mike Eastman (NH); Maj. Rene Cloutier (ME); Asst. Director Larry Furlong (PA); Lt. Tom Gadomski (NY); Sgt. Greg Garner (SC); Maj. Rob Kersey (MD); Capt. Bob Lynn (GA); Capt. Doug Messeck (DE); Katie Moore (USCG); Maj. Pat Moran (MA); Director Kyle Overturf (CT); Capt. Jason Snellbaker (NJ)

STAFF: Ashton Harp; Mark Robson; Megan Ware

Issue 4.1 Regional Boundaries

The LEC reviewed its position on establishing a regional boundary line at the east end of Long Island Sound. The LEC first considered this issue during a March 17, 2017 teleconference call, and again during its regularly scheduled meeting on May 9, 2017. The LEC reaffirms its previous positions:

March 28, 2017 Memorandum of Teleconference Call

Defining a boundary line between areas

A proposed boundary line between the sound and the ocean would be hard to determine on the water as there are no clear buoys to reference. This would make enforcement difficult, especially if land reference points are used to define the boundary line. A boundary line over the water without clearly visible landmarks or demarcations is almost completely unenforceable. At the very least, making strong cases for violations of such a line presents numerous enforcement challenges such as verifying position data of the patrol vessel and the fishing vessel in question, and determining a vessel operator's intent to violate the boundary vs. an accident of navigation.

May 9, 2017 LEC Meeting Summary:

Tautog.—Ashton Harp briefed the LEC on proposed management boundaries for Long Island Sound. Options 5 and 6 for defining a boundary line in eastern Long Island Sound both present enforcement challenges if the differences in regulations among the 3 associated management units are significant. Recreational and commercial fishermen regularly move back and forth from the inner sound, the ocean side of Long Island and Rhode Island waters. The LEC cautioned that selecting either line will require substantial enforcement resources to ensure compliance with the various management regulations that will be in close proximity. It was

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pointed out that using the ColRegs line in Option 6, with more visible land-points, might be preferable, although Option 5 was also acceptable. Enforceability of widely differing regulations in close proximity will be influenced by tagging requirements of commercially harvested fish.

Issue 4.4 Commercial Harvest Tagging Program

The LEC reaffirms its support for a commercial tagging program for tautog. The LEC also reaffirms its previous positions regarding the timing of tag applications. **Tagging of tautog should occur as close to the point of harvest as possible.** Dealer tagging is not supported. Members expressed concern that even tagging at the dock or prior to offloading presents significant enforcement challenges, but is at least a more acceptable option than dealer tagging. In summary, the quicker a harvested tautog is tagged, the more likely a commercial tagging program will achieve its intended results.

The Law Enforcement Committee appreciates the opportunity to provide advice and recommendations regarding the management of tautog.