Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

October 26, 2016
2:00 – 5:00 p.m.
Bar Harbor, Maine

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)* 2:00 p.m.

2. Board Consent 2:00 p.m.
   - Approval of Agenda
   - Approval of Proceedings from August 2016

3. Public Comment 2:05 p.m.

4. Review Timeline of Menhaden Activities through 2019 (*M. Ware*) 2:15 p.m.

5. Set 2017 Atlantic Menhaden Fishery Specifications **Final Action** 2:25 p.m.
   - Review of Stock Projections and Recent JAI Trends *(J. McNamee)*
   - Consider Postponed Motion to Set the 2017 TAC
     Motion to set the 2017 coastal TAC for the Atlantic menhaden fishery at 225,456 metric tons (20% increase)

6. Consider Draft Amendment 3 Public Information Document for Public Comment **Action** 3:05 p.m.
   - Overview of Public Information Document (*M. Ware*)
   - Advisory Panel Report (*J. Kaelin*)

7. Technical Committee Report (*J. McNamee*) 4:25 p.m.
   - Review of "The Fate of an Atlantic Menhaden Year Class"

8. Biological Ecological Reference Point Working Group Progress Report (*S. Madsen*) 4:35 p.m.

9. Review and Populate Advisory Panel Membership (*T. Berger*) **Action** 4:45 p.m.

10. Other Business/Adjourn 5:00 p.m.

The meeting will be held at the Harborside Hotel, 55 West Street, Bar Harbor, Maine; 207.288.5033

MEETING OVERVIEW

Atlantic Menhaden Management Board Meeting
Wednesday-October 26, 2016
2:00 – 5:00 p.m.
Bar Harbor, Maine

Chair: Robert Ballou (RI) Assumed Chairmanship: 05/16	Technical Committee Chair: Jason McNamee (RI)	Law Enforcement Committee Representative: Capt. Kersey (MD)
Vice Chair: Russ Allen (NJ)	Advisory Panel Chair: Jeff Kaelin (NJ)	Previous Board Meeting: August 3, 2016
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (18 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from August 2016

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. Overview of Menhaden Activities Through 2019 (2:15-2:25 p.m.)

Background

- The Board will be considering several actions over the coming years including final action on Amendment 3, approving a stock assessment update, setting a TAC for 2018, and reviewing BERP ERPs for management.
- In order to organize the timing of each of these actions, staff has created a schedule outlining action through 2019.

Presentations

- Timeline overview by M. Ware (**Briefing Materials)**

5. Review and Set 2017 Atlantic Menhaden Specifications (2:25-3:05 p.m.) Final Action

Background

- As specified in Amendment 2, the Board will set an annual or multi-year TAC using the best available science.
- The TC completed nine stock projection runs for the 2017 year based on recommendations from the Board.
- At the August meeting, a motion was tabled to increase the 2017 TAC by 20%:

Motion to set the 2017 coastal TAC for the Atlantic menhaden fishery at 225,456 metric tons (20% increase). Motion by Mr. Gary, seconded by Mr. Schill.

Presentations

- Review of 2017 stock projections and recent juvenile abundance indices by J. McNamee, Chair **(Briefing Materials).**

Board actions for consideration at this meeting

- Approve fishery specifications for 2017.

6. Draft Amendment 3 Public Information Document (3:05-4:25 p.m.) Action

Background

- In May 2015, the Board initiated Amendment 3 to the Atlantic Menhaden FMP to review allocation and consider ecological reference points.
- A draft of the PID was presented to the Board in August for feedback. Over the last few months, the PDT continued development of the PID.
- The Advisory Panel met on September 30th to review a draft of the PID and provide feedback on the issues and options included in the document.

Presentations

- Overview of options included in PID by M. Ware **(Briefing Materials)**
- Advisory Panel report by J. Kaelin, Chair **(Supplemental Materials)**

Board actions for consideration at this meeting

- Approve document for public comment.

7. Technical Committee Report (4:25-4:35 p.m.)

Background

- In May 2016, the Board requested the TC review the paper "The Fate of an Atlantic Menhaden Year Class". On June 17th, TC met to review the paper and provided recommendations on ways to improve the analysis.
- In August 2016, the Board requested the TC review an updated version of the paper. The TC met on August 26th to review changes to the analysis and again provided recommendation on how to improve the scope of the paper.

Presentations

- Technical Committee report by J. McNamee **(Briefing Materials)**

8. Biological Ecological Reference Point Working Group Report (4:35-4:45 p.m.)

Background

- The Board tasked the BERP working group with developing Ecosystem Based Reference Points (ERPs) for Atlantic Menhaden.
- The BERP working group met in July 2016 to review work on the Steele-Henderson model.

Presentations

- BERP working group progress report by S. Madsen

9. Advisory Panel Membership (4:45 -5:00 p.m.) Action
Background • Bob Hannah from Massachusetts, Patrick Paquette from Massachusetts, Dave Monte from Rhode Island, Meghan Lapp from Rhode Island, Paul Eidman from New Jersey, Leonard Voss from Delaware, Peter Himchak from Virginia, and Scott Williams from North Carolina have been nominated to the Atlantic Menhaden Advisory Panel.
Presentations • Nominations by T. Berger **(Briefing Materials)**
Board actions for consideration at this meeting • Approve nominations.

10. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC MENHADEN MANAGEMENT BOARD

The Westin Alexandria
Alexandria, Virginia
August 3, 2016

These minutes are draft and subject to approval by the Atlantic Menhaden Management Board
The Board will review the minutes during its next meeting

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INDEX OF MOTIONS

Amended Motion
Move to set the 2017 coastal TAC for the Atlantic menhaden fishery at a 10% increase (206,668 metric tons). Motion failed. Roll Call Vote: In favor – ME, NY, NJ, DE, MD, PRFC, VA, NMFS; Opposed – NH, MA, CT, PA, NC, SC, GA, FL, USFWS; Null – RI.

Main Motion
Move to set the 2017 coastal TAC for the Atlantic menhaden fishery at 225,456 metric tons (20% increase).

Motion to Amend
Move to amend the main motion to set the 2017 coastal TAC for the Atlantic menhaden fishery at 19% increase of 2016 TAC (Page 48). Motion by Robert Boyles; second by Martin Gary. Motion failed (Page 49). Roll Call Vote: In favor – ME, NJ, PRFC, VA, NMFS; Opposed – NH, MA, RI, CT, NY, PA, DE, NC, GA, FL, USFWS; Null – MD, SC.

Motion to Postpone Main Motion
Move to postpone until the next meeting of the Menhaden Board (Page 49). Motion by Dennis Abbott; second by Bill Adler. Motion carried (Page 51). Roll Call Vote: In favor – NH, MA, NY, PA, DE, MD, VA, NC, NMFS, USFWS; Opposed – RI, CT, NJ, PRFC, SC, GA, FL; Null – ME.

Main Motion
Move to set the 2017 coastal TAC for the Atlantic menhaden fishery at 225,456 metric tons (20% increase). Motion postponed until next meeting.

7. **Motion to adjourn** by Consent (Page 63).

ATTENDANCE
Note: Sign-in Sheet not distributed to all attendees

Board Members

Pat Keliher, ME (AA)
Terry Stockwell, ME, Administrative proxy
Rep. Jeffrey Pierce, ME, proxy for Sen. Langley (LA)
Steve Train, ME (GA)
Cheri Patterson, NH, proxy for D. Grout (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Rep. Sarah Peake, MA (LA)
Bill Adler, MA (GA)
David Pierce, MA (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Robert Ballou, RI, proxy for J. Coit (AA)
David Borden, RI (GA)
David Simpson, CT (AA)
Rep. Craig Miner, CT (LA)
Steve Heins, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Tom Fote, NJ (GA)
Loren Lustig, PA (GA)
Andy Shiels, PA, proxy for J. Arway (AA)
Tom Moore, PA, proxy for Rep. Vereb (LA)
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)
Bill Goldsborough, MD, proxy for Del. Stein (LA)
Rob O'Reilly, VA, proxy for J. Bull (AA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Cathy Davenport, VA (GA)
Michelle Duval, NC, proxy for B. Davis (AA)
Jerry Schill, 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)
Martin Gary, PRFC
Derek Orner, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Jason McNamee, Technical Committee Chair
Jeff Kaelin, Advisory Panel Chair

Staff

Bob Beal
Toni Kerns
Mark Robson
Kirby Rootes-Murdy
Megan Ware

Guests

Charles Lynch, NOAA
Wilson Laney, US FWS
Mike Luisi, MD DNR
Robert Newberry, Delmarva Fisheries Assn.
David Sikorski, CCA Maryland
Dr. Jane Harrison, Appalachian State University
Joseph Gordon, PEW Trusts
Greg DiDomenico, Garden State Seafood Assn.
Shaun Gehan, Omega Protein
Ben Landry, Omega Protein
Patrick Paquette, Massachusetts
Robert Brown, MD Watermen's Assn.
Ken Hinman, Wild Oceans
Aaron Kornbluth, PEW Trusts

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, August 3, 2016, and was called to order at 8:00 o'clock a.m. by Chairman Bob Ballou.

CALL TO ORDER

CHAIRMAN ROBERT BALLOU: Good morning everyone, 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 Chair. I want to welcome all of the board members, all staff, and all members of the public who are here today; as well as those who may be listening in remotely via the webinar.

Before we begin, I just want to note a few things. First, we have a very full agenda, as I think you all know, and just three hours to get through it. I will ask for the Board's and the public's assistance in being as concise as possible with your questions, comments and discussion. I also want to note that for two items on the agenda today, involving final action; and that would be the Draft Addendum I and the 2017 Specifications.

Any meeting-specific proxies may fully engage, but may not participate in the final votes taken by the board. Lastly, although it feels to me that Megan is already a veteran, given the many exchanges we've had over the past several weeks, his is, in fact, her first meeting as FMP Coordinator, so I just want to formally welcome her, and acknowledge what a great job she's been doing. It has really been a pleasure working with her.

Lastly, I'll just note that I am visually impaired. I ripped a contact lens this morning, so you all look like a sea of menhaden to me. I'm going to really do my best, and Megan is going to help. But if I'm fumbling to try to see who has their hand up, it is because I am at about 80 percent vision right now; so what a wonderful development, that is, I have to tell you.

APPROVAL OF AGENDA

CHAIRMAN BALLOU: Okay, having dispensed with the pleasantries, let's get down to business. Item one is the approval of the agenda. Are there any additions to the agenda? Terry Stockwell.

MR. TERRY STOCKWELL: I think the state of Maine has been in part responsible for making Megan's introduction of menhaden more interesting; and I would like to report to the board with an update on Maine's episodic fishery this summer.

CHAIRMAN BALLOU: Are there any other additions to the agenda? Seeing none; are there any objections to approving the agenda, as modified? Seeing none; the agenda stands approved by consent.

APPROVAL OF PROCEEDINGS

CHAIRMAN BALLOU: Moving on to the next item, which is the approval of the proceedings from the May, 2016 Board meeting.

Are there any recommended changes to those meeting minutes? Seeing none; is there any objection to approving those minutes? Seeing none; those minutes stand approved by consent. Thanks to the stenographer, Dot, for doing a great job.

PUBLIC COMMENT

CHAIRMAN BALLOU: Next on the agenda is public comment. This is an opportunity for anyone from the public who wishes to comment on any issue that is not on today's agenda, to do so, which means that if your comments pertain to either Draft Addendum 1, or to Specifications for 2017, now is not the time to comment.

There will be opportunities to comment on both of those issues when we get to them. I believe there has been a signup sheet, and I think Megan is heading back with that in hand; so

what I'll do is I'll draw from that signup sheet now, and call upon those who wish to comment on anything not on the agenda; and we have a blank sheet. With that I will ask, is there anyone from the public who wishes to comment at this time?

DRAFT ADDENDUM I TO AMENDMENT 2

CHAIRMAN BALLOU: Seeing no hands; we'll move on to the next item, which is Draft Addendum I to Amendment 2, involving a potential adjustment to the bycatch provision of the FMP. This draft addendum involves four options. It has gone through a formal public comment process involving several public hearings in several states, and is now before the board for final action. We have 45 minutes set aside for this item.

I will first be turning to Megan for a staff presentation; then to Jeff Kaelin for an AP report, then to Mark Robson for a Law Enforcement Committee report. After addressing any questions the board may have for Megan, Jeff or Mark, I will open the floor for motions. At this point, I will go to Megan for her presentation on the Draft Addendum, the options presented, and a summary of public comments received.

REVIEW OF OPTIONS

MS. MEGAN WARE: I'll be going through Draft Addendum I today, and again this is to consider potential changes to the current bycatch provision. An overview of my presentation today, first. I'll go through a timeline of the addendum. I will briefly review the bycatch fishery and the options that are included. Then I'll move right into public comment. We'll go to the AP report, the LEC report; then the board will consider final action today.

As a timeline, the board initiated this addendum in February, to consider revisions to the bycatch provision. In May, the Board saw a draft of this addendum, and approved it for public comment. We had our public comment period from May through July 11, and today we're going to be reviewing those comments and taking final action.

Just a reminder of how the bycatch provision currently works. All landings prior to a state reaching its quota count towards the quota. Then once a state reaches its quota, it closes its directed fishery and it moves to a bycatch fishery; where there is a 6,000 pound per vessel per day trip limit and this is for non-directed fisheries.

The problem or issue we're trying to address in this addendum is that since the bycatch provision is per vessel rather than per individual, it means that two permitted individuals working on the same vessel cannot land up to 12,000 pounds of menhaden bycatch. This has been a problem or a source of inefficiencies, especially in the Chesapeake Bay pound net fishery; where it is common for fishermen to pool resources and crew, and fish from the same vessel.

Some statistics on the bycatch fishery, from 2013 to 2015, bycatch averaged 5.63 million pounds per year; and this represents approximately 1 to 2 percent of coastwide landings, so it is not a vast majority by any means of total landings, but it is still important. By location the Chesapeake Bay accounts for the vast majority of total bycatch landings at 81 percent. Then if we delve deeper into that, the Maryland pound net fishery accounts for about 40 percent of bycatch landings, and the Virginia anchored gillnet fishery about 21 percent. We can also look at the trips that land menhaden bycatch.

From 2013 to 2015, a total of 12,750 trips landed under the bycatch allowance; and about almost 9,000 of those were from stationary gears. Then this table here, this is Table 2 in the addendum, and it might be a little easier to read actually on paper. But what it shows is the percent of trips in each state that were using

stationary gears that landed menhaden bycatch from 2013 to 2015.

The states are in the columns, and we have different pound bins in the rows. The way to interpret this is that for example, Virginia, 71 percent of their stationary gear bycatch trips landed between 1 and 1,000 pounds of menhaden. I have outlined in red some of the boxes under Maryland and the Potomac River Fisheries Commission.

Those are trips that landed in excess of 3,000 pounds. This is really the fishermen that we're targeting in this addendum. If you had two of these fishermen on a vessel and say, they each averaged 4,000 pounds of menhaden per trip; that's 8,000 pounds combined, so they would be over the current 6,000 pound bycatch limit.

Just to summarize, the bycatch landings are largely from the pound net fishery in Maryland and Potomac River Fisheries Commission, and the anchored gillnet fishery in Virginia. The pound net traps are landing menhaden in amounts that would lend to cooperative fishing behavior. However, there are other gears in other jurisdictions that also land menhaden bycatch, and they may also benefit from cooperative fishing.

That is why you'll see in these options, that they include multiple gear types. I'll move into the options now included in the document. As Bob mentioned, there are four. The first one would be status quo, so that is a 6,000 pound per vessel per day bycatch limit. Then B through D, they don't change that status quo; but what they do is add flexibility to it.

The difference between B, C and D is who that flexibility is given to. B is the broadest option, and it says that two authorized individuals working from the same vessel, fishing stationary multispecies gears, are permitted to land up to 12,000 pounds per day. In the addendum we define stationary multispecies gears to include pound nets, anchored or staked gillnet, fyke nets, and fish traps and fish weirs.

Pots are not included in this, because the PDT felt that pots target a specific species; therefore, they are not a multispecies gear. Option C is very similar to Option B; but it is a bit more narrow in who that flexibility is given to. What it says is that the two authorized individuals have to be in a limited entry fishery; so it is still that stationary, multispecies gears, but operating in a limited entry fishery.

The PDT included this, because they felt that limited entry fisheries are an important management tool, and it restricts the expansion of harvest. Again, pots are not included, because they are not considered a multispecies gear. Then we have Option D; this would allow two authorized individuals fishing pound nets to work together to land up to 12,000 pounds per day. This options gets back to the root of the request from Maryland and Potomac River Fisheries Commission; and this is the option that reflects the data as we see the pound net fisheries are the ones landing menhaden in amounts that lend to cooperative fishing.

PUBLIC COMMENT

MS. WARE: I'll move right into the public comment. We didn't receive too much public comment on this addendum. We had two letters and then we held six public hearings.

The Rhode Island and Maryland public hearings were the only ones with attendees, so I'll be focusing on those today. In terms of the written comments, we had one letter in favor of status quo and one letter in favor of Option B; so that would allow all stationary multispecies gears to work together cooperatively.

The letter in favor of Option A felt that a 12,000 pound bycatch limit, even if it is for two people, is more of a directed fishery rather than an incidental catch. In terms of the public hearings, we had one individual from Rhode

Island who is in favor of Option B. Then we had eight individuals from Maryland who are in favor of Option D.

The reason these fishermen felt that D was the most appropriate option for them is in Maryland, it sounds as though most of the menhaden bycatch is coming from pound nets and then drift gillnets, and since drift gillnets are not a stationary gear, they are not included in this addendum. They felt that pound net option most appropriately reflected the Maryland bycatch fishery.

Many of the fishermen commented that this type of flexibility will be important in insuring economic gains, as well as improved safety in the fishery. Overall, they were in support of adding this provision. Then just some general comments we received: we had a concern that menhaden and other forage fish are becoming harder to find in our estuaries and bays.

We had a comment that the 2009 to 2011 reference years for allocation are not appropriate. We also had a couple comments that the state quotas only last through part of the year, so that the quotas are really too low; and there has been a greater than 20 percent reduction in harvest. I am going to let Jeff present the AP report.

ADVISORY PANEL REPORT

CHAIRMAN BALLOU: Well, first let me just see if there are any questions for Megan. We can always circle back after the other reports. But seeing no hands; we will, indeed, go to Jeff for the AP report. Jeff.

MR. JEFF KAELIN: Good morning, board members. The slide will describe what I'm going to read. We did have a conference call on July 14, the memo that you have in your packet describes who was in attendance. We had four commissioners and five members of the public. We did take up this issue first.

We reviewed the addendum and supported Option C, which allows the two authorized vessels working from the same fishing vessel in stationary multispecies gear, to land up to 12,000 pounds per day. The reason why the two members supported that option as described on the slide is that it would be easier to enforce the allowance if there was a limited access fishery involved.

We had two AP members supporting that option, and one AP member supporting Option D; noting that for some states B, C and D are the same. One other AP member supported an option which insures bycatch allowances can be accurately monitored and easily enforced; with no option selected, and another AP member did not have a preference for an option, Mr. Chairman, so I think that concludes my AP report. I would be happy to take any questions.

LAW ENFORCEMENT COMMITTEE REPORT

CHAIRMAN BALLOU: Thank you, Jeff for that report. Any questions for Jeff on the AP report? Seeing none; I'll go to Mark Robson, our LEC Chair for the LE Committee report.

MR. MARK ROBSON: The LEC provided written comments on an earlier review of this particular addendum, and we provided written comments back in January. We met again in teleconference on July 8th, to consider the addendum again. In reviewing the previous comments we made, where we supported the allowance for the 12,000 pound bycatch for the pound net fishery, the LEC in July reaffirmed its position.

We support Option D, whereby two individuals fishing pound nets could land up to 12,000 pounds from a single vessel in a day. The LEC did not support allowing other types of stationary multispecies gear to be included, as it felt this would introduce some problems with identifying which gear were being legally fished, and in situations where individual fishermen may have multiple gear licenses, it creates some

additional complications for enforcement on the water or at the docks in monitoring this bycatch fishery.

In the previous comments we made, we also had noted that the support for the 12,000 pound bycatch provision was based on some experience from back in 2013, when a similar provision did not seem to result in any issues or problems for enforcement. We again reiterate our support for Option D, limiting it to the pound net fishery.

We also would reaffirm our original recommendation that since this is something that would be sort of a new process on the water; that we actually take a look at this after a year or so to see if there are any unforeseen problems that crop up. The Law Enforcement Committee did not anticipate any, but in case those do arise, we can look at the issue and make recommendations for changes or improvements, as appropriate. That concludes my comments, Mr. Chairman.

CONSIDER FINAL APPROVAL OF ADDENDUM I

CHAIRMAN BALLOU: Any questions for Mark? Seeing none; I will now open the floor to motions from the board. We will need three, and I plan to take them sequentially. The first, frankly, is the biggest one, and that is the preferred option. The second would be the implementation date for whatever option the board decides on, and then lastly, we'll need a final motion on final adoption of the addendum. That third and final motion will be subject to a roll call vote, so at this point I will entertain a motion on the preferred option. Would anyone like to make one? Lynn Fegley.

MS. LYNN FEGLEY: Thank you to the board for your consideration of this action. I want to just preface a motion by reminding everybody that this all started back in 2012, when we were developing Amendment 2 and we were trying to figure out how to deal with these stationary, multispecies gears that are not necessarily selective for a particular species of fish.

At that time when Maryland put in its implementation plan, we had a plan for this dual bycatch; because of the way that our fisheries operate. It was approved by the Technical Committee, and so we fished in 2013 under this provision. But then it was removed for 2014 and 2015. Now we have data that show that these fish are going to be caught, whether it is a 6,000 pound or a 12,000 pound. The result in Maryland is that the fishermen are at an economic disadvantage; and sometimes they're not safe, because they're having to commission additional vessels, sometimes unsafe vessels, to get to that other net and get that second bycatch.

I also want to remind everybody that we were hoping to do this under a conservation equivalency. We could not do that under the rules of Amendment 2, so hence we have this addendum before us. The Technical Committee reviewed our proposal for the dual bycatch, and they approved it. At that time there was conversation about the impacts of this provision if it were applied to stationary multispecies gears along the coast. I believe at that time what Dr. McNamee said, was the bycatch occurring from these gears along the coast is less than 1 percent.

The stock is not overfished and overfishing is not occurring; and so it will not have a negative impact on the stock. This provision is for one year, until we get to Amendment 3, which I hope we all keep our eyes on that ball. Thank you for indulging me**. I would now like to make the motion to approve Option B, which is working together permitted for all stationary multispecies gears.**

CHAIRMAN BALLOU: **I see Steve Train, would you like to second that motion?**

MR. STEPHEN TRAIN: **Yes, Mr. Chair**.

CHAIRMAN BALLOU: We have a motion moved and seconded, and the motion is to move to approve Addendum 1 with the following option; Option B. Motion by Ms. Fegley and seconded by Mr. Train; discussion on the motion. Dr. Pierce.

DR. DAVID PIERCE: Question for the Law Enforcement Committee, if I may, Mr. Chairman. The Law Enforcement Committee indicated that Option D was their preferred option, as a consequence of their consideration of law enforcement concerns on the water. I would appreciate; I suppose the whole board would appreciate some further comment from the LEC regarding Option B. In other words, is that a definite no go; that will present significant enforcement problems in the opinion of the LEC, or perhaps not? A little more LEC perspective on that option would be appreciated.

MR. ROBSON: I will do my best to recall the conversations during the teleconference call. I don't know if Megan can recall any of the discussions, too, as far as the specific concerns. I guess the primary issue was one of officers dealing with and sorting out two fishermen who may have multi-gear permits.

I don't know whether it would be a factor in Chesapeake Bay, if you had fishermen coming from Virginia or back and forth from Maryland to Virginia. But it seemed that the discussion was based on the complication of sorting out if multi-gear operations are in place, whether everything is in order from a permitting standpoint; and whether those gears beyond pound net gear are being fished legally. I am sorry that I can't recall more specific discussions than that, Dr. Pierce. Megan, I don't know if you could recall or not.

MS. WARE: I think the discussion was mostly that the pound net provision had been in place in 2013, and so they felt confident that that would be successful, since it was in 2013. Then there was concern that if two fishermen were fishing different types of gear but working cooperatively, and one of them had this provision and one didn't; there were questions about enforcement or potential for loopholes, I'll say, in that sense.

MR. RUSS ALLEN: I'm definitely in support of this motion. I probably would have liked to have seen Option C, but I'll take Option B. It really will help our fishermen. That said, on the law enforcement issue, I'm not really sure what the issue would be if you're bringing in fish from a drift gillnet or a staked and anchored gillnet.

They are so limited in the number of fishermen that are actually doing that; and we all know what gears they're using at the time they are catching this bycatch. I think the law enforcement issue is very slight, when compared to overall harvest of menhaden; to say that. I am happy to see this option make it up there, and we're definitely in support of that; so thank you.

MR. DAVID G. SIMPSON: I'm certainly in support of the idea. I am a little bit concerned about not limiting this to limited access fisheries, and that this could proliferate. Also, going beyond pound nets makes me a little bit concerned with gillnets and associated issues and the law enforcement concerns. I don't think I'll make a counter motion or amendment; but I just express that reservation and see if there is a broader feeling along those lines on the board.

MR. ROB O'REILLY: I support this motion. I can appreciate the advisory panel comments on Option C, and in Virginia, we do have limited entry; in terms of we have two types of gillnet licenses, Class A, which is limited, but we have Class B, which is open to those who can't have the same sort of privileges that a Class A can have in terms of length of net, for example, and location.

I think it does promote efficiency. I don't expect that there will be a lot of

companionship, as far as two licensees with the gillnet fishery; but there will be some. There are also younger people moving up, which is why I think with nine limited entry fisheries in Virginia, overall I think the idea to give younger people a chance to apprenticeship, by way of working with someone, is a benefit. For that reason rather than C, Option B is the right option.

CHAIRMAN BALLOU: Then I will be coming back to you, but first I want to give other members of the board a chance to weigh in, and next I have Terry Stockwell.

MR. STOCKWELL: I speak in support of the motion on the board. As our report under other business, Maine has had an interesting summer. Alternatives such as this would provide additional flexibility to the state of Maine, and the other states that intend to use the episodic quota.

CHAIRMAN BALLOU: I'll go back to Lynn, I'm sorry, Marty Gary.

MR. MARTIN GARY: PRC supports this motion as well for near identical reasons that Maryland made the motion; for safety reasons, for efficiency and flexibility.

CHAIRMAN BALLOU: I'll go back to Lynn at this point, oh Lynn's fine; any other comments on the motion? I am now going to move from the board to a brief opportunity for public comment. The matter, I would note, has gone through formal public comment, so while I'm willing to allow additional input at this time; that input must be brief, focused specifically and solely on the motion before the board, and it would really not be appropriate to repeat comments already provided on the record. With those caveats, is there anyone from the public with a burning desire to provide additional comment?

I hope I talked you out of it, and it looks like I did. With that, we will now come back to the board and I will afford a 30 second caucus, and then we will vote on this motion. Okay, ready for the vote? All in favor, please raise your hand. You can put your hands down. All opposed, like sign, any null votes, any abstentions? **The motion carries unanimously;** thank you. The next item to be decided is the implementation date, and I'm just going to have Megan tee that up for us.

MS. WARE: At this point we just need to decide a deadline of when states have to implement this provision. A state can implement it as quickly as they like. However, we just want to set a date by which everyone must implement it. It is usually helpful for states that are concerned about the timeline to speak up at this point.

CHAIRMAN BALLOU: For any state with such a concern, would anyone like to make a motion regarding the implementation date for this new adjustment to the bycatch provision?

MS. FEGLEY: **I would move in this option that Addendum 1 be implemented as soon as a state can do so under its authority.**

CHAIRMAN BALLOU: I'm going to look to staff, is that an appropriate motion as far as an implementation date or do we need a date specific?

EXECUTIVE DIRECTOR ROBERT E. BEAL: It's better to have date specific, Mr. Chairman. However, since this is providing the states with essentially additional fishing opportunities, the effective date really is the date that the states are allowed to initiate processes to implement these regulations. This is kind of the opposite of some of our plans, where we're not implementing a more restrictive season or size limit of something else.

If you made the effective date essentially tomorrow; that means the states are allowed to start utilizing the provisions of the 6,000/12,000 pound trip limits effective tomorrow. Then the

states have to work through their processes to implement those regulations. I think, in this instance, where the board is affording states more flexibility, timing is not as critical. But a date certain would be nice.

CHAIRMAN BALLOU: Lynn, do you want to perhaps clarify that motion?

MS. FEGLEY: Sure, I can try. I guess I didn't want to presume what other states authorities are. For Maryland we have the authority to implement immediately, so maybe given what Mr. Beal said the implementation date would be August 15th, and that means that states can implement any time after that right, they don't have to have it in place by then, they can implement.

CHAIRMAN BALLOU: That sounds reasonable.

MS. FEGLEY: August 15th.

CHAIRMAN BALLOU: Okay, so Lynn Fegley moves to enact an implementation date of August 15th. Is there a second to that? Marty Gary is the second. Of course, this would be pursuant to all other existing provisions that are already on the books. This would just enable a state to adjust its bycatch provision. We have a motion regarding the implementation date, discussion on that motion; Jim Gilmore.

MR. JAMES GILMORE, JR.: I just want to clarify that see we can do it quickly too, but under emergency provisions, which they prefer to really save for emergencies; and this one is not. Our normal rulemaking process takes three to six months to do something like this. If we began this immediately, does that still satisfy the implementation timeline?

CHAIRMAN BALLOU: I'm sorry; you're asking if you begin your rulemaking immediately? Yes, I think the answer is that if any state wishes to move forward to enact this new provision, they can do so, provided that it does not become effective prior to August 15th. Does anyone on the board have a different take on what I just said, in terms of what this would mean?

Seeing not; that is my interpretation of what the motion says. With that; is there any further discussion on the motion? Seeing none; is the board ready to vote? Is there any need to caucus? I'm assuming there may not be. I am going to look for a show of hands on the motion. All in favor, please raise your hand.

Thank you, hands down. All opposed, any null votes, any abstentions? **Seeing none; the motion carries unanimously** and we lastly just need a final motion on final adoption of Addendum 1 to Amendment 2 as specified by the board today. That would in essence be what the motion should read, or how it should read. Would anyone like to make that motion?

MR. WILLIAM ADLER: **I'll so move to approve the addendum.**

CHAIRMAN BALLOU: We have it up on the board, Bill.

MR. ADLER: Okay yes, well that is one of those things. I want that.

CHAIRMAN BALLOU: At least we had it. I thought we had it. I'm sorry; I might have jumped the gun. I looked up and saw language that looked to me like exactly what we were needing. But I think I know you well enough to know that you're going to defer to staff on this, so I think staff is putting up the motion as we speak.

There it is; move to approve Addendum I as modified today. It couldn't be simpler. Moved by Bill Adler, is there a second? There is a second by Emerson Hasbrouck. We've had a good discussion on this, so I'm just going to assume we're ready to vote. It is a final action, so we do need a roll call vote; so I'll be asking Megan to call the roll now.

MS. WARE: Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. CHERI PATTERSON: Yes.

MS. WARE: Massachusetts.

DR. PIERCE: Yes.

MS. WARE: Rhode Island.

MR. ERIC REID: Yes.

MS. WARE: Connecticut.

MR. SIMPSON: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. ANDY SHIELS: Yes.

MS. WARE: Delaware.

MR. JOHN CLARK: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

DR. MICHELLE DUVAL: Yes.

MS. WARE: South Carolina.

DR. MALCOLM RHODES: Yes.

MS. WARE: Georgia.

MR. PAT GEER: Yes.

MS. WARE: Florida.

MR. JIM ESTES: Yes.

MS. WARE: NMFS.

MR. DEREK ORNER: Yes.

MS. WARE: Fish and Wildlife.

MS. SHERRY WHITE: Yes.

CHAIRMAN BALLOU: **Thank you, the motion carries unanimously;** and we did a great job with that in terms of keeping on time.

SET ATLANTIC MENHADEN FISHERIES SPECIFICATIONS FOR 2017

CHAIRMAN BALLOU: Let's see if we can continue that with our next item, and that next item is Fisheries Specifications for 2017. This is a final action item. We have one hour set aside for what I anticipate will be a robust discussion and decision on the issue.

In terms of how we'll proceed, I will be first going to Megan for a staff presentation, then to Jason McNamee for the TC report, and then to Jeff Kaelin for the AP report. After addressing any questions the board may have for Megan, Jason or Jeff, I will be providing an opportunity for public comment. I will do so at that point. Then I will come back to the board for motions. That is how I plan to proceed, and with that I'll turn things over to Megan.

OVERVIEW OF SPECIFICATION PROCESS

MS. WARE: I am just going to be very brief, but my goal here is to help provide context to this discussion; since we don't have a formal recommendation on this. In Amendment 2, the board can set an annual or multiyear TAC through board action. This is supposed to be based on the best available science, which will be the projections that Jay will be showing momentarily. In the TC memo there is no recommendation from the TC.

I think our discussion today is going to be focused on risk and what level of risk the board is willing to accept when setting the TAC. We have a Risk and Uncertainty Working Group that is starting to think about these issues, but they have not completed that process yet. My goal is just to get everyone on the same page as to what risk is, and look back and see what risk the board assumed in 2015. Going off of the definition here; risk is a chance of adverse effects from deviations from expectations.

This is stemming from variability and uncertainty, which is very prevalent in fisheries management, and what makes our job exciting and also challenging. We have different sources of uncertainty, and many of these are coming from some of the thoughts that the Risk and Uncertainty Working Group is thinking about now. But we have biological uncertainty, so there are changes in recruitment, species interactions. We have management uncertainty, so either illegal or unreported catch; if bycatch goes over what we think. Scientific uncertainty is if we have incomplete data or imperfections in the model, and then ecological uncertainty; so changing ocean temperatures, phytoplankton abundance. All of these things influence the uncertainty and the risk that are within the menhaden fishery.

We can look at the board decision in 2015 to kind of gauge where we were last time, and hopefully, this will inform the discussion today. In 2015 the board decided on the 10 percent increase in the TAC, and it is in between two of the projection runs; and I've outlined those in red on the slide. The top chart is the percent risk of exceeding the F target, and the bottom chart is the percent risk of exceeding the F threshold.

In 2015, the board assumed between a 57 and 62 percent chance of exceeding the F target, and then in 2016 that decreased to 28 percent, between 28 percent and 35.5 percent. In terms of exceeding the F threshold, the board assumed a 2 percent risk in 2015 and a 0 percent risk in 2016. I am hoping that this is brief but informative as to what happened last time, and can provide some context; and I'll pass it off to Jay.

CHAIRMAN BALLOU: Jason, actually before you begin, I just want to interject briefly here. I think you have a slide at the end of your presentation synced with the TC **r**eport, which is in the meeting materials; that addresses the TCs comments on the paper titled The Fate of a Atlantic Menhaden Year Class.

Because that paper does not relate directly to the issue of 2017 specs, I would like to just hold off a bit on that until the board gets through the spec setting process; then immediately circle back to it. If you could just hit the pause button maybe when you get to that point in your presentation, we will come back to it after we complete the spec setting process.

TECHNICAL COMMITTEE REPORT

MR. JASON McNAMEE: I think Megan may have actually moved it to make that flow a little better, so we should be all set. My name is Jason McNamee; I work for the Rhode Island Division of Marine Fisheries, Chair of the Menhaden Technical Committee. I've got a brief presentation here where I'll walk through some of the projections, some of the numbers; so you kind of understand the playing field a little better, and we'll get into some risk and uncertainty discussion, as well.

A little bit about the projection set up, just to catch you back up. At your last meeting the board approved using the Beaufort Assessment Model; this is the approved menhaden model; the BAM model is how we commonly refer to it. We followed the projection methodology that we had detailed during the last benchmark stock assessment in 2015.

A couple of the assumptions that go into these projections, and these are sort of standard assumptions for a lot of species that you all deal with when you're talking about projections. But some of the assumptions are, there are a lot of functional forms used to describe population dynamics; so these are curves to describe selectivity and things like that.

Dome-shaped selectivity would be an example of that. One of the other big assumptions is that median recruitment over time is what we are assuming as we kind of tick forward in the projections. Another one is that the allocation stays the same between bait and reduction; so when we project forward, we're assuming that things are staying relatively stable with regard to which fishery is operating on the population. The biggest impact has to do with the selectivity that we're applying. We also assume that fishing mortality occurs throughout the year. One of the things that you approved is updating the catch input, so we had some data available to us that we didn't have when we ran the projections after the benchmark.

We used actual landings for catch input in 2014 and 2015. The numbers are up there. Then we assumed that the entire TAC is taken in 2016, sort of a standard assumption when you are in the middle of a fishing year and you're not sure what happened yet. I think that may say 187,800; it should say 187,880, sorry about that.

The projection timeframe, 2017 is the terminal year of the projection. The reason for that is in particular, with a species like menhaden, you don't like to project out so far that you lose all of the existing data points, so 2017 we still have some information that came out of the terminal year of the stock assessment that is informing the projections.

Just to give you a quick look at current stock status. Here is the mean F for ages 2-4, so that is on the Y axis, and then the X axis on this graph is year going up in year from left to right. You can see both the threshold and the target; indicated with the straight lines that are on there. You can see our mean F is below both the target and the threshold in the terminal year of the stock assessment.

At the same time, when we're looking at biomass, in the case of menhaden we're talking about fecundity; a little bit different there. The Y axis is fecundity increasing as you go up the Y axis. Again year along the bottom, again target and threshold are noted on the graph in the multicolored straight lines there.

You can see that fecundity in the terminal year is a little bit below the target, but kind of bouncing right around that target at the top of the chart there. At the last board meeting, you all provided us some very good guidance, as far as what you wanted to see. I think there are a total of; I think it is nine runs that we performed all together. I'm sorry if I got that wrong. But there are several runs that you asked for.

We broke them on to two slides so that you could actually read them. This first slide sort of indicates the first run there. Number 1 is just status quo; if we just rolled forward with the current TAC as specified. Then Runs 2-5 are different increases to that current TAC. It goes from 5, 10, 20 up to 30 percent, so you can see both the percentage increase as well as the specified TAC that that represents on this slide.

There are tables and stuff that we'll kind of hang on at the end so you don't have to memorize this stuff at this point. Hey, it was right, nine runs all together; so 6, 7, 8 and 9; so Number 6 is actually another increase. That is a

40 percent increase from the current TAC. Then 7, 8, and 9 these are based on risk. These are your risks or the probability rather of being below the F target in 2017.

You can see that probability increases as you go 7, 8 and 9; and you'll get a better look at what those numbers represent as we continue through our presentation here. Here is the first table. I took all of the increase, just the proportional increases to the current TAC. I put those on a single slide. Number 1 is the status quo, current TAC, and then 5, 10, 20, 30 and 40 percent increases to the current TAC. The second column over in this table is what that TAC would be, as calculated. Then the next column over, risk of exceeding the F target, so this would be with relation to fishing mortality and it would be the risk that you have of going over; getting into a stock status. But we're talking about the target here and not the threshold with this first column.

Not surprisingly, as you increase your harvest, the risk of exceeding the target increases. The final column, all the way on the right, that is your risk of exceeding the F threshold, so between target and threshold is the area that you want to be in; managing toward the target, but the threshold sort of bounds where you are.

You can see none of these has a risk, according to the projections, of exceeding the threshold. The next table, these are now the ones that are based on risk. Again, you can see the TACs associated with those different probabilities of being below the F target. Those numbers are reciprocal of each other.

Maybe that was sort of confusing, we apologize for that; sort of talking about it in two ways. But again, the middle column there just to the right of TAC, that is risk of exceeding the F target, and you can see that sort of corresponds with how we kind of set the projection. But again, in none of these runs is there a risk of exceeding the F threshold.

This has an animation on it that we'll kind of click through. Megan did a nice job of talking a little bit about risk and uncertainty; and I'll give it another shot. We've already talked a little bit about risk in the tables. Those are sort of noted by those proportions that I just kind of stepped through. Another way that this is represented to you all in the Technical Committee memos, with these plots that had all kinds of lines on them.

We wanted to just highlight, when you're looking at that stuff so it's not confusing, we wanted to talk about it a little bit. The projections are highly uncertain; I said that probably a thousand times already. The uncertainty, it is captured in the tables as I mentioned, and again in these figures. What we're representing first, to kind of orient you to these, there are four plots up there and I'm not expecting you to be able to read them.

They are in your memo; I'm just trying to give you a little more guidance as to what you're looking at when you're looking at the memo. Top left is the projection of fecundity. This is your biomass proxy. Just to the right of that is recruits. Bottom left is fishing mortality, and then the bottom right is the landings that are calculated by the projections.

There are these sorts of symmetrical lines, so the colored lines again represent the target and the threshold. Then you've got these solid and hashed lines that are kind of curve like, I guess. The first one, the one right in the middle there with kind of the big dashes that is the 50th percentile, so when we run these projections, we run it with certain types of uncertainty accounted for.

We do what we call a bootstrap, so we kind of run these with different starting inputs, and then do a projection run and then do it again and do it again. It is pretty amazing with the power of our computers now, we can do that pretty rapidly. Guessing there is probably about a thousand bootstraps. I can't remember

exactly how many Amy did. But the one in the middle that is the middle of all of those, we'll just call it 1,000 runs. The next line is kind of the dotted lines there. That now bounds all of the different runs by the 25th and 75th percentiles.

What we're trying to do is show you that you can get a lot of different answers from the projections, and you can look at where the majority of those projection runs fall, and that gives you a sense of judgment of how much risk there is involved with picking any specific point in any given year.

Then the final solid lines here are the 95th and 5th percentiles. Hopefully, that helped a little and wasn't more confusing. All right, caveats, I said this to you before. We think it is important to highlight again. We ran these projections. One important thing, we put a lot of uncertainty into it. But one type of uncertainty that we've not accounted for is structural, or what they call model uncertainty.

It is important to understand that these projections are accounting for uncertainty; but a very specific type of uncertainty. Again, they are conditional on functional forms, selectivity, recruitment, things like that are kind of based on history and things like that. They are not based on actual data but on modeled representations of reality.

Again, the fisheries were assumed to continue at current proportions of allocation between bait and reduction; using current selectivities, so if new management regulations that alter these that would affect the projection results. If that were to change, our projections become less reliable. If future recruitment is characterized by runs of large or small year classes, like a number of years in a row that are below average; that would affect stock trajectories, things like that.

I think this is the final caveat. The projections apply the Baranov Catch Equation, and the important assumption associated with that is that mortality occurs throughout the year. If you were to put in seasonal closures or something like that, that affects that assumption and can change the projections. That is it on that, Mr. Chairman. I am happy to take any questions on the projections.

CHAIRMAN BALLOU: Excellent report, and I will take questions now for Jason. Again, I want to just note that it is question time, not comment, opinion, position time. Please, we will be getting to that; but for now any questions for Jason on his presentation?

MR. SIMPSON: Very helpful presentation, as usual. I note that the projection starts in 2014, goes out to '17, it appears the error bars are a little wider in '14, a little narrower in '17; seem to be. I am wondering actually, is this through 2013 data and you're actually projecting '14? Where does the projection start; would be my first question.

MR. McNAMEE: Good call, David, and yes, that is absolutely true. The terminal year of the stock assessment is 2013, so the first year of projection is 2014. I think you're correct, depending on which metric you're looking at, they do kind of condense as you get out in the projection; and I think a lot of that is because of the recruitment.

The very reason why I made the comment about keeping at least one cohort, you can think of it that way, in there that we actually saw in 2013. Keeping one cohort in the projections, because as you get further and further out, everything becomes projection model assumed, and so the uncertainty decreases.

MR. SIMPSON: To follow on that then. Given the comparatively short lifespan, or number of ages in the menhaden population now, it seems maybe in the neighborhood of 80 percent of the population is being projected out. In other words, this is largely a projection of not the stock with some adjustments, but the stock that

will be assuming recruitment. It is perhaps 80 percent dependent upon an assumption of recruitment, and not simply adding a couple of years to a very broad age structure type of species.

MR. McNAMEE: Yes, I will say, I am not sure I would necessarily -- just because I'm uncomfortable with that 80 percent number you threw out. I take your point that you were just kind of offering something in a relative sense. I think what you said is accurate. Menhaden, as we see them now, they do get out to 4, 5 and 6.

But we don't see very many of them as it stands now, and so that is correct. That is why we suggest not projecting beyond 2017, because it becomes much more uncertain at that point; because everything becomes contingent on these functional forms and this sampling from the median recruitment and that sort of stuff.

MR. O'REILLY: This is along the lines in some way of what David was just asking about. Jay, what you said was projections are highly uncertain; then we have five uncertainties that you covered. I'm wondering if that is any different than say, if you worked with other species, could you sort of indicate whether these uncertainties are much different?

Is this sort of typical for running projections? Then the other part of that is, having an endpoint of 2017, so having a narrow band of the projections. How does that sort of mitigate any problems with uncertainties, and then later on when we talk about this risk?

MR. McNAMEE: I think the answer is, or maybe you weren't looking for a yes or no answer. I think what you said is accurate in that the shorter projection mitigates the uncertainty to some degree. I think that comment is accurate. Then the other aspect is, is this wildly different from other species; and the answer to that is no.

All of these assumptions when you're projecting forward, these are statistical models, so a lot of the species that we deal with at the commission are modeled with statistical models. You should be fairly familiar with these assumptions and the uncertainties associated with them; because they are fairly common across species.

Each species has the risk associated with those various assumptions. It may change on which assumption is more important for any particular species, but in general, there is nothing unique about the uncertainties with these projections that is specific to menhaden.

MR. EMERSON HASBROUCK: I have two questions for Jason. One is, you had mentioned how the model uses median recruitment over time. I'm just wondering what that timeline is, how far back did you look to use the median recruitment? That is the first question.

MR. McNAMEE: I think you can check me on this, because I think it's in the memo, and I get conflated a little bit with all of the different species that I work with. I'm pretty sure we use the entire time series for menhaden; and so it is the median with uncertainty based on the entire recruitment time series for menhaden.

MR. HASBROUCK: My second question is, on some of the parameters as you pointed out; it is quite a difference between the 25th percentile and the 75th percentile. On the output, in terms of 1percent risk of exceeding F target, is there a statistical significance? Is there a significant difference between some of those projections? I would guess, for instance, there is a significant difference between status quo and a 40 percent increase. But is there really any statistical difference between a 5 percent and a 10 percent or a 10 percent and a 20 percent increase, for instance?

MR. McNAMEE: That is a tricky answer. I think the way to think about it, this was a really healthy discussion at the Technical Committee meeting; specifically about these plots, the

uncertainty plots and the uncertainty bounds that we were representing. The way that these are performed, it is not necessarily probabilistic, where you could determine statistics based on it.

I think the better way to think about it is, all of these various runs are all plausible. The median kind of hits the middle, but that doesn't mean that that is the most likely scenario. What it means is that is the middle of all the scenarios, and then as you spread out from that central value, you are just bounding; more of the runs fall within this range, and so you can have a level of comfort.

Whatever your level of comfort is, whether you are okay being in that 25th, 75th; that is a lot of the thousand runs, and so I'm comfortable with those, or if you want to be really certain, I want all but 5 percent to be within the range that I'm comfortable with. That is kind of the way you can think about it. They are all plausible, each of those individual runs; and you can just sort of bound the upper and the lower range of your comfort level with the risk you're willing to accept.

MR. JOHN McMURRAY: Regarding the projections in the level of uncertainty, was there any accounting for predator/prey interactions in that?

MR. McNAMEE: Good question. Predator/prey interactions specifically, the answer is no. There is natural mortality assumption in there, and so natural mortality is, not to demean it, but sort of a catch all that is supposed to account for predation. All of the removals that are not attributed to fishing, so natural mortality is in there; specifically, predator/prey interactions, the answer is no.

MR. McMURRAY: Just for clarification; that M2 value really just accounts for predator impacts on prey, and not the impacts a reduced amount of prey would have on predators, correct?

MR. McNAMEE: Traditionally, the definition of M2, I think what you've said is correct. We do not partition natural mortality. There is a single M, so it is not partitioned into M1 and M2 for the projections or the model for the BAM model for that matter.

CHAIRMAN BALLOU: Next I have Bill Goldsborough.

MR. WILLIAM J. GOLDSBOROUGH: I think my question was asked, but maybe I'll just boil it down and ask it anyway; and that is just for clarification, Jason that the projections are based on the last assessment and the reference points in the assessment, correct?

MR. McNAMEE: That's correct.

MR. ADAM NOWALSKY: You've been doing these projections for a long time on many different species. Can you let us know when the last time every run you did for a species generated a 0 percent chance of overfishing; and what was your last recollection of a management body taking management action on 0 percent risk of overfishing?

MR. McNAMEE: Yes, I think the answer is I don't know that I've ever experienced that personally. I think it is a good observation, sort of unique in this situation with menhaden, relative to other species that I've dealt with, which I think the ASMFC has dealt with.

CHAIRMAN BALLOU: Any other questions loaded or unloaded. Seeing none; there will obviously be more time to circle back to this; but at this point, I'm going to turn it over to Jeff Kaelin for the AP report.

ADVISORY PANEL REPORT

MR. KAELIN: Again, you've got the drafted report in front of you. The point I didn't make earlier, we only had 5 of 15 AP members on this call; and that is why later in the agenda the board will have an opportunity to discuss

repopulating the AP. However, two AP members advised that the board maintain the current TAC; 188,000 metric tons, until Amendment 3 is completed and implemented in 2018.

They stated the purpose of the amendment is to reallocate menhaden between states and the ecosystem. To change the TAC before this time would be premature, given ecological reference points are being developed, and there is an ongoing socioeco1nomic study on the commercial fishery. Furthermore they expressed concern that the projections are based on the current single species reference points, and therefore do not consider the impact of an increased TAC on predators.

Overall, these AP members recommended the board maintain the status quo TAC until the ecological and socioeconomic implications of an increase can be fully understood. I believe that the BERP process is supposed to be completed by 2018 or 2019. Two AP members recommended the board increase the TAC to a level that has a 50 percent probability of being below the F target in 2017, which is a 267,500 metric ton target.

They felt that the resource is under fished since there is a high abundance of juvenile fish in the bays and estuaries, and many states directed fisheries are already closed. As a result they felt the risks associated with a 50 percent probability of exceeding the F target is well within the sustainable limits of the menhaden fishery.

These members also stated the recent stock assessment was robust and considering predator needs, and they were not concerned the projections are based on single species reference points. Furthermore, they stated that Amendment 3 will primarily focus on allocation, and as a result there is no need to hold off in a decision regarding an increase to the coastwide TAC.

One AP member felt that a 40 percent increase in the coastwide TAC was too large; but didn't provide specific detail on what level of TAC he preferred. Mr. Chairman, I'm in receipt of the memo that basically says if I want to make any further comments I should go to the microphone. I'm not going to do that in the interest of time, because I think it's pretty clear to the board members that I was one of the two AP members that recommended an increase; so I won't take any more of your time on that.

CHAIRMAN BALLOU: Questions for Jeff on the AP report.

MR. NOWALSKY: Mr. McMurray asked a question about the accommodations within the projections for predation. Then we have the comment in the AP report that some AP members felt the recent stock assessment was robust in considering predator needs. Can you refresh us what those considerations might have been in the last stock assessment that is going into the decisions that we're deliberating on today? Assuming that is an accurate statement from the AP, and that might be for staff or somebody to answer as well.

MR. KAELIN: I guess I'll turn it over to Jason, but my understanding is that this M vector that has been generated in the BAM model is to the extent that data is available, does try to project predator needs, and that the human predators get the remainder. It is our view in the industry that even though the BERP process hasn't been completed and we don't know what the impact on the predators are, whether they're all healthy or whether there is an impact from menhaden or not.

We pointed out that that process isn't completed until 2018 or 2019. As you pointed out, this is a very unique situation, where all the options in front of the board are all about eliminating under fishing and we're nowhere near overfishing. I think that the industry people on the call feel that the BAM assessment model, to the extent that the data exists,

project predator needs adequately. I don't know if Jason wants to fill in the blanks on the M vector or not; but thank you for the question, Adam.

MR. McNAMEE: Yes just a comment. Maybe I'll speak about the robustness. In the assessment, so just to be very clear; M is not explicitly about predation, M is about predation and old age and environmental mortality. All of that is captured in M, so it is more than just predation; it goes in as a single value by age.

We did test some uncertainties. Specifically, one of the sensitivity runs we did in the assessment was to use the variability from the multispecies, the MSVPA model that exists that we updated with the last benchmark. That creates an age and time specific natural mortality matrix; and so we use the variability in that matrix, the variability not the values, and ran sensitivity based on that variability. You can make a judgment as to the robustness, but it was certainly a sensitivity that we tested in the assessment.

CHAIRMAN BALLOU: Any other questions for Jeff? Seeing none; I am now going to provide an opportunity for public comment. We have a public comment microphone in the back corner, so if you have an interest, please head that way. I ask for your indulgence in three ways; first, please focus your comments on any of the nine options that are before the board on this issue.

Please be as concise as possible, and by that I mean three minutes or less, and lastly, please refrain from repeating any points made by anyone who may have preceded you. That is in the interest of trying to keep this meeting moving along. With that is there anyone from the public who would like to address the board? Yes, Patrick, and please even if I know who you are and am good in saying your name correctly, please identify yourself before you speak, thank you.

MR. PATRICK PAQUETTE: Patrick Paquette; I am a recreational angler and stakeholder representative from the Commonwealth of Massachusetts. I am very happy today to come to you singing a different song than I normally do when it comes to menhaden, because in the first time in over 15 years, the southern waters of Massachusetts are chock-a-block full of menhaden. From an area called the Golf Balls, or basically for the line where the Mid-Atlantic Byte of the western North Atlantic Ocean meets, where the Mid-Atlantic and the North Atlantic meet at Ray's Point; south of that our waters are filled with menhaden.

Striped bass have come in from the deep waters and we're experiencing some of the best inshore fishing that we have in a decade on the back side, to the point that in the last two weeks, members of the Massachusetts Beach Buggy Association, the beach buggy crowd tends to be an older crowd now. Younger people don't go to the beach that way anymore, because the fishing has been quite frankly horrible for years.

But shore fishing is rejuvenated, 65 year old women and 75 year old men are posting pictures on social media of 35 pound striped bass caught off of Nauset Beach, where the world record once came from. It is like our ecosystem is rejuvenated; and oh by the way in all of these posts, not one complaint about seals.

There is enough forage on the back side of the Cape for the first time in a couple of decades; that we're not complaining about seals. That is what you folks did in Amendment 2. You put a quota on menhaden, and for the last four years we have watched incremental recapture of the stocks range to the north.

We watched last year as that wall of menhaden came all the way up to Narragansett Bay. The year before they flooded the Sound, we've got the luxurious problem of New York having to hire commercial fishermen to empty out a river

to avoid a fish kill. The people in Massachusetts Bay haven't yet experienced that.

This wall of menhaden reaches Ray's Point, and it hasn't quite gone that much farther. Yes, there is an episodic event going on in Maine, but in Gloucester where there used to be a plant for menhaden, they haven't seen it yet. In Boston Harbor off of Duxbury and that part of Massachusetts Bay that is next year.

I'm pretty sure it's next year, because I believe in what I've watched for the last four years. The northern end of this range is starting to get fish back. If this were river herring, the TC and the scientific heavyweights around this board would be talking about letting the species have one full generation of recovery throughout the range, before we started to put precautionary regulations on increasing harvest.

I agree there is a harvest increase coming. I'll agree with that. I believe that Massachusetts commercial fishermen should be selling bait to the Massachusetts tackle shops that I represent. I believe that the Rhode Island bait fleet needs more bait, because they have fish. But I think you only do that when the range has been recaptured, and you do that while you do ecological reference points in Amendment 3.

That is the time for the increase. You say, and I understand, Mr. Chair, you need me to be done. Just this last point, the industry said through the last AP meeting that they want stable regulations. To increase today and then in Amendment 3, after the next stock assessment in what two years, to be talking about some sort of ecological reference points with an allocation redone. There is going to be changes. Why would we do a short term thing right now for one year, when for most states it is going to be like less than 1 percent? It makes no sense for us to do the increase now. There is an increase coming, it should be done when Amendment 3 goes on the water, with ERPs and a reallocation; and that we set how this fishery is going to be managed into the future.

This seems just like short sighted and a little bit, I don't' want to say greed, but it is premature. Like we've got something really good going on with menhaden, and oh by the way, wouldn't it be nice for the ASMFC to have a flag beside striped bass to be proud of? You've got that opportunity right now.

We are so close; we are so close if you continue to do this right. You've done some courageous things that are finally paying off, and I get to come here and not complain about menhaden, and I love that and I thank you for that, and my angler's thank you for that. But let's just finish it. Let's let the rest of them have the fish, too. Thank you.

MR. TERRY GIBSON: My name is Terry Gibson; I'm from Florida. I'm an erstwhile charter captain and outdoor writer. A couple profound things happened this year. I got my first set of reading glasses, and I had my first baby in the same year. It gave me pause. I've been thinking about how long I've been trying to bring menhaden back.

I saw, as a child in the eighties, massive shoals of menhaden off southeastern Florida off of Stuart. Until a couple years ago, until 2012 when you actually took some dramatic steps to rebuild this population, I seriously doubted if any offspring of mine, if I ever had them, would actually get to see menhaden in our waters again.

They are certainly not there now, and to echo what Patrick Paquette just said, we've got to bring these things back to the full extent of their historic range; that is from Maine to Florida, not from the south side of the Cape to North Carolina, although there are a few fish off of South Carolina and Georgia and Florida.

But the kids that now think that there are huge schools of menhaden off of northeast Florida can basically net those schools up with one or two throws of the 12 foot net. I mean, the baseline shift here is so profound, and I just

don't feel like the science is reflecting that. It really, really angers me that you all are sitting here considering an increase, when you've got more information coming in a year or so.

In all these models, biological reference points that are coming and that have been used elsewhere in the world successfully; and we're talking about increasing, taking away from future generations and not rebuilding fish in places that are in as much trouble as Florida is right now. I don't know if you all pay attention to what has happened to our estuaries, but they've collapsed; and this is not reflection on our Florida Fish and Wildlife Conservation Commission. They don't manage water quality.

I was talking to Jim Estes the other day, yesterday about this, and saying that some of our bait guy's landings are pretty steady. Well, that doesn't really show me fish on the water that shows how good of a fisherman they are. That is CPUE, that information isn't that valuable. I can tell you where they aren't, where it is physically impossible to catch them, and that is the southern extent of their range. I can tell you that fish captains throughout the southern states are struggling to catch the bait they need; because they haven't come back there yet.

We need to bring these fish back, everybody deserves them, so please do not make any changes in the allocation right now; let's be patient.

CHAIRMAN BALLOU: Would anyone else like to speak?

MR. BEN LANDRY: My name is Ben Landry; I'm with Omega Protein. I have spoken to a number of you all before. I think what this boils down to for me and for the people that I work with is the fundamental fairness of this species trying to be treated the same as other species. I've sat around this commission for a number of years seeing stocks of other species that have been far more troubled and the call from other groups are to delay; don't impose cuts, or let's wait until another assessment.

You have the exact opposite with this species. You have perhaps the most comprehensive assessment that was released just 18 months ago, showing that the stock is not overfished. Overfishing is not occurring. The TC runs these projection models on what would occur to the stock if different increases be put into place, and it shows such a little risk of even reaching the target in zero risk of overfishing the stock.

I hear from some commissioners, well that is not enough for me. Zero percent likelihood of not overfishing the stock is not enough. I don't know what that commissioner needs to be convinced that this is a robust stock; it is expanding in its range. That is of no debate. We spent the earlier part of the morning working on provisions in Addendum III to help fishermen navigate the regulatory process.

You could help fishermen very easily by increasing this quota right now with very little risk of reaching the target; no risk of overfishing the stock. The time is now. I don't know, I can't count on there being a future time where we have this discussion. There is very little risk now. I would suggest that 20 or 30 percent increases are still being very reasonable to protect this stock.

Secondly, I hear from a lot of commissioners that my allocation is low, an increase won't help my fishermen. I couldn't disagree more. Is it the allocation that you want; perhaps not. But there is not a fisherman here that would turn down a 20 or 30 percent increase to their bottom line. You're just kidding yourself if you think that you're the one protecting your fishermen. That fisherman wants access to more fish, and you could do so with little risk. I thank you for your time, and I appreciate your deliberations.

MR. DAVID SIKORSKI: My name is David Sikorski; I am the Government Relations

Chairman for CCA Maryland, and I am also a Menhaden AP member. I won't say much, I will say that I support what Mr. Paquette said, and want to provide a little perspective in Maryland, with regard to the abundance and the state of the stock there; and how it relates to your decisions you're facing today, and also a comment about the science and I'll leave with that.

You increased quota as science guided you in the past, as you initiated Amendment 3, and I think that was a right step in the right direction; and the press reflected that. Initiating ecosystem-based reference points and a small increase in quota was the right thing to do at that time. You have not received updated science to tell you what effect that had on the stock, and that is something should lead to the amount of caution that you use in making the decision moving forward. In the AP report there is something that I probably should have said on the AP call but missed, and so I'll say it now. For a forage species like menhaden, I don't believe under fishing can occur. These fish are utilized by a number of predators that this board manages and this board doesn't manage; endangered species, all that other kind of stuff, birds, and we're seeing that expand.

The stories that Patrick is talking about are successes that we're seeing. We have striped bass on the rebound. We've had good young of the year; those fish need the young that this menhaden adult stock can produce. I was fishing last week on the Bay during Artificial Reef deployment that CCA did. There were peanut bunker everywhere, and I haven't seen them in that quantity in a long time.

Our striped bass have been gorging on Bay anchovies and silversides, because it is all that's left. But we're starting to see some young of the year, we're starting to see maybe some abundance and some increase in the recruitment of the stock. It's because of the good work you did by reducing quota and being cautious. I urge you to continue to be cautious, and I appreciate the time to provide comment, thank you.

CHAIRMAN BALLOU: Is there anyone else? Yes, I'm sorry three hands up, just next up.

MR. GREG DiDOMENICO: Two of them were mine, Bob; I tricked you, given your eyesight this morning. My name is Greg DiDomenico; I am the Executive Director of the Garden State Seafood Association. I am going to be as brief as possible. I'm speaking on behalf of a group of fishermen from New Jersey who are in the gillnet fishery and in the purse seine fishery.

I mention that because I've heard testimony prior to me that they are speaking on behalf of other people, who have also seen increases in the stock. Now, please remember that the New Jersey fishermen took a very, very serious and significant reduction in their fishery when the commission took action a few years back to implement the quota. You did so, on similar advice or similar results from an assessment, as you have today.

I'm asking for the same reaction that the commission took when you received information that the stock was slightly overfished in its terminal year. Now, you have an opportunity to increase landings based upon best available science, based upon a stock that is highest it's ever been in the last 15 years, based upon a series of increases that have zero risk of overfishing. I am asking for some consistency. I'm asking for the commission to understand the impact to fishermen from our state who were greatly impacted by the actions you took a few years ago.

They want to be successful, as well. They are asking me why there is even a discussion about increases in this fishery this year; given the science and given the fact that there is a 0 percent chance of overfishing. I have to go back and explain to them how this commission took action. I hope I can go back and say that they increased it by 40 percent; they abided by the

science, which says, there would be a 0 percent chance of overfishing. I support the 40 percent and I thank you.

CHAIRMAN BALLOU: Anyone else, yes, sir. Thank you, everyone has been keeping within three minutes, and I really appreciate that. It really is helping with the flow of the meeting, thank you.

MR. MONTY DIEHL: I will be brief, my name is Monty Diehl; I was the general manager of the Omega Protein Plan at Reedville. There is no one in this room who three years ago had to sit and tell more people that they had lost their jobs than I did. My family has been in this business working there for over 100 years. Many of these people were my friends, they were my family.

Many of those people are still not back to work. There is no reason now. No one blames this board for what happened three years ago. I sat through all the meetings. I think people did what they felt was right, and based on the information that they had at the time. But now you've got different information, and there is really no reason that we can't put all these people back to work.

MR. ROBERT NEWBERRY: My name is Captain Robert Newberry; I'm chairman of the Delmarva Fisheries Association. We are affiliated with the Southeastern Fisheries Association out of Florida. What we've heard today, we've heard several years back in Maryland. We were unfortunate that we had to take legal action, but during the course of that legal action we had found out that this species was not being overfished; that overfishing did not occur.

In the course, we may have lost the case on technicality, but on merits we established certain facts. Well, the year after that we received a 10 percent increase in our fishery in Maryland, and by the way, thank you very much for the bycatch that was approved here today. I'm going to be able to take this home to my people that I represent on the eastern shore of Maryland. They'll be very happy with this.

If you're looking at these facts that you've presented here today that there is a 0 percent chance of overfishing and affecting it, I can't see why there shouldn't be an increase. I mean it is up to this board to determine the percentage of the increase, I understand that. That is not my job. You know the old saying; if it ain't broke don't fix it.

All we've heard is an increase and increase. I'm fortunate enough to be on the Chesapeake Bay a majority of the week, and I also do some offshore fishing. I mean I've seen an increase in the Chesapeake Bay in the amount of fish that we had. I mean I'm out there every day. I'm not like a lot of people that study it, that come out occasionally.

I'm out there; I try to be out there seven days a week, unless I'm fishing in the ocean. Last year we saw as far out as 55, 60 miles to our amazement large schools of menhaden out on the edge of the Baltimore Canyon and south in the Washington Canyon. The fact is the fish are out there. Our fishery in Maryland is so limited.

We're stationary gear, and you can probably count all our menhaden fishermen in the Bay on two hands. But as far as it goes on the states, other states that can benefit from this from increased landings; I would urge this board with a 0 percent chance of any effectiveness on overfishing, to approve. It is your decision what percentage you want to go with. Thank you, very much once again for the 12,000 pound bycatch for our state. That means a lot for our guys, and it is a pleasure to be here today. Thank you very much.

MR. SHAUN GEHAN: Hi, Shaun Gehan; I work with Omega Protein and the Menhaden Coalition. I just want to raise a quick point; because we've heard a couple times, this recovery began because of Amendment 2. But I would point out that as the stock assessment

shows, we've actually been fishing under the new reduced fishing mortality target since 2002.

The population in terms of fecundity has been at its highest sustained level in those last three years of the assessment. Greg noted that the 2012 assessment showed a slight chance of overfishing in the terminal year, but also a severe retrospective pattern; which was overestimating fishing mortality and underestimating the population.

That was corrected in the peer reviewed benchmark assessment, and so it wasn't a dramatic departure in any sense from before, and I think that everyone, just what we've heard from testimony today from both sides, says the population is increasing. A 20 percent increase would put the fishery back to where it was those last three years, a little below where it was the last three years before Amendment 2, 2010 to 2012.

It keeps faith with the manager's promise that when we think action needs to be taken; we're going to take action. But it is always premised on the message to the industry that at the end of the day, when things are better, you'll benefit. That is all we're asking for, just put us back to where we were when we know this stock was fished below our current target, and the population was abundant. Thank you very much.

CHAIRMAN BALLOU: I see two more hands, so I'm going to take two more comments. Yes, the gentleman in the blue shirt.

MR. ROBERT T. BROWN: I would like to thank everybody for the bycatch that you all granted us; it is very valuable to our fishery. Robert T. Brown; President of the Maryland Watermen's Association, with there being no chance of, as they predict, of overfishing, we could really use an increase and we're due to it.

As you know, it has been hard for all of us to do this, and it was a hard decision for you all to make to cut us three years ago as you did. But a sword has two sides to it. Well, you used one side of the sword and you cut us three years ago; now, it is time to use the other side and cut us the same way and put us back on the right track to catching more fish.

It seems, like when we come up here to see us a fishery cut, we have to beg and plead to try to get it reopened again. The best science available says it's a good chance to open it up; that that is the right track. The fish are coming back. I heard them say before, they didn't see many small fish. They need to come around and look in our creeks during the spring and the early part of the summer.

We've had more small menhaden, say two to three inches or even smaller in the creeks; school after school after school in our creeks, and now they've moved out in the river some, but they are up on top of the flats in the shallow water, because they're small and they're trying to stay away from the bigger predators. We need the increase. We feel that it is time to do it, because the science is there to approve it; and I thank you very much.

CHAIRMAN BALLOU: Yes Ken, last comment.

MR. KEN HINMAN: My name is Ken Hinman; President of Wild Oceans and also a member of the Menhaden Advisory Panel. I've heard a couple of times this morning that we need to treat menhaden the same way you treat other species. We hear everybody looking at the single species assessment and the single species reference points applied to it, and the projections that using both of those things as if menhaden are just like any other species.

But that is the whole point; menhaden aren't like all other species. They are a critical forage species. Striped bass and a whole bunch of other fish, a whole bunch of other wildlife depend on abundance of menhaden. That is

why this commission since 2001 has been talking about moving to an ecosystem-based approach to menhaden.

That's why you initiated Amendment 3 a year ago, to develop ecological reference points, and that is why the BERP is looking at moving away from a single species assessment model to a multispecies ecosystem-based model. They are not the same as other species. Don't look at these projections, don't look at what you should do right now; in terms of menhaden as just any other species.

They are an important forage species, and you have to wait for this other information to come in. To give a raise now is like giving the employees in your business a raise before you figure out what your budget is next year. Next year we're going to have a lot of information on the way we manage forage species in other fisheries.

We're going to have a lot of information on allocation, we're going to have a lot of information to make the decision that you should not be making now. Make it then when you will make an informed decision, and you'll be able to manage this fishery and the abundance of menhaden for the long term, rather than just being flip flopping back and forth every other year. Thank you.

CHAIRMAN BALLOU: I just want to thank everybody who just spoke. I think this really helps inform the process, and I think everyone really offered their views in a very thoughtful and effective way, so thank you all for your contributions. Now, we turn it back to the board; and at this time, having pretty much covered all of the preliminaries, I would entertain motions, particularly, a motion on specifications for the menhaden fishery for 2017. I see a hand up, Marty Gary.

MR. GARY: I would like to put a motion on the table to start our discussion.

CHAIRMAN BALLOU: Go ahead.

MR. GARY: If I get a second to that, I would like to have an opportunity to provide some commentary to support that. **I would move to set the coastal total allowable catch of Atlantic menhaden for 2017 at 225,456 metric tons (20 percent increase from the current TAC).**

CHAIRMAN BALLOU: Okay, first is there a second to that motion. There is a second by Mr. Schill. Motion by Mr. Gary and seconded by Mr. Schill; and let's wait and get that up on the board. Let me say this, as we're getting that. Did staff get that or do we need to have that said again? As staff is getting it up, and I will come back to you, Marty, to make sure that we have it correct.

But as we're doing that, I would like to just ask for a show of hands. I want to make sure this is a balanced discussion, so we'll go forward in the way that we need to do; and that is we'll go pro and cons, a show of hands for those who would like to speak in favor of the motion that is being put up on the board. Mr. Schill, I will be going to Marty and Mr. Schill. A show of hands for those who would like, and yes, we have Russ Allen, as well. I won't call out your names. Megan will be writing them down; anyone else at this early stage of the game, recognizing that; early stage of the process.

Is there anyone who would like to speak in opposition? Keep your hands up, Megan is going to write down your names and I just want to make sure. We'll go through everyone. Keep your hands up as Megan writes them down. I see we're still working on the motion, but I want to back to Mr. Gary and make sure it's accurate. How are we looking, Marty?

MR. GARY: I think that captures the motion I made, Mr. Chairman.

CHAIRMAN BALLOU: With that, keep your hands up, we're making sure we've got everybody listed. You can put your hands

down, thank you, and if we miss anyone I will absolutely give you the opportunity. Everyone will get a chance to speak. I just want to make sure we do things as orderly as possible. Marty, I am going to go to you first for comments on your motion.

MR. GARY: Thank you, Mr. Chairman and members of the board, for the opportunity to speak to you. First, I wanted to say I was struck by Adam Nowalsky's question to Dr. McNamee about the risk and quantifying that against historical opportunities we've seen in the past. It really hit me; best science, 0 percent chance of crossing F threshold, and at best, in the most liberal option, a flip of the coin to surpass the target.

But at the same time, the science isn't perfect and the discussion is very energized with emotion and passion, and it is just not that simple. I wanted to give you a quick snapshot of our commission's perspective on this issue and why I put that motion on the table. First a snapshot of our fishery, we have 20 pound netters in our fishery.

They have a 2.5 million, approximately 2.5 million quota. They report weekly to us when they cross the 70 percent threshold of quota attainment, they have a mandatory telephone call in. When the hit the 90 percent threshold we project for the close date; make sure we don't surpass the quota and we shut them down, they switch to bycatch. We do thank the board for their vote this morning to afford more flexibility with the bycatch provision. In 2015, the most recent year I can reference, we attained our bycatch switchover on September the 25th.

Any increase in the TAC will help our fishermen in our pound net fishery and might eliminate the bycatch provision altogether for us; depending on the level of magnitude of the increase in the TAC. Our fishermen are supportive of a liberal increase, but again, that is the fishery; that is the pound net fishermen. It is more than that; it's a community, right. We're all interdependent upon one another.

We have other stakeholders, we have crabbers that buy bait from the pound net fishermen, and they want to see an abundant menhaden resource in the river; and they want to see a consistent supply of bait that they can use. We have an emerging blue catfish fishery, an invasive species that surpassed our rockfish landings or striped bass landings; and it is encroaching upon our menhaden quota incredibly. But they use menhaden for bait as well. We also have a for-hire fleet, charterboat operators, sport fishermen. They buy bait from our pound netters, and they want a supply of bait; but they also want to see menhaden in the river. They want to see an abundance prey resource for predator species like striped bass, weakfish and bluefish; so they care and they're concerned about the availability of menhaden, and opening up the quota too much.

After careful deliberation amongst our commissioners, and listening to all the feedback we had from our Finfish Advisory Committee, and the different members of our community as a whole, it is just not that simple to liberalize or hold status quo. All the groups had good arguments, the very same ones you heard from our public speakers.

A microcosm, the feedback to our commissioners was almost identical to what we heard this morning from the cross section of folks that spoke during the public speaking opportunity. Those of you that know the history of PRFC know from one side of the river to the other, menhaden management can and has been extremely polarizing.

I thought it was pretty amazing that after canvassing our commissioners, despite disparate viewpoints, almost unanimous support for a compromise; and that compromise was the 20 percent. That was based on feedback within our community, and then also reviewing the letters that all of you

took the time to submit; Wild Oceans, Ben Landry, others, forwarded everything to them. I think they really carefully considered this.

While our perspective on compromise of 20 percent might not be reflective of what you and your communities feel, we think that is a good spot; and I hope you'll consider that. But again, this is a broader issue than one fishery, one perspective, it is more holistic than that and we are interdependent.

At the PRFC community level and we're interdependent all the way up to this level, where all the representatives around the coast are sitting at the table to weigh in on this issue. I hope this is a good start to our discussion this morning. I'm not sure it will be representative of the end point; but I think from our perspective, it would be an area that we would be comfortable with.

CHAIRMAN BALLOU: Next, I'll go to Jerry Schill, whose name is also up on the board.

MR. JERRY SCHILL: Again, my name is Jerry Schill; I'm a one-time proxy for Representative Bob Steinburg, as I understand the SOPs. I can make motions, I can debate, I cannot vote. This isn't the first time I've carried a one-time proxy. In the late 1980s there was a Governor's appointee named Kenny Daniels from North Carolina that asked me to attend my very first ASMFC meeting, and I said sure; not knowing what the ASMFC was or did.

But on the plane ride up here, I actually read the charter, actually read it; and when I got here, I sat around the table and kept looking at the charter and listening to debate and thought, gee, they're not listening to their own charter. I made that point known and I was told that while I had some very valid points, the various reasons why that wasn't taking place; and I said, it doesn't say you should, it says you shall do certain things.

At that time Governor's appointees, legislative appointees were very slim around this table, and very little input from them. But that has changed to the good, I do believe. But I just want you know that sometimes onetime proxies don't come to you as a neophyte, but do know the process a little bit. Now, I did take a short respite from my duties in fisheries in North Carolina, and when I was up north in Pennsylvania spreading manure, I thought fondly of all the times I sat around listening to the debates of South Atlantic Council, Mid-Atlantic Council and the ASMFC; and I do say, fondly.

When you go into a barn, fresh hay with timothy and clover and alfalfa, it has a narcotic effect; so much so that I found myself missing Tom Fote. Tom and I go way back. Listen, I've sat around these tables. I served two terms on the South Atlantic Council, and many times I go back to commercial fishermen and they would say, whose side are you on, anyway? But when you raise your right hand to do this job, you don't take it lightly.

You don't raise your hand to represent a certain organization, you raise your hand to do the right thing of what you're charged to do, and I took that very seriously. The one thing and I very much agree with a lot of the things that Mr. Gary said. I am very pleased that he mentioned blue catfish. I believe that is something that this board needs to take very seriously.

It is a threat to our ecosystem, and I think that is one place where recreational fishermen, commercial fishermen and environmental causes can get together and work on jointly. But I look at this as a little bit different, because over the years I've had to be the bearer of that bad news. My job wasn't just to take the charge of what commercial fishermen thought, and go and be like a bull in a china closet and do their bidding.

It was also to take information that I gathered in places like this back to them, and be the bearer of bad news; whether it be to address trawl bycatch in the shrimp trawl fishery, or turtle excluder devices in the shrimp trawl fishery, or dealing with ITPs for sturgeon or whatever. Again, many times, even to this day since I've been back in the saddle the last three years; that who's side are you on anyway.

You know when you go to them and the science says, you have to take reductions; it is a bitter pill to swallow, but that is what you have to do. But when the shoe is on the other foot, as in today, fairness ladies and gentlemen, is what this is all about. Now I could talk to you about what this means to North Carolina's bait fishermen.

We banned the reduction fishery, I think, unwisely in 2012. If I had been there, I don't think it would have been done by the General Assembly, but that was based on based on bad information. I think it was wrong for our General Assembly to ban the reduction fishery. That is not fair; it was based on bad information.

This is a time to start payback. Fishermen aren't seeing it. I hate to say this, but since I've been involved in this, and 1987 is when I started. The number of commercial fishermen in commercial fishermen in North Carolina has declined. The number of commercial fishing boats has declined, and the average age of commercial fishermen is increased greatly.

Now that's not great, so in those years that I've been involved, it is kind of like building a house for 30 years and you haven't got beyond the foundation; as a matter of fact it's gotten less. It is not a very easy way to do things, but ladies and gentlemen, again, this is all about fairness. We're talking about a 0 percent probability of exceeding the threshold fishing mortality rate. Finally, I will say this, in keeping with the onetime proxy, if I wasn't a onetime proxy; I would have amended the motion for 40 percent increase. But I know Bob Steinburg, I know how he feels, and that is the reason why I'm agreeing to a 20 percent increase; and I thank you very much for your time.

CHAIRMAN BALLOU: Next, I'll go to Robert Boyles.

MR. ROBERT BOYLES: These are challenging times, a lot of complex issues, a lot of competing interest; and I would like to thank everybody who has shown up today to comment. I would like to thank everybody who has shown up and has participated in what I think is a bastion of liberty.

Difficult issues, complex questions, competing interest and a lot of passion. I thank everyone around the table and in the community for sharing those with us. I think where I find myself with this situation with menhaden, I have, I would like to lay out to you, maybe four interests. I think I am interested in developing a long term strategy for effective management of this very, very important resource; upon which so many people's livelihoods, avocations, communities and recreation depends.

I'm interested in getting things correct. We made a commitment, this board made a commitment some time ago to develop, we begin to work on Amendment 3, with two very, very big and very, very complicated tasks at hand; and that was to deal with the complicated and challenging and vexing issue of allocation, and also to deal with the complicated, vexing, equally difficult issue of developing ecosystem reference points.

From my perspective, Amendment 3 is the prize, and I recognize and appreciate the sacrifices that have been made by industry. I recognize and appreciate the sacrifices that have been made by many people to engage with this board to share their wisdom with us. It is the Wisdom of Solomon that I pray for today.

Mr. Chairman, I believe we have one opportunity here to get things correct, and I think that opportunity is Amendment 3. Complicated, challenging, competing interest, a lot of passion, but I think we need to maintain our commitment to deal with these issues headlong; and I think we need to have the opportunity to fully discuss and consider the impacts of the long ball game with Amendment 3. There are two things that have struck me as we have discussed these issues for many, many months.

Clearly, everyone here is very, very interested in the sustainability and the health of the resource. I think we all can deal with disagreement and divergence of opinions. I find it difficult to deal with apathy, so I am grateful that we're not dealing with apathy about the menhaden resource. I am grateful for that. The second thing, I think, that we can offer is stability in the decision making process.

I'm concerned with the motion on the board that we may find ourselves painted in the corner once we get the results of the next stock assessment. Once we hear from our technical advisors on how we deal with ecosystem reference points**. I'm afraid we may paint ourselves in the corner with this motion today, so Mr. Chairman, with that, I would like to make a motion to amend Mr. Gary's motion to maintain status quo for fishing year 2017.** Thank you.

CHAIRMAN BALLOU: Is there a second, seconded by Ritchie White. We have a motion to amend, and I'm going to wait until it gets up on the board; but I believe the motion was to amend by maintaining status quo for the 2017 fishery. I just want to make sure we get that correct. We have a motion by Mr. Boyles and a second by Ritchie White; to maintain status quo for the 2017 coastal TAC for the Atlantic menhaden fishery. Is that an accurate read of your motion, Mr. Boyles?

MR. BOYLES: Yes, sir.

CHAIRMAN BALLOU: Let me go to Ritchie White for the next comment.

MR. G. RITCHIE WHITE: It is always extremely difficult to follow Robert, so I have very little to add to his eloquent remarks. What I would add is, my constituents have told me that even though there are finally some menhaden north of us in Maine, we have not seen any in New Hampshire yet.

Their comments are, we're finally starting to see some, don't screw it up. Give it a chance to fill in some more. Give us a chance to see some for a few years. With those comments and with all the other public input that we've gotten, which is overwhelming, I support this motion.

CHAIRMAN BALLOU: I'll go to Russ Allen next.

MR. ALLEN: Obviously, I will not support this motion. I would be remiss to my constituents, who have suffered from the cuts we have made; that wasn't a bad thing, it is what we did. We have a 0 percent chance of overfishing, and there should be some sort of opportunity for them to get some of this back.

Our purse seine fishery is closed right now. Our small fishery closes for the most part for most of the year. This would give them the opportunity of lasting a little longer during the course of a year. Maybe 20 percent might have been too much, but there is no reason for us to sit here and say, stay status quo for next year; then be waiting for an amendment or an addendum that might take another year or two down the line.

Now, we're talking, okay we'll just stay status quo until the next assessment. On the last assessment we made cuts. We just had an assessment that showed no overfishing is happening. We're not overfishing, it's not overfished; yet we're not going to give them any fish back. I cannot support this motion, and I may even move to substitute at some point.

CHAIRMAN BALLOU: I would like to now take a comment in support of the amended motion. Dr. Pierce, would you be speaking in support? You're next.

DR. PIERCE: I do, indeed, support the motion to amend to go with status quo, the 187,880 metric tons for the 2017 fishing year. Much of what I was going to say actually was said by Patrick Paquette; who spoke very eloquently to the issue of the resurgence of menhaden off of Massachusetts has begun.

I hear from many different sources an abundance of menhaden, certainly on the south shore and the backside of the cape. That doesn't really surprise me, because back in 2013 through Amendment 2, we did establish a rather lower quota; not as low as it might have been, but certainly a lower quota of 171,000 metric tons thereabout, and we kept it pretty much there, 188, 187,000 in 2016.

For the last three years, we've been rather conservative in our approach for setting the TAC for the coast. I consider that to be a major contributing factor for this abundance of menhaden off of our coast. It is not the only factor, of course, but it is a major factor in my mind. In Massachusetts we certainly had a long wait for menhaden to return to our shores, and indeed, that long wait now seems to be over.

I don't want to jeopardize it in any way by certainly increasing it up to that higher number. I would much prefer to keep it status quo. Regarding the projections, I have a lot of appreciation for the work done by the Technical Committee. The projections have been very helpful. However, as noted in the documents, the projections are highly uncertain.

In addition, it is noted in the documents we have before us the model structure has uncertainty; so that adds to my concern about the usefulness of those particular projections. In addition, the statement about there being zero probability of our overfishing, I have to express my concern about the current definition we have for overfishing; that is the threshold.

It is an F value of 1.26; which I've always thought was too high. That translates into about a 75 percent removal of the stock every year, 75 percent removal then we have the natural mortality. I've always thought that was exceedingly high. Nevertheless, that is the way it is. Relying on that as a way for us to feel comfortable that we're not overfishing, therefore we can increase the amount. I don't subscribe to that because it is still too high a value that defines overfishing. Then finally, it has already been said, but I'll just highlight it.

The menhaden has tremendous ecological value; that value is very high. I'm going to continue to base my decision today and certainly in the future with an understanding that that value is high, it has to be respected; and as a consequence we need to be quite conservative as we move forward, moving in the direction of the next amendment, which will result in some ecological reference points and some more sound thinking about how we move into the future with management of this very important fishery.

CHAIRMAN BALLOU: Now, I would like to take a comment opposed to the motion to amend. Rob O'Reilly.

MR. O'REILLY: Certainly, I think a lot of the board has expressed very good comments, and the reason I asked an earlier question about the projections was specifically to pinpoint the idea of just how they are, how fragile they are. They're not very fragile, they are connected with other species as well; as far as projections go, 2017 is used.

What I'm concerned about, and we might remember there is a retrospective here, so if you go back to December, 2012, Virginia went clawing its way away from the 20 percent reduction, initially starting with a 5 percent,

which was rejected, a 10 percent which was rejected, a 15 percent was rejected; and ultimately Virginia succumbed to the majority of the board. Now, there are lots of calls to maintain status quo, but status quo has changed quite a bit. If we all recognize that what we really did in 2012 was not start a rebuilding frame, but to attempt to have better management of menhaden; which is what I think was done in 2012, to start that and which is going forward.

Then we do understand that there was a false ceiling. That cap was a false ceiling. It was raised once by 10 percent or very close to it, just under; and now today there is a call to raise 20 percent, and if you think about it, that is 10 percent more than would have been there in the beginning.

Based on the assessment results, based on the fact that it was noted that the fishery has been under target F since 2002, the fecundity is as high as it was in the mid-seventies. I'm not sure, just because we don't have optimum yield written in our charter perhaps, that should be a reason to postpone for Amendment 3, because Amendment 3 to use Mr. Schill's term may be a foundation and that's it.

We go to Amendment 3 on the biological and ecological reference points; does anyone really think that is just going to be it? No, that is not going to be it that is going to be the foundation we have to build from. In the meantime, we are really postponing what is a deserved increase based on all the scientific information. For that reason, I can't support the amended motion.

CHAIRMAN BALLOU: Dave Simpson, are you planning to speak; no you're going to pass. Next, on my list Tom Fote, would you be planning to speak in support of this motion to amend? Go ahead.

MR. THOMAS P. FOTE: I am going to divert for one second. About a year ago, as I was walking through the halls, somebody passed me and I didn't recognize him. Then I find out it was Jerry Schill; because his wife said, why is Tom Fote ignoring you? I said, well, I've gotten a lot older, Jerry hasn't, but his hair has turned white so I didn't recognize him when he passed me; after many years of knowing each other and working together on a lot of issues.

As all of you know menhaden has always been dear to my heart, one of the reasons I got involved with the commission. I realize the importance it is for other species, a lot of people have said that around the table, more articulate than I can do. But I really said I want to see it restored to the full range. That has been my cry for 25 years.

I said, we have reduction compliance up and down the coast and we don't have it, because there is no fish. What happened in Massachusetts, what is happening, why did striped bass disappear from the Kennebec River quite a few years ago, because there were no menhaden up there? My concern is, we're just seeing that progression. We took some tough steps.

I mean, I'm sitting here a couple of months ago talking about striped bass and we realized that we overestimated the mortality, we overestimated this, we had the fourth highest young-of-the-year index, and the eighth highest young-of-the-year index within four years; yet we said, we're going to be precautionary.

We're going to wait for the next amendment before we increase the catch in striped bass, because again important. Over the last 25 years we have also targeted forage species a lot more. I mean, we basically targeted squid, we've targeted Atlantic herring to supply the lobster industry and everything else, and so we've taken a lot of forage species out of the water. We've taken, causing problems with those species that depend on them. I mean, I was happily surprised and thankful that the

Mid-Atlantic Council was looking at a forage species plan, and how do we deal with that.

I found it ironic that false albacore wound up on it, because I never thought of false albacore as a forage species; but it is, it is for sharks, it is for anything that can catch it, so it is a forage species, dolphins and things like that. I also look at the birds. I've been involved with the osprey rebuilding when Pete McClain in New Jersey started doing that.

Pete, in his talk that we see that they depend on menhaden, I see them when I'm walking up and down the boardwalk in Sea Side Park. It is a part of their diet, a part of the bird's diet. It is very important. Menhaden is more than just menhaden harvest. I think what always disturbed me the most that when one industry, and now it's one company, had 83 percent of the quota.

I mean, you could address a lot of these problems with the 30-70 split, which we should have done a couple years ago when we passed this plan. That's what I supported and couldn't get it done, it wasn't the effort there. For those reasons, I think we should stay status quo. We should deal with all the issues that we're going to deal with, and in Amendment 3, and I'll try to be brief by just shutting up now; thank you.

CHAIRMAN BALLOU: I will now take a comment in opposition to the motion to amend. Terry Stockwell.

MR. STOCKWELL: I'm going to speak in opposition to the motion to amend, as well as to the underlying motion; if that is all right with you. Certainly, Maine's episodic event this year makes it easy for me to support some kind of increase in quota. I could have been in support of 20 percent, if 10 percent of it would be awarded to the episodic quota; but that cannot be done in this action.

My concern is that 20 percent has the potential to muddy the waters of the reallocation discussion we're going to have in Amendment 3, and that status quo is too conservative for an action that might take several years to get out the door. I'm in support of a more modest increase, such as 10 percent for one year and to expedite the development of Amendment 3; and I'll see how this motion goes up or down, may make a motion to substitute or amend as my turn comes around again.

CHAIRMAN BALLOU: Next on my list I have John McMurray. Are you planning to speak in support of the motion to amend? Go ahead.

MR. McMURRAY: Yes, I support the motion to amend for a number of reasons. The first of which is that the 2015 assessment is really 180 degree turnaround from what we saw with the prior assessment, which did account for predator/prey interactions. The TC is very clear that those projections are highly uncertain that we're basing this sort of increase on.

It doesn't take into account predator/prey interactions, and any sort of increase based on that is contrary to where this commission is going with Amendment 3. It is my understanding that we made a commitment to manage menhaden in an ecosystem context; and this just doesn't jive with that. But the real reason that I support this, is because of what a few other people around the table have talked about, is the return to their historical range. Now, we have extraordinary concentrations of bunker, and we have for the last two years off of Long Island, the south shore in particular.

I've done 70 trips this year, and I can say with some certainty that at least 40, 45 percent of those trips, their success was directly related to that sort of abundance and that sort of concentration of bait. It is a really good example of; if you build it, they will come. Things are absolutely different now because of that concentration.

We have a thresher shark fishery in 40 feet of water. There are whale concentrations that

nobody has ever seen, and the point is that these things are supporting jobs. They are creating jobs, they're bringing jobs back that were sinking; mine included. We have to understand that this is a public resource. This is not a resource that is meant to be managed for the benefit of one or two states; it is to be managed for the benefit of the entire public.

The sort of expansion we're seeing now, I truly believe is a result of the 25 percent reduction that was made in 2013. I know some people around the table are shaking their heads and saying there is no stock recruitment relationship. But I find it really hard to believe that leaving those hundreds of millions of pounds of fish in the water did not have something to do with the sort of abundance increase that we're seeing now; and they're going all the way up to New England.

I don't think we have the data to show us now what this sort of increase would do, what a 20 percent increase would do to those levels of abundance we're seeing now, and those jobs that were created up there. I would support staying at status quo; at least until we get squared away with Amendment 3.

CHAIRMAN BALLOU: Lynn, are you planning to speak in opposition to the motion to amend? Go ahead.

MS. FEGLEY: Yes, I cannot support this motion. I would like to try to put some things in perspective as to where we are with this stock. The terminal F coming out of the stock assessment was F 70 percent. The Lenfest/Pikitch F recommendation was F 64 percent, and we have a target of F 57 percent.

We are finding ourselves in a good neighborhood, I think, to achieve our diverse goals for this fishery. We also have a responsibility to manage this fishery for all of our constituents. We do have science before us that talks about the risk of an increase, which is low. We cannot -- I think it is important that we be willing to act in either direction when the information speaks that we can.

That being said; we are standing on the cusp of a new assessment. We are going into Amendment 3, where we will discuss ecological reference points, so the industry and the fishermen, who have sacrificed so much through this process, should realize that any increase that this board offers could be removed quickly, after the process is complete. In line with Mr. Stockwell, I would support a more modest increase. I would be in favor of something more on the line of 10 percent, and I would be willing to also make a motion to that effect when the time comes.

CHAIRMAN BALLOU: Loren Lustig, are you planning to speak in support of the motion to amend?

MR. LOREN W. LUSTIG: Indeed, I am. Can I go ahead with my comments? I find it absolutely fascinating to hold the position that I do here with ASMFC, although I have been an absolutely avid angler for probably 65 years. I am not a fisheries scientist. What I am is an environmental educator.

I've been thinking about that fact, and wondering how I would address these questions to a group of sixth graders on Fox Island, right where the Virginia/Maryland border is at in the Chesapeake. One of the crucial foundation blocks of being an environmental educator is that you have to absolutely believe in what you're saying; otherwise, of course, you lose all kinds of credibility and it is just not going to work.

For me, personally, I would have absolutely no problem looking into the eyes of a group of sixth graders at Fox Island, and saying that I fully support the recovery of menhaden to their historic range. Absolutely no doubt about it! I would also have no problem in saying to that same group of sixth graders that I am

encouraging an ecosystem-based approach; no problem there either.

Now, perhaps, the essence of wisdom is to ponder what sort of world we're going to turn over to our grandchildren, and try to figure out a way to turn over a world that is ecologically whole; not fractured. I do recall about an hour ago that there was a slide presented early on for us to look at that showed the relative abundance of menhaden since 1960 in ten year increments.

When that slide was on the board, I leaned over to the gentleman here on my left and said, is there any chance that we could ever return to the abundance as indicated in say 1950 or 1960, just before those numbers absolutely fell off the table? I would very, very much like to see us have that kind of goal in hand, to return to those kinds of abundances. With that being said, I certainly am in full support of the amendment that allows these baby steps of recovery to occur.

CHAIRMAN BALLOU: Dr. Duval; in opposition?

DR. DUVAL: No, Mr. Chairman, I wanted to speak in support.

CHAIRMAN BALLOU: If you could hold then, in opposition. Let me go to Kyle, I'm sorry I'm just going to go on to the hands that just went up. Kyle, you're next.

MR. KYLE SCHICK: We have to remember that in 2012 we made some decisions on best science available; which was horrible science. It was inaccurate; the data for the fisheries was poor. We ignored signs of the Potomac River pound net information that showed that the stock was stable, because of all of the other minutia that was surrounding our decision making process.

It is a very emotional fish. Before it was thought as just a little oily fish that didn't matter much, and now we know that it is a very important fish. It is an important fish in my neighborhood, because I'm from Northern Neck, Virginia. I know the people that are out of work. I know the industries that have been hurt; the bait industries, the reduction industries. We have no automobile plant, we have no major industry in the Northern Neck, other than fishing and agriculture; and these people took an unnecessary cut. The cut was not proper, and it should not have been done; but we used best management practices with poor information.

To stay status quo, to keep the pie small; because we're going to cut the sizes of the pieces in a couple years, is not correct. The pie should be bigger, because the science tells us there are more fish that should have been and could have been caught. The full extent range of this fish will never, never come back; because we are not willing to eliminate 25 percent of a population of the human beings on the east coast of the United States.

We are the cause of all of our environmental fishery issues; not the fishermen it's pollution. It is water quality. This board can't do anything about that except for go home and tell our legislators to stop polluting through sewer systems and nonpoint source sediments of proteins and runoff from farms and industrial sites, and from our neighborhoods.

We don't have power to do that here, so we're talking about doing something that we cannot change. All we can do is look at this science and say, how much fish can we take out of the water and still keep this species healthy. A 30 percent, shouldn't be 20 percent, it should be 30 percent. Let's go back to 2012, where the error was made. Let's put out pride in our pockets, and let us not say to ourselves, oh we can't do this because I'm afraid I might not be right.

We are right. We were wrong then, we need to be right now, and it is a matter of fairness, it is a matter of science, and it shows a 30 percent

increase is really where we should be. All of our fisheries have uncertainty. We brought this buzz word up here, because it is one way that the proponents to keeping status quo can put uncertainty in our minds.

We are just as certain that we can fish at a 30 percent increase as we are in any other fish that we manage. This is what we need to do. We need to forget about a status quo; if we can get a 20 percent that is great; 30 percent is where we should be, and we need to move forward with this.

Then when we come to Amendment 3, we've got a pie that is the right size and we can start dividing that up the way that we come to. If we're going to use multispecies, hopefully, we're not going to jump the gun on that like we did in 2012 with jumping the gun. We need to use not only best science, but we have to use good science.

I certainly don't want to rush Amendment 3, just because we think that this is the right thing to do for our constituents; so we can be safe in saying that we're using this new method to save the world. It is not going to save the world if we implement something before it is right. Let's go ahead and defeat this and get to the main motion.

DR. DUVAL: I very much appreciate all the members of the public who came here to provide their comments today, as other commissioners have noted. It has been a long and bumpy road to get to where we are, and I'm not sure that this is actually where we're going to end up. But I don't want to see us lose all that we've gained. I'm always apprehensive when there is a significant reversal in stock status from one benchmark to another. That gives me pause, and I'm concerned about a significant increase in the TAC on top of the 10 percent increase that was implemented for 2015 and 2016. I would certainly be more comfortable if we had more complete information after the update that we're supposed to receive next year; particularly with regard to recruitment. That's one of the biggest uncertainties that gives me the greatest pause, I guess. My concern deals with lack of a complete picture without all of the information. The board has made the commitment to walk down the road towards a development of ecosystem-based reference points.

One of my concerns is that I could not support the original motion. I simply think that is too significant of an increase in the TAC, and my concern was that a year from now we would end up having to, as Ms. Fegley said, take some of that back. Though I recognize that we need to be flexible when we have the opportunity, but I'm also concerned about substantial increases; because I do believe that it does a disservice to industry when we have to turn around a year later if we get a stock assessment and pull back on that.

I also have concerns, as we move down this road towards implementation of ecosystem reference points; that given everything that we've heard about that and it seems like where we are now is within the envelope of where we need to be. I could not have supported 20 percent, I'm not sure status quo is where we're going to end up. But I will end my comments there, Mr. Chairman.

CHAIRMAN BALLOU: Rachel Dean.

MS. RACHEL DEAN: I am new, hi! Thank you for giving me the opportunity to speak, Mr. Chairman. I just wanted to kind of go over a couple of the things that have already been said; and kind of put my own spin on it. Mr. Boyles, you certainly spoke to the heart of the issue. Amendment 3 is certainly the prize, and I think that we all have our eyes on it.

I would not want to do anything that would jeopardize that. Mr. Nowalsky, your loaded question was spot on. It was exactly what I was thinking. You make decisions, and when you have that risk and that risk is so low, it is really

difficult to take that answer home to constituents who have taken those cuts in the industry; and say, the science supported that cut, but now it is not going to support what is in place or an opportunity for the increase.

Mr. Lustig, on the heartfelt, you spoke about the children and how you would explain it to them. I'm having a hard time thinking about how I might go home to their fathers and explain to them that cut that they took that just, not so much crippled them, but really kind of cut the income and what was coming home.

Now that we have the science to support that increase, I'm having a really hard time, thinking about how I could go home to them, our fishermen, and explain to them. I guess what I'm asking here today is that you help me explain to them that this commission is one that acts upon the best available science and form that trust that I want them to have with this commission.

Because I think that as we move forward to Amendment 3, and we keep our eye on the prize. I really look forward to working with those guys, with my predecessor, who had the seat before me as Maryland's Governor's appointee, and other stakeholders in our state of Maryland; so that we can all kind of work towards that and of course work with each of you as well. I would not support this movement to amend at status quo, and I look forward to someone else possibly making a motion possibly on that 10 percent.

MR. SHIELS: I'll be brief, because when you go near the end everybody has already taken all of your good ideas. I'm also new to the board, and as a result, I've heard some comments through the hallway and at dinner about where we should be on Amendment 3, and this particular motion; and what might happen today.

One of the nice things you can do is you go to the ASMFC website, and you can find a treasure trove of all the historical information. I missed breakfast this morning, because I was up very late last night trolling through the ASMFC website to find some information. Maybe the most telling thing that I found was a news release ASMFC put out when Amendment 3 was being introduced, and there were two points to it that are very important.

They've been discussed, but we can maybe put a fine edge to it right here. Reallocation of the menhaden to the different jurisdictions, different parties, and ecological reference points; that is really what Amendment 3 boils down to, and we've heard proponents on both sides and discussed that.

One of the things that is important to us in Pennsylvania is we don't have commercial fishing, but we do have menhaden in our part of the Delaware River. We're very concerned about American shad, river herring, hickory shad, eels; fish that also would be eaten by predators if they don't have the option to choose menhaden.

A healthy menhaden population relieves foraging pressure on shad, river herring, hickory shad and other species. In addition, I think we need to stick to the status quo; and I support the motion to amend. As one of the previous speakers mentioned, I had my own cliché about the pie. My point was that if we go through Amendment 3, we see the positive increase in menhaden that everyone is reporting on both sides of the aisle; all reporting much larger numbers of menhaden.

Then the pie that will be divided in the reallocation process is going to be a bigger pie. We can have the arguments about how we make those splits, but if we have a healthy population and it increases through one more year; that pie will be much bigger, and I think the end result will be worth the wait.

Finally, the last thing I wanted to say was, I think we should allow the process to work. A lot of you spent a lot of time in the room to

make sure that it was done with all comments, it was all seriousness previously. I don't see a need for you to jump out in midstream. Thank you for the opportunity to comment.

MR. NOWALSKY: First of all, I want to thank you all for giving me way more credit than I deserve for coming up with a loaded question. I just looked at it and said wow! I've never seen this before, has anybody seen it before, so thank you all. I see no reason to wait on the debate here of making another motion. I'm prepared to move to amend for 10 percent, Mr. Chairman.

CHAIRMAN BALLOU: I would just ask you to wait if you don't mind. I'm almost through the hands that have gone up, and then I think we're going to vote. What I would like to do is go through, I think at least two more people who have yet to comment; and I think it is important to allow everyone to comment. Then I would like to take a vote on this amended motion, and then we would be back to, depending on how that vote goes there would be an opportunity for another amendment to be made. If it is okay, Adam, because I think Terry and Lynn and others may be thinking the same thing, I would rather get through this, vote on this, and then see if there is any interest in making any additional motions. Is that okay with you?

MR. NOWALSKY: I'll defer to your decision on the matter. I think the 10 percent is probably where we can make the quickest decision on whether that is something those that are around the table, that have spoken strongly in favor of status quo, whether those people can look everyone in the eye, look at the science and really say; can I provide some compromise. Can I work with my partner states here at this board to find some middle ground here? I really think the sooner we get there the better.

CHAIRMAN BALLOU: My intent is to go to Bill Goldsborough, then Rep Peake, if they both wish to speak, and then see if the board is ready to vote. Bill Goldsborough.

MR. GOLDSBOROUGH: We find ourselves in an accidental circumstance, I believe, here considering an unplanned quota change that would, in effect, be a departure from the course we laid out for ourselves last year. In February of last year we received a last assessment report. We did not act on it then.

The wisdom of the board, in particular, its chair at that time, was that we absorb that new information for one sequence before doing so, because it was quite a change from the previous benchmark. In May of last year, we did consider the assessment, which remains our current assessment.

We did take two main actions, the first thing we did was we embarked on Amendment 3, as has been mentioned; that had two main points, a development of ecological reference points, finally. That would have been 14 years after we first committed to accounting for menhaden's ecological role, three years after we first decided in Amendment 2 to develop ecological reference points.

We also decided to revisit allocation; which was something we also laid out three years previously in Amendment 2; and those are two very important things for moving us forward in the management of menhaden. The other thing we did in May of last year, when we considered the assessment, was we decided to increase the quota by 10 percent for 2015 and 2016.

That would have put us right up to the 2017 implementation date that we had laid out for Amendment 3, and that was our plan at that time last year. It was an ambitious timeline, and because of that, that summer we, if you recall, appointed two workgroups of this board; one to work on developing new allocation scenarios for the board to consider under Amendment 3 and one to work on various options for ecological reference points.

We held a workshop on ecological reference points, and we did this in a flurry of activity over

a period of about six weeks, in some cases with weekly meetings; if you all recall, in August and September of last year. That was because we had this timeline that we had laid out to implement Amendment 3 in 2017, next year.

Then we came to the annual meeting, and we started discussing the study that we wanted to commission the Committee on Economic and Social Science, and how that would be an important thing to have in hand before we did any shift in the way we allocate this quota. That led us to delay the timeline for Amendment 3 by a year. Now the date for implementation is 2018. It is only because of that decision, and this is how it's written in the record of the annual meeting; it is only because of that decision that we now find ourselves considering specifications for 2017.

It was not our intent in May of last year, when we took action based on what remains the current assessment, it was not our intent to change the quota until we implemented Amendment 3; and I think we should maintain that as our intent. To do otherwise would be a reconsideration of what is still the current science; which we already had a very thoughtful discussion of.

We waited a full three months before we did that to fully absorb it, and it would be doing so without the benefit of the socioeconomics report that we also said we wanted to have in front of us before we considered allocation issues. I recommend we stay the course, the course that we've laid out, and that the public trusts that we are on.

Also, for a point of perspective, I want to note that there have been several references to the assessment finding of no overfishing and to the catch projections that suggest 0 percent risk of overfishing, and the sentiment of some of the folks who brought those things up for themselves or on behalf of constituents; that they didn't understand why we wouldn't make a decision to increase the quota at this time. Well, meaning no disrespect, but we should understand that by now. It has now been 15 years since we committed to accounting for menhaden's ecological role. That is the reason. The finding of no overfishing, the projection that says zero risk of overfishing; those are based on single species reference points. We are in the process, we have committed to and we are midway through a process of developing and adopting ecological reference points; and I think we ought to stay on that track.

With respect to one of those ecological reference point options, it was pointed out that we are in the neighborhood of the Lenfest reference points, and that should give us comfort; and it does give us some comfort. It kind of reflects the earlier points that were made about how we're seeing some progress, so let's try and complete that recovery.

But to put a little finer point on it, where we are is, our current F is above the F target that the Lenfest ecological reference points would call for us to adopt. Now we're considering increasing the quota, even with the knowledge that we are above the F target of one of the ecological reference points we're going to be considering under Amendment 3. To me, that is really going back, not only on the course we laid out that the public has faith that we're sticking to; but also the very technical foundation for that course and the intent of it.

REPRESENTATIVE SARAH K. PEAKE: When I first raised my hand it was with the intent of wanting to call the question, having heard eloquent arguments for over an hour on both sides of the issue. But since you have signaled your intent that you will allow a vote on this motion, prior to accepting any amended motions, I am going to take my moment at the microphone to weigh in on the merits.

But having just acknowledged that so much has been said, I have pages of notes that I've scribbled here with my thoughts in favor of the motion, the amended motion that is before us;

the motion for status quo. But rather than go through those point by point, because so many people who've preceded me at the microphone have spoken, certainly in an in depth and thoughtful way on both a scientific basis and a public policy basis, and a consideration of future generations basis.

I guess I will conclude that beginning with Mr. Boyles to Mr. Paquette, Mr. Goldsborough just now, and certainly my own DMF commissioner, Mr. Pierce. I would associate myself with their comments, voice my strong support for the amendment that is before us, and look forward to your calling the question so we can cast our vote.

CHAIRMAN BALLOU: I am prepared to now call for a vote on the motion to amend. Ritchie has his hand up.

MR. WHITE: Roll call, please.

CHAIRMAN BALLOU: Okay. Because there has been a request this will be done via roll call. I will note that because this is not the final vote, it can't be because it is a motion to amend, all members of the board may participate in the caucus; and I will now allow for a one minute caucus. Okay, I think that was about a minute, so I am now going to ask Megan to call the roll. **This is on the motion to amend.**

MS. WARE:

MR. STOCKWELL: No.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Connecticut.

MR. SIMPSON: Yes.

MS. WARE: New York

MR. McMURRAY: No.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: Pennsylvania.

MR. LUSTIG: Yes.

MS. WARE: Delaware.

MR. CLARK: No.

MS. WARE: Maryland.

MS. FEGLEY: No.

MS. WARE: Potomac River.

MR. GARY: No.

MS. WARE: Virginia.

MR. O' REILLY: No.

MS. WARE: North Carolina.

MR. DOUG BRADY: No.

MS. WARE: South Carolina.

MR. BOYLES: Yes.

MS. WARE: Georgia.

MR. GEER: Yes.

MS. WARE: Florida.

MR. ESTES: Yes.

MS. WARE: NOAA.

MR. ORNER: No.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: Yes.

CHAIRMAN BALLOU: **The motion fails on a 9 to 9 tie vote**. We are back to the main motion. Would anyone like to make any additional comments with regard to the main motion?

MS. FEGLEY: If I may, Mr. Chairman I would like to substitute the main motion.

CHAIRMAN BALLOU: Whether it is substitute or to amend; why don't you go ahead and offer and then we'll try and figure out from parliamentary whether it is an amendment or a substitute. Go ahead.

MS. FEGLEY: **I'll offer an amendment. I would move to amend the main motion to replace the TAC of 225,456 with 206,668 (10 percent) increase.**

CHAIRMAN BALLOU: Seconded by Terry Stockwell. Moved by Lynn Fegley, seconded by Terry Stockwell to amend the main motion by setting the 2017 coastal TAC for the Atlantic Menhaden Fishery at 206,668 metric tons (10 percent increase). Is that accurate? Yes. That is the new amended motion. I do not intend to go through everyone on this. But I will certainly give the maker of the motion the opportunity to speak to it, and I will allow for limited additional comment; particularly by those who may not yet have commented.

MS. FEGLEY: This is really our opportunity to appreciate the science that has been presented to us, but insure that we're treating the situation, which is precarious, if I might say, with a sufficient caution.

CHAIRMAN BALLOU: Dennis Abbott, would you like to comment?

MR. DENNIS ABBOTT: The only comment I would make is I think we've had extended debate, and I would prefer to make a motion as Representative Peake did to limit debate and call this to a vote, if the body so desires. I think there has been enough debate about the issue that we don't really have to go around the table again to hear things; so my motion would be to limit the debate at this point.

CHAIRMAN BALLOU: I understand there might be just one other hand up, Jim Gilmore; did you want to weigh in? If so, in all due respect, I wouldn't mind entertaining at least one additional comment and then put this to a vote.

MR. GILMORE: It is just a very quick question, and I believe Bill Goldsborough may have answered it before. The schedule for Amendment 3, from what I understand, is that we would come up with that very simple task of ecological reference points in 2017, and then finalize the amendment that would be implemented in 2018 if all things go correctly. Is that correct?

MS. WARE: Yes, so the upcoming schedule would be; and I will go through the timeline in the next agenda item; but we would be looking at this point for a final approval at the November, 2017 meeting for Amendment 3 for implementation in 2018. We have the socioeconomic study coming up February, 2017, and 2017 is also an assessment update for menhaden; so busy year coming up.

CHAIRMAN BALLOU: Okay, one last comment only because Bill, you have yet to comment on this issue; so go ahead, Bill Adler.

MR. ADLER: I support this. I understand that the big picture will be Amendment 3, I understand that. But that is several years away, and after all the comments that we have heard about not overfished, zero risk, all this type of stuff. I think the industry does need some little increase; even though it won't affect Massachusetts all that much; I just think it is, in

fairness, that there be some increase while we're fixing Amendment 3, so I'm in support of this motion.

CHAIRMAN BALLOU: Megan would like to clarify one issue.

MS. WARE: Jim, just to clarify. The BERP ERPs aren't expected to be ready until 2018/2019, so I'll go through the reference points section in the PID. There are a couple options there, I just want to make sure you know that.

CHAIRMAN BALLOU: Okay, 15 second caucus, and then a motion to amend; Ritchie.

MR. WHITE: Roll call, please.

CHAIRMAN BALLOU: Fifteen second caucus and then a roll call vote. Okay, Megan, please call the roll.

MS. WARE: Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: No.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: No.

MS. WARE: Rhode Island.

MR. REID: Null vote.

MS. WARE: Connecticut.

MR. SIMPSON: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. LUSTIG: No.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: No.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

MR. BRADY: No.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: Yes.

CHAIRMAN BALLOU: **The motion fails 8 to 9;** there was one null vote, but the motion fails 8 to 9. Dave Simpson.

MR. SIMPSON: As a third try, maybe it will be a charm. **I'm going to move a 5 percent increase in the quota; which is where I started out, so I would be very happy if we end up approving that.**

CHAIRMAN BALLOU: I see Jim Gilmore's hand up to second, yes; moved by Dave Simpson, seconded by Jim Gilmore to amend by setting the 2017 Coastal TAC for the Atlantic menhaden fishery at a 5 percent increase. We have had, I think, enough discussion that I think unless anyone has a burning question or a parliamentary question.

MR. ABBOTT: I do have a parliamentary question. If we continue to vote on certain percentages and none of them acquire a majority, what are we left with? Are we left with status quo?

CHAIRMAN BALLOU: Well, thank you for asking the Chair that question. I'm going to cross that bridge when we come to it. I'm going to call for a vote on this. I know that the outcome of this will determine where we are vis-à-vis the main motion; and I may look to you for some guidance on how to proceed, or staff. But let's cross that bridge when we come to it. I think it could very well be a good question. But I am prepared unless anyone wishes to offer anything else, and Ritchie would you like a roll call vote on this as well?

MR. WHITE: Please.

CHAIRMAN BALLOU: A roll call vote, no need to caucus. As I see it, I think we've vetted this quite well on what I hope to be the last motion to amend; that being a 5 percent increase. Megan, please call the roll.

MS. WARE: Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: No.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: No.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Connecticut.

MR. SIMPSON: Yes.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: Pennsylvania.

MR. LUSTIG: No.

MS. WARE: Delaware.

MR. CLARK: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: No.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

DR. DUVAL: Yes.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NMFS.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: Yes.

CHAIRMAN BALLOU: **Motion fails on a 9 to 9 vote.** We are probably exactly where Rep. Abbott thought we might be which is at the main motion. I'm going to look for guidance on where we go from here. Obviously, the next step should be a vote on the main motion. I guess if that fails; it is status quo. I think that was the essence of your question. I'm going to look to staff, and I'll start with Megan to see if that's the correct interpretation as to the outcome of a failed vote on the main motion; which we're about to undertake.

MS. WARE: If we don't have consensus on the next vote, what that means is we don't have a quota for 2017. I recommend we figure out something today so we have a quota for 2017.

CHAIRMAN BALLOU: That is actually different than what I said. We don't have a fall back. We don't have specifications for 2017. We do need an affirmative vote, one way or the other on 2017 specs. There is no fallback as I see it. Adam, do you have a thought on the issue?

MR. NOWALSKY: Well my thought, Mr. Chairman, would be to go ahead and take the vote on this and then move for a short recess to discuss our options, one of those might be a motion to create a blank, get some numbers out and then go ahead and address it that way; might be our best chance moving forward.

CHAIRMAN BALLOU: Thank you for that suggestion. Let me go to David Borden, and then Dennis Abbott.

MR. DAVID V. D. BORDEN: I think it would be cleaner if we simply made a motion to amend to establish status quo for 2017.

CHAIRMAN BALLOU: I think the issue is we've already run through that and I'm not sure we can repeat a motion that has already been voted on.

MR. ABBOTT: Considering what's been going on, I think that we probably reached a point that this may require some more thought by the board members. I think we have time to adequately look at this prior to the annual meeting; therefore, I will make a motion to postpone until the annual meeting.

CHAIRMAN BALLOU: I'm going to look to staff to see if that motion is in order.

EXECUTIVE DIRECTOR ROBERT E. BEAL: The motion is in order; I think the question would be to the states. Does a decision in the third week of October provide the states with enough time to implement a new quota? States do adjust quotas for species in shorter time than that for other species. I just don't know what flexibility the states have and how much notice the states need to react to a change in quota. Is October too late for some states?

CHAIRMAN BALLOU: I also want to ask from a parliamentary standpoint. If the motion to postpone were adopted today, would we have a clean slate going into the October meeting, or would we have to fall back on the votes that

were taken today and insure that we don't repeat them? I just want to make sure that our eyes are wide open on how we might proceed here.

EXECUTIVE DIRECTOR BEAL: Yes, I think the process would be that the motion that's on the board right now, which is a 20 percent increase in the quota, would be the motion that you start with at the annual meeting; and any amendments and other considerations that you want to make to that would be fair game. You could go back and revisit status quo, 5 and 10 percent if there is interest in going through that again. But this is your starting point that is on the screen now, 20 percent increase and then we start over after that.

CHAIRMAN BALLOU: Let me do this. I'm going to take Adam up on his suggestion. I know we're probably already running late; but this is a very important issue and I want to make sure we get it right. Let's take a five minute recess, during which time we will consider whether we are going to move forward on a motion to postpone. When I say we, you should think about your thoughts on a motion to postpone versus some other motion relevant to the main motion. I'm sorry, before we break, Bill.

MR. ADLER: Does that need a second?

CHAIRMAN BALLOU: It does, but I'm going to suggest this. I'm going to suggest a recess and then when we come back I'm going to turn to Dennis to allow him to make his motion, and see if there is a second.

MR. ADLER: I will second.

CHAIRMAN BALLOU: Okay, I want to take a five minute recess; only five minutes, and then we're going to be back.

(Whereupon a recess was taken.)

CHAIRMAN BALLOU: Let me give you a lay of the land as I understand it. I've been advised that it would be, although it is possible, it is not in the board's best interest to postpone, better to have a TAC set today than to wait until the next meeting. The motion that could be made to postpone would be in order, but it would not be advisable to move in that direction.

My understanding is that there are two schools of thought, in terms so what folks are interested in offering to get us out, get this done. That just to let you know, is likely to be a motion for a 1 percent increase; and depending on how that goes, a motion to reconsider at 10 percent. I am going to do my best to manage those two votes; which I anticipate are about to happen.

I just want to give you a sense as to the two votes that I anticipate occurring now, and these would both be motions to amend. I believe I am going to turn to Dennis Abbott. Is it your intent to offer a motion? By the way, the motion to postpone can be taken off the board. I didn't allow for a second, it is not a motion before this board. Do you want to withdraw it, Dennis?

MR. ABBOTT: Yes. I thought I was doing a good thing. I think I was doing a good thing. In lieu of the conversations we've had during the break, I think it would be wise to withdraw that motion. My interest was in getting us to some number. I was afraid we weren't going to get to any number; so I would like to see Representative Sarah Peake recognized for a motion, if you would.

CHAIRMAN BALLOU: Thank you, and before I go to Rep. Peake, Robert, you have your hand up.

MR. BOYLES: Yes sir, Mr. Chairman. Point of parliamentary inquiry please; the motion for a 10 percent increase; there was not a prevailing side. That was a tie vote as I understand it. My request of you as Chair is since there was no prevailing side, can that question be brought back before the body?

CHAIRMAN BALLOU: That is a very good question and I have asked it, and my understanding is that because the motion failed, the prevailing side is on the failed side of that vote; therefore, anybody who voted no would be able to move to reconsider, because they were on the prevailing side.

That was the interpretation that I was given. If you wish to appeal that or question that, I guess now would be the time, because we're going to go to another motion first, but if you don't agree with that interpretation then I'm going to have you take it up with our Executive Director who advised me. Go ahead, Robert, if you wish to speak.

MR. BOYLES: I pass.

CHAIRMAN BOYLES: Again, I want to make sure. I had asked the question and it was answered. Rep. Peake, would you like to make a motion?

REPRESENTATIVE PEAKE: I would, Mr. Chairman. I would move to set the 2017 coastal TAC for the Atlantic menhaden fishery at a 1 percent increase.

CHAIRMAN BALLOU: Is there a second to that motion, seconded by Dennis Abbott; moved by Rep. Peake, seconded by Dennis Abbott to set the 2017 coastal TAC for the menhaden fishery at a 1 percent increase. Do we need a roll call vote on this? I assume we do. I'm going to ask Megan to call the roll on this motion to amend to increase by 1 percent. Megan.

MS. WARE: Maine.

MR. STOCKWELL: No.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

MR. ADLER: Yes.

MS. WARE: Rhode Island.

MR. REID: Yes.

MS. WARE: Connecticut.

MR. SIMPSON: Yes.

MS. WARE: New York.

MR. GILMORE: No.

MS. WARE: New Jersey.

MR. NOWALSKY: No.

MS. WARE: Pennsylvania.

MR. LUSTIG: Yes.

MS. WARE: Delaware.

MR. CLARK: No.

MS. WARE: Maryland.

MS. FEGLEY: No.

MS. WARE: Potomac River.

MR. GARY: No.

MS. WARE: Virginia.

MR. O'REILLY: No.

MS. WARE: North Carolina.

MR. BRADY: No.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: U.S. Fish and Wildlife.

MR. WRIGHT: Yes.

CHAIRMAN BALLOU: **The motion failed 7 to 11**. Per the advice I've been given, if anyone on the board who was on the prevailing side of a failed vote; I think I said that correctly. Let me say this again, who was on the prevailing side of a vote which would have been a failed vote; so any of the prior motions that were made that failed, anybody who voted no can move to reconsider.

MR. GARY: I believe, based on your description, I fit into that category on the prevailing vote, I voted no. If I understand the protocol correctly, **I would move to reconsider the original motion for a 10 percent increase to the coastal TAC.**

CHAIRMAN BALLOU: Well, that wouldn't be the original motion that would be a move to reconsider the amended motion to establish a 10 percent increase. Is there a second to that move to reconsider that motion? Seconded by Adam Nowalsky. Is this a straightforward majority vote? I believe we're voting on the move to reconsider, then on the actual substance of the measure; is that correct?

EXECUTIVE DIRECTOR BEAL: That's my understanding, yes.

CHAIRMAN BALLOU: I would be calling for a vote on the motion to reconsider; Cheri, you have your hand up?

MS. PATTERSON: yes, I just have a question. Is it true that both the status quo motion and this motion had equal votes, so both of those can be under reconsideration?

CHAIRMAN BALLOU: The answer is yes.

MR. SCHILL: In reconsidering this motion, is it by majority or does it require two-thirds?

CHAIRMAN BALLOU: My understanding is it is a majority vote. A majority vote of the board would bring this motion back before the board. We are voting not on the substance of the motion, but on the board's desire to bring this back before the board for consideration. Is everyone clear on the next vote we're about to take? If so, let's take that vote, and I, of course, assume it needs to be done via roll call, because of how close all the voting has been. I'll ask Megan to call the roll on the motion to reconsider this particular motion to amend.

MS. WARE. Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: No.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: No.

MS. WARE: Rhode Island.

MR. REID: Null.

MS. WARE: Connecticut.

MR. SIMPSON: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. LUSTIG: No.

MS. WARE: Delaware.

MR. ROY W. MILLER: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

MR. BRADY: Yes.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: No.

CHAIRMAN BALLOU: **The motion passes 9 to 8.** We have now brought back the motion for a 10 percent increase. **We now need to vote on that motion to amend**. It has been brought back before the board per the prior vote to reconsider. Now we need to vote again on the same motion that we voted on prior, and wonder if there is going to be a different outcome**. Megan, please call the roll on the motion to amend for a 10 percent increase to the Atlantic menhaden 2017 coastal TAC.**

MS. WARE: Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: No.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: No.

MS. WARE: Rhode Island.

MR. REID: Null.

MS. WARE: Connecticut.

MR. SIMPSON: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. LUSTIG: No.

MS. WARE: Delaware.

MR. MILLER: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

MR. BRADY: No.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: No.

CHAIRMAN BALLOU: **The motion fails on a tie vote**. Robert Boyles.

MR. BOYLES: Can you tell us where we are now? Give me a parliamentary inquiry, and I have a motion.

CHAIRMAN BALLOU: We are back at the original motion, which we have not yet voted on, and a tie vote on the main motion, of course, would mean a failed vote, which would be no action, which would mean no specifications for the 2017 fishery. That is not an outcome we can walk away with. We are at either an impasse; in which case a motion to postpone may well be in order, even though it is not the best way forward, it may be the only way forward, given the impasse. It would give us the next three months to think it through. We would take it up again at our annual meeting, or we can try to wrestle through it today.

MR. BOYLES: My interests have been well known and I won't spare any more of your time**. I would like a motion to amend the main motion to set the 2017 coastal TAC for the Atlantic menhaden fishery;** you all forgive me, at 19 percent, and if I get a second, I'll try to explain that.

CHAIRMAN BALLOU: Seconded by Marty Gary, go ahead. The motion made and seconded to increase by 19 percent.

MR. ABBOTT: A parliamentary inquiry.

CHAIRMAN BALLOU: Yes, Dennis Abbott.

MR. ABBOTT: We've had a lot of votes and probably like a lot of people, I'm getting confused. Did we not just vote on the main motion that was brought by Marty a long time ago on 20 percent; and that did not pass? Is that not true?

CHAIRMAN BALLOU: I don't think we actually got to that point. We were approaching that point.

MR. ABBOTT: Even though it got erased from the board, it is not up there anymore. Like I said, I'm confused as to if that main motion wasn't voted on.

CHAIRMAN BALLOU: Bob Beal, do you want to clarify the issue?

EXECUTIVE DIRECTOR BEAL: I think you're in the right spot. The main motion has never been voted on today. All the votes that the board has taken, so far, are motions that would have

amended the 20 percent motion that is the main motion, the original motion from hours ago.

CHAIRMAN BALLOU: I think the reason why we're in this awkward place is because the votes have all been tied, and so there is a concern that when it comes to the final vote on the main motion, if that is also tied; we're left with nothing, absolutely nothing, which is out quandary. Robert, you have offered a motion and you would like to speak to it. Go ahead.

MR. BOYLES: I think, clearly, we need to set specifications for 2017 fishing year. I will point out and remind the board that I indicated an interest in stability in decision making. I indicated an interest to the board to make sure that we maintain our focus on the prize. It is clear that the group here is extraordinarily divided.

My concern, I just will restate that a change off of status quo will lead us to further forays as we've seen here. I appreciate everybody's interest. I offer my motion; 19 percent was not offered before. But I think we need to recognize the interest of the community and the industry to make these decisions, so it is under that spirit that I reluctantly offer the motion.

MR. NOWALSKY: Can I just get clarification. Okay, 19 percent increase, because it said just 19 percent a moment ago.

CHAIRMAN BALLOU: Okay, let's move forward with a vote on the motion to amend. It will need to be a roll call, obviously, and so Megan, please call the roll.

MS. WARE: Maine.

MR. STOCKWELL: Yes.

MS. WARE: New Hampshire.

MS. PATTERSON: No.

MS. WARE: Massachusetts.

REPRESENTATIVE PEAKE: No.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Connecticut.

MR. SIMPSON: No.

MS. WARE: New York.

MR. GILMORE: No.

MS. WARE: New Jersey.

MR. ALLEN: Yes.

MS. WARE: Pennsylvania.

MR. LUSTIG: No.

MS. WARE: Delaware.

MR. MILLER: No.

MS. WARE: Maryland.

MS. FEGLEY: Null.

MS. WARE: Potomac River.

MR. GARY: Yes.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

DR. DUVAL: No.

MS. WARE: South Carolina.

DR. RHODES: Null.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: No.

CHAIRMAN BALLOU: **The motion fails 5 to 11;** Megan may be tallying the final numbers, but it is far enough away that I can announce that it failed. I've never had so much fun in my life; by the way. Thank you all, this is just awesome.

MR. ABBOTT: Can I make a motion?

CHAIRMAN BALLOU: Absolutely, Dennis.

MR. ABBOTT: The motion is to present you an award for doing such a good job in this meeting. **No, seriously, I think we're probably back to a motion to postpone.**

CHAIRMAN BALLOU: **I think that would be in order. Would you like to make that?**

MR. ABBOTT**: I am making that; thank you very much, Mr. Chairman**.

CHAIRMAN BALLOU: Moved by Dennis Abbott, seconded by Bill Adler is a motion to postpone until the next meeting of this board, so it is specific to the next meeting. Craig, you have a comment on the motion?

MR. CRAIG A. MINER: One of the concerns that I have about going along with this motion is that the motion that would then remain on the board, I think for consideration is the 20 percent. I don't think we've ever had a real conversation about whether the 20 percent is the right place to be; but I think if I kind of listen to the discussion and look at the numbers, none of us are at 20 percent or we would be hard pressed to defend 20 percent.

I was going to suggest that maybe we pick a number north of 5, short of 10 and give it one more stab; because to leave 20 percent on the board, that is what the public is going to react to. They are going to come to the annual meeting and they're going to say, what's up for consideration is a 20 percent increase. I'm not sure that is the message I would like to leave the public with.

CHAIRMAN BALLOU: Well, fair enough, but I do think we need to take this issue up, as to whether the board wishes to postpone. Granted with that in that context, but nonetheless the matter would be open, wide open as I understand it. We would start at the annual meeting with this motion, but then there would be opportunities to amend. That is my understanding is that we would be back at it from the beginning at the annual meeting if this motion were to pass.

After Adam makes his comment, I am going to quickly go out and see whether there are any states that feel that postponement would severely affect their ability to manage their state fishery in 2017. That is a key concern, and I think we need to know whether that is an issue. If so, take that under advisement as we vote on this measure.

MR. NOWALSKY: Having now voted on a number of different numbers, if we do postpone this to the annual meeting, what would be our range of options to vote on without reconsiderations at that time?

CHAIRMAN BALLOU: I'm going to ask Bob to speak to that.

EXECUTIVE DIRECTOR BEAL: My interpretation would be that if this motion to postpone passes,

the 20 percent motion would be viable and be the starting point for the annual meeting; and all of the other options that you've talked about today are eligible, 5 percent, 10 percent, 19 percent, status quo.

Those can all be voted on again by the board at the annual meeting; if that's where folks wanted to go. Just because they were voted on today and failed or tied, doesn't preclude the board from working with those numbers at the annual meeting. The general premise, as I understand Roberts Rules, is that the actions of one board really can't hamstring or limit the options of a board at a subsequent meeting.

What this would do is just bring the 20 percent forward. It's like we started over this meeting an hour and a half, two hours ago. Everything is available at the annual meeting.

CHAIRMAN BALLOU: Does that answer your question, Adam? Rob O'Reilly.

MR. O'REILLY: I'll make it very short. I would request that the Technical Committee take an accounting of the concerns that were expressed today, especially of the uncertainties, the projections, and anything else that the Technical Committee can perhaps provide us at the annual meeting; in terms of guidance.

CHAIRMAN BALLOU: Is the board ready to vote? Yes, I'm sorry, Roy Miller.

MR. MILLER: Also, could we task the Technical Committee with giving us a better understanding of when we can expect ecological reference points to be available to us for our consideration. I've heard 2018, I've heard 2019. I think there is some uncertainty in that regard.

MR. ABBOTT: If this passes, I think it might be useful for the following meeting if we had a table. It would be useful to me, if I saw what each of the states who have a quota, what particular percentage, what increase they would receive under we'll say increments of 5, 10, 15, 20 percent; what the actual poundage would be.

CHAIRMAN BALLOU: I believe that might be in your meeting materials, if it is, we'll insure it is in the next time.

MS. FEGLEY: I hate to do this for the TC, but I think this goes along with Mr. O'Reilly's comment that if at all possible if the TC at the annual meeting could give us an update on recruitment in those years between the terminal 2013 and present. I think that would really help our conversation.

CHAIRMAN BALLOU: I'll just assume that all the suggestions that have just been made have been duly noted, and that the TC will do their best to address them at the annual meeting. With that, I would like to call for a vote on the motion to postpone until the next meeting of the board; which would be in October. I guess we'll do a roll call vote, just to make sure we're clear on the outcome. With that I'll ask Megan to call the roll on the motion to postpone.

MS. WARE: Maine.

MR. STOCKWELL: Null.

MS. WARE: New Hampshire.

MS. PATTERSON: Yes.

MS. WARE: Massachusetts.

MR. ADLER: Yes.

MS. WARE: Rhode Island.

MR. REID: No.

MS. WARE: Connecticut.

MR. SIMPSON: No.

MS. WARE: New York.

MR. GILMORE: Yes.

MS. WARE: New Jersey.

MR. ALLEN: No.

MS. WARE: Pennsylvania.

MR. LUSTIG: Yes.

MS. WARE: Delaware.

MR. MILLER: Yes.

MS. WARE: Maryland.

MS. FEGLEY: Yes.

MS. WARE: Potomac River.

MR. GARY: No.

MS. WARE: Virginia.

MR. O'REILLY: Yes.

MS. WARE: North Carolina.

MR. BRADY: Yes.

MS. WARE: South Carolina.

DR. RHODES: No.

MS. WARE: Georgia.

MR. GEER: No.

MS. WARE: Florida.

MR. ESTES: No.

MS. WARE: NOAA.

MR. ORNER: Yes.

MS. WARE: Fish and Wildlife.

MR. WRIGHT: Yes.

CHAIRMAN BALLOU: **Motion passes 10 to 7 with 1 null vote.** We have actually made a decision. How about that?

MR. ABBOTT: Mr. Chair?

CHAIRMAN BALLOU: Yes, Mr. Abbott.

MR. ABBOTT: I'm sorry, but did I not hear Maine as null and Rhode Island as a null? It was a no, thank you. I'm old and don't hear well.

CHAIRMAN BALLOU: Okay, so with that and given that we're so over our schedule, I think what I'm going to suggest is that we had parked one issue that I would frankly like to move to the annual meeting; and that is the TC report or response on the paper. I don't know, Jason, let's give it a shot. Let's give it a quick shot.

We've got a few more items and we're going to do everything humanly possible to get done by lunch; which is 26 minutes from now, 12 o'clock is 26 minutes from now. Let's move through these next items, break for lunch and then the Striped Bass Board is going to meet after that.

TECHNICAL COMMITTEE COMMENT ON ANALYSIS BY PETER HIMCHAK

CHAIRMAN BALLOU: We had parked one item in the TC report. Jason, if you could bring back that slide and speak to it, it is a TC response or comment on a paper that was submitted that a board member asked to be considered. Let's cover that right now, Jason.

MR. McNAMEE: Yes, super quick. I think the slide is just about to pop up. We received an analysis from Peter Himchak titled Fate of an Atlantic Menhaden Year Class. We had a discussion about that at the TC. What we did was offered him some feedback. There was additional discussion between Peter and some Technical Committee members, but individuals. He improved the analysis. We can re-review

the analysis, if it is the wish of the board, and that is the extent of that, Bob.

CHAIRMAN BALLOU: Any questions or comments?

MR. SCHICK: Yes, I would like to request since there was conversation going on that the TC get into a webinar and further address some of the concerns, and present at the next meeting.

CHAIRMAN BALLOU: Is the board comfortable with having the TC continue to vet this issue, respond to this issue as Kyle has suggested? Is there any objection to that? Seeing none; we'll ask the TC to continue to work with the author of the paper, and we will move on to the next agenda item which is Guidance on the Draft PID for Amendment 3. We will have a brief presentation on the draft document, which has been developed by the PDT and is before the board for review.

GUIDANCE ON THE DRAFT PID FOR AMENDMENT 3

CHAIRMAN BALLOU: Megan has a few slides summarizing the document. We will then be seeking board input, perhaps limited input given the time, on the issues and options as presented. This input will be in the form of feedback to the PDT, which they will consider as they continue working on the development of the document as a draft; and that draft document will be brought back before the board at our meeting in October. This is not an action item, as such; we're not looking for any motions or any votes; thank God. We only have just a few minutes for this, but it's an important issue, so Megan, to you.

MS. WARE: In the interest of time today I'm just going to mostly focus on the issues I would like board feedback on. I've been working with the PDT over the last couple of months to start the PID; again, this is our broad scoping document where we're asking, generally how do you want to see the menhaden fishery managed.

Then after this we'll move to Draft Amendment 3, which is a bit more narrow in its focus. Just to go over the timeline, since I've received a couple questions about this, this is the master timeline for Amendment 3. In October I will be bringing the PID for approval for public comment, which means our public comment period on the PID will be in November, 2016 through January, 2017.

After that, we will review those comments in February. I am going to work with the PDT to draft Draft Amendment 3 between March and July of 2017. In August, 2017 I hope to have the document for approval for public comment, so that means public comment on Draft Amendment 3 would be September through October 2017, and then November 2017 we would take final action on the document.

These are the issues currently included in the PID. I'll go through most of these in greater detail today. A question I have for the board is if there is an issue you are interested in seeing in the PID which is not on this list here, please let me know today so that I can have the time to incorporate that issue into the document.
Reference points, so this is going to be a big portion of the document. The board is interested in pursuing ecological reference points. At this point I have three options included in the PID. The first would be status quo; which is the single species reference points from the 2015 benchmark stock assessment.

Option B is the Pikitch et al ERPs; these were brought forth by Pew and reviewed by the BERP. Then Option C is interim reference points until the BERP ERPs are completed. Just for some clarification, I believe the BERP ERPs are going through peer review at the end of 2018, which would make them available in 2019, just to clarify that. There had been a question.

If the board is interested in using those, we will need interim reference points before that time. Those interim reference points can be the single species reference points, they can be other ERPs, but right now, this is the PID; we're keeping it broad, so that is Option 3. Quota allocation, so we have many different options here.

The two concerns I've heard from the board or from the public is that the current allocation does not strike an equitable balance between different gear types and regions. Also, the current allocation does not allow for growth in the fishery, especially in some of those peripheral states. We have a suite of options here. These are all presented to the board already in the memo from the Allocation Working Group. I am not going to go through these in specifics right now, but if there is a question I am happy to add more information. Going along with that would be the allocation timeframe. We have three different options there. Again, this has been presented to you before so I am not going to spend time on this; but I am happy to give detail if asked.

Our fourth issue is quota transfers and overage payback. We're including this because as a practical matter, transfers are a really efficient and useful way to address overages. However, some regions may be disadvantaged by the quota transfer system, due to the timing of their fishery relative to other fisheries on the coast.

Also, there is no ASMFC guidance on what a state should do if they receive multiple transfer requests at the same time. To try and address some of those issues we have three options in the PID. The first would be status quo, so quota transfers can continue and any remaining overages are deducted from the subsequent year's quota.

Option B is a voluntary transfer pool, so how this would work is a jurisdiction with an underage could transfer any unused quota to a shared pool; and then extra quota in the shared pool would be distributed to states with an overage, either through a conference call or some sort of allocation scheme.

Again, the specifics are not yet defined but we're trying to understand if there is support for these general ideas. Option C is overage reconciliation, which some other fisheries do use. If the TAC is not exceeded in a specific year, any quota overage would be forgiven. When the TAC is exceeded but one state has an underage, that unused quota would automatically be pooled and distributed to states with an overage.

The main difference between B and C is whether that is a voluntary giving of unused quota or it's an automatic pooling. If there are any other options the board would like to see in this, please let me know. Quota rollovers, in Amendment 2 it says that quota can be rolled over if the stock is not overfished and overfishing is not occurring.

We're now at that point. However, the specifics weren't outlined in Amendment 2, and so the board has decided to push this into Amendment 3. We have three options; one that quota rollover is permitted. Option B is that limited quota rollover is permitted so that rollover would be capped by a certain percentage of allocation. Then Option C, no quota rollover is permitted.

Bycatch allowance, this is an area I am looking for some feedback from the board on; especially since we have taken action today on Addendum 1. But some of the concerns I've heard and the PDT and I have tried to address in the options you see before you, are that the bycatch is not included in the quota and so that could undermine the TAC. I've heard concerns that we don't have a clear definition of what a non-directed fishery is or what incidental catches, if it needs to be a percent composition of catch; things of that nature.

Hoping to address those with these options, but again if there is another option please let me know. We have status quo, the 6,000 pounds per vessel; which we will add to this the 12,000 pound provision. Option B, bycatch would be included in the quota. Basically, all bycatch of menhaden would count towards the quota. Once the quota is met the fishery would shut down. Option C would be a bycatch cap and trigger. Bycatch is limited by a harvest cap, and if the bycatch landings exceed that cap by a certain percentage in a single year or exceed that cap in two consecutive years, that would trigger the board to take management action to reduce bycatch landings. Option D, bycatch allowance per individual, this is trying to get at the issue that was brought up through Addendum 1; so each permitted individual would have a bycatch limit.

Then Option E is to define bycatch as a percent composition. Trip landings, for example, over a thousand pounds would have to maintain bycatch landings under a certain percent composition. The thousand pounds is not necessarily what we have to go with, it is just an example; and the reason the PDT put that in there is there is the issue of cast nets, which we're looking for some feedback on.

Those, in some ways, are directing, but they're small landings and bycatch. It is unclear how to deal with this. I would appreciate feedback. All right, episodic events, especially over the past three months, are an issue that have come up a lot. I think that this is something that would be useful to address, specifically now that we have three states participating in the program, and New York, which originally wasn't included as a participating state is now a part of that.

I don't really have much guidance from the board, and I would appreciate feedback on what you would like to see in this. We just have status quo right now, but some questions I have are, does the board want to keep episodic events? If yes, do you want to increase or decrease the amount of TAC that is allocated to this program? What states should be allowed to participate in this program? Again, I'm looking for some feedback on this issue.

Finally, the Chesapeake Bay Reduction Cap is included. There are no specific options in the PID here, and I don't think the PDT intends to write them. What we're hoping to do is just put some questions out to the public as to whether we should keep this cap. The reason for this is that the Chesapeake Bay reduction fishery has consistently underperformed this cap, and there has been a peer review of the Atlantic Menhaden Research Program, which found localized depletion is not occurring in the Chesapeake Bay.

Our two questions for the public are: should the Chesapeake Bay reduction fishery cap be maintained, and is this an important tool for management of Atlantic menhaden? I have just some starter questions for the board; but again, I'm looking for some feedback today so we can bring a polished PID to the board in October.

CHARIMAN BALLOU: Excellent presentation. With these questions, does the board have any suggestions that are responsive to the questions that are up on the board?

MR. SIMPSON: I do, thank you. Under Issue 6, some of the concerns that were raised relate to lack of clarity on what bycatch is, is it meant to be a percent and so forth. I would like to be able to address that; and sort of a preamble to what I'm going to suggest. I want to point out that from Table 3 in the Draft Amendment, all gears other than gillnets, pound nets or purse seines account for just less than three-quarters of a percent of our coastwide landings.

Gillnets account for 1.35 percent, pound nets 3.7 percent, and purse seines 94.2 percent. To begin with under Issue 6, my suggestion would be for clarity in this bycatch area is to rename this issue; small scale fishery allowance. I think that is what we're trying to get at, so that yes a cast net is a directed fishery, but let's keep it in

perspective on what it is. We can always set appropriate trip limits. My other suggestion is to add a new Option F, which would be a small scale fishery set aside. Just to follow the format that you've used, it would be: Small scale fishery set aside. One to 7 percent of the overall TAC would be set aside for small scale fisheries landing not more than 1,000 to 6,000 pounds per trip.

To get public comment on that sort of range of percentages and trip limits, I think, would help us a lot in terms of the administrative burden all the states face, managing the hundreds of people that cumulatively only represent a small fraction of the catch; 1 or 2 percent. That's my suggestion.

CHAIRMAN BALLOU: Additional suggestions?

MR. McMURRAY: Not necessarily a suggestion, but a clarification question if I may. Regarding the reference point options, Option C is very vague. You say you're going to develop interim reference points, but then you kind of mention a combination of A and B. Can you maybe explain what you're planning on doing there?

MS. WARE: With that option, I'm trying to gauge interest or get comments on if the public and the board are interested in using the BERP ERPs, what do we do in the meantime since those are not going to be ready when we take final action on Amendment 3? In the document it says that interim reference points could be the single species reference points that we currently use.

It could be the Pikitch et al ERPs. I'm also hoping to get, if there are other ERPs that are applicable to this fishery, information on those. It is broad, but I'm trying to cast a wide net to get as much information as possible. If you would like more specifics or it to be more specific, please let me know.

CHAIRMAN BALLOU: Additional? Yes, Terry.

MR. STOCKWELL: Concerning the episodic events, given New York's and Maine's experiences this summer, I would like to see some options that would allow for extended eligibility and for quota increases.

CHAIRMAN BALLOU: Next hand is Bill Goldsborough:

MR. GOLDSBOROUGH: I noted with surprise in Megan's presentation, the statement that localized depletion in Chesapeake Bay had been found in that research program to be not occurring. That is absolutely not my recollection of what happened. We put that cap in place as a precautionary measure about ten years ago, and embarked on a five-year-research program at that time, which was inconclusive.

Because the various methods that were attempted were actually counting how many menhaden were in the Bay at any one time, including LIDAR; if some of you recall, were unable to do that. I guess I would request that the PDT revisit the record on that program, and what it did conclude; because as far as I'm concerned it is still an open issue, and I believe that view represents the views of a lot of stakeholders in the Chesapeake.

CHAIRMAN BALLOU: Go right around the table, Lynn Fegley.

MS. FEGLEY: I just wonder to Dave Simpson's point. Up front in the Addenda when it talks about why are we doing this. I wonder if it wouldn't be helpful to have some language about the administrative burden that a lot of the states are facing. In Maryland, we're spending more money than the fish is worth to try to manage the quota. I think that that is a pretty good rationale for going down the road we're going down.

CHAIRMAN BALLOU: Other comments. Rob O'Reilly.

MR. O'REILLY: There were about eight telephone conferences among board members during the allocation period of this going forward. During that time, several times it was talked about not having the episodic continue forward if possible, and even not having the, what is called now, the bycatch.

My comments would be, what could we have to sort of direct us that way? It seems that we, today at least, were unwilling to increase the TAC, and certainly that's one way that there can be better programs than simply having these episodic events that someone can miss like Maine or New York, and at the same time the 6,000 pound bycatch. I don't think we should be resigned to the current formula for that. I think that takes a little bit of work.

On the 6,000 pound bycatch the way it is now. There was one item that indicated the quota should contain the bycatch. I think it would be helpful if it doesn't already appear somewhere, to get the monthly progression of the bycatch. There are probably five states mainly that are involved with the bulk of the bycatch, and the Bay certainly is the leading contender.

But we should probably look at that monthly distribution so the other states can get an idea of if someone wants to go forward with making the bycatch that it is now part of the quota, what the risk is there on a seasonal basis; so monthly data if possible, and I hope that wouldn't be too hard to produce.

CHAIRMAN BALLOU: We're absorbing all these comments and we won't be responding or discussing them, just really like a sponge kind of pulling them all in so they can be conveyed to the PDT, so we'll do that. Other comments? Dr. Pierce.

DR. PIERCE: In the reference points section, there, of course, is a reference to Option B, the Lenfest work relative to ecological reference points. There is also reference to, in this document, an April, 2015 document from the BERP, the Biological Ecological Reference Points Working Group.

Just a caution that when I read the reference in the document to the working groups evaluation of that particular reference point from Lenfest, I come away with the conclusion that they're saying, don't use it, it's inappropriate. Yet, it is in the document as an option. I know it's important for there to be a more evenhanded treatment of that particular Lenfest document, because when I read other information about it, I have more of a positive outlook.

There is a negative outlook in the text relative to the options, so it is almost a self-fulfilling prophecy that individuals will look at the text and say, why are you actually offering it up as an option; it makes no sense. But it does make sense to offer it up as an option. A more evenhanded treatment, and if there is anything more that's been provided by the BERP since April of 2015 that would be supportive of including it, as a reasonable, feasible reference point, then that should be put into the document.

CHAIRMAN BALLOU: Additional comments? Bill.

MR. GOLDSBOROUGH: I just would add to what Dr. Pierce just said and remind us all that the Lenfest program actually provided feedback to this board after the BERP had evaluated that approach and sent a memo. In that response that was handed out at a meeting about a year ago, maybe it was in May of last year, I forget, they actually addressed a lot of the concerns that the BERP had expressed.

I think, consistent with what David was saying, that ought to be reviewed and maybe incorporated into the representation of that option, as well. Second point, please, I guess I'm a little unclear on what was represented as to the various ecological reference point approaches that would be available under the current timeline for Amendment 3. Some of

them, apparently in development, will take longer.

But it was my understanding that there were a couple that have been under development that are expected to be available. I didn't see mentioned anywhere, the ecopath with ecosim was one, and maybe Megan can comment; but I think maybe the Steel-Henderson was another. In general though, I don't mean to make a comment specific to those options, but I would hope we are casting our net wide.

It is my understanding that there is quite a bit of expertise on this in the Northeast Fisheries Science Center, in particular with Dr. Jason Link. My suggestion would be for the PDT or maybe this is the BERP, I'm not sure, but in the development of the PID and Amendment 3, to consult with Dr. Link and make sure we have all our bases covered on that.

CHAIRMAN BALLOU: That is a BERP Working Group matter, as I understand it. But let's just take the comments for what they're worth right now, because we don't have the time to really get into many back and forth's; but thank you, Bill for that. Any other comments? Seeing none; let's move on.

We've got three last agenda items, and I would like to try to move through these as quickly as possible. I'm sure we're all hungry. The next item is, and by the way just to remind the board. The PID, which will be further developed, will be back before the board at the next meeting. This is just comments on a draft that will come back before you as a draft, and just know that that is happening.

UPDATE ON THE COMMERCIAL MENHADEN FISHERY SOCIOECONOMIC STUDY

CHAIRMAN BALLOU: Item 7, an update on the socioeconomic study on the commercial menhaden fishery being undertaken by Doctors Jane Harrison and John Whitehead, pursuant to a contract with the commission. We have a brief presentation by Dr. Harrison, who has been patiently here this entire morning with us, up front and to Dr. Harrison, I turn it to you.

DR. JANE HARRISON: I am going to make this brief. I am hungry, I'm cold, and I can't be here much longer. Thank you all. I'm going to give you an update here on the socioeconomic analysis that I'm working on with Dr. John Whitehead at Appalachian State University. If you want to go to the next slide please, and just click through a couple times here. As you click you'll see, this is just a description here; figure those little red circles, just keep it there, show some of the changes that we've seen over the last 15 years with the pounds landed for menhaden. I'm sure most of you are aware of some of these downturns, downturns in the bait fishery at certain times, downturns for the reduction fishery.

We're looking at some of this data, and I'm going to tell you in just a bit about kind of what we're going to be able to find out through our analysis. A big question we have is, how have the quota changes in the past affected the industry of today, and how could future quota changes; future TAC decisions affect the industry as it is?

The study began March, 2016. I'm not sure if you all can read from way far back there. But there are really three types of data that we are relying on for this study. First is the ACCSP data, this is data that I'm sure you all have had access to over the years in different forms; and this really looks at just overall, the pounds landed, the prices, the vessel types, gear types, fishing effort type of data.

We're using that to do some assessments looking at some time trend analyses, so again, how have quota changes, these different special events, affected the industry at different points in time, affected the amount of pounds landed and what's going on in terms of profitability for both the bait side and the reduction industry.

Then we have two other forms of data, so we're collecting some original data here that will be new to you all. The first form is the interview data. We have started with the interview data in Reedville; we're doing three different states. I'm going to get into that a little bit more, but we're looking at Virginia, New Jersey and Maine.

We're really trying to understand industry participants in all of those states. We're trying to understand just kind of this general profile, their economic profile; how important industry is to them; their other sources of employment; and really looking at the supply linkages in the industry, so when a menhaden fish comes out of the water, where does it go?

For the wholesale bait industry, it may end up with a distributor. That may happen in Virginia, and then it may get sold to Maine, where it is then sold to a lobsterman who uses it, who then sells his lobster for a price. We're really looking at this long supply chain, which is something that isn't really out there in the literature from what we can see.

We're doing those interviews, and then we're also collecting survey data. The survey data is going to be with industry participants; again, in those three states, Virginia, New Jersey, and Maine. We are also doing a survey to the public. We're trying to get at just a better sense of how the public kind of thinks of menhaden; what are their perceptions of the fishery; how it is being managed; and what are some of the tradeoffs that they see, in terms of if the quotas are changed, how do they feel about that?

The next few slides just go into a little bit of detail, which I don't want to go too far. I will say the ACCSP data was a little more difficult to get than I was hoping for. It took about four months just to get data approval; so we are just starting to get into that data. We really haven't done any of these time series analyses yet. But we will be doing that over the next few months. We have like I said, started the interviews, and those interviews are with anyone that we see is part of the supply linkages. We're asking questions about their employment; their revenue; cost of operation; and we're really trying to talk to anyone that we think is part of the supply chain. It may be a fisherman at Omega, it may be a guy who is really a crabber, but he also fishes for menhaden to reduce his costs for crabbing.

It could be a recreational bait seller at a bait shop. We're talking about a lot of different folks, looking at their fishing community; and what kind of changes they've seen due to quotas in the past, so what have been their impacts, and also their social networks. What do they rely on? Who do they rely on to kind of keep afloat in their community; economically, but also kind of more broadly in terms of their wellbeing.

You can just click through a few pictures here. These are just some of the pictures of the types of people we're talking to, and what we're talking to them about. We're looking at all those different products, again talking to the fishermen themselves, talking to lobstermen, talking to those who produce these products; who sell these different products.

We have this interview schedule. If you're in one of these states and you want us to come by and chat, please let us know. We've already gone through Virginia; we might go back if we need to. But we've really chose these states because most of the landings are in Virginia and New Jersey.

Then we wanted to understand the perspective of a state like Maine, who has a much smaller number in terms of their quota, and to see what kind of impact a quota change could have on them. The industry surveys, those will be going out in August, and they were really going to be a complement to the interview data.

Interviews are great for the deep kind of description, the deep understandi1ng of how

the industry works. But the survey data is a population study, so we're really looking at all the industry participants, all the fishermen, all the menhaden fishermen, and all the bait dealers; to really get a sense of whether our interview are representative; the stories we're hearing, are those representative of the industry as a whole.

Finally, again, the public surveys. We're going to be creating a survey that is only going to be going to the states of Virginia and New Jersey. It is not going to the other states, because I think it would be difficult for the public in some of the other states that have very low quotas, to really make tradeoffs.

We're asking the states where there are a lot of menhaden being landed, for that public to think about what are the alternatives. What is the opportunity cost of keeping the quota as it is, of making an increase or a decrease, and really looking at some of the other options as well; so if you keep the fish in the water its role as a forage species, its role as catch or prey for the striped bass, getting them to think about those opportunity costs.

Then the final slide, so just so you know our timeline. We're going to finish data collection in October. We'll be doing our data analysis primarily November through January. I do plan to come back with Dr. Whitehead at your February meeting to give results; if you all are interested for that we would be happy to come. Then we will have a draft final report by the end of February, and then the final report by the end of March. Thank you all, and feel free to talk to me afterwards if you have any questions. I don't know if we have time now.

CHAIRMAN BALLOU: Limited time. I guess my one question would be, is there anything that the board members can do to help with your response rate issues? Meaning, are those folks you're contacting, is that a confidential dataset or is it something that you would be comfortable sharing, and if so, is that something that board members can help encourage members of their industries to respond?

DR. HARRISON: That would be great. I have been very fortunate with the Fisheries Agencies in Virginia, New Jersey and Maine; they've all been very responsive in getting us contact information. Some of that contact information has been mailing addresses, phone numbers and e-mails. I would have to check on whether I could share that with just anyone.

I'm not sure that that would be kosher. If you have your own networks though, and you can send messages out to those that you're in contact with, that you're going to be getting information about the study that would be very helpful. Bob; let's talk more about if I can get an announcement to everyone. I think it would make more sense for you to send to whatever networks that you already have, versus me sharing a contact list that I think is likely confidential.

CHAIRMAN BALLOU: That makes a lot of sense to me; other questions, comments from the board.

MS. FEGLEY: I thank you for your presentation. I just feel compelled to get this on the record. As a huge proponent of this effort, I am a little disappointed that there is no interview effort happening in the state of Maryland. We are in a very unique spot, because we are the largest artisanal bait fishery, so we do not have the big purse seines, we do not have the snapper rigs.

We have fishermen and small communities up and down our eastern shore who rely on this and other fisheries for their income; and part of the problem that we've faced, is understanding the values and impacts within this artisanal fishery versus the larger scale fisheries. I just thank you for your efforts, and just to say, also, that I have been talking to our fishermen about this. They are standing by ready to talk. I would just, if there is any way to get any

information from our state, I would really appreciate it; and thank you.

DR. HARRISON: Yes, I think that is a good point, and just to touch upon that. I only have so much time. This is a short study, so we couldn't go to every state. But what we are attempting to do is to look at the entire supply chain. If there are say, menhaden fishermen selling to distributors that then the fish is ending up in Maryland, in Delaware, other places, then we will try to track down some of those linkages; because we want to see complete supply chains.

Basically, our goal is to describe every kind of different type of supply chain out there. I would be happy to talk to you more afterwards, just to make sure we're not missing something that is distinct in the industry. But we are going to have data from every state through the ACCSP data program.

We may have examples that come out of Virginia and New Jersey, but we should be able to say whether those examples, the interviews, represent a similar type of industry profile in Delaware, Maryland and other states. We will try to make that clear and make those connections.

CHAIRMAN BALLOU: Any other points? Yes again, limited time; but Jim and then Loren.

MR. GILMORE: My question is similar to what Lynn raised, and maybe you're going to cover this. I think your answer sort of maybe alluded to it. Those smaller states that have a bait fishery or whatever, but then you connect that to rather, I don't what the right term is. We go from artisanal fishery to recreational fisheries; some with high value to them, based upon different ports and elite ports whatever.

There is a whole section of where they're using that bait for multipliers for the crabbing, recreational crabbing and through all those things. You start out looking at a very small bait fishery, but then when you connect all those multipliers, this thing actually may eclipse the reduction fishery, because of its value. Is that going to be looked at in terms of your analysis?

DR. HARRISON: Yes, we are definitely focused on understanding all of the different players in the industry. We're looking at the reduction side, but we're definitely looking at all of these different ways the bait fish is used. It does have a lot of distinct kind of ways that it travels and ways that it ends up to end users.

Whether it is for recreational bait or for commercial bait, whether it is just sold to some guy off the boat dock, we're trying to kind of look at – I don't know exactly what you mean by artisanal, small scale, but that is something we can talk about afterwards. I would like to make sure that I've covered that so far in who I've talked to.

CHAIRMAN BALLOU: I just want to wrap this up, but it sounds like Dr. Harrison is going to make herself available, both immediately after this meeting and even after that. Loren, did you want to jump in real quick?

MR. LUSTIG: Thank you for a fascinating report. You did mention that you are canvassing the public. A bit of clarification might be helpful. Would that be people who have some involvement or attachment to the menhaden, or would it be a cross-section of society, and if it's the latter then you might be able to have some conclusion regarding their basic knowledge level and how articulate they are about the whole issue.

DR. HARRISON: Yes, it's a cross-section, so this is a general public survey and we are trying to get at their general perceptions, their general attitudes; as well as asking them some of the more difficult tradeoff questions. I mean, because you can ask people, would you like there to be more striped bass that you can catch; sure, yes. But are you willing to then

make a cut to an important commercial fishery that supports jobs in a community near you.

We're really trying to make them think about these tradeoffs and we're going to give them a couple different options. Our survey instruments, we've been trying to get extensive feedback, as much as we can from the members around this table, from other social scientists that work in fisheries; and the industry participants. If you're interested in giving any feedback, especially on that public survey that is the last one to be developed, and we have not finalized that yet. We'll be sending that out for review soon, and we would love to hear your feedback.

CHAIRMAN BALLOU: With that, I'm going to wrap up that agenda item. We've got two last items before we break for lunch. The next quickly, but importantly is to note that the AP membership for menhaden needs to be refreshed. Jeff Kaelin, who is the chair, acknowledged this on a recent call. Megan may offer a little bit more clarity, but basically what we need to do is call upon the board to review the AP list.

DISCUSS ADVISORY PANEL MEMBERSHIP

CHAIRMAN BALLOU: We've got a number of vacancies; we also have a number of positions that have just basically seemed to have faded and that folks have not been participating for quite some time. We need to refresh, fill vacancies, reappoint, if needed, for folks who have for whatever reason kind of falling through the cracks, and make sure we've got a well constituted AP; particularly as we move through the Amendment 3 process. Mega, do you want to just offer some thoughts on how the board can offer a review and comment on the issue?

MS. WARE: I think there are two issues. We have vacancies, and then we have people who are on the AP but not participating. For states with vacancies, I'm just going to say who they are, because there are quite a few; Georgia, Virginia, North Carolina, South Carolina, Connecticut, Massachusetts and New Jersey.

You guys all have vacancies, so those can be easily filled by filling out one of the forms. I can e-mail it to you. Then it has to go through board approval so we can do that electronically once we have a batch. In terms of people who are on the AP, but maybe not participating. It will be helpful if states could reach out to current AP members, make sure they're interested in participating in the Amendment 3 process. That would be very helpful.

CHAIRMAN BALLOU: I believe there is a handout in your materials that really sets the stage as to where things stand. I would really strongly urge all the states to look at how things stand. Move on this as quickly as possible, because I think the AP is looking to reconvene again as early as like September.

This is something that we would hope you would jump on more or less right away, get a batch of forms in, and then there will be some sort of board review; perhaps via e-mail as need be. Any other questions or comments on that issue? I think everyone is clear on the need for getting a good AP constituted.

OTHER BUSINESS

CHAIRMAN BALLOU: Okay, we're on to the last item, which is other business, which is Terry Stockwell and Maine.

MR. STOCKWELL: Many of you heard, but I want to report out to the board that for the first time since 2008, Maine has got a huge abundance of menhaden in our coastal waters. Anecdotal reports started trickling in 1mid-July, primarily from the Mid-coast and Casco Bay Area. Stock abundance and directed fish1ery effort have both quickly wrapped up since.

In your meeting materials, you should find copies of Maine's menhaden rules, reporting rules, and the emergency regulations, and I'm

going to refer a little bit about each of them. Maine has two primary rules in place; associated with the landing of menhaden. First is, pelagic license, any vessel that fishes for or lands menhaden is required to possess a state pelagic license; which has a number of trip level effort and landings data requirements.

The second is our reporting program, and to summarize the program, if a vessel is federally permitted and reports electronically, DMR will have the data the same day. If a vessel sells to a federal dealer, the earliest DMR should see the data would be the middle of the following week. If vessels are selling to a state only dealer that data would not be due until the middle of the following month. State only harvesters are required to report trip level data monthly; however, there is generally a lag and the department usually doesn't see these reports until the harvesters try to renew their annual licenses.

That all being said, the only hard numbers our landings group had until late last week were from one vessel that landed one day the prior week. Obviously, that data was confidential, couldn't be released or used to accurately monitor or close the state allocation fishery; and at this point I can disclose, it was less than our annual state allocation of around 161,000 pounds.

We were aware of other landings, but there are no other hard dealer landings or harvester reports, and it was during that time period that I relayed my concerns both to Megan and to Chairman Bob. After a number of calls with Megan and Toni, Maine developed and published emergency rules to implement the episodic dealer reporting requirement and to address several issues that were raised by the Plan Review Team.

We published the rules this past Sunday. For everyone's information, as of Monday our dealer reported landings, prior to the episodic declaration, totaled about 1.85 million pounds. I am going to be reaching out to every state this fall with unused state allocation quota, to help us balance our books. This morning's discussion was a little interesting, and I can hardly wait to have it again in Maine in the fall.

To address a question that was raised, why Maine didn't track the landings on a daily basis prior to implementing the episodic program requirements, State Agency, DMR cannot, did not allocate the staff or research to monitor daily landings of a fishery that we haven't had for eight years. At the beginning of this week the approximate amount of the episodic quota was 3.5 million pounds, and at the current rate of landings we project the entire amount could be landed within the next couple weeks.

Consequently, Pat has been working with our staff back at the office, and we will be closing the fishery effective this Friday, in order to let the dust settle, allow for a full accounting of the landings and effort, and to consider any additional emergency regulations to better scale a fishery to any additional available episodic quota.

I want to be quite clear to everybody. We have zero intention of exceeding the episodic quota. However, we haven't had an influx of fish like this since 2008; and prior to that time, there were a number of significant fish kills in multiple bays and rivers all throughout the mid-coast area, and the resultant public health issues.

DMR is currently monitoring the dissolved oxygen levels in these rivers, and we'll be conducting periodic aerial observations using marine patrol aircraft. Following the closure of the episodic fishery in Maine, we're going to be in the difficult position of estimating the abundance of menhaden in or near these river systems; and considering whether or not striped bass and the other prey is prevalent in this really unusually hot summer will drive the menhaden up the river.

In our menhaden rules is specific language that allows a commissioner to suspend the closure rules to prevent fish kills; should that happen I'll be on the phone to Megan immediately. That is where we're at; we've got a huge state allocation overage. We're trying to manage our episodic quota. Unfortunately, I think we're going to tank the entire quota, and for the other states this year.

ADJOURNMENT

CHAIRMAN BALLOU: Any questions for Terry? Seeing none; we have completed our business for the day. Is there any objection to adjourning? Seeing none; we are adjourned, thank you very much.

(Whereupon the meeting adjourned at 12:22 o'clock p.m. on August 3, 2016.)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Megan Ware, FMP Coordinator

DATE: October 4, 2016

SUBJECT: Timeline for Atlantic Menhaden Action Through 2019

In the coming years, the Atlantic Menhaden Management Board (Board) will be considering several management actions. These include selecting reference points and an allocation scheme in Amendment 3, approving a stock assessment update, reviewing a socio-economic study on the commercial fishery, setting a Total Allowable Catch (TAC), and reviewing a SEDAR benchmark assessment which will include the multispecies models produced by the BERP. Given the complexity and interconnectivity of these issues, staff have created a timeline of meetings and management decisions through 2019. The goal of this timeline is to inform the Board of the steps moving forward and set uniform expectations of what will occur at each Board meeting.

Proposed Timeline for Atlantic Menhaden Management Action

October 2016 – December 2019

Month	Tasks and Action
Annual Meeting 2016	• Set 2017 fishing specifications • Consider approving Amendment 3 PID for public comment • BERP Working Group Update
October 2016-January 2017	• Staff conducts public hearings and collects public comment on the Amendment 3 PID • Members of the TC begin work on the 2017 stock assessment update • Unused Episodic Set Aside distributed to states on November 1st • BERP meets to review progress on multi-species models
Winter Meeting 2017	• Review public comment on the Amendment 3 PID • Board provides direction on what management options should be included in Draft Amendment 3 • Review results of the commercial fishery socio-economic study
February-April 2017	• BERP meets to review multispecies catch-at-age model • PDT meets to begin drafting Amendment 3 • Members of the TC collect and standardize data for 2017 stock assessment update • State compliance reports due April 1 • PRT meets to review draft of 2017 FMP Review
Spring Meeting 2017	• Review 2016 landings and quotas for 2017 • 2017 FMP Review of the 2016 fishery • Board provides guidance on projection runs for the 2018 TAC • BERP Working Group update

May-July 2017	• PDT completes draft of Amendment 3 • TC meets to review completed 2017 stock assessment update • TC completes projection runs for the 2018 TAC • AP meets via conference call to provide feedback to PDT on draft Amendment 3 and provide recommendations on the TAC • BERP conference call to review progress on multi-species models
Summer Meeting 2017	• Consider approving draft Amendment 3 for public comment • Consider approving 2017 stock assessment update for management use • TC presentation on 2018 stock projections • Set fishery specifications for 2018
August-October 2017	• Staff conducts public hearings and collects public comment on draft Amendment 3 • AP meets to provide recommendations to Board on options included in draft Amendment 3 • BERP meets to review production model with time-varying parameters
Annual Meeting 2017	• Review public comment on draft Amendment 3 • Select final management options and implementation deadline
2018	• Implement Amendment 3 management measures • TC and SASC begin work on 2019 SEDAR Benchmark Stock Assessment • TC and BERP meet for data workshop (Spring) • State Compliance Reports Due April 1 • PRT meets to review draft of 2018 FMP Review (April) • Board reviews 2017 landings, quotas for 2018, and the 2018 FMP Review (Spring Board meeting) • Board provides guidance on projection runs for 2019 TAC (Spring Board meeting) • TC completes projection runs for the 2019 TAC • AP meetings via conference all to provide recommendations on the TAC (July) • Board reviews stock projections and sets 2019 fishery specifications (Summer Board meeting) • BERP meets for second data workshop (Fall)
2019	• SASC and BERP meet for assessment workshop (January) • State Compliance Reports Due April 1 • PRT meets to review draft of 2019 FMP Review (April) • Board reviews 2018 landings, quotas for 2019, and the 2019 FMP Review (Spring Board meeting) • Board provides guidance on projection runs for 2020 TAC (Spring Board meeting) • BERP meets for second assessment workshop (June) • TC completes projection runs for the 2020 TAC • AP meetings via conference all to provide recommendations on the TAC (July) • Board reviews stock projections and sets 2020 fishery specifications (Summer Board meeting) • SEDAR peer review workshop of single species assessment model and BERP multi-species assessment models and ERPs (December)

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Technical Committee

DATE: September 20, 2016

SUBJECT: 2015 Juvenile Abundance Indices

At the August 2016 meeting, the Atlantic Menhaden Management Board (Board) requested the Technical Committee (TC) provide information on recent recruitment trends in the fishery. Given that recruitment trends are derived from the Beaufort Assessment Model and can only be updated during a stock assessment, the TC decided to investigate juvenile abundance indices (JAIs) as a proxy for recruitment. Given time constraints, only eight indices from six different states could be updated in time for the October Board meeting. These juvenile indices are presented below in an attempt to provide the Board with some information on the juvenile portion of the Atlantic menhaden population. The TC highlights that these indices do not provide a comprehensive picture of juvenile abundance along the coast, especially since the available indices only span from Rhode Island to Virginia. As a result, the TC is not able to provide a statement on recruitment in 2015 nor are they able to predict the magnitude of the young-of-year population in 2015.

The eight available juvenile abundance indices are presented below and are organized geographically, from north to south.

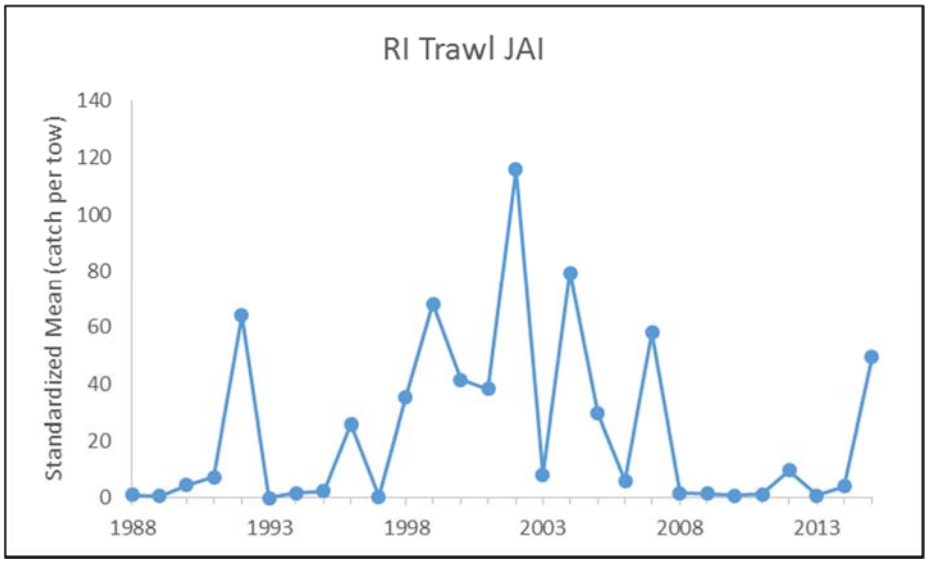

Figure 1: Juvenile abundance index from the Rhode Island Seine Survey, 1988-2015. The survey samples 18 fixed sites in Narragansett Bay, RI each month from June through October.

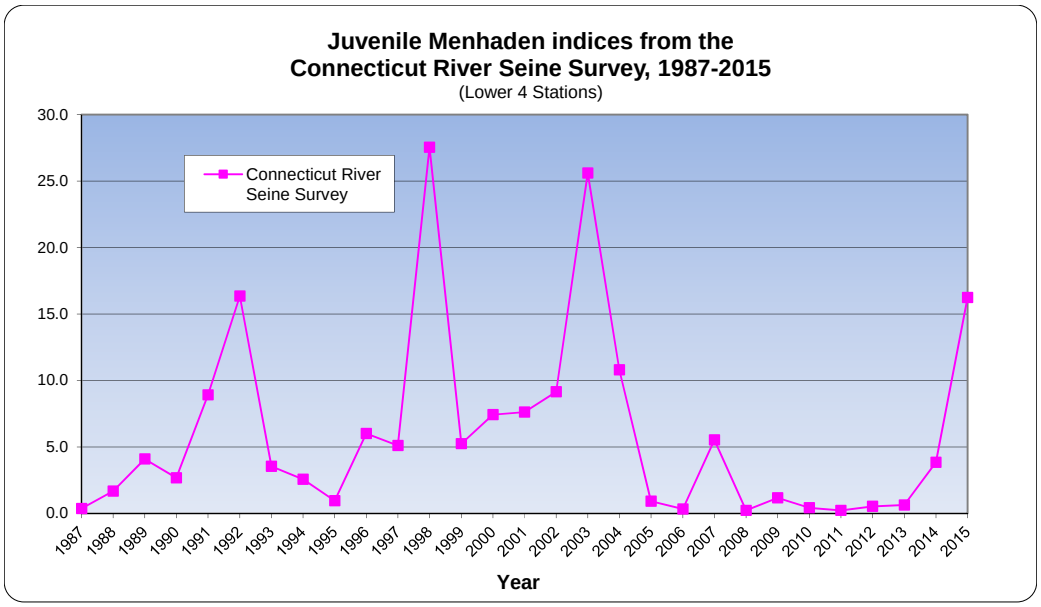

Figure 2: Juvenile abundance index from the Connecticut River Seine Survey, 1987-2015. The survey calculates a juvenile menhaden index based on four stations from Glastonbury, CT to Essex, CT, near the river mouth. The survey is standardized to a 14 week period between mid-July and mid-October. The x-axis is the geometric mean.

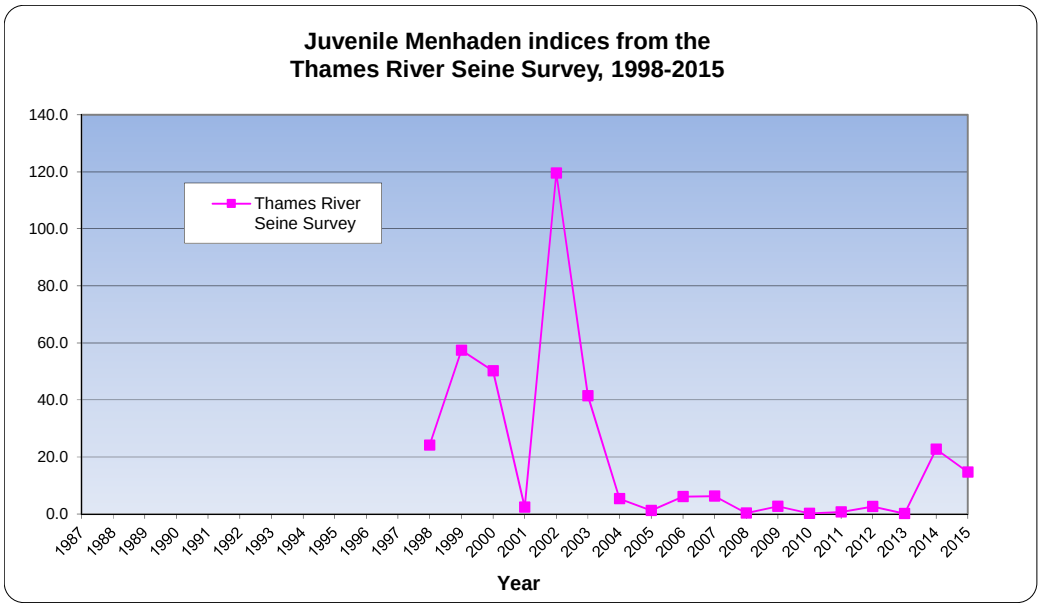

Figure 3: Juvenile abundance index from the Thames River Seine Survey in Connecticut, 1998-2015. Sites located between Norwich, CT, and the mouth of the river are used to calculate a juvenile index for menhaden. The survey is standardized to a 14 week period between mid-July and mid-October. The x-axis is the geometric mean.

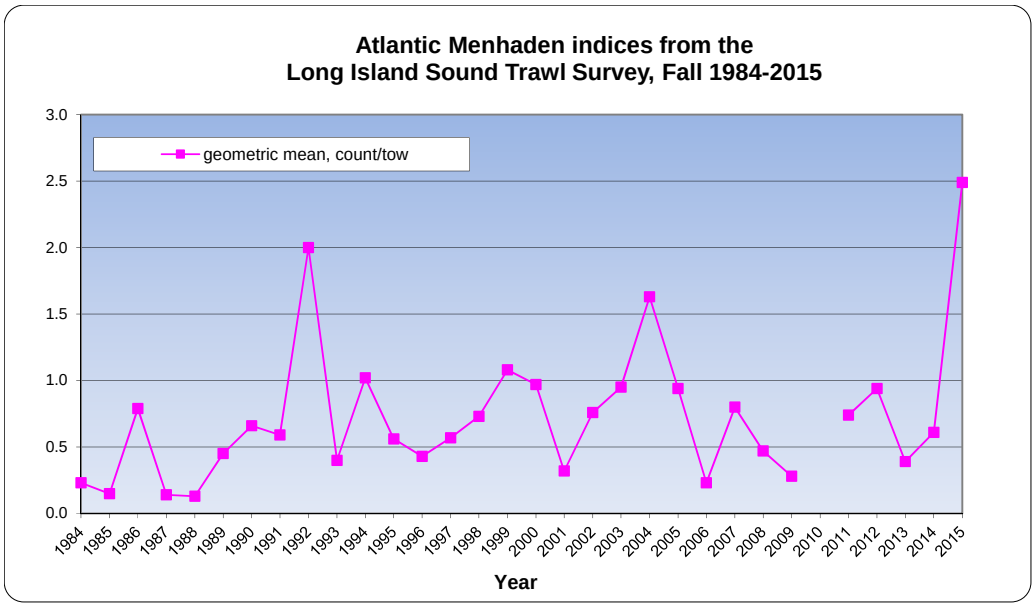

Figure 4: Atlantic menhaden index from the fall Long Island Sound Trawl Survey, 1984-2015. The fall survey occurs in September and October and samples 40 stations selected at random between Groton, CT, and Greenwich, CT, in both New York and Connecticut waters. While this index is used for both juvenile and adult indices, over 60% of menhaden caught in the fall survey are juveniles.

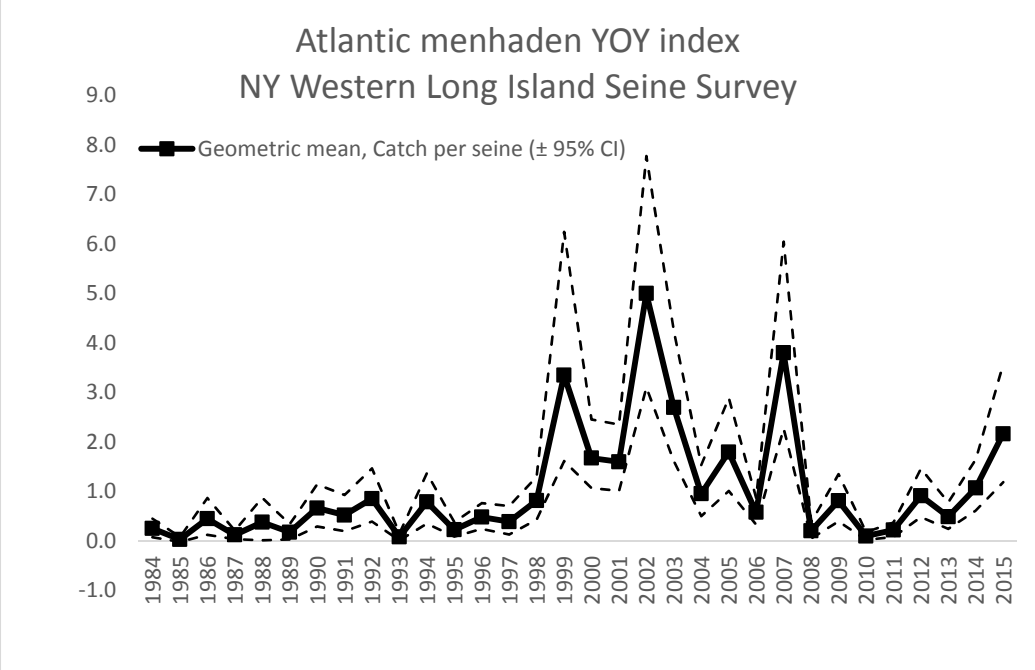

Figure 5: Young-of-year index from the New York Western Long Island Sound Seine Survey, 1984-2015. The survey covers 20 beach sites across 4 bays between May and October.

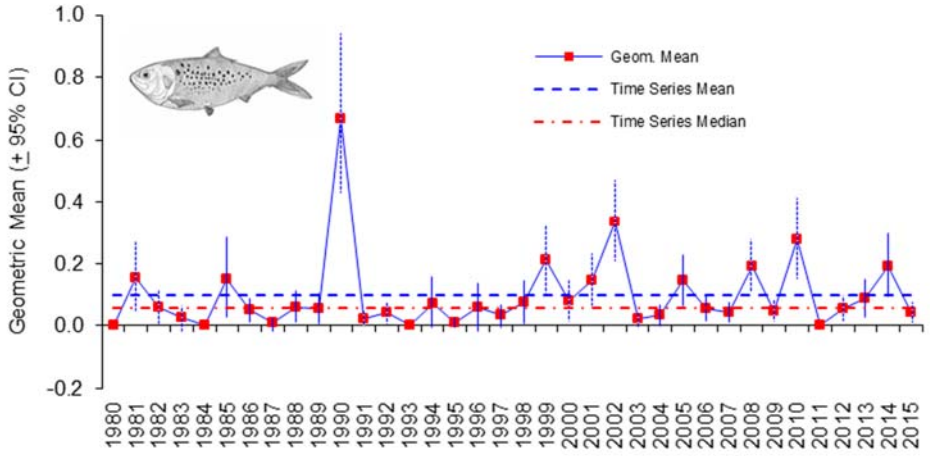

Figure 6: Index of young-of-the-year Atlantic menhaden abundance from the Delaware Bay Juvenile 16ft Trawl Survey, 1980 – 2015. Sites along the western coast of the Delaware Bay are sampled monthly from April through October. The time series mean and median are plotted in blue and red lines, respectively.

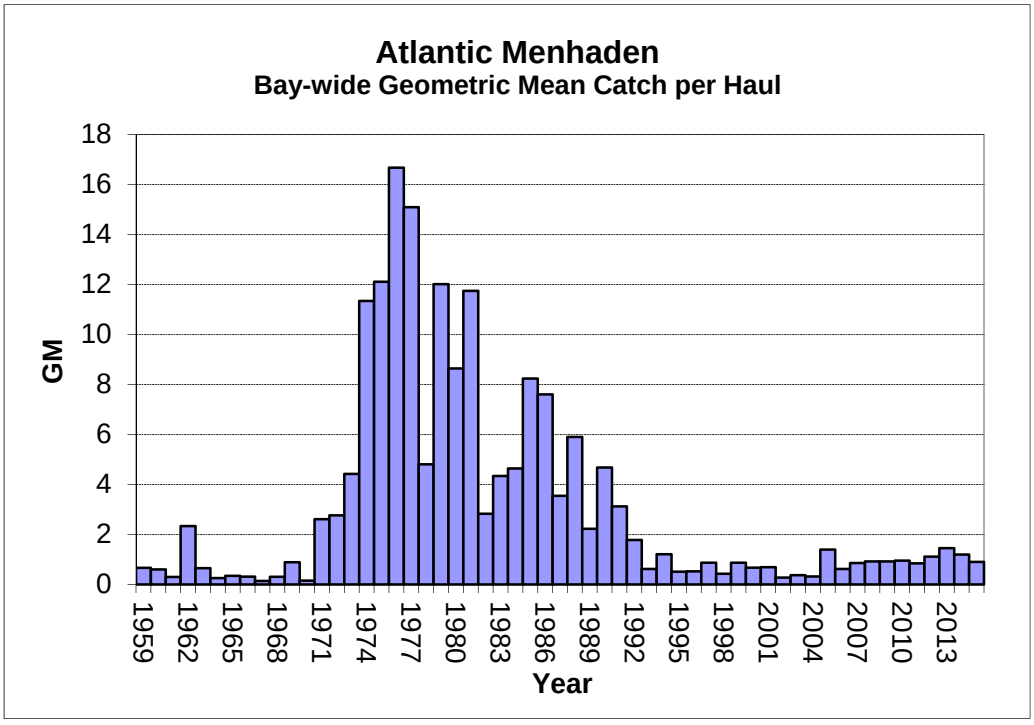

Figure 7: Juvenile abundance index from the Maryland Juvenile Striped Bass Seine Survey, 1959-2015. The juvenile index is derived from samples at 22 fixed stations within Maryland's portion of the Chesapeake Bay. Sampling occurs monthly between July and September.

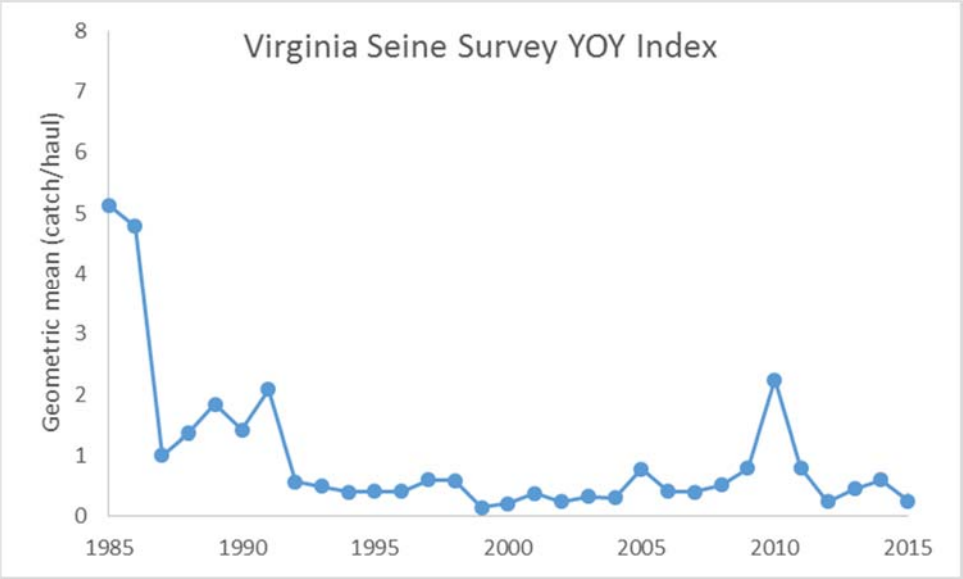

Figure 8: Juvenile abundance index from the Virginia Juvenile Striped Bass Seine Survey, 1985-2015. Index is a geometric mean. The survey samples 18 historic sites and 22 auxiliary sites in the James, York, and Rappahannock Rivers between July and September.

Atlantic States Marine Fisheries Commission

PUBLIC INFORMATION DOCUMENT

For Amendment 3 to the Interstate Fishery Management Plan For

ATLANTIC MENHADEN

October 2016

Vision: Sustainably Managing Atlantic Coastal Fisheries

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

The Atlantic States Marine Fisheries Commission seeks your input on the initiation of 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 Month Day, 201X.** 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 when developing the first draft of Amendment 3.

You may submit public comment in one or more of the following ways:

1. Attend public hearings held in your state or jurisdiction, if applicable.
2. Refer comments to your state's members on the Atlantic Menhaden Board or Atlantic Menhaden Advisory Panel, if applicable.
3. Mail, fax, or email written comments to the following address:

Megan Ware
Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 North Highland Street, Suite 200A-N
Arlington, Virginia 22201
Fax: (703) 842-0741
mware@asmfc.org (subject line: Menhaden PID)

If you have any questions please call Megan Ware at (703) 842-0740.

YOUR COMMENTS ARE INVITED

The Atlantic States Marine Fisheries Commission (Commission) is developing an amendment to revise the Interstate Fishery Management Plan (FMP) for Atlantic menhaden. The Commission, under the Atlantic Coastal Fisheries Cooperative Management Act, is charged with developing fishery management plans for Atlantic menhaden which are based on the best available science and promote the conservation of the stock throughout its range. The states of Maine through Florida participate in the management of this species.

This is your opportunity to inform the Commission about changes observed in the fishery, actions you feel should or should not be taken in terms of management, regulation, enforcement, and research, and any other concerns you have about the resource or the fishery, as well as the reasons for your concerns.

WHY IS THE ASMFC PROPOSING THIS ACTION?

At the May 2015 meeting, the Menhaden 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 2015 Atlantic Menhaden Benchmark Stock Assessment and Peer Review Report categorized the development of ERPs as a high priority for Atlantic menhaden management. Currently, the stock is assessed with single-species biological reference points, which were defined in the 2015 stock assessment and concluded the stock is not overfished and overfishing is not occurring. However, this method does not consider the ecological role which menhaden serve as forage fish or how changes in the population of predator species may impact the abundance of menhaden. ERPs will consider the multiple roles which menhaden play, both in supporting fisheries for human use and the marine ecosystem, and is a tool which could improve the management of menhaden.

Additionally, Amendment 2 (implemented in 2013) requires quota allocations be revisited every three years. The Atlantic menhaden quota is currently allocated to states based on a three-year average catch between 2009 and 2011. In revisiting the allocations, the Board decided to investigate different allocation schemes 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 opportunities. Some states have also expressed concern about unreported landings during the baseline years and/or that the administrative burden of the current allocation scheme outweighs the value of the fishery they are allocated.

In order to pursue the implementation of ERPs as well as changes to the current quota allocations, changes in the management tools used to regulate the fishery are necessary. This document proposes a suite of management

tools which consider different types of reference points and allocation methods.

WHAT IS THE PROCESS FOR DEVELOPING AN AMENDMENT?

The publication of this document and announcement of the Commission's intent to amend the existing FMP for Atlantic menhaden is the first step of the formal amendment process. Following the initial phase of information gathering and public comment, the Commission will evaluate potential management alternatives and the impacts of those alternatives. The Board will also work to narrow down the potential number of regulatory options, especially in regards to quota allocation and incidental catch. The Commission will then develop Draft Amendment 3, incorporating the identified management options, for public review. Following that review and public comment, the Commission will specify the management measures to be included in Amendment 3, as well as a timeline for implementation. In addition to issues identified in this Public Information Document (PID), the Draft Amendment may include issues identified during the public comment period of the PID.

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 ***Current Step***	**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				**X**			
Review and approval of Draft Amendment 3 by Board for public comment					**X**		
Public review and comment on Draft Amendment 3						**X**	
Board review of public comment on Draft Amendment 3							**X**
Review and approval of the final Amendment 3 by the Board, Policy Board and Commission							**X**

WHAT IS THE PURPOSE OF THIS DOCUMENT?

The purpose of this document is to inform the public of the Commission's intent to gather information concerning Atlantic menhaden and to provide an opportunity for the public to identify major issues and alternatives relative to the management of this species. Input received at the start of the amendment development process can have a major influence in the final outcome of the amendment. This document is intended to solicit observations and suggestions from fishermen, the public, and other interested parties, as well as any supporting documentation and additional data sources.

To facilitate public input, this document provides a broad overview of the issues already identified for consideration in the amendment; background information on the Atlantic menhaden population, fisheries, and management; and a series of questions for the public to consider about the management of the species. In general, the primary question on which the Commission is seeking public comment is: **"How would you like management of the Atlantic menhaden fishery to look in the future?"**

WHAT ISSUES WILL BE ADDRESSED?

The primary issues considered in the PID are:

- Reference Points for Determining Stock Status
- Quota Allocation
- Allocation Timeframe
- Quota Transfers and Overage Payback
- Quota Rollovers
- Incidental Catch and Small Scale Fishery Allowance
- Episodic Events Set Aside Program
- Chesapeake Bay Reduction Fishery Cap

ISSUE 1: Reference Points

Background: Amendment 2 established single-species reference points by which 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. Specifically, 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, producing the reference points in use today. A goal of these reference points was to provide a better measure of sustainability. As a result, the overfishing target and threshold were changed to $F_{57\%MSP}$ (0.38) and $F_{26\%MSP}$ (1.26), respectively, to provide a more conservative approach to menhaden management until multi-species reference points could be developed. Additionally, an overfished target and threshold based on fecundity (FEC) were established at $FEC_{57\%MSP}$ (189,270 billion

eggs) and $FEC_{26\%MSP}$ (86,821 billion eggs), respectively. As of 2013, the stock is not overfished (170,536 billion eggs) and overfishing is not occurring (F=0.22).

Given the crucial biological role which menhaden play as forage fish, the Board has expressed interest in developing ecological reference points (ERPs) by which to manage the menhaden stock. Menhaden serve an important role in the ecosystem as they 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 whale, bottlenose dolphin). As a result, changes in the abundance of menhaden may have implications for the larger ecosystem. ERPs provide a method to assess the status of menhaden while considering interactions with predators and other prey species. This method accounts for changes in the abundance of several species 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 the context of the ecosystem.

In May 2015, the Board tasked the Commission's Biological Ecological Reference Point Workgroup (BERP) with developing ERPs for Atlantic menhaden. To begin this process, the Board identified fundamental objectives for the development of ERPs, including sustaining menhaden to provide for fisheries and predators. The BERP subsequently identified four multi-species modeling approaches which could be used to successfully calculate ERPs for menhaden. These models can combine information on the abundance of menhaden and its predators to quantitatively assess ecosystem needs and set appropriate harvest targets and thresholds. Given the complexity of these models and the large amounts of data required, the BERP does not expect to finish developing these menhaden-specific ERPs before Amendment 3 is finalized. The BERP will be having several data, assessment, and modeling workshops over the next few years in order to complete the ERPs and have them peer reviewed by 2019.

In addition to the menhaden-specific reference points being developed by the BERP, there are other precautionary guidelines on developing ERPs for forage fish in general. Several organizations and scientific papers, such as Smith et al. (2011), support the use of a 75% rule-of-thumb, which recommends forage fish populations be maintained at three-fourths of their unfished biomass levels in order to lower impacts on marine ecosystems. This rule has been implemented by the Convention for the Conservation of Antarctic Marine Living Resources which manages krill to maintain 75% of the unfished biomass in the water to account for the needs of predators.

The Lenfest Ocean Program, a grant making program managed by Pew Charitable Trusts, has also developed guidelines for the development of ERPs for forage fish. In their 2012 report by Pikitch et al., Lenfest describes how they applied a suite of 10 published models to develop a general equation to predict predator responses to

specific levels of forage fish abundance. This equation by Pikitch et al. (2012) proposes a control rule in which fishing mortality does not exceed half of the forage species natural mortality rate (for menhaden, 1/2 M = 0.29) and that, when biomass falls below 40% of unfished biomass, fishing is prohibited.

Another ERP option could combine these guidelines, such that the 75% rule-of-thumb is combined with a fishing mortality target consistent with achieving 75% unfished biomass, and if biomass falls below 40% of unfished biomass, fishing is prohibited. The concept of a fishing mortality cutoff for forage species is used by the Pacific Fishery Management Council in conserving sardine (although it is not set at the 40% of unfished biomass level in that fishery).

In an effort to evaluate existing ERP guidelines, the Board asked the BERP to review the ERPs proposed by Pikitch et al. (2012). The BERP noted several concerns, namely that the Lenfest equation was developed for forage species which are a main component (> 50%) of a predator's overall diet. Although menhaden are important forage for a number of species, and may be a main food source for some species during certain seasons, they do not account for more than 20% of the overall diet for any of the finfish predators currently considered in the BERP multispecies models. The BERP also raised concerns that the Pikitch et al. (2012) equation assumes a stock-recruit relationship can be defined for the forage species. Available data indicate recruitment of menhaden is driven primarily by environmental effects rather than stock size. For these reasons, the BERP recommended the Lenfest equation was not an appropriate method for developing ERPs for menhaden (See Appendix 2 for BERP Memo dated April 20, 2015). Members of the Lenfest Forage Fish Task Force responded to the concerns raised by the BERP, stating it is not necessary for predators to be highly dependent on menhaden (>50% of diet) for the report's management recommendations to apply and that the report's reference points can be applied without a specific stock-recruit relationship. The Lenfest Forage Fish Task Force also highlighted the reference points in Pikitch et al. (2012) offer a precautionary approach to prevent stock collapse and maintain high levels of forage fish biomass in the water (See Appendix 3 for Lenfest Forage Fish Task Force memo date May 4, 2015).

Moving forward, there are several options for the Board to consider.

- Continue use of single-species reference points approved in the 2015 stock assessment.
- Adopt ERPs based on existing guidelines for forage fish in general.
- Adopt, upon completion, menhaden-specific ERPs created by the BERP. Given the BERP ERPs will not be completed before 2019, the Board would have to identify interim reference points by which to manage the stock. These could include the current single-species reference points or existing guidelines for forage fish species.

Importantly, the Board is interested in considering all viable approaches for developing ERPs and invites the public to submit information on other ERPs which have been peer-reviewed and could be proposed in draft Amendment 3. In order to be considered by the Board, submissions should include information on how the ERP was developed, what species it can be applied to, if it has been previously implemented, and how it has been peer-reviewed.

Statement of the Problem: Given the ecological importance of menhaden as a forage fish, the Board is interested in developing ERPs for the stock. Options for ERPs include existing guidelines for forage fish species and those which are currently being developed by the BERP. If the Board wants to pursue the ERPs developed by the BERP, interim reference points must be selected given this modeling work will not be completed until 2019.

Option A: Single Species Reference Points
The Atlantic menhaden stock continues to be managed with the single-species biological reference points developed in the 2015 benchmark stock assessment. These set an F target and threshold of $F_{57\%MSP}$ and $F_{26\%MSP}$, respectively, and a fecundity target and threshold of $FEC_{57\%MSP}$ and $FEC_{26\%MSP}$, respectively. Under this option, the Board would direct the BERP to stop work on the development of menhaden-specific ERPs.

Option B: Existing Guidelines for Forage Fish Species
The Atlantic menhaden stock is managed with ERPs based on existing guidelines for forage fish species (e.g. the 75% rule-of-thumb or Pikitch et al. (2012)). Under this option, the Board would direct the BERP to stop work on the development of menhaden-specific ERPs.

Option C: Single-Species Reference Points Until ERPs are Developed by the BERP
The Atlantic menhaden stock is managed with the current single-species reference points until menhaden-specific ERPs are developed by the BERP and adopted by the Board. It is expected that the BERP will complete its work in 2019.

Option D: Existing Guidelines for Forage Fish Species Until ERPs are Developed by the BERP
The Atlantic menhaden stock is managed with ERPS based on existing guidelines for forage fish species (e.g. the 75% rule-of-thumb, Pikitch et al. (2012), or a combination of these guidelines) until menhaden-specific ERPs are developed by the BERP and adopted by the Board. It is expected that the BERP will complete its work in 2019.

Public Comment Questions: Should the Board manage the Atlantic menhaden stock with single-species biological reference points or multi-species ecological reference points? Do you support the use of more simplistic, readily-available ERPs until the

BERP's recommended ERPs are complete? Do you know of other approaches for establishing ERPs for menhaden that could be implemented through Amendment 3?

ISSUE 2: Quota Allocation

Background: Amendment 2 established a commercial total allowable catch (TAC) for Atlantic menhaden and divided this catch into commercial quotas for participating jurisdictions from Maine through Florida. A TAC and quota system were adopted in order to respond to the overfishing stock status from the 2012 stock assessment and cap landings in the commercial fishery. Since it was implemented in 2013, the quota system has been able to successfully limit the harvest of menhaden.

The 2015 benchmark stock assessment found the Atlantic menhaden stock is not overfished and overfishing is not occurring. As a result, the 2015 and 2016 TACs were raised 10%, from the 2013–2014 level of 170,800 mt to 187,880 mt. The 2013 and 2014 TACs were based on a 20% reduction from the average 2009–2011 coastwide landings. (See Table 1 in Appendix 1 for the state allocations and yearly quotas.)

Amendment 2 requires allocation be revisited every three years. Currently, the TAC is divided among jurisdictions based on average landings between 2009 and 2011. In beginning the discussion on quotas, the Board decided to re-visit the allocation methods given concern that this approach does not strike a balance between gear types and regions, as well as the present needs of the fishery versus future growth opportunities. More specifically, because 85% of the quota is allocated to Virginia, where the last remaining menhaden reduction fishery takes place, increases in the TAC provide limited benefit to the small-scale bait fisheries along the coast. Additionally, given improvements in the condition of the Atlantic menhaden stock, the process of determining allocation on a narrow period of historical catch could 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.

Recognizing these concerns, the Board is interested in exploring other allocation strategies. Many fisheries use quotas to limit effort and provide examples of how catch can be allocated. Some examples: The Atlantic herring quota is currently allocated by season in the inshore management area. None of the quota is allocated between January and May due to spring spawning and interactions with other fisheries; 72.8% of the quota is available from June through September and 27.2% from October through December. Quota for golden tilefish is allocated by gear-type with the annual catch limit divided between the longline and hook-and-line fisheries. This was done to ensure continued participation by hook-and-line fishermen since the commercial quota was being rapidly harvested by the longline sector. Spiny dogfish uses both a regional and state allocation system with the northern region

(ME–CT) receiving 58% of the quota and the states of NY through NC receiving individual state shares. This allocation system was used to allow Southern states the ability to participate in the fishery before the total allowable catch is caught by the northern most states.

In May 2015, the Menhaden Board established an Allocation Working Group to initiate the process of revisiting menhaden quota allocation. The Allocation Working Group considered landings history, the performance of state fisheries, and the challenges associated with the current management plan. As a result, the group created a broad range of allocation options which are presented below. Information on menhaden landings by jurisdiction, gear type, and disposition can be found in Tables 2 and 3 and Figure 1 of Appendix 1.

Statement of the Problem: Amendment 2 requires menhaden allocation be revisited every three years. The Board is exploring different allocation strategies due to several concerns with the current state by state quotas, including inequitable access to quota among gear types and the inability for some states to participate in the growing fishery.

Option A. Jurisdictional Quotas
Quotas are allocated to each state/jurisdiction in the management unit based on its landings during a selected reference period. (See Table 2 in Appendix 1 for commercial landings by jurisdiction.) The current reference period is 2009-2011; however, issue 3 (pg 13) considers potential changes to this time period.

Option B. State-specific Quotas with Fixed Minimum
Quotas are allocated to each state/jurisdiction in the management unit based on its landings during a selected reference period; however, no state/jurisdiction receives less than a minimum fixed percent quota (e.g., 1% of the coastwide TAC). A minimum fixed quota allocation provides growth opportunity for states which have small quotas. For example, in the American eel fishery, each state is allocated a minimum 2,000 pound quota in order to increase equity in the distribution of quota.

Option C. Coastwide Quota
There is one coastwide quota which applies to the entire Atlantic menhaden fishery.

Option D. Seasonal Quotas
The TAC is divided into designated seasons, such as a winter, spring, summer, and fall. Under this option, it may be possible to consider further allocation (e.g., regional, state by state) of the season-specific quotas to provide equitable access to the fishery. (See Figure 2 in Appendix 1 for a breakdown of commercial landings by month).

Option E. Regional Quotas

Quotas are allocated to designated regions. The intent of these geographic delineations would be to capture the spatial dynamics of the fishery. Specific regional options could include:

1. Two region split: (1) North, defined as waters north of Machipongo Inlet, VA, on the Delmarva Peninsula; and (2) South, defined as waters south of Machipongo Inlet, including the Chesapeake Bay. These regions match those used for stock assessment purposes in the 2015 Benchmark Stock Assessment.
2. Two region split: (1) Chesapeake Bay; and (2) Coast.
3. Three region split: (1) New England, defined as ME–CT; (2) Mid-Atlantic, defined as NY–DE; and (3) Chesapeake Bay South, defined as MD–FL.
4. Four region split: (1) New England, defined as ME–CT; (2) Mid-Atlantic, defined as NY–DE; (3) Chesapeake Bay, defined as MD–VA; and (4) South Atlantic, defined as NC–FL.

Option F. Disposition Quotas

Quotas are allocated to the bait and reduction fisheries separately. The intent of this option is to capture the different dynamics which exist between the bait and reduction fisheries. Under this option, it may be possible to consider further allocation (e.g., regional, state-by-state) of the disposition-specific quotas to provide equitable access to the quota.

Option G. Fleet Capacity Quotas

Quotas are allocated to various fleets based on their harvest capacity, as determined by gear type. The intent of this option is to capture the different scales of operation which exist in the fishery and their dynamics. It may be possible to consider further allocation (e.g., regional, state-by-state, disposition) of the capacity-specific quotas to provide equitable access to the quota. Some of the specific fleet capacity options below include a "soft quota" concept, which sets a target quota but does not subject the fleet to a fishery closure. The intent of a soft quota is to restrict the retention of menhaden but add flexibility for additional catch in years when fish are abundant.

Specific fleet options could include:

1. Two Fleet Capacity Allocation

Small Capacity Fleets:

Types of gears in the small-capacity fleet include, but are not limited to, cast net, trawl, trap/pot, haul seine, fyke net, hook and line, pound nets and gill nets. Total coastwide landings for these small capacity gears are approximately 22 million pounds annually or 5% of coastwide landings from 2009–2012. The small capacity fleet could be defined by a trip limit such that a vessel must land less than a certain poundage of menhaden to fish in the small capacity fleet; otherwise they would move to the large capacity fleet. Alternatively (or additionally), a trip limit could be established if the small capacity fleet harvest grows to an unacceptable level. Given the small capacity of these gear types, this

fleet could be managed with a soft quota, whereby harvest is allowed to fluctuate above the quota in years when fish are available (Figure 1). Flexibility in the quota would minimize menhaden discards from this fleet.

Large-Capacity Fleet:

Types of gears in the large-capacity fleet include, but are not limited to, purse seines and pair trawls. Total coastwide landings are approximately 436.2 million pounds annually or approximately 95% of the coastwide TAC from 2009–2012, and include both bait and reduction fishery harvest. Given the large capacity of these gear types, this fleet would be managed with a hard quota.

2. Three Fleet Capacity Allocation

Small-Capacity Fleet:

Types of gears in the small-capacity fleet include, but are not limited to, cast net, trawl, trap/pot, haul seine, fyke net, and hook and line. Total coastwide landings for these small-capacity gears are approximately 3.14 million pounds annually or roughly 1% of the coastwide TAC from 2009–2012. Given the small capacity of these gear types, this fleet would be managed with a soft quota.

Medium-Capacity Fleet:

Types of gears in the medium-capacity fleet include, but are not limited to, pound nets and gill nets. Total coastwide landings for these gear types are approximately 18.92 million pounds annually or 4% of the coastwide TAC from 2009–2012. Given the medium capacity of these gear types, this fleet would be managed with a soft or hard quota.

Large-Capacity Fleet:

Types of gears in the large-capacity fleet include, but are not limited to, purse seines and pair trawls. Total coastwide landings for these gears are approximately 436.2 million pounds annually or 95% of the coastwide TAC from 2009–2012, and include both bait and reduction fishery harvest. Given the large capacity of these gear types, this fleet would be managed with a hard quota.

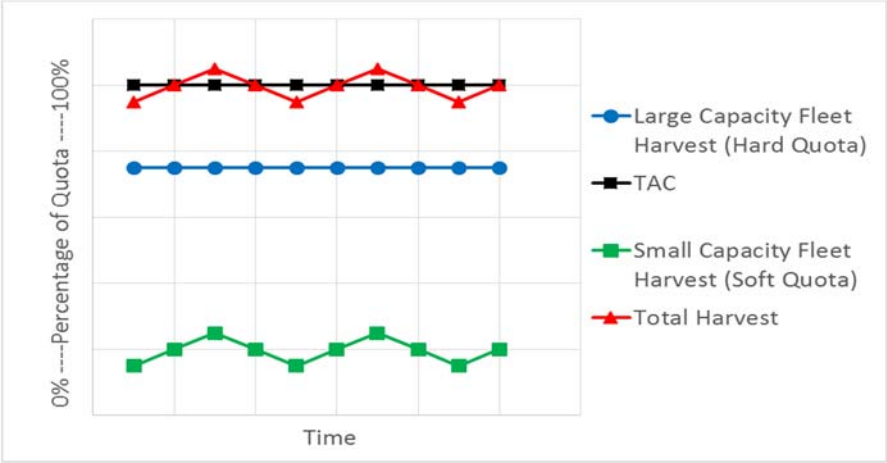

Figure 1. A graphical representation of the two fleet capacity allocation showing the fluctuating small capacity bait harvest and its impact on total harvest relative to the quota.

Public Comment Questions: What allocation mechanisms provide for the fair and equitable distribution of coastwide total allowable catch? Which allocation scheme strikes a balance between current needs and future growth opportunities? Do you support the use of soft quotas for some user groups?

ISSUE 3: Allocation Timeframe

Background: As part of its required review of menhaden allocation, the Board is also considering changes to the reference period on which the quotas are based. Amendment 2 divides the total allowable catch into jurisdictional quotas based on average landings between 2009 and 2011. The primary question facing the Board is whether this timeframe represents a fair and equitable picture of coastwide menhaden catch. Regardless of the allocation scheme chosen in Issue 2, historic landings will be used to allocate the TAC.

Statement of the Problem: Amendment 2's reference period does not consider recent changes in the fishery. In addition, some states have expressed concerns about underreported harvest during 2009–2011. In revisiting state-by-state quotas, the Board must decide if these three years are an appropriate timeframe on which to base allocation.

Option A: 2009–2011 Average (Status Quo)
Quota allocation is based on a three-year average catch between 2009 and 2011.

Option B: Longer Time-Series Average
Quota allocation is based on a longer time series average of catch. For example, quota allocation could be based on a four-year average catch between 2009 and 2012, with 2012 being the last year before implementation of Amendment 2. Or the allocation timeframe could be extended to include years prior to 2009, such as 2006 when the Beaufort, North Carolina reduction plant closed or 1985 when more accurate bait landings data become available.

Option C: Weighted Allocation
Allocation is weighted over two time periods: a more distant period and a more recent period. For example, 50% of the allocation could be based on average landings between 2009 and 2012 while the other 50% of allocation could be based on average landings between 2013 and 2015. Or, a portion of allocation could be based on landings in the 1980's while another portion of allocation could be based on landings in the 2000's. Weighting is intended to balance prior trends in the fishery with recent changes in catch.

Public Comment Questions: Should the Board consider changes to the reference period on which menhaden allocation is based? Should allocation consider prior trends as well as recent changes in the fishery? What years would you recommend as the basis for allocation?

ISSUE 4: Quota Transfers and Overage Payback

Background: Amendment 2 allows for two or more states to transfer (or combine) their Atlantic menhaden quota. Transfers often occur when a jurisdiction has exceeded its allocation for the year; rather than reduce its subsequent year quota by the amount of the overage, as required by Amendment 2, a state can receive quota from another state which did not harvest its entire allocation. These transfers do not permanently affect a state's quota allocation. All states participating in a transfer (i.e., the donor states and the receiving states) must individually submit signed letters to the Commission, requesting approval for the transfer of a specified poundage of menhaden. Transfers are not final until written approval is granted by the Executive Director.

As a practical matter, fisheries routinely, yet inadvertently, exceed or under perform their quota due to the challenges of quota monitoring, including delays in reporting and unanticipated changes in catch rates. Transfers are a useful technique to address these occurrences. However, some regions may be disadvantaged by the quota transfer system due to the timing of their fishery relative to other fisheries along the coast, meaning they may not know they've had an overage until late in the year when available quota has already been donated. Furthermore, there is no ASMFC guidance on how to apportion unused quota if there are multiple transfer requests at the same time.

Other FMPs allow for quota transfers and provide examples of potential management tools. The black sea bass FMP allows for quota reconciliation such that, in a year where the coastwide quota is not exceeded, any state-specific overage is forgiven in its entirety. This streamlines the transfer process and avoids the need for written approval from the individual states and the ASMFC Executive Director. This could potentially be a viable option for the menhaden fishery given that states' harvest did not exceed the annual TAC from 2013-2015.

The black sea bass FMP also provides examples of what to do in years when the coastwide TAC is exceeded. Specifically, states which did not meet their allocation may transfer their unused quota to a common pool. This common pool quota is then re-distributed to states which exceeded their quota based on the proportion of the state's overage. Any overage which remains after the re-distribution of unused quota is deducted from a state's quota the subsequent year. It is important to note that quota reconciliation may not be compatible with quota rollovers (see Issue 5 on pg 15) as unused quota is used to offset overages.

Statement of the Problem: Amendment 2's procedure for quota transfers may not benefit states evenly, lacks specific guidance, and can be an administrative burden on donor and receiving states. Consequently, the Board is considering a quota reconciliation process to address quota overages, as a replacement for quota transfers for this purpose. Quota transfers could still occur for other reasons (e.g., a state grants a vessel safe harbor with catch destined for another state that is then

unloaded there). In the case of the fleet capacity quota allocation options, reconciliation would not be necessary for any fleet assigned a soft quota.

Public Comment Questions: Should the process for quota transfers be further defined or replaced by an automatic reconciliation process? Should state-specific quota overages be forgiven in years when the coastwide TAC is not exceeded? When the coastwide TAC is exceeded but at least one jurisdiction has an underage, should unused quota be pooled and distributed through a specified transfer process to states with an overage? Should there be accountability measures for a state which exceeds its quota by a certain percentage or repeatedly participates in quota reconciliation?

ISSUE 5: Quota Rollovers

Background: Amendment 2 allows for unused quota to be rolled over for use in the subsequent fishing year only when the stock is not overfished and overfishing is not occurring. At the time of implementation (2013), the Atlantic menhaden stock was considered not overfished but overfishing was occurring. As a result, the amendment deferred defining the specifics of the rollover program until overfishing was no longer occurring.

In 2015, a new benchmark stock assessment was approved for management use which found the stock is not overfished and overfishing is not occurring. As a result, the stock met the qualifications for quota rollovers; however, how much quota can be carried into the next year has not been established. In August 2015, the Board agreed to consider the details of quota rollovers in Amendment 3. Other species, including spiny dogfish and Atlantic herring, allow for a percentage (5% and 10%, respectively) of unused quota to be rolled over from one year to the next. For example, in the spiny dogfish fishery, if a state's annual quota is 1 million pounds, a maximum of 50,000 pounds (5%) of unused quota can be rolled over into the subsequent year.

It is important to note that the issues of quota reconciliation and quota rollover may not be compatible, such that it may not be possible to have quota overages automatically forgiven via reconciliation and unused quota roll over into the subsequent fishing year. Any unused soft quota would also not be eligible for quota rollover into the subsequent fishing year.

Statement of the Problem: The Atlantic menhaden stock is not overfished and overfishing is not occurring, thereby qualifying the stock for quota rollovers per Amendment 2. However, the details of a quota rollover program were not specified in Amendment 2, preventing any rollovers from occurring.

Public Comment Questions Should unused quota be rolled over into the subsequent year? Should the amount rolled over be limited to a percent of quota? Should all sectors of the fishery be allowed to roll over quota?

ISSUE 6: Incidental Catch & Small Scale Fishery Allowance

Background: Upon a state reaching its individual quota and closing its directed fishery, Amendment 2 provides a bycatch allowance of up to 6,000 pounds of Atlantic menhaden per vessel per trip for non-directed fisheries. The intent of this allowance was to account for incidental catch, or catch that is not targeted but is caught and landed. As specified in Amendment 2, all landings which occur during a state designated open season count towards a state's quota; however, menhaden caught after the closure of a state's directed fishery are considered bycatch and do not count towards the quota.

Coastwide, the vast majority of menhaden harvested under the bycatch allowance is with stationary multi-species gears. Table 4 in Appendix 1 shows the average bycatch landings between 2013 and 2015 by gear and jurisdiction. On average, 5.7 million pounds of menhaden bycatch are landed each year, representing 1-2% of total landings in the fishery. Over 80% of the bycatch harvest comes from stationary gears with the biggest contributors being the Maryland pound net fishery and the Virginia anchored gill net fishery. Cast nets contribute 6% of bycatch landings and represent the largest contributor from the mobile gear sector. This is followed by drift gill nets (5%) and beach seines (3.7%). Jurisdictions in the Chesapeake Bay contribute the most to bycatch landings of menhaden, with Maryland harvesting 40.7%, Virginia harvesting 24.9%, and the Potomac River Fisheries Commission harvesting 15.4% of annual coastwide bycatch landings. Between 2013 and 2015, 59.6% of bycatch trips using stationary gears landed less than 1,000 pounds of menhaden and 80.7% of trips landed less than 3,000 pounds of menhaden (Table 5 in Appendix 1). In 2015, most menhaden landed under the bycatch allowance were landed in April (28%), September (23%), and October (21.3%). This corresponds with the closure of several states' directed fisheries in the spring and fall (Table 6 in Appendix 1).

Concerns have been raised regarding the current bycatch provision. The first is that landings under the bycatch allowance do not count toward a state's quota. As a result, bycatch landings may undermine the efficacy of the coastwide TAC since there is no yearly bycatch limit. Additionally, given neither "bycatch" nor "non-directed fisheries" are defined in Amendment 2, there are questions of whether the bycatch allowance supports a small-scale directed fishery rather than accounting for incidental catch. Cast nets, for example, direct on menhaden but have been included in the bycatch provision.

Another concern is the current bycatch provision dissuades cooperative fishing since the bycatch allowance is per vessel rather than permitted individual. This is particularly problematic in the Chesapeake Bay where it is traditional for multiple permitted individuals to work together from the same vessel to harvest menhaden. Addendum I (implemented in 2016) alleviated this problem by allowing two permitted individuals fishing from the same vessel using stationary multi-species gear to land up to 12,000 pounds of menhaden (ASMFC 2016); however, there may be other ways to address this problem in Amendment 3.

Moving forward, there are several options to address concerns with the current bycatch provision. Bycatch could be defined as a percent composition to ensure it accounts for incidental landings. Bycatch could also be defined per permitted individual rather than per vessel to allow for cooperative fishing. Alternatively, bycatch could be included in the TAC or limited through a harvest cap to ensure it does not undermine the total quota. Additionally, the bycatch provision could be removed and replaced with a coastwide small-scale fishery set aside (Option F on page 18). This would remove the administrative burden on states to closely monitor landings by small scale fisheries, allow for flexibility in landings as abundances changes geographically and temporally, and bring the current bycatch fishery under the TAC.

Statement of the Problem: Under Amendment 2, there is 6,000 pound incidental bycatch limit per vessel per trip/day for non-directed fisheries. Several issues have been identified with this allowance, namely that bycatch is not included in the TAC, there is no definition of what constitutes bycatch, and the allowance does not support cooperative fishing.

Option A: Incidental Catch Limit per Vessel
Following the closure of the directed fishery, there is an incidental catch limit per vessel per trip for non-directed fisheries. Two permitted individual fishing from the same vessel using stationary multi-species gear are allowed to land twice the allowance when working together.

Option B: Incidental Catch Allowance per Permitted Individual
An incidental catch limit would be established per person/trip, rather than per vessel/trip. As a result, multiple permitted individuals on the same vessel could each land the incidental catch limit.

Option C: Incidental Catch Included in Quota
All incidental catch of menhaden would count towards the directed fishery quota. Once the quota is reached, the menhaden fishery would be closed and no landings would be allowed.

Option D: Incidental Catch Cap and Trigger
Rather than a trip limit, incidental catch in the Atlantic menhaden fishery would be limited by a harvest cap (not part of the annual TAC). If the collective incidental landings exceed this cap by a certain percentage in a single year or by any percentage in two consecutive years, management action would be triggered by the Board to reduce incidental landings in the fishery.

Option E: Incidental Catch Defined by Percent Composition
Trips in the non-directed fisheries which land above a certain poundage of menhaden would be required to maintain their menhaden landings under a specific percent composition of catch. This option can be combined with either an incidental catch

allowance per trip or a cap in order to limit menhaden landings in the non-directed fisheries.

Option F: Small-Scale Fishery Set Aside
A portion of the overall TAC would be set aside for gears participating in the small-scale fisheries. Trips by these gears would be limited to a certain poundage per day and all trips conducted by these gears would count towards the small-scale fishery quota. If the quota is exceeded in a given year, payback may be required or the quota for the subsequent year may be adjusted up or down to meet the expected harvest by small-scale gears. While similar to Option G presented in *Issue 2: Quota Allocation*, the inclusion of this option allows for the establishment of a small-scale fishery set aside regardless of what allocation option is chosen.

Public Comment Questions: Should there be a cap on incidental landings in the Atlantic menhaden fishery? Should incidental catch be defined as a percent composition? Should the incidental catch allowance be allocated to vessels or permit holders? Should the incidental catch provision be replaced with a small-scale fishery set aside, and if yes, what gears should be included in this sub-quota (see Table 3 in Appendix 1)?

ISSUE 7: Episodic Events Set Aside

Background: Amendment 2 sets aside 1% of the overall TAC for episodic events, which are times and areas where Atlantic menhaden are available in more abundance than they normally occur. The purpose of the set aside is to enable increased harvest of menhaden during episodic events so as to minimize discards in the fishery. The details of the program were approved by the Board in May 2013 and are outlined in Technical Addendum I.

Eligibility in the episodic events set aside program is reserved for the New England states (Maine through Connecticut). To participate in the program, these states must implement daily trip level harvest reporting, restrict the harvest and landing of menhaden under the episodic events program to state waters, and implement a maximum daily trip limit no greater than 120,000 pounds/vessel. In order for a state to declare participation in the episodic events program, a state must demonstrate it has reached its quota prior to September 1 and provide information indicating the presence of unusually large amounts of menhaden in its state waters. Any set aside quota which is not used by October 31 is returned to the coastwide quota and redistributed to the states. If the set aside quota is exceeded, overages are deducted from the next year's episodic event set aside amount.

In 2014 and 2015, Rhode Island was the only state to declare participation in the episodic set aside program, harvesting 8% of the set aside in 2014 and 45% of the set aside in 2015 (Table 1). In 2016, Rhode Island and Maine declared participation in the program and New York requested inclusion in the episodic events set aside. While

New York is not considered a New England state under Technical Addendum I, New York highlighted the unusually large amounts of menhaden in the Peconic Bay estuary and the potential for fish kills. The Board approved New York's request to harvest under the episodic events set aside, capping New York's harvest under the program to 1 million pounds.

Table 1: Episodic events set aside for 2013-2016 and the percent used by participating states. Note: 2016 data is preliminary and the amount of unused set aside for reallocation is still unknown.

Year	Set Aside (lbs)	Landed (lbs)	% Used	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	

Given the increasing amounts of menhaden landed under the episodic events program and New York's request to harvest under the set aside, the Board is considering changes to the program. Specific questions include whether the percent of TAC allocated to the set aside should be increased, which states should be allowed to participate in the program, and whether the current definition of an episodic event is appropriate. Furthermore, some allocation options presented in this document would potentially negate the need for such a set aside.

Statement of the Problem: Since 2013, participation in and landings under the Episodic Events Set Aside Program have increased. As a result, the Board is considering changes to the scope of the program, including the amount of quota allocated to the set aside and which states are qualified to participate.

Public Comment Questions? Should a percentage of the TAC be set aside for episodic events? If yes, what percentage of the annual TAC should be set aside? Which jurisdictions should be allowed to participate in this program? Does the episodic event program need to be reconsidered as the distribution of menhaden changes? How should states demonstrate that an episodic event is occurring in state waters?

ISSUE 8: Chesapeake Bay Reduction Fishery Cap

Background: The Chesapeake Bay reduction fishery is currently limited by a harvest cap of 87,216 metric tons. The goal of this restriction is to prevent all of the reduction fishery harvest from occurring in the Chesapeake Bay, a critical nursery area for Atlantic menhaden. Harvest by the reduction fishery is prohibited within the Chesapeake Bay when 100% of the cap has been reached. A maximum of 10,976 metric tons of un-landed fish can be rolled over into the subsequent year's harvest cap. The Chesapeake Bay reduction fishery has consistently underperformed the 87,216 metric ton harvest cap, landing less than 50,000 metric tons in 2015, less than

45,000 metric tons in 2014, and less than 40,000 metric tons in 2013. Note that landings by the Chesapeake Bay reduction fishery are confidential and only approximate landings are provided.

The Chesapeake Bay Reduction Fishery Cap, which was originally implemented in 2006, was intended to prevent the localized depletion of menhaden. There was a hypothesis that the potential for localized depletion exists in the Chesapeake Bay given the concentrated harvest of the species in the area, particularly from the reduction fishery. Possible outcomes of localized depletion include compromised predator-prey relationships and chronic low recruitment of larval menhaden. The Board committed to assessing the potential for localized depletion at its February 2005 meeting and established the Atlantic Menhaden Research Program (AMRP) to evaluate the possibility of such depletion occurring. In 2009, work completed under the AMRP was peer reviewed by the NOAA Center for Independent Experts (CIE). The peer review was unable to conclude localized depletion is occurring in the Chesapeake Bay given there were two assessment models which generated different advice. It also 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".

Given harvest by the reduction fishery has consistently been below the cap and there has not been conclusive evidence that localized depletion is occurring in the Chesapeake Bay, the Board would like feedback on whether this is an important management tool in the Atlantic menhaden fishery.

Statement of the Problem:
The Chesapeake Bay Reduction Fishery Cap was intended to protect menhaden nursery areas and prevent against localized depletion; however the reduction fishery has consistently under-performed its harvest cap and a peer review report was unable to conclude that localized depletion is occurring in the Chesapeake Bay. The Board would like feedback on whether this is an essential management tool.

Public Comment Questions: Should the Chesapeake Bay Reduction Fishery Cap be maintained? Is it an important tool for the management of Atlantic menhaden?

BACKGROUND INFORMATION ON THE MANAGEMENT AND STOCK STATUS OF ATLANTIC MENHADEN

Summary of Fishery Management

The Commission has coordinated interstate management of Atlantic menhaden (*Brevoortia tyrannus)* in state waters (0-3 miles) since 1981. Management authority in the exclusive economic zone (3-200 miles from shore) lies with NOAA Fisheries. As outlined in the Commission's Charter, fishery management plans shall be designed to prevent overfishing throughout the specie's range, be based on the best available science, minimize waste of fishery resources, protect fish habitat, provide for public participation, and allow for fair and equitable allocation among the states.

In 1988, the Commission initiated a revision to the FMP. The Plan revision included a suite of objectives to improve data collection and promote awareness of the fishery and its research needs, including six management triggers used to annually evaluate the menhaden stock and fishery. In 2001, Amendment 1 was passed, providing specific biological, social, economic, ecological, and management objectives for the fishery. Subsequent addenda (I-V) to Amendment 1 sought to improve the biological reference points for menhaden and cap the reduction fishery. Addendum I revised the biological reference points and changed the frequency of stock assessments. Addenda II and III instituted a harvest cap on the Chesapeake Bay Atlantic menhaden reduction fishery for the 2006 through 2010 fishing seasons. Addendum IV extended this harvest cap through 2013. Addendum V, which was approved in November 2011, established a new F threshold and target rate (based on MSP) with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species.

The Atlantic menhaden fishery is currently managed through Amendment 2 to the Atlantic Menhaden FMP, which was passed in 2012 and implemented in 2013. It sets a coastwide TAC for the stock and allocates this harvest into state quotas. Amendment 2 also establishes a bycatch provision which allows for the harvest of up to 6,000 pounds of Atlantic menhaden per trip for non-directed fisheries and sets aside 1% of the overall TAC for episodic events. In order to effectively implement the management measures established in Amendment 2, states are required to implement timely reporting systems to monitor catch.

Technical Addendum I outlines the provisions of the episodic events set aside program. It restricts participation in the program to the New England states and requires these states to implement daily harvester reporting, restrict harvest to states waters, and set a 120,000 pound daily trip limit in order to harvest under the set aside. Technical Addendum I also outlines a process for declaring participation in the program.

Addendum I to Amendment 2 revisits the bycatch provision and allows two licensed individuals to harvest up to 12,000 pounds of menhaden bycatch when working from the same vessel fishing stationary, multi-species gear–limited to one vessel trip per day. Stationary multi-species gears are defined as pound nets, anchored/staked gill nets, and fyke nets.

Summary of Stock Status

The latest peer reviewed stock assessment is the 2015 benchmark assessment. The assessment used the Beaufort Assessment Model, a statistical catch-at-age model which estimates population size at age and recruitment in 1955 and then projects the population forward in time to the terminal year of the assessment (2013). The model estimates trends in population dynamics, including abundance at age, recruitment, spawning stock biomass, egg production, and fishing mortality rates. The current stock

assessment model configuration does not directly output the unfished biomass of the Atlantic menhaden stock.

Model results indicate the population has undergone several periods of both high and low abundance over the time series. Biomass has fluctuated over time from an estimated high of over 2,284,000 metric tons in 1958 to a low of 667,000 metric tons in the mid-1990s. Population fecundity (measured as number of maturing ova, or eggs) has also varied throughout the time series with a large number of eggs seen in the early 1960s, the 1970s, the early 1990s, and the 2000's. Fishing mortality has steadily decreased throughout the model time series. This is primarily due to a decrease in harvest in the reduction fishery which peaked in the late 1950's at over 700,000 metric tons and decreased to roughly 130,000 metric tons in 2013. In contrast, bait landings have slowly increased from roughly 30,000 metric tons in the late 1980s to over 60,000 metric tons in 2012.

Population fecundity in 2013 was estimated to be 170,536 billion eggs, well above the fecundity threshold of 86,821 billion eggs (Figure 2). As a result, the population is deemed not overfished. Overfishing is also not occurring as the fishing mortality in 2013 (0.22) is below the fishing mortality threshold of 1.26 (Figure 3).

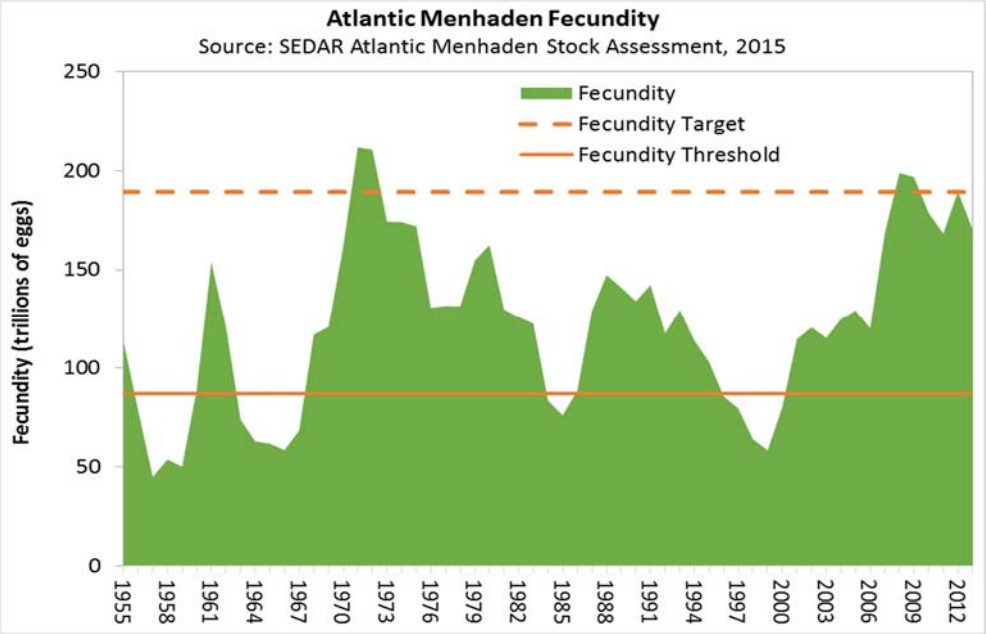

Figure 2: Atlantic menhaden fecundity target and threshold from the 2015 stock assessment. Population fecundity in 2013 was estimated to be 170,536 billion eggs, well above the fecundity threshold of 86,821 eggs.

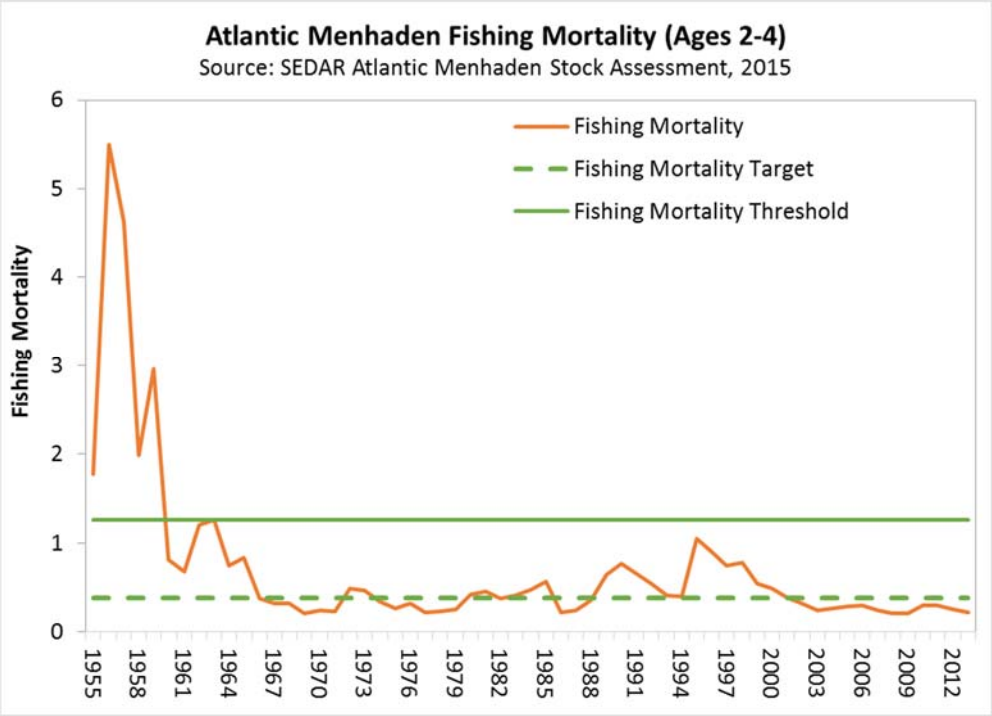

Figure 3: Atlantic menhaden fishing mortality target and threshold from the 2015 stock assessment. Overfishing is also not occurring as the fishing mortality in 2013 (0.22) is below the fishing mortality threshold of 1.26.

Social and Economic Impacts

Changes in the allocation of total allowable catch are expected to have socioeconomic impacts on affected states/jurisdictions, regions, and fishery interests. Overall, improvements in the menhaden stock which lead to increased TAC should benefit fishery participants; however, reductions in allocation to a particular area or interest could lead to reduced employment and associated reductions in the economic benefits derived from menhaden. In general, the reduction sector is expected to take fish in response to the allowable catch in relation to prices of competing oils (for example flax or other vegetable oils), and demand for oil and fishmeal products. The bait sector is expected to take fish in response to allowable catch in relation to the following factors: available fish, competing products (for example herring as bait for lobster), demand for menhaden as a primary desired bait, and prices for competing products in addition to the cost of fishing, fuel and vessel maintenance.

Currently, there is little socioeconomic data available with which to assess the specific effects of changes in allocation and other management actions. The Commission's Committee on Economics and Social Sciences (CESS) issued a request for proposals to fund research in order to characterize the coastwide commercial fisheries, including the bait and reduction sectors and the fishery communities they support. The study will gather both primary and secondary information from stakeholders to understand spatial trends in landings, the distribution of revenue, operational costs, and participation in the fishery. A project was selected early in 2016 and the research is

presently being conducted. It is anticipated this data and other project deliverables will be available to the Commission and CESS early in 2017. Information from this survey will be incorporated into Draft Amendment 3.

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Appendix 1

Table 1. Atlantic menhaden allocation and quotas for 2013-2016. Current state-by-state allocation is based off of average landings between 2009 and 2011. Quota totals do not include the 1% of the TAC which is reserved for the Episodic Events Set Aside Program. Florida exceeded their quota in 2015 and this overage is deducted from their 2016 quota.

State	Allocation	2013-2014 Quota (lbs)	2015-2016 Quota (lbs)
ME	0.00039	146,787	161,466
NH	0.0000003	112	123
MA	0.00839	3,126,024	3,438,630
RI	0.00018	66,779	73,457
CT	0.00017	65,034	71,537
NY	0.00055	206,695	227,365
NJ	0.11192	41,721,164	45,893,335
DE	0.00013	49,230	54,153
MD	0.01373	5,116,874	5,628,568
PFRC	0.00621	2,314,174	2,545,595
VA	0.85322	318,066,790	349,873,884
NC	0.00493	1,836,948	2,020,645
SC	0.00000	-	-
GA	0.00000	-	-
FL	0.00018	66,995	73,695 (72,030 in 2016)
TOTAL	**-**	**372,783,605**	**410,062,453**

Table 2: Atlantic menhaden total landings (1985-2015) by jurisdiction. Landings include directed harvest, bycatch, and landings from the Episodic Events Set Aside Program. Total coastwide landings do not include confidential data.

	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PFRC	VA	NC	SC	GA	FL	TOTAL
1985	33,192,713		3,039,625	8,388,046	234,800	901,800	2,879,766	176,135	5,372,193	16,768,889	17,320,505	97,738,403	C		7,579,674	193,600,487
1986	C		3,411,000	10,389,187	254,400	399,650	2,453,593	20,081	5,449,350	10,971,973	9,885,311	66,377,931	9,952		7,997,973	140,234,901
1987	18,668,660		1,215,175	13,609,224	94,900	206,795	2,563,163	22,034	5,793,683	13,120,698	14,318,627	55,498,571	C		2,776,777	127,892,241
1988	19,687,805	C	8,047,320	15,583,437	175,200	504,100	1,984,045	127,713	6,430,164	13,231,368	44,976,740	73,715,713	500		1,026,228	185,494,889
1989	380,619	C	1,459,402	19,033,173	148,500	449,100	2,854,361	104,382	6,166,236	8,334,174	24,310,430	66,756,288			1,372,959	131,374,824
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	18,224,186	72,231,989			2,636,497	134,055,066
1991	16,107,463	204,000	12,798,310	5,090,375	96,300	650,150	16,597,402	278,774	3,540,179	5,376,264	14,487,238	110,528,754			2,062,983	187,818,192
1992	14,857,195	C	13,499,450	2,849,359	91,200	1,131,701	27,470,906	130,833	1,777,088	5,061,565	16,233,980	57,515,712	C		2,788,592	143,434,801
1993	19,520,455	C	1,211,569	5,146,280	195,827	1,048,993	28,296,741	164,046	2,326,613	7,884,001	296,453,210	64,711,384			2,584,766	429,547,595
1994			351,251	533,800	60,128	961,474	38,176,201	78,672	2,369,071	6,680,937	270,775,349	73,853,901			1,387,012	395,227,796
1995			2,910,613	5,873,315	255,264	1,087,978	36,572,507	101,388	4,264,754	7,002,818	360,140,489	58,374,081			687,944	477,271,151
1996			8,500	802	82,851	11,135	35,516,726	100,063	3,906,808	5,111,423	294,195,660	53,850,943			294,936	393,079,847
1997			238,500	5,750	72,329	553,953	38,118,579	55,733	3,457,237	5,757,370	267,021,139	97,727,057	C		408,492	413,416,309
1998	C	C	121,200	400	338,817	430,084	33,287,641	58,048	2,933,818	3,980,738	513,879,901	57,976,455			301,566	613,309,912
1999	C		292,800	2,330	30,298	242,886	27,753,567	78,551	4,460,534	4,860,883	374,942,360	42,799,080			288,144	455,753,158
2000	C		72,600	320,000	14,423	565,800	31,266,780	47,980	3,935,307	5,023,374	358,236,761	56,280,112			260,710	456,025,297
2001	C		144,600	-	38,865	576,426	26,375,573	53,257	3,970,243	3,329,035	484,528,580	56,012,396			179,951	575,209,116
2002	70,062		301,500	5,750	1,138,788	444,739	24,716,412	80,261	4,023,389	3,122,050	362,640,618	69,190,596			55,304	465,789,469
2003			218,255	62	46,515	384,875	17,080,463	42,593	3,163,252	2,438,790	372,486,794	48,936,502			35,810	444,833,911
2004		C	-	39,232	33,210	543,481	20,678,813	75,635	5,369,952	5,411,043	394,100,339	50,577,983			21,220	476,851,047
2005	30,302		2,177,724	14,453	30,636	871,081	17,574,826	120,658	10,635,776	4,759,905	368,988,147	13,386,245			39,404	418,629,157
2006	37,297		2,524,255	15,524	866,235	811,934	21,290,309	111,405	6,841,296	3,413,517	365,305,722	962,648			157,117	402,337,258
2007	C	C	5,543,805	8,948	90,254	483,557	37,202,485	81,850	11,370,064	5,036,906	405,836,300	1,134,167			71,373	467,054,635
2008	4,310,055	C	14,131,256	269,288	104,881	410,121	38,210,688	72,970	8,153,008	4,820,645	339,001,968	645,231			60,098	410,190,616
2009	166,942	33	6,719,048	107,548	170,907	330,496	33,329,177	69,476	7,756,192	3,191,905	335,238,841	2,124,733			52,800	389,258,097
2010	C	C	4,973,857	78,149	42,489	394,556	50,497,253	51,933	6,903,300	2,790,728	404,384,758	1,299,130			76,593	471,531,136
2011	C		116,151	83,899	26,929	279,117	74,324,485	70,326	6,506,430	2,759,597	389,652,459	3,529,967			146,534	477,551,894
2012	39,383	C	1,648,395	106,606	37,454	258,271	85,457,890	130,725	13,737,314	5,892,228	386,552,474	538,783			126,141	494,526,039
2013	C		2,314,888	99,821	26,463	1,187,525	39,819,342	125,909	7,074,727	3,295,295	316,537,921	454,172			224,872	371,168,714
2014	C		2,226,294	500,903	36,552	825,549	41,449,670	161,509	7,005,271	3,175,893	322,492,690	917,375			220,587	379,145,293
2015	C		2,932,128	1,802,089	77,003	1,468,165	47,811,837	150,542	7,551,430	2,739,035	350,524,668	839,637	C		377,729	416,275,905
% of total landings 1985-2015	**1.4%**	**0.0%**	**0.8%**	**0.9%**	**0.0%**	**0.2%**	**7.9%**	**0.0%**	**1.5%**	**1.6%**	**73.6%**	**11.8%**	**0.0%**	**0.0%**	**0.3%**	100.0%

Table 3: Atlantic menhaden coastwide landings averages by gear type for 2009-2012 and 2013-2014. Bycatch allowance landings are included in the 2013-2014 average. Data are preliminary and subject to change.

Landings in Pounds	2009-2012 Average	Percent by Gear	2013-2014 Average	Percent by Gear
Purse Seine	436,211,312	95.188%	353,766,645	94.207%
Pound Net	16,129,566	3.520%	13,990,507	3.726%
Trawl	2,639,414	0.576%	1,444,210	0.385%
Gill Net	2,784,530	0.608%	5,052,734	1.346%
Cast Net	213,494	0.047%	750,823	0.200%
Trap/Pots	104,775	0.023%	156,790	0.042%
Fyke Net	51,994	0.011%	3,865	0.001%
Haul Seine	64,215	0.014%	118,651	0.032%
Other	65,608	0.014%	237,735	0.063%
Total	**458,264,908**	**100%**	**375,521,959**	**100%**

Table 4: Average landings under the bycatch allowance from 2013-2015 by gear type and jurisdiction. The highlighted cells indicate the high bycatch landings in the Maryland pound net fishery and the Virginia anchored gill net fishery. (C)= confidential landings and (-)=no landings. Total confidential landings were 209,277 pounds (i.e., the sum of all C's in the table below). Note that the sum of pounds and percent of total columns do not include confidential data.

State/Jurisdiction	RI*	NY	NJ**	DE	MD	PRFC	VA	FL	Sum lbs (NonConf)	% of Total
Stationary Gears While Fishing										
Pound net	57,231	128,854	C	-	2,306,552	884,843	122,913	-	3,500,393	60.9%
Anchored/stake gill net	C	-	100,202	28,998	5,131	-	1,242,512	C	1,376,843	24.0%
Pots	-	C	-	C	10,001	-	-	C	10,001	0.2%
Fyke nets	-	-	C	-	C	-	C	-	<1000	0.0%
Mobile Gears While Fishing										
Cast Net	C	183,137	C	-	C	-	-	163,776	346,913	6.0%
Drift Gill net	-	18,175	129,620	66,117	16,082	-	57,794	-	287,788	5.0%
Seines Haul/Beach	-	206,587	-	-	C	-	5,119	-	211,706	3.7%
Trawl	C	9,733	C	-	-	-	-	-	9,733	0.2%
Hook & Line	C	-	-	-	C	-	-	C	<300	0.0%
Sum lbs (NonConf)	**57,231**	**546,485**	**229,822**	**95,116**	**2,337,766**	**884,843**	**1,428,339**	**163,776**	**5,744,572**	
% of Total	1.0%	9.5%	4.0%	1.7%	40.7%	15.4%	24.9%	2.9%		

NJ** an ad hoc method was used to split gill net data between stationary and mobile gears
RI* trips do not include those landed under the episodic events set aside because those landings are counted as part of the directed fishery.

Table 5: Total number of bycatch allowance trips landing menhaden by stationary gears from 2013-2015 by jurisdiction and percent of total trips by 1,000 pound landings bins. (C)= confidential landings.

Bins (LBS)	VA	MD	PRFC	NJ	NY	DE	RI*	FL	Total Trips	Total Bin%
1-1000	71%	35%	31%	85%	88%	91%	53%	100%	**5,350**	59.6%
1001-2000	13%	12%	21%	10%	9%	4%	14%	0%	**1,176**	13.1%
2001-3000	7%	8%	15%	3%	C	4%	18%	0%	**716**	8.0%
3001-4000	3%	7%	10%	1%	3%	1%	4%	0%	**426**	4.7%
4001-5000	3%	7%	13%	C	C	1%	3%	0%	**441**	4.9%
5001-6000	2%	14%	10%	C	C	0%	6%	0%	**519**	5.8%
6000+	0%	16%	0%	C	C	0%	3%	0%	**351**	3.9%
Total Trips	**4672**	**2057**	**1138**	**477**	**345**	**165**	**102**	**23**	**8,979**	
Total Trips %	52.0%	22.9%	12.7%	5.3%	3.8%	1.8%	1.1%	0.3%		

RI* trips do not include those landed under the episodic event set aside because those landings are counted as part of the directed fishery.

Table 6: Menhaden bycatch landings by month in 2015. Jurisdictions which landed under the bycatch allowance include Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Potomac River Fisheries Commission, Virginia, and Florida. Bycatch landings correspond to the closure of states' directed fisheries in the spring and fall. Landings under the Episodic Events Program are not included in this table. (C)=confidential landings. Note: the total sum of pounds does not include confidential landings.

	Pounds	%
January	-	
February	-	
March	C	
April	1,746,125	28.4%
May	214,409	3.5%
June	239,290	3.9%
July	160,574	2.6%
August	199,904	3.2%
September	1,416,328	23.0%
October	1,308,829	21.3%
November	640,627	10.4%
December	232,055	3.8%
Total	6,158,140	100.0%

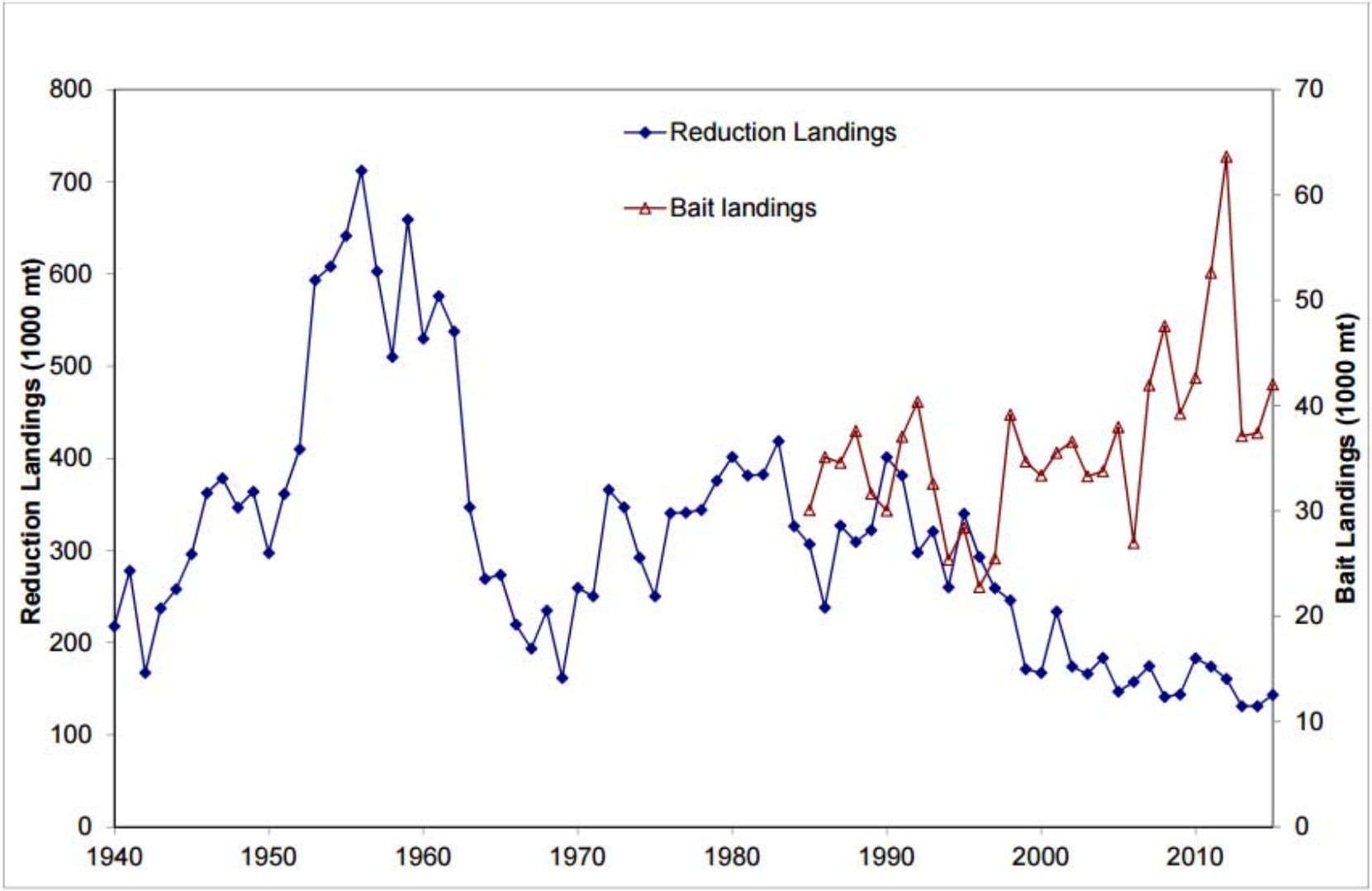

Figure 1: Landings from the reduction purse seine fishery (1940-2015) and the bait fishery (1985-2015) for Atlantic menhaden. Note the two vertical axes are on different scales.

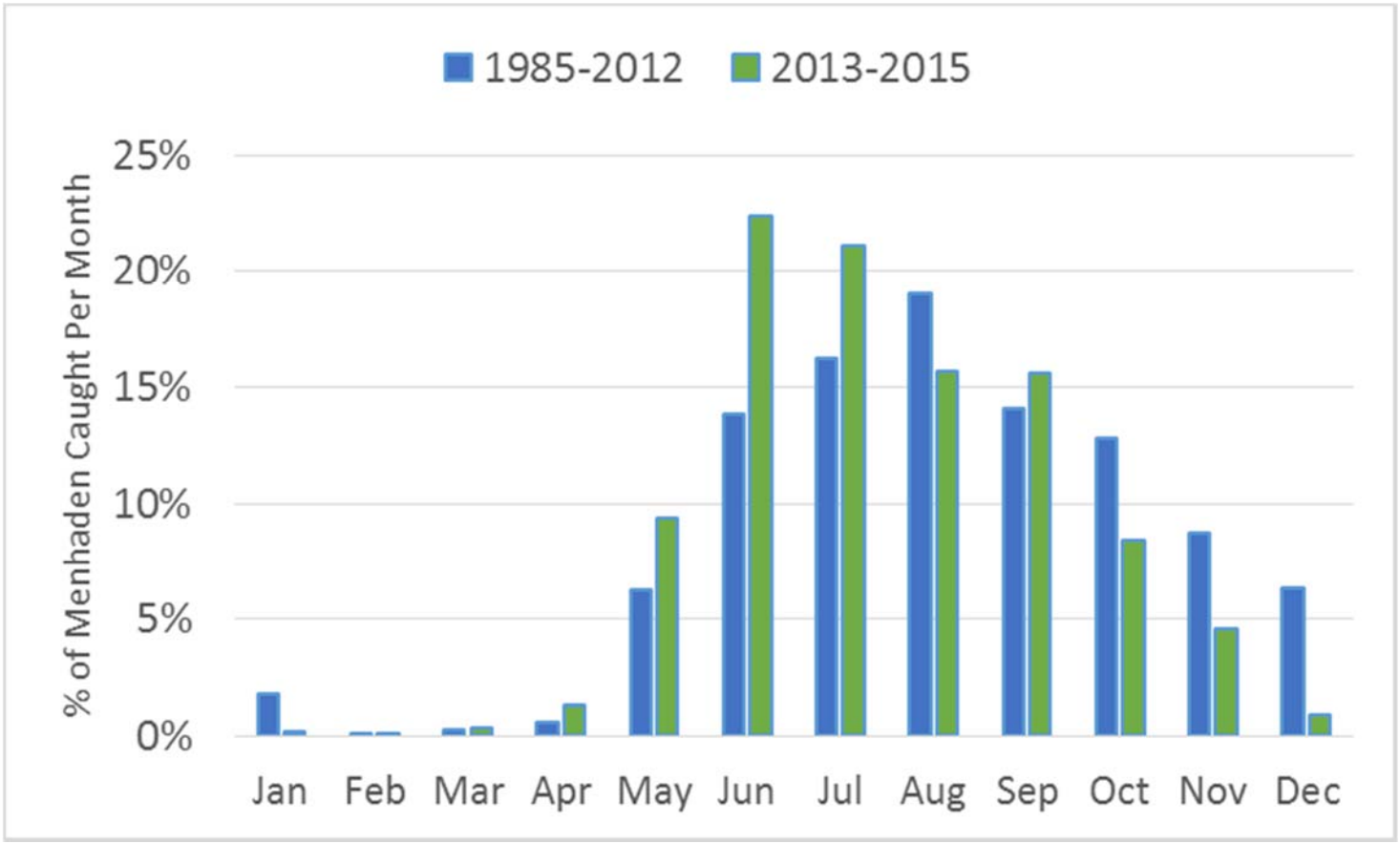

Figure 2: Percent of landings from the menhaden commercial fishery by month. Blue bars show landings from 1985 to 2012 and the green bars show landings from 2013-2015 (following the implementation of Amendment 2).

Appendix 2

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
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MEMORANDUM

April 20, 2015

To: **Atlantic Menhaden Management Board**

From: **Biological Ecological Reference Points Workgroup**

RE: **Ecological Reference Points using Pikitch et al. (2012)**

At its February meeting, the Atlantic Menhaden Management Board (Board) tasked the BERP WG with developing ecological reference points for Atlantic menhaden using Pikitch et al. (2012) as described in the ERP Report. As the Workgroup noted in the ERP Report, models or ERPs presented in the ERP report required further review by the BERP WG. To complete this task, the Workgroup reviewed the methodology by Pikitch et al. (2012) to determine which "information tier" Atlantic menhaden fit into. Subsequently, the WG evaluated the applicability of the recommended management action associated with that information tier. After detailed discussions, the WG concluded:

1. The WG recognizes that the recommendations in Pikitch et al. (2012) are based on the idea that the variable stock dynamics of forage species, like Atlantic menhaden, may require additional managment precautions than other non-forage species.
2. The WG acknowledges that while the ERPs referenced in Pikitch et al. (2012) may be a bet-hedging strategy, it assumes that there must be some stock-recruitment relationship that has not yet been identified for Atlantic menhaden.
3. The WG decided that menhaden fall under the "intermediate information tier" as defined by Pikitch et al. (2012), with strong caveats (please see the attached table).
4. The intermediate information tier recommends management actions in the form of applying a hockey stick harvest control rule with $B_{LIM} \geq 0.4B_0$ and F=0.5M. 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 species' natural mortality rate. The recommended fishing mortality rate from Pikitch et al. (2012) and a comparison to the 2015 Benchmark Stock Assessment single species reference points are displayed below including the terminal year F_{2013}.

Reference Points/Terminal Year F	Benchmark
$F_{26\%MSP}$ (threshold)	1.26
$F_{57\% MSP}$ (target)	0.38
$F_{64\% MSP}$ (Pikitch et al. 2012)	0.29
$F_{70\% MSP}$ (F in terminal year 2013)	0.22

5. The WG notes that many of the case studies examined in Pikitch et al. (2012) involved predators that were "highly dependent" (i.e., ≥50% of diet) on a single forage species, with strong trophic effects caused by changes in forage abundance. However, in the case of the coast-wide stock of Atlantic menhaden, the primary predator species are more opportunistic, consuming a diverse prey base.
6. While the WG was able to identify that striped bass may meet the Pikitch et al. (2012) predator dependency definition (with menhaden as forage) at certain times of the year and in certain areas (e.g., Chesapeake Bay in winter), the WG determined that none of our predator species of interest could fit the criteria of "highly dependent" predator (with menhaden as forage) on a coast-wide scale. Therefore, the WG does not believe the reference point recommendations in Pikitch et al. (2012) are applicable to this system.
7. Ultimately, the BERP WG does not feel that the management actions recommended in Pikitch et al. (2012) are appropriate for Atlantic menhaden specific management. Furthermore, the WG cannot evaluate if the Pikitch et al. (2012) buffers will actually provide enough forage to sustain predators of interest at desired population levels. Overall, although the ERPs in Pikitch et al. (2012) are less than ideal, predator removals are a large source of mortality for this stock. As such, through the framework of the ERP Report, the WG is working to have better ERP advice that is specific to Atlantic menhaden management.

The WG recommends that the Board form a subcommittee to collaborate with the BERP WG and industry to define more concrete ecosystem management goals and objectives. This would help the WG identify which models might be the most appropriate to achieve proposed objectives. Moving forward, the WG would like to combine the recommendations of a Board subcommittee with those of the Atlantic menhaden peer reviewers to define an objective approach to developing ERPs.

References

Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. (2012). Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

Appendix 3:

TO:

Bob Beal, Executive Director, ASMFC, rbeal@asmfc.org
Toni Kearns, Director, ISFMP Oversight and Policy Development, tkearns@asmfc.org
Michael Waine, Senior Fishery Management Plan Coordinator, Atlantic Menhaden, mwaine@asmfc.org
Louis Daniel, Chair of the ASMFC, louis.daniel@ncdenr.gov
Robert Boyles, Chair of the Atlantic Menhaden Board ASMFC, boylesr@dnr.sc.gov
Matt Cieri, Chair of the Biological/Ecological Reference Points Working Group, matthew.cieri@maine.gov
Micah Dean, Chair Atlantic Menhaden Technical Committee, micah.dean@state.ma.us
Jason McNamee, Vice Chair Atlantic Menhaden Technical Committee, jason.mcnamee@DEM.RI.GOV
Jeff Kaelin, Chair Atlantic Menhaden Advisory Panel, jkaelin@lundsfish.com
Amy Schueller, NMFS Beaufort Fishery Analyst: amy.schueller@noaa.gov

RE:
Biological Ecological Reference Points Working Group memo dated April 20, 2015

It was brought to our attention that the Biological Ecological Reference Points (BERP) Working Group (WG) had been tasked "with developing ecological reference points for Atlantic menhaden using Pikitch et al. (2012) as described in the ERP Report." However, as the WG detailed in its memorandum to you on April 20, 2015, "the WG does not believe the reference point recommendations in Pikitch et al. (2012) are applicable to this system." Furthermore, "the BERP WG does not feel that the management actions recommended in Pikitch et al. (2012) are appropriate for Atlantic menhaden specific management.

As two co-authors of Pikitch et al. (2012), we are responding to several possible misinterpretations and flawed arguments in the WG memo. We do so by responding to the main reasons the WG gives for concluding that the Pikitch et al. (2012) recommendations are not applicable or appropriate:

1. **"The WG acknowledges that while the ERPs referenced in Pikitch et al. (2012) may be a bet-hedging strategy, it assumes that there must be some stock-recruitment relationship that has not yet been identified for Atlantic menhaden."**
   - **Brief response**: It is not necessary to identify a stock-recruitment relationship for Atlantic menhaden to apply the Pikitch et al. (2012) recommendations.

   Detailed Response: The recommendations in Pikitch et al. (2012) are not a bet-hedging strategy, but rather a precautionary approach that will reduce the odds of forage fish population collapse, keep higher forage fish biomass in the water, and, importantly, prevent or ameliorate impacts on dependent fish, marine mammal, and seabird populations that depend on forage fish. A recent paper in the *Proceedings of the National Academy of Sciences* by Essington et al. (2015) provides additional evidence of the importance of using a high minimum biomass threshold to prevent collapse and maintain high levels of forage fish in the water. The paper also finds minimal impact on fishery yields from this practice over the long term.

Regarding the stock-recruitment relationship, the WG has misinterpreted Pikitch et al. (2012). Its recommendations are derived, in part, from an assessment of the effects of forage fish on dependent predators in 10 Ecopath with Ecosim (EwE) models from around the world. EwE does contain a mathematical function that sets the renewal rate (equivalent to recruitment) for some of its trophic groups, but it does not assume a specific strength or pattern. The report's recommendations regarding reference points may therefore be applied without concern about a particular stock-recruitment relationship.

In a memo dated April 22, 2015, the Atlantic Menhaden Technical Committee offers projections based on the assumption that recruitment is independent of density and centered on median recruitment. According to the SEDAR 40 stock assessment for Atlantic menhaden, the BAM model indicates only three years with recruitment above this median in the last 23 years, so this approach is less conservative than that taken by Pikitch et al. (2012).

2. "None of our predators of interest could fit the criteria of 'highly dependent' predator (with menhaden as forage) on a coast-wide scale."

- **Brief response**: It is not necessary for predators to be highly dependent to apply the report's management recommendations.

Detailed response: The report defines a "highly dependent" predator as one that relies on a forage fish species for at least 50 percent of its diet. As the WG memo correctly states in the table on page three, the existence of such predators is a reason to increase the biomass limit reference point and reduce the fishing mortality limit reference point relative to the recommended hockey stick harvest control rule (HCR). When such predators are absent, as is the case when Atlantic menhaden are considered on a coast-wide basis, the report provides a clear recommendation: use a biomass limit reference point of $0.4B_0$ and a fishing mortality limit reference point of 0.5M.

It is important to note that the WG's predators of interest do not include the birds and mammals known to consume menhaden and to depend on menhaden in their diets. This is an additional argument in support of considering the biomass and fishing mortality limit reference points proposed by Pikitch et al. (2012). The WG is probably correct that none or few of the fish predators in the coastal western Atlantic are highly dependent on menhaden, as defined by Pikitch et al. (2012), at least in recent history. In the past, this might have been different, either throughout the system or in particular regions, such as the Chesapeake Bay.

3. "The WG cannot evaluate if the Pikitch et al. (2012) buffers will actually provide enough forage to sustain predators of interest at desired population levels."

- **Brief response**: The buffers presented in Pikitch et al. (2012) were designed to do exactly that in a precautionary sense. The WG's statement that, because the adequacy of these buffers cannot be determined, the WG proposes to adopt an even higher fishing mortality level is illogical.

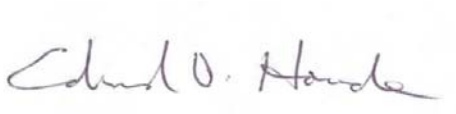
Detailed response: A key recommendation of Pikitch et al. (2012) was to use the "PREP equation" (PREP stands for "predator response to the exploitation of prey"), to predict predator declines using only the fraction of the predator's diet that is composed of the target forage fish. Since these diet data are available for predators of interest, it is appropriate to use the PREP equation to determine the biomass of forage fish necessary to achieve any desired level of predator

abundance (with a given probability of success), up to its estimated biomass of the predator in the absence of forage fish fishing. As an alternative to the PREP equation, the report recommends using data from models specific to the ecosystem. Since the WG indicates its ERP models are under development, we contend that it is appropriate to use the PREP equation at this time.[1] As noted above, the WG has proposed reference points that are less conservative than those in Pikitch et al. (2012). We do not see the logic of adopting a *higher* level of fishing mortality as a reference point on
the ground that the Pikitch et al. reference points might not provide enough forage to sustain predators of interest.

4. **The report's "recommended HCR and ERPs make little sense when there is no dependent predator or stock-recruit relationship."**
   - **Brief response**: The report's recommendations are adaptable for a variety of situations, including this one.

   Detailed response: To clarify, although it is correct that there is no identified *highly* dependent predator in the system, striped bass and bluefish are dependent on menhaden for more than 10 percent of their diets. As noted above, use of Pikitch et al. (2012) recommendations does not require the existence of a stock-recruit relationship. Under the circumstances, and as an alternative approach, it makes sense to apply the Pikitch et al. (2012) HCR and ERP recommendations. The recommendations were developed to work in many circumstances, including when there are no identified highly dependent predators and when the stock-recruit relationship is uncertain. The WG was tasked to apply the Pikitch et al. (2012) approach in its charge and it should follow that directive.

Ellen Pikitch, Chair, Lenfest Forage Fish Task Force



Edward D. Houde, Member, Lenfest Forage Fish Task Force

REFERENCES

Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. 2012. Little Fish,Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

Essington, T., P.E. Moriarty, H.E. Froehlich, E.E. Hodgson, L.E. Koehn, K.L. Oken, M.C. Siple, and C.C. Stawitz. 2015. Fishing amplifies forage fish population collapses. Proceedings of the National Academy of Sciences. doi: 10.1073/pnas.1422020112.

[1] One of us (Houde, with co-investigators) has research under way to provide ecosystem-specific ERPs, scheduled to be delivered later this year

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Technical Committee

DATE: September 6, 2016

SUBJECT: Comments on Updated Analysis in "The Fate of an Atlantic Menhaden Year Class"

On their August 26th conference call, the Atlantic Menhaden Technical Committee (TC) reviewed updated analysis from the paper "The Fate of an Atlantic Menhaden Year Class" by Peter Himchak. The TC originally reviewed Mr. Himchak's work on their June 17, 2016 conference call (see June 30, 2016 memo re: Comments on "The Fate of an Atlantic Menhaden Year Class"). On their August call, the TC again commended Mr. Himchak's continued efforts to analyze the impacts of fishing mortality on the menhaden stock and on his inclusion of natural mortality in the updated analysis. The TC recommended the following additions to the analysis to provide a more complete picture of the impacts of fishing mortality on an age class.

- While the analysis provides one perspective on how a hypothetical year class erodes over time, it would be helpful to provide a parallel calculation which focuses on the mature portion of the population. Given Atlantic menhaden reach 50% maturity at age 2, the roughly 13 billion fish which are removed from the population due to natural mortality before they mature are never going to contribute to recruitment of the stock. As a result, it would be more appropriate to understand harvest as a percent of the mature population in order to determine the relative impact on the stock's reproductive potential. Given the size selectivity of the fishery, a focus on ages 2+ also addresses the TC's previous recommendation of evaluating the fishery's impact on the harvestable portion of the population.
- The analysis highlights the large impact that natural mortality has on the juvenile portion of the menhaden stock. The TC notes that, while the estimate of natural mortality at age from the 2015 Stock Assessment represents the best available science, there is still uncertainty in this calculation. As the result, the calculation of natural mortality in Mr. Himchak's work is only as good as the estimates from the stock assessment. The TC believes that calculations of natural mortality at age will be improved through the work being conducted by the Biological Ecological Reference Point (BERP) Working Group.

The TC also notes that in the future, it would be helpful for the Board to provide context as to how they plan to use this and other analyses they ask the TC to review. This information will help the TC direct their comments and recommendations as they review new scientific work.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

September 21, 2016

To: **Atlantic Menhaden Management Board**

From: **Tina Berger, Director of Communications**

RE: **Advisory Panel Nominations and Request for Guidance Regarding the Addition of Nontraditional Stakeholders to the Panel**

Please find attached four nominations to the Atlantic Menhaden Advisory Panel – Patrick Paquette, a recreational/for-hire/commercial fisherman from Massachusetts; Bob Hannah, a commercial fisherman from Massachusetts; Meghan Lapp, a representative with SeaFreeze Ltd in Rhode Island, representing the company's commercial vessels and processors; David Monti, a recreational angler/for-hire captain from Rhode Island; Leonard Voss, a commercial fisherman from Delaware; Paul Eidman, a recreational angler from New Jersey; Peter Himchak, a representative with Omega Protein from Virginia, representing the company's commercial vessels and processors; and Scott Williams, a recreational angler from North Carolina.

Virginia has also requested that the Board consider the addition of a nontraditional stakeholder position to the panel, to be filled by Jeff Deem of Virginia, who has experience in all sectors of the fishing industry (commercial, recreational and for-hire).

Seats for nontraditional stakeholders may be added to the panel at the Board's request. A nontraditional stakeholder is generally defined as someone outside of the typical user groups, such as non-governmental organizations, grassroots organizations, and individuals/groups with an interest in the particular species conservation. By practice, two seats are made available and a broad solicitation for nominations is released to the general public. A subgroup of the Board would review the submitted nominations and select two nominees for Board consideration and approval by the Board. I would note that Ken Hinman, a longstanding member of the advisory panel, would be considered a nontraditional stakeholder. He was nominated by Georgia when the advisory panel was created to represent the interests of environmental stakeholders.

The Board could proceed in a number of ways (1) create two new seats and solicit nominations from the public; (2) approve Jeff Deem as a nontraditional stakeholder and seek nominations for one additional seat; (3) accept Jeff Deem and Ken Hinman as nontraditional stakeholders and provide Georgia the opportunity to appoint a traditional stakeholder as its representative; (4) allow Virginia to have three members on the panel; or (5) take some other action.

With this memo, staff seeks approval of the four nominations to the panel and guidance on how the Board would like to proceed with regards to nontraditional stakeholders.

Atlantic Menhaden Advisory Panel

Bolded names await Board approval

Maine

Brian Tarbox (comm bait)
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Phone: 207.829.5567
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Appt. Reconfirmed 11/30/05
Appt Reconfirmed 5/10

Jennifer S. Bichrest (processor/dealer)
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Appt. Confirmed 10/21/08

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Appt Confirmed 11/8/10

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Appt Confirmed 8/3/10

Massachusetts

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Bob Hannah (comm seine/traps)
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Rhode Island

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Vacancy (rec)

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Melissa Dearborn (processor)
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Appt. Reconfirmed 1/23/06
Appt Reconfirmed 5/10

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Atlantic Menhaden Advisory Panel

Bolded names await Board approval

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John W. Dean (comm/pound net)
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Virginia

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North Carolina

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Vacancy – commercial

South Carolina

Vacancy (rec)

Georgia

Ken Hinman (conservation)
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Appt. Confirmed 2/06
Appt Reconfirmed 5/10

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Phone (eve): 904.725.3775
FAX: 904.630.3007
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Appt. Reconfirmed 1/2/06
Appt Reconfirmed 4/22/10

PRFC

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Appt. Confirmed 7/17/01
Appt. Reconfirmed 1/2/06
Appt Reconfirmed 5/10

Nontraditional Stakeholder
Jeff Deem
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Phone: 703.550.9245
deemjeff@erols.com

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: David Pierce (your name) State: MA

Name of Nominee: Patrick Paquette

Address: 61 Maple Street

City, State, Zip: Hyannis, MA 02601

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 781-771-8374 (c) Phone (evening): 781-771-8374 (c)

FAX: _____ Email: BasicPatrick@aol.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Atlantic Menhaden
   2. _____
   3. _____
   4. _____
2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes_____ no X
3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no_____

   If "yes," please list them below by name.

Massachusetts Striped Bass Assn	Northeast Charterboat Captains Assn
Massachusetts Beach Buggy Assn	Cape Cod Commercial Fisherman's A
Martha's Vineyard Surfcasters	(this is an incomplete list)

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Striped Bass, Bluefish, Menhaden	Atlantic Bonito & False Albacore
Black Sea Bass, Scup	Bluefin Tuna, Red Drum
Winter & Summer Flounder	(this is an incomplete list)

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Cobia & Black Drum	Permit & Tarpon
Spanish Mackerel	Various Billfish
Bonefish & Barracuda	(this is an incomplete list)

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 20+ years
2. Is the nominee employed only in commercial fishing? yes _____ no X
3. What is the predominant gear type used by the nominee? Rod & Reel
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? Worked as mate or held commercial SB inshore permit on and off since 1995

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 20+ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no _____

   If "no," please list other type(s)of business(es) and/occupation(s): Employed in various aspects of the sport fishing community
3. How many years has the nominee lived in the home port community? 10 years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 40+ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes X no _____

   If "yes," please explain.

Owns consulting company involved w/ marketing fishing tackle, grassroots organizing

re: fisheries managment, is an outdoor writer & is captain for two for-hire companies.

Has held over 25 different jobs related to both sport and commercial fishing over the past

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? 20+ years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

   _____

   _____

   _____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

   _____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management? yes _____ no X

   If "no," please list other type(s) of business(es) and/or occupation(s):

   _____

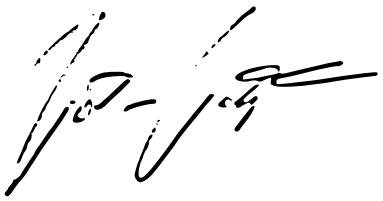
   _____

   _____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I have been involved in harvesting Menhaden either for personal use or for use on various charter b



Nominee Signature: _____ Date: 8/9/16

Name: Patrick Paquette
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____ _____
State Director State Legislator

_____
Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

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Form submitted by: DAVID PIERCE State: MA
(your name)

Name of Nominee: BOB HANNAH

Address: 335 CONCORD STREET

City, State, Zip: GLOUCESTER, MA 01930

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 978-879-6727 (c) Phone (evening): 978-281-6752 (h)

FAX: _____ Email: zoey01930@yahoo.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no NO

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes YES no _____

   If "yes," please list them below by name.

   MASS LOBSTERMEN'S ASSOC.

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

MENHADEN

Lobster

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Haddock, Cod, flounder — Herring

MENHADEN — MACKERAL

Lobster

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 44 years
2. Is the nominee employed only in commercial fishing? yes Yes no _____
3. What is the predominant gear type used by the nominee? SEINES, TRAPS
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? INSHORE

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no _____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management? yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

Nominee Signature: Robt N Hannah Jr. Date: 9/20/14

Name: Robert N Hannah Jr.
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

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Form submitted by: Meghan Lapp (your name) State: RI

Name of Nominee: Meghan Lapp

Address: 100 Davisville Pier

City, State, Zip: North Kingstown, RI 02852

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 401-218-8658 Phone (evening): 401-218-8658

FAX: 401-295-5825 Email: Meghan@seafreezeltd.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

RI Fisherman's Alliance
Sustainable Fisheries Coalition
Center for Sustainable Fisheries
Menhaden Coalition
National Coalition for Fishing Communities

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

squid
mackerel
butterfish
herring
processed menhaden
and other species

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

same

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? Me: 2 years Seafreeze: 30 years
2. Is the nominee employed only in commercial fishing? yes ✓ no _____
3. What is the predominant gear type used by the nominee? trawl
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? offshore for Seafreeze Ltd; both for Seafreeze Shoreside vessels

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no _____

   If "no," please list other type(s)of business(es) and/occupation(s): _____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing?
   30 years
   Me: 2

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes X no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? Me: 2 Seabreeze: 30 years

   If less than five years, please indicate the nominee's previous home port community.

Fairhaven/New Bedford, MA

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? Me: 7 years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes X no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I am a Fisheries Liaison for Seafreeze Ltd, and represent their interests. We also have a shoreside facility servicing other vessels which processes menhaden in RI, in addition to other species. I have tried to answer the application to reflect our vessels and both processors, in addition to myself. I have been employed by Seafreeze Ltd for 2 years and prior to that was employed by Reidar's Manufacturing in New Bedford building trawl gear. I serve as an advisor to the NEFMC's Herring Advisory Panel, and to the MAFMC's Ecosystems and Ocean Planning Advisory Panel.

Nominee Signature: Meghan E Lapp Date: 9/12/16

Name: Meghan Lapp
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

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Form submitted by: _____ State: Rhode Island
(your name)

Name of Nominee: David P. Monti

Address: 399 Greenwood Avenue

City, State, Zip: Warwick, RI 02886

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 401 480 3444 Phone (evening): 401 737 4515

FAX: _____ Email: dmontifish@verizon.net

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Atlantic menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

RI Party & Charter Boast Association

RI Saltwater Anglers Association

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

striped bass — tautog, scup, bluefish

summer flounder — Atlantic menhaden

tuna — Black sea bass

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

see above

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? _____ years
2. Is the nominee employed only in commercial fishing? yes_____ no_____
3. What is the predominant gear type used by the nominee?_____
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)?_____

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 8 years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no X

   If "no," please list other type(s)of business(es) and/occupation(s):_____
   fishing writer for newspapers and sprot fishing magazines, retired advertising executive
3. How many years has the nominee lived in the home port community? 64 years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 55 years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes X no _____

   If "yes," please explain.

work as a fishing writer now and as a charter captain and fishing guide

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management? yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

see attached statement

Nominee Signature: _____ Date: 8.22.16

Name: David P. Monti
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____
State Director

_____
State Legislator

_____
Governor's Appointee

David Monti Atlantic menhaden Advisory Panel Nomination Statement

As a fishing journalist I get to meet and discuss the importance of good participation in the policy making process with hundreds of fishermen. As a matter of course I get their point of view on a number of issues.

I respectfully listen to everyone's concerns and input and try to understand them and articulate they accurately at meetings, however, I always try to come down on the side of the fish when key decisions have to be made.

I have done this routinely as a member of the RI Marine Fisheries Council. Willing to make difficult decisions if it is the right thing to do for the fish. I pledge to apply my knowledge of recreational and commercial fishing to have a positive impact on the work of the Atlantic menhaden advisory panel of the ASMFC.

ATLANTIC STATES MARINE FISHERIES COMMISSION

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Form submitted by: PAUL EIDMAN (your name) State: NJ

Name of Nominee: PAUL EIDMAN

Address: 9 WILLIAMSBURG DR

City, State, Zip: TINTON FALLS NJ 07753

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): SAME Phone (evening): 732-614-3373

FAX: — Email: PAULYFISH@REELTHERAPY.COM

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. MENHADEN AP
   2. _____
   3. _____
   4. _____
2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X
3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

MANASQUAN FISHING CLUB
JERSEY COAST Anglers Assn.
Anglers Conservation Network

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

STRIPED BASS
Summer Flounder
Blue fish
WEAKFISH
FALSE ALBACORE
Bonito

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

ABOVE

FOR COMMERCIAL FISHERMEN: NA

1. How many years has the nominee been the commercial fishing business? _____ years
2. Is the nominee employed only in commercial fishing? yes_____ no_____
3. What is the predominant gear type used by the nominee?_____
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)?_____

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 16 years
2. Is the nominee employed only in the charter/headboat industry? yes X no_____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

   CHARTER BOAT "REEL THERAPY" OWNER OPERATOR
3. How many years has the nominee lived in the home port community? 20+ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 50+ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes ✓ no _____

   If "yes," please explain.
   Light Tackle Inshore Saltwater Fishing Guide

FOR SEAFOOD PROCESSORS & DEALERS: NA

1. How long has the nominee been employed in the business of seafood processing/dealing? _____ years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? 25+ years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no X

   If "no," please list other type(s) of business(es) and/or occupation(s):
   Sales Consulting

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I FEEL THAT MY INPUT WOULD ADD MUCH NEEDED BALANCE TO THE ADVISORY PANEL. I HAVE A UNIQUE FORWARD LOOKING PERSPECTIVE THAT COULD HELP THE ASMFC ACHIEVE ITS GOAL OF SHIFTING TOWARDS ECO SYSTEM BASED MANAGEMENT.

Nominee Signature: Paul Eidman Date: 9/21/16

Name: PAUL EIDMAN
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director (proxy for Dave Chanda)

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

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Form submitted by: WILLIAM J CARSON JR. State: DE.
(your name)

Name of Nominee: Leonard H. Voss, Jr

Address: 2854 Big Oak Road

City, State, Zip: Smyrna, DE 19977

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 302-423-6564 Phone (evening): 302-423-6564

FAX: 302-653-8373 Email: shrlyvss@AOL.Com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no ✓

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes _____ no ✓

   If "yes," please list them below by name.

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Striped Bass
Menhaden
Blue Crab

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Stripped Bass
Menhaden
Bluecrab
HorseShoe Crab
American Eel
American Shad
Conch

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 36 years
2. Is the nominee employed only in commercial fishing? yes ✓ no _____
3. What is the predominant gear type used by the nominee? Gill Net, Pots, dredge
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? Inshore

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no _____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I'm a member on the Governor's Advisory Council on Shellfish where I serve As Chairman!

I serve on Take Reduction Teams for Harbor Porpoise and Bottlenose Dolphine

I'm a member of the Advisory Panel for Stripped Bass at the ASMFC

Menhaden is very important to our blue crab pot Industry

Nominee Signature: Leonard H Voss J

Date: 8-23-2016

Name: LEONARD H VOSS JR
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

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Form submitted by: Rob O'Reilley (your name) State: VA

Name of Nominee: Peter J. Himchak

Address: P.O. Box 85, 52 My Way

City, State, Zip: Tuckerton, NJ 08087

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 609 331 2255 Phone (evening): 609 296 5604

FAX: 609 296 8887 Email: peter.himchak@omegaprotein.com

. . . . . .

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Atlantic Menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes _____ no X

   If "yes," please list them below by name.

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

I haven't devoted much time recently but have focused more on SCUBA diving, primarily in the Caribbean, coral reef dives, night dives, shark dives and dives in Mexico's Cenotes (freshwater underground rivers & CAVE networks.)

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

flyking (tuck bays) blue grade
Bluefish (tuck boat & Party Boats) Whiting & Ling (Party Boat
Hard Clams (Mercenaria Lived 2 summers in Alaska, Gulf Stream
boarding and scallop taking intertidal flats fishing (bottom, wreck
+ more.)

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? _____ years

2. Is the nominee employed only in commercial fishing? yes_____ no_____

3. What is the predominant gear type used by the nominee?_____

4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)?_____

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years

2. Is the nominee employed only in the charter/headboat industry? yes _____ no_____

   If "no," please list other type(s)of business(es) and/occupation(s):_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? _____ years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no _____

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? 44 years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes X no ____ Senior Fishery Scientist for Omega Protein

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.:

I spent 39 years as a marine fisheries biologist employed by the N.J. Division of Fish & Wildlife, Marine Fisheries Administration. Served on ASMFC TCs for striped bass (15 years), Atl. menhaden (18 years), tautog (16 yrs), and horseshoe crabs (7 years). Also served on ACCSP Committee (Operations and Coordinating Council) ASMFC Board and Management Boards for most ASMFC species, most notably the Menhaden Management Board (2006 – 2013).

Served as administrative proxy for NJ on the Mid-Atlantic Fishery Management Council (2008-2013).

Now working for Omega Protein as Senior Fishery Scientist from Oct, 2015 – Present. I believe in objective interpretation of best available scientific data!

Nominee Signature: Peter J Himchak Date: 8/25/16

Name: Peter J. Himchak
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Scott Williams (your name) State: North Carolina

Name of Nominee: Scott Williams

Address: 7104 Stonehaven Drive

City, State, Zip: Waxhaw, NC 28173

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 704-989-7211 Phone (evening): 704-989-7211

FAX: _____ Email: scott.williams.charlotte@gmail.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?
   yes_____ no No

3. Is the nominee a member of any fishermen's organizations or clubs?
   yes Yes no_____

   If "yes," please list them below by name.

Previous member of CCA NC

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Red Drum _____ Black Drum _____

Speckle Trout _____ Spanish Makerel _____

King Mackerel _____ Flounder _____

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Red Drum _____ Black Drum _____

Speckle Trout _____ Spanish Mackerel _____

King Mackerel _____ Flounder _____

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? _____ years

2. Is the nominee employed only in commercial fishing? yes_____ no_____

3. What is the predominant gear type used by the nominee?_____

4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)?_____

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years

2. Is the nominee employed only in the charter/headboat industry? yes _____ no_____

If "no," please list other type(s)of business(es) and/occupation(s):_____

_____

3. How many years has the nominee lived in the home port community? _____ years

If less than five years, please indicate the nominee's previous home port community.

_____

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 40yrs years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no No

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no _____ If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? _____ years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no _____

   If "no," please list other type(s) of business(es) and/or occupation(s):

_____

_____

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

I do not live near the coast, I am not currently affiliated with any fishing organizations or groups and I have not been involved in politics. Why now? Because I have a 20 yr old son who enjoys being on the water as much as I do. I am typically on the water 30+ days a year. I want my grandchildren to enjoy the benefits of fishery management that allows for a healthy ecology and finfish stock while supporting the heritage of the families that have worked on the water for generations.

If you have any questions please contact me directly 704-989-7211

Nominee Signature: Scott Williams Date: 9-12-16

Name: Scott Williams
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

State Director

State Legislator

Governor's Appointee

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Jeff Deem (your name) State: VA

Name of Nominee: Jeff Deem

Address: 6701 Newing Rd.

City, State, Zip: Lorton, VA 22079

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 703-550-9245 Phone (evening): _____

FAX: _____ Email: deemjeff@erols.com

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Menhaden
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

Recreational Fishing Alliance

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Flounder
Marlin
Dolphin
Tuna

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Grey trout
Black drum
Croaker
Bluefish
Red drum
Wahoo

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been the commercial fishing business? 55 years
2. Is the nominee employed only in commercial fishing? yes _____ no X
3. What is the predominant gear type used by the nominee? _____
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)? _____

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? 55 years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no X

   If "no," please list other type(s)of business(es) and/occupation(s): _____

3. How many years has the nominee lived in the home port community? 55 years

   If less than five years, please indicate the nominee's previous home port community.

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 55 years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes _____ no XMe

   If "yes," please explain.

_____

_____

_____

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? 55 years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no XMe If "no," please list other type(s) of business(es) and/or occupation(s):

Mechanical contractor.

Mechanical contractor.

Mechanical contractor.

3. How many years has the nominee lived in the home port community? 55 years

   If less than five years, please indicate the nominee's previous home port community.

_____

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? 55 years

2. Is the nominee employed in the fishing business or the field of fisheries management?
   yes _____ no X

   If "no," please list other type(s) of business(es) and/or occupation(s):

Mechanical contractor.

Mechanical contractor.

_____

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

Represented VA On The MAFMC 2006-2009 And 2012-2015
Current Chair Of The VMRC's Finfish Management Advisory Committe
Recreational Fishing Representative For MARCO And The
MidA RPB.

Nominee Signature: _____ Date: 8/8/2016

Name: Jeff Deem
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____ _____
State Director State Legislator

_____
Governor's Appointee

From: Dave Conlon [mailto:daveconlon6@gmail.com]
Sent: Sunday, August 7, 2016 8:27 PM
To: info <info@asmfc.org>
Subject: Omega Protein Violating its 3 year probation

I'm disappointed that the Atlantic States Marine Fisheries Commission failed to set the 2017 quota for menhaden harvest. Omega Protein out of Reedville takes the lion's share of this valuable fish and leaves too few for striped bass and other sport fish. The result is predation of juvenile crabs and a weakening of the health of many species.

I urge you to further restrict the wholesale plunder of the menhaden stock by Omega Protein when you meet again in October.

Omega plays fast and loose with the rules and regulations. Because of prior violations and violating its probation, it should be subject to additional criminal penalties and stricter catch limits imposed.

Sincerely,

David Conlon
24146 Creekview Lane
Carrollton VA 23314
daveconlon6@gmail.com

From: Eric Dammeyer <ericjrickd@aol.com>
Sent: Monday, September 19, 2016 3:55 PM
To: Megan Ware
Subject: Re: Menhadden

I simply request you support better protections for forage fish. And, that Omega Proteins claims that a stable population that is only 10 percent of the original population is inadequate to support game and table fish populations.
Thank you
Eric Dammeyer
Sent from my iPhone

Public comment for the next meeting.
-----Original Message-----
From: louistruppi@lntassoc.com [mailto:louistruppi@lntassoc.com]
Sent: Thursday, August 04, 2016 7:04 PM
To: Comments <comments@asmfc.org>
Subject: Menhaden issues

Please maintain staus quo on the Menhaden issues! They are rebounding somewhat and without proper conservation as is being implemented, it could wield a decanting blow to our fisheries.
They are the lifeblood of food foe many marine species, take them away or reduce their numbers many fisheries will just disappear!
Thank you for your consideration on this matter!
Louis J Truppi
A concerned angler
Sent from my iPad

Reedville Bait, Inc.
P.O. Box 370
Burgess, VA 22432

September 7, 2016

Mr. Robert Beal
Director, ASMFC
1050 N. Highland St
Suite 200 A-N
Arlington, VA 22201
RBEAL@ASMFC.ORG

Dear Mr. Beal,

On August 3 we witnessed the Atlantic Menhaden Management Board struggle with a decision regarding the Total Allowable Catch (TAC) for 2017.

As members of the bait fishery in Virginia, we wanted to respond to that somewhat amazing and open discussion conducted by members of the Menhaden Board – all senior and experienced professionals who manage extensive fisheries based on the best available science before them. Managing a fishery that way is the expectation of all stakeholders – not just those in the commercial bait sector, like Reedville Bait.

In the words of ASMFC's own technical committee, "Atlantic menhaden are not overfished, and overfishing is not occurring." The revised reference points reviewed previously before Management Board and approved by a peer review panel are based on historical performance of the population during the time frame 1960-2012, a period during which the Technical Committee considers the population to have been sustainably fished. As we understand the report, fishing mortality has been decreasing throughout the history of an expanding fishery, and is now 42% below the target.

While we operate our bait companies in Virginia, the largest of all of the state menhaden fisheries, we have witnessed first hand both the increased demand for our bait products and the increase in menhaden. The commercial expansion of our bait companies has been limited by the decision made in 2013 to reduce landings for all coastal states by 20%.

Our menhaden are processed here in Virginia, and are used by watermen along the East Coast and Gulf States, and by sport fishermen here and in Florida.

We were appreciative and grateful to the Board when in 2015 you approved an increase in the total allowable catch for 2015-16 of 10% over the 2014 TAC. You acknowledged that decision and the increase was in response to the positive findings of the benchmark assessment.

What changed?

We understand the Board's commitment to moving forward with the development of an amendment to establish ecological based reference points and a socioeconomic study of commercial Atlantic menhaden fisheries – to characterize the coast-wide commercial fisheries, including our sector (bait) and reduction. However, we believe this ongoing effort is intended to guide future decisions of the fishery, and should in no way impact a decision regarding the 2017 TAC.

We believe at a minimum the Board should increase the total allowable catch for 2017 by 10%, and would encourage you to support that decision at the ASMFC Annual Meeting in October.

The coastwide bait fishery has changed significantly since ASMFC implemented Amendment 2. It has grown. According to ASMFC's own numbers, between 2001 and 2012 the percent of total landings used for bait rose from 13% to a high of 28% in 2012. In 2013, bait harvest composed approximately 22% of the total menhaden harvest.

We respectfully request that you consider this information when you meet as a Management Board in late October. We strongly support a minimum 10% increase in the coastwide TAC for 2017, which is validated by the best available science.

Please do not hesitate to contact any of us regarding the contents of this correspondence.

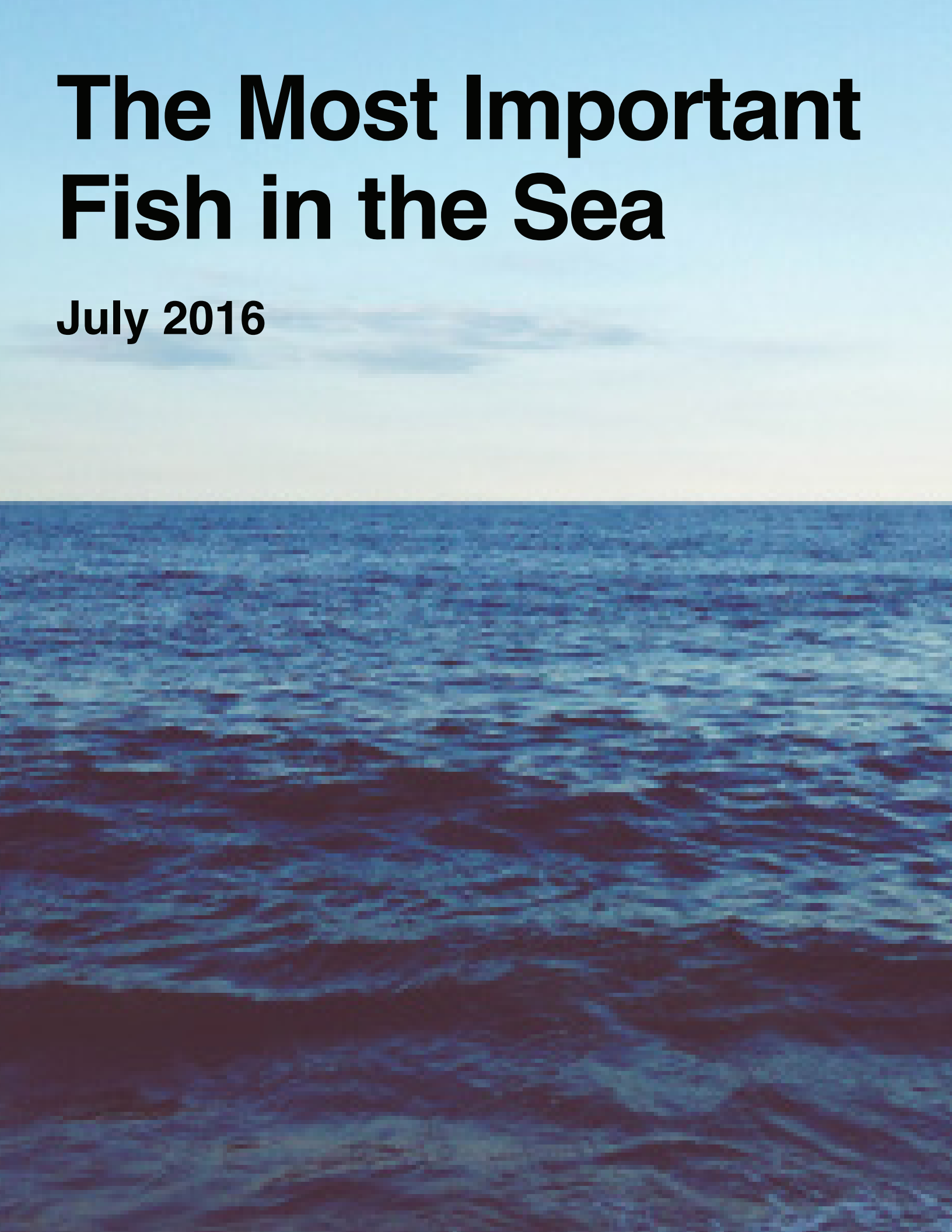
Respectfully yours,

Ronald W. Bevans	S. Lake Cowart, Jr.	Frederick Rogers
Bevans Oyster Co.	Mid-Atlantic Bait	Reedville Bait

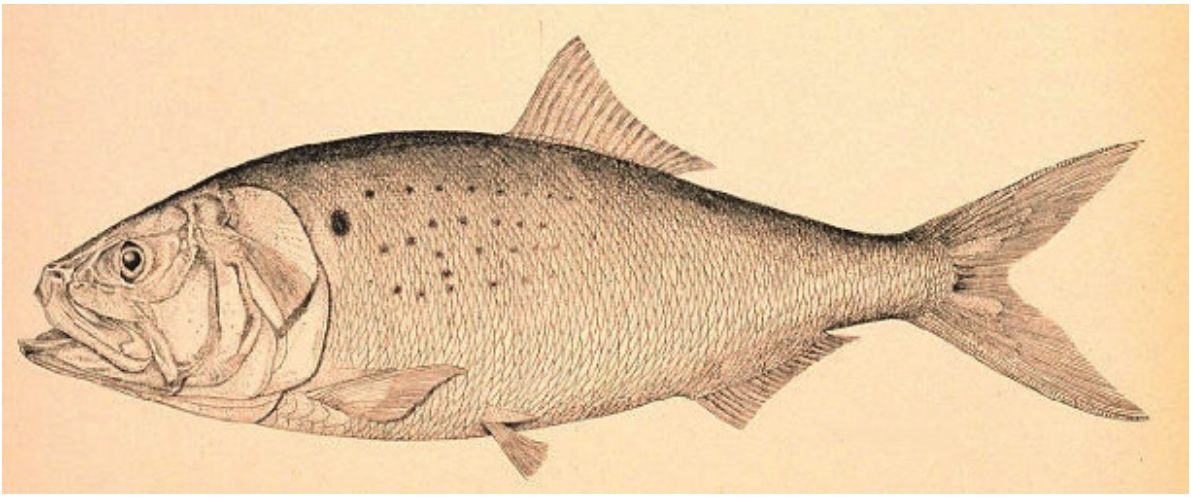
Copy to: J. Bull, Commissioner, VMRC
Catherine W. Davenport
R. O'Reilly, VMRC, member, Menhaden Management Board
The Honorable R. H. Stewart
The Honorable M. Ward, Virginia Secretary of Natural Resources
Mr. Robert E. Beal, Executive Director

The Most Important Fish in the Sea

July 2016



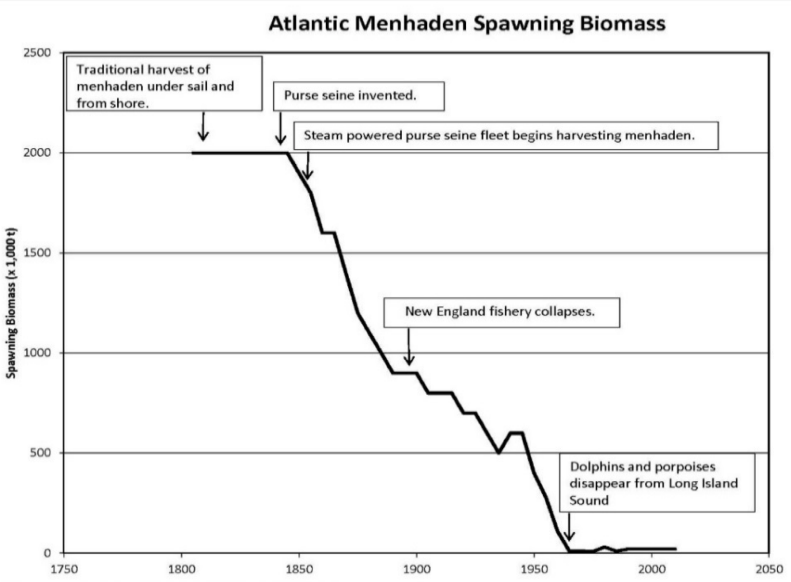
The Most Important Fish in the Sea



An obscure company in Texas, with political power greater than its size, is in the process of destroying the marine ecology of the Atlantic and Gulf coasts, starting with the Chesapeake Bay. How can they do this? Why are they allowed to commit this ecocide? It all starts with a small, oily fish called Atlantic menhaden (Brevoortia tyrannus), and its Gulf of Mexico cousin, (B. patronus).

Menhaden are the keystone fish of the coastal Atlantic Ocean and Gulf of Mexico. They provide the primary food source for dozens of key predators such as striped bass, tarpon, weakfish, sharks, dolphins, bluefish, whales, harbor seals, ospreys, pelicans, loons, and more. They are also a filtering species, removing algae and zooplankton from the sea, and consequently playing a critical role in clarifying water and reducing algae blooms. As ecosystem engineers, menhaden have been called "the most important fish in the sea," yet only a small fraction of their historic population survives today. [1]

Centuries ago, menhaden schooled in massive groups that went on for miles, providing ample food for predators and passing nutrients to animals higher in the food web. But a virtually unregulated fishery coupled with 20th century advancements in fishing technology have shrunk the menhaden population and negatively impacted many important predators, as shown in the following graphic[2]:



Netted by the billions, menhaden are pulverized into meal, fertilizer, and fish oil, in a process known as "reduction." The resulting products are sold for pennies and used in cosmetics and animal feeds worldwide. More pounds of menhaden are caught each year in the continental United States than any other fish. Excessive removals of these small filter-feeding fish, from the Atlantic Ocean in particular, is wreaking havoc on important U.S. coastal ecosystems and decimating the economically important fishing and tourism industries that depend on them.

Ending menhaden "reduction" fishing is the only way to avoid the collapse of this fish population and its predators in the Chesapeake Bay and other vital East Coast waters. The quality of our water, food supply, and coastal marine ecosystem depend on action being taken now. This paper highlights the science and context driving

1 For more information on "the most important fish in the sea," see H. Bruce Franklin's seminal book of the same title; ASMFC Menhaden Benchmark Stock Assessment 2015, http://bit.ly/StockAssessment

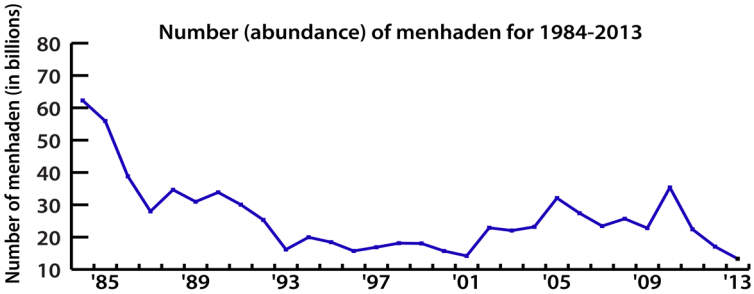
2 July, 2013 edition of Long Island Boating World, http://bit.ly/BoatingWorld

these politically charged conditions.

The Threat

The menhaden reduction fishery nets and processes more than one billion pounds of menhaden in the United States annually from the Atlantic Ocean and the Gulf of Mexico.

For decades, scientists, environmentalists and coastal residents have warned that the removal of this prodigious amount of menhaden from its native waters will have long-term devastating consequences on the productivity of our coastal ecosystems. In recent scientific assessments, scientists concluded that the Atlantic menhaden population is a small fraction of its historical stock size.[3]



At one time there were 91 processing plants along the East Coast from Maine to Florida that "reduced" menhaden to fish oil and meal. By the 1950s that number had shrunk to 20 reduction factories. Today, all of these plants but one have closed principally due to the severe depletion of the menhaden population. The one remaining East Coast factory, located in Reedsville, Virginia, on the southwestern side of the Chesapeake Bay, processes about 80% of the Atlantic menhaden catches; the other 20% is harvested for use by recreational fishing and for commercial crab and lobster bait. Two reduction factories still process menhaden on the Gulf Coast from bases in Louisiana and Mississippi.[4]

For its Atlantic operation, the reduction fishery uses factory ships and spotter planes to find and net huge schools of menhaden. Menhaden's natural form of protection from predators is to school in tight wads, which are easily located by spotter planes as a huge reddish shadow. Once spotted, reduction boats encircle entire schools with giant nets called "purse seines." When the fish are surrounded, the net is cinched tight like a drawstring, and a hydraulic vacuum pump is used to transfer the fish to the ships. In this way, menhaden are literally

vacuumed out of the ocean by the millions, along with any predators that happen to be feeding on the school.

Menhaden are no match for this armada; there are few survivors.

Furthermore, 10% or more of the reduction fishery's catch is bycatch (unintended harvest) of key predators that school with menhaden. This bycatch is not a nominal amount: scientists estimate that 50% of the U.S. Spanish mackerel catch is taken incidentally by the menhaden fishery's nets.[5]

Back at the factory, the reduction fishery grinds and cooks the menhaden, processing the fish into fish meal, fish oil and soluble products used in international aquaculture, livestock and pet foods, cosmetics, and fertilizers. The reduction fishery's total revenues were $309 million in 2014, but these revenues come at great ecological costs to consumers, fishermen, and the environment.

Why We Should Care

The word "reduction" is aptly used here since the fishery has greatly reduced the population of the most important forage fish in coastal Atlantic and Gulf seas. By reducing the primary source of protein for dozens of apex predators, the fishery also reduces populations of predator fish, marine mammals, and birds. Due to overfishing by the reduction industry, striped bass and others species no longer have the access to the abundant, nutrient-packed menhaden that they need. This overfishing

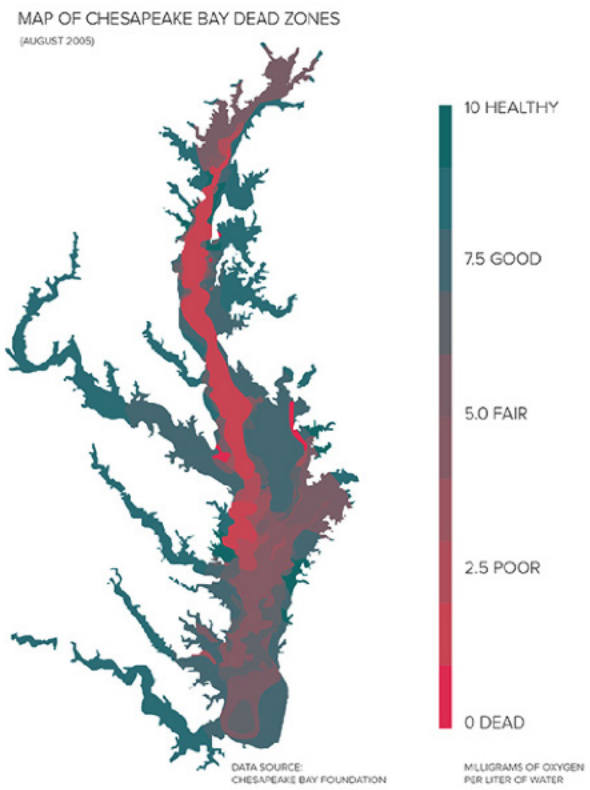
3 http://bit.ly/StockAssessment

4 http://bit.ly/StockAssessment, p. 162

5 Senior NOAA scientist regarding Gulf Menhaden

has triggered a number of other problems for wildlife. In 1975, menhaden filled 75% of the osprey diet; today it's just 28%. Menhaden once represented 70% of the striped bass diet; today, it makes up a paltry 8%.[6]

Fishery researchers have estimated that up to 60% of the striped bass in the Chesapeake Bay are now infected with a fatal wasting disease called mycobacteriosis, which has been linked to malnutrition. Weakfish have also suffered significant depletion in the past decade, as whales and striped bass have out-competed young weakfish for the dwindling supply of menhaden. As these predators pursue other sources of protein, they reduce the populations available for the next predator in the food chain, cascading the problem down the food chain to species like lobsters, clams and oysters.



The menhaden fishing industry has pushed these valuable predator populations to their brink, destabilizing aquatic ecosystems by leaving far too few menhaden in the water to support its natural predators. Since menhaden are migratory fish and their predators closely follow their migrations, this has far-reaching impacts on industries like saltwater recreational and commercial fishing. Each of these industries contribute billions of dollars to the economies of all the Atlantic coast states as well as those in the Gulf of Mexico.

Menhaden and the Chesapeake Bay

The Chesapeake Bay is the largest and most important estuary in the United States. It hosts thousands of species of animals and plants, and nearly 17 million people live in its watershed. The Chesapeake also supports economically important resources including blue crabs, Eastern oysters, striped bass, and two of the five major commercial seaports in North America. Unfortunately, it is also home to the menhaden reduction fishery which harvests up to 240 million pounds of menhaden every year from the Chesapeake Bay alone, many of which are immature juveniles.

Historically the Chesapeake Bay supported massive populations of menhaden, striped bass, bluefish and other predators. Captain John Smith, upon arriving in the Chesapeake Bay in 1607, reported seeing schools of menhaden extending for miles and so thick he "could easily catch them with a frying pan." But the pristine and balanced ecosystem he witnessed is a thing of the past. The menhaden reduction industry's vacuuming operation is principally focused on the Virginia waters of the Chesapeake Bay. This has had devastating consequences for the ecosystem and key fishery resources, like for example, striped bass. Scientists estimate that the Chesapeake Bay spawning areas produce 70 to 90% of coastal migratory striped bass. Stripers then spend the first 4-6 years of their lives in the Chesapeake, feeding on immature menhaden and beginning the process of synchronizing their life-cycles to the migrations of menhaden, ultimately following them from Florida to Maine and back again.[7]

Other predators also sync their life cycles to menhaden as they mature. Menhaden move north and south from the Bay, which produces incredible striper, bluefish, tuna, and tarpon fishing up and down the East Coast. The famous fall run of stripers around Montauk arrives when the menhaden are moving back south to spawn. Unfortunately, that's where they again meet their apex predator in the main stem of the Chesapeake Bay – the menhaden reduction industry and its purse seine nets.

Menhaden are Efficient Filter Feeders

Menhaden use specialized gill-rakers to feed on microscopic phytoplankton and zooplankton throughout their lives – this represents one of their most significant ecological roles. Without menhaden to remove these tiny plants and animals from the water, plankton populations explode, resulting in harmful red tides and algal blooms, a primary cause of "dead zones"

6 http://bit.ly/BayFoundation

7 http://bit.ly/DNRStripedBass

in the Chesapeake Bay. As the numbers of menhaden have declined, dead zones have become a significant and growing problem, not just in the Chesapeake Bay but along the entire Eastern seaboard.

The over-production of phytoplankton and zooplankton has other unintentional consequences: with the addition of more food, jelly fish populations have thrived, making many beaches and waterways uninhabitable during certain times of the year.

Scientific estimates reveal the tremendous filtering capacity of menhaden if restored to their native abundance. The average menhaden is about 8 inches long, weighs 0.3 pound, and is capable of filtering 2.4 gallons of ocean water each and every minute. Thus, the current average annual catch of 1.5 trillion menhaden by the reduction fishery leaves an astonishing 1.9 quadrillion gallons of seawater unfiltered. Left alone to serve their critical ecological role, the yearly menhaden catch could likely filter the entire Chesapeake Bay every 3.8 days. Given the severity of pollution along the Atlantic coast, these missing menhaden would significantly improve water quality by combating scourges like nutrient runoff and algal blooms.

The Value of Menhaden to the Economy

Recent estimates suggest that the menhaden reduction industry provides $88 million to the local economy of Virginia. But this figure pales in comparison to the remarkable value those missing menhaden could provide in the form of environmental cleanup alone. By removing such an incredible number of water-filtering, protein-packed menhaden from the coastal ecosystem, the reduction fishery costs Eastern seaboard states hundreds of millions of dollars in vital ecosystem services. When you take into account the number of predators and people who depend on those predators, the total value of these missing fish is astonishing.

If the menhaden reduction fishery were a logging company cutting old growth trees from a Virginia State Park and hauling them to Asia, one would certainly not count the value of those trees as income to Virginia. Those trees would be a loss. Likewise, the value of the menhaden taken from the waters of Virginia is a loss to the people of Virginia as well as all of the Atlantic States from Maine to Florida.

Put simply, forage fish like menhaden are worth more in the water than they are in the nets and vacuum pumps of the reduction industry. The Lenfest Forage Fish Task Force recently estimated that the value of leaving forage fish in the ocean as a food source for predators is $11 billion—twice as much as the $5.6 billion those fish generate when reduced into fish meal and fish oil for things like aquaculture, farming, human supplements, and pet food.[8]

"Political" Science – How the Ecocide has Occurred

Every state on the East Coast, with the exception of Virginia, has banned reduction fishing in their state waters. How and why has a single industry been allowed, with de minimis oversight, to decimate the menhaden population along the entire Eastern Seaboard? The answer lies squarely in the thorny politics of the Atlantic States Marine Fisheries Commission (ASMFC), a multi-state agency chartered by Congress with federal and state funding.

Fifteen Atlantic coastal states formed the ASMFC in 1942, recognizing that fish do not adhere to state boundaries. Since then, the ASMFC has coordinated the management of Atlantic fishery resources, regulating 24 migratory species that include striped bass, lobster, weakfish, eel, river herring and menhaden. Because most fishing takes place in the rich and diverse near-shore waters where many species tend to congregate, the ASMFC has a substantial amount of power and latitude over decisions concerning Atlantic commercial and recreational fisheries.

In 1981, the ASMFC took responsibility for regulating menhaden, and for more than thirty years the commission took no action to limit menhaden catches along the Eastern Seaboard, despite the fact that ASMFC's scientists and external experts consistently recommended protecting the forage base that sustains the ecosystem. During those thirty years, every Atlantic Coast state except Virginia recognized the wonton ecological devastation associated with destroying massive amounts of menhaden, and banned reduction fishing in their state waters.

Over the years, the menhaden reduction fishery has worked several angles to guarantee its position as primary harvester of menhaden. Industry representatives sit on ASMFC governing committees that provide recommendations to fisheries regulators. They hire economists to prove the local economic value of the fishery.

8 http://bit.ly/Lenfest

They co-opt small business bait fishermen who catch small amounts of menhaden for use by recreational and other fishing. Finally, the industry spends hundreds of thousands of dollars annually in lobbying and PR to influence regulators and public opinion.

As a result, the industry has managed to convince the ASMFC and Virginia lawmakers to allow menhaden reduction fishing within Virginia state limits and in proximal federal waters (between three and 200 miles out to sea). This virtually exclusive access enables the company's continued exploitation of the sensitive nursery areas of the Chesapeake Bay and Federal waters along all coastal states.

In 2012 the ASMFC finally took a small step in the right direction. New science showed that just 8% of menhaden remained in the Atlantic compared to historic levels. Following this discovery, and under intense public pressure, the ASMFC implemented the first coastwise quota for the menhaden fishery (i.e., a hard limit on the number of pounds of menhaden that could be caught in a given fishing season). The reduction fishery's menhaden catch had to be reduced by 20%.

This was a start, but independent scientists have since argued that a 20% cut in menhaden fishery is not nearly enough to protect the menhaden population in the short or long term. In order to protect the Chesapeake Bay and the Atlantic predator populations, they are recommending even greater cuts as well as a ban on netting in the Chesapeake Bay.

Whose Science is it Anyway?

In February 2015, the ASMFC released new science that painted a rosier picture of the status of the menhaden population, claiming that menhaden were no longer subject to overfishing. The basis of the claim was the menhaden population biomass (i.e., pounds of fish) had significantly increased. Upon further analysis of the report, the perceived increase in stock biomass was the result of changes to the assumptions in the stock assessment model including inclusion of large "phantom" fish in New England waters, and the questionable rejection of a multi-species assessment model that explicitly considered predation by striped bass, bluefish and weakfish. Crucially, the number of menhaden did not increase, only the measurement of their individual weights showed an uptick. In fact, the menhaden population remains at its lowest abundance (numbers of fish) in the 60 year history of assessments. This is important because it's not the weight that's important per se, but the total numbers of fish of all sizes that matters to the dozens of predators along the Eastern seaboard that rely on menhaden for food. In addition, the fishery data used in the current science only accounts for the years between 1955 and the present. The historic importance and size of the menhaden population is not taken into account, despite the fact that menhaden numbers were far higher in the centuries before the advent of industrial fishing techniques in the mid 20th century.

In spite of these contradictions, the menhaden reduction industry set their regulatory and scientific machine in motion and immediately began calling for a "substantial quota increase." On the basis of this new "science," and pressure from the industry, regulators capitulated and allowed the fishery to take 10% more menhaden in 2016 than they had the previous year.

Furthermore, ASMFC's current stock assessment model is rigged against the ecosystem; it measures the health of menhaden population based only on whether the population can sustain itself for the needs of the reduction industry. Managing menhaden on the basis of one predator (man) is counter-intuitive since so many economically important predators also depend on the menhaden resource for survival. Exactly how many menhaden are needed to sustain species other than the reduction industry has never been accounted for in the official calculations.

For many years, scientists have recommended the development of "ecological reference points" (ERPs), or benchmarks that would quantify the important ecological roles that menhaden play in the coastal ecosystem. ERPs would allow reduction fishing only after those ecological roles have been fulfilled. Unfortunately, the ASMFC currently has no obligation, legal or otherwise, to leave any menhaden in the ocean for all the predators that depend on it.

The ASMFC began the process of developing ERPs for menhaden in 2015, creating a working group of ASMFC members and industry stakeholders who are tasked with holding a series of workshops to define how to proceed. The group has set a goal of establishing ERPs by 2017.

Alarmingly, the ASMFC has allowed the menhaden reduction fishery to be involved in the development and formulation of these critical reference points; in essence, allowing the industry to assist in setting the standards by which it will be regulated. It is a classic case of a fox

guarding the henhouse.

Conclusion

Over the years, the menhaden reduction industry has committed its ecocide by manipulating the data and the politics in their favor. It's time to change that formula with the truth about this special species of fish. Menhaden Defenders, Anglers Conservation Network, and conservation minded anglers up and down the East Coast are working to create a scenario whereby menhaden are allowed to perform their dual functions of improving water quality and serving as an abundant food source for a variety of fish and animals. Reduction fishing cannot be controlled under the ASMFC's current model of single species management. Only when the complex roles that menhaden play in the coastal ocean ecosystem are accounted for can the system change for the better and sustain this critical and keystone resource.

Your support is vital towards accomplishing the following near term goals:

- ASMFC adoption of ecological reference points for management of menhaden in 2017.
- Precautionary management of menhaden - i.e. no catch increases - until the implementation of ecological reference points.

Your support is also essential for meeting the long term goal of ending reduction fishing altogether. These fish are more valuable left in the water where they provide the greatest impact and utility to both man and nature.

For more information and to find out how you can help, please visit menhadendefenders.org.

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A MODEST OPINION

Next year's model

by Ken Hinman, President

As I write this, the ASMFC is working on Amendment 3 to its coast-wide Atlantic Menhaden Management Plan, which will include ecosystem-based reference points to protect menhaden's vital role as forage. The commission will seek public input at the end of the year and then draft the amendment next year for implementation in 2018. East coast anglers and conservationists have been waiting 15 years for this change in the way menhaden are managed, and we've never been closer.

The big fly in the ointment, however, is that the scientists advising the Atlantic States Marine Fisheries Commission (ASMFC) reject more generalist, best practices approaches to conserving forage fish, such as the ecological reference points recommended by the Lenfest Forage Fish Task Force, or The Berkeley Criterion as described in the *Wild Oceans* report, Resource Sharing. Instead, they favor spending the next three years developing complex food web models specific to menhaden with the hope of someday using these to determine how much menhaden to leave in the water for the ecosystem.

But based on what we know about the complexity of marine ecosystems and the limitations of models, is that a reasonable expectation?

The biggest mistake any fishery scientists – and here we're talking about an *ad hoc* subgroup of the Menhaden Technical Committee known as the Biological Ecosystem Reference Point Workgroup, or BERP – can make is to approach ecosystem models as merely more complicated versions of the single-species models they are familiar with. They are not. Systems theory recognizes a critical difference between systems that are "complicated" and those that are "complex".

Yes, it is possible to mathematically model complicated systems, given proper design, sufficient data and a reasonable understanding of the relationships among the constituent parts. But marine ecosystems are not complicated systems, they are *complex*, and "complex systems, like ecosystems, are not fully knowable, have an infinite number of variables affecting them, and cannot be understood with sufficient precision to assess causality with any certainty or to predict the outcome of interventions reliably." [i]

> "A model's just an imitation of the real thing."
>
> — Mae West

In other words, it is highly unlikely that a complex, organic ecosystem, or even a subset of that system, such as a food web made up of numerous competing predators and their associated prey, can be modeled *for management purposes*; that is, in the mechanistic way we traditionally use single-species models. Ecosystems are not machines.

Keep in mind that our current stock assessment models, which only attempt to sustain a single predator – humans – are complicated and difficult enough. Even the conventional single-species model used to assess Atlantic menhaden and make projections as to sustainable catches is fraught with uncertainty.

That should be obvious when one considers the degree to which the results can differ from one assessment to the next, merely through changes in assumptions, new interpretations and adjustments in data. The 2010 menhaden benchmark stock assessment, which went through a rigorous independent peer review process and, on the advice of menhaden scientists, was formally accepted by the ASMFC's Menhaden Management Board for management use, indicated the spawning biomass was well below the threshold, indicating a severely overfished stock. The 2015 benchmark assessment, which also was peer reviewed and accepted for management use, showed the spawning biomass to be well above the target level, indicating a healthy stock.

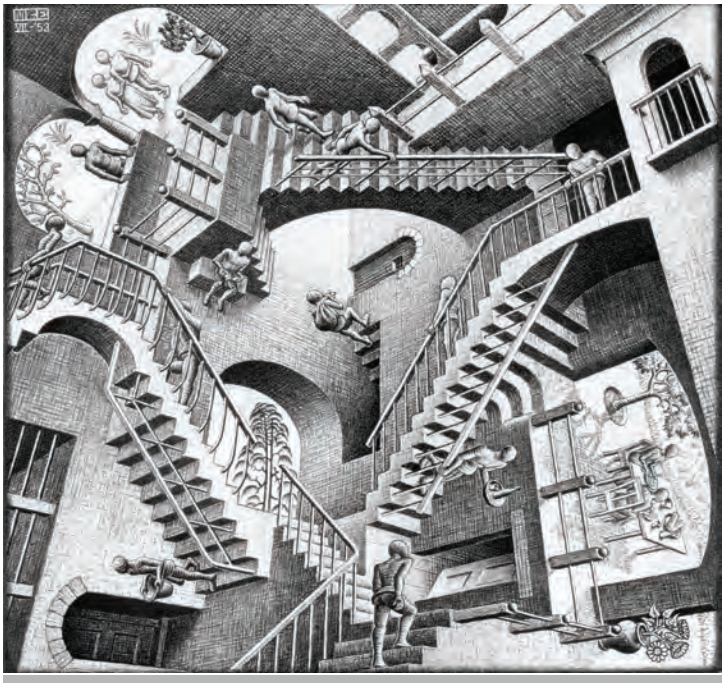
The point here is not to argue whether one assessment is a more accurate portrayal of the status of the menhaden population than the other, but rather to demonstrate that even single-species models are so complicated as to be easily manipulated, and I don't mean that in the pejorative sense. The word modelers prefer is "calibrated," but it amounts to the same thing.

The Perfect Model?

The many uncertainties inherent in single-species models are amplified exponentially in multispecies models, where cause and effect become far less knowable and much less predictable.

To be sure, multispecies models have advantages over their single-species counterparts in informing decisions at the ecosystem level, but in each case they are offset by the disadvantages. For instance, they allow complex systems to be simplified to the point where we can comprehend them, but if they are oversimplified – which they must be to have any utility as a management tool – realism and accuracy are lost. They allow predictions to be made about future events at an ecosystem scale, but those predictions cannot be considered reliable for making fishery management decisions. They allow for comparison of different management scenarios involving various inter-related species, but different models have different outcomes and complex models can be interpreted differently by different scientists.

On this last point, it's clear that using multispecies or ecosystems models appeals to fishery scientists advising management bodies because they are familiar and comfortable with using models



Is this how we get there? *(Relativity by M.C. Escher)*

for applying single-species reference points to single-species assessments. However, for most of these scientists, ecosystem models are a brand new endeavor, an experiment.

The ASMFC's menhaden scientists are, of course, well aware of this. The BERP has made it clear that, even when they've completed work on developing ecosystem models for menhaden several years down the road, they cannot recommend ecological reference points (abundance targets and fishing limits) until managers provide "a more explicit statement of ecological/ecosystem goals and objectives for menhaden management and the performance of the proposed ERPs and the models used to generate them can be formally evaluated through multi-model comparisons, simulation testing, and the completion of single (and possibly multispecies) management strategy evaluations." [ii]

So let's add several more years to the timeline, which takes us to about 2022. That's a long time away, and in the end, as we've been saying all along, it will come down to members of the Menhaden Management Board making an allocation decision between fisheries and the ecosystem.

When I think about the enormity of the task these scientists are taking on, I'm reminded of Al Goodman's idea for developing the perfect computer. "You just feed in your problems, and they never come out again." For those on the Board and in the fishing industry who don't want to ever manage menhaden for its forage value, that's the perfect model.

'A Rule of Thumb'

So, yes, I'm a skeptic. But skepticism is not a position; it's a process, one where critical thinking leads us away from popular misconceptions toward ideas and actions that benefit humanity.[iii] It's not anti-science, it's enhancing scientific inquiry with traditional sources of wisdom, i.e., basic ecological principles, practical knowledge and common sense. That's what I attempted to do in developing The Berkeley Criterion[iv] and what is at the root of the Lenfest and similar approaches, which were all developed by fishery ecologists, i.e., scientists, using available scientific studies.

The crux of the BERP's criticism of these general services approaches (in shorthand, leaving 75% of the un-fished forage population in the water and fishing at half the rate of predation mortality) is that "these reference points assume that you are accounting for ecosystem services in a general way, but they do not address specific services. As such, these methods represent more a 'rule of thumb' than an actual accounting of removals."

As if rules of thumb, or broad management guidelines, are not common in fisheries science or management. We *want* to account for ecosystem services "in a general way"; that's what an ecosystem-based approach is all about, the big picture, not just providing "specific services". Moreover, "an actual accounting of removals" is something we've never been able to do, even for use in single-species stock assessments, i.e., determine an accurate estimate of natural mortality. And even if we could, it would not assure us that this level of removals is what we're aiming for. Ecologists emphasize the importance of maintaining enough prey to meet the *needs* of predators, which is vastly different from what they may be consuming now. For many top predators, the amount of food they need to consume is less than the amount they need to have in the environment in order to forage effectively, for some by several orders of magnitude.[v]

It was the Menhaden Management Board's intent in initiating Amendment 3 that these approaches, which are ready for implementation by 2018, be included in the Public Information Document that will go out for comment later this year.

Given that the 75% solution is clearly a legitimate approach to developing ERPs for menhaden, with broad support within the scientific community at-large, the ASMFC must seriously consider it as an option in Amendment 3. Those on the Board and among its advisors who wish to ignore this approach and keep kicking the solution into the long grass where we may never find it, can do so. But if they choose to remain unresponsive to either the ASMFC's broad east coast constituency of anglers and conservationists or to the health of the ecosystem, they can't claim to be hiding behind the science. ■

(Endnotes)

[i] Pollard, Dave. Systems Thinking and Complexity 101. June 14, 2014.

[ii] SEDAR. 2015. SEDAR 40 – Atlantic Menhaden Stock Assessment Report. SEDAR, NorthCharleston SC. Appendix E, p. 30.

[iii] Dunning, Brian. What is Skepticism? Skeptoid.com.

[iv] Hinman, K. 2015. Resource Sharing: The Berkeley Criterion. Wild Oceans. http://wildoceans.org/wp-content/uploads/2016/01/RESOURCE-SHARING-Updated-4-19-16.pdf

[v] Furness, Robert W. Reference point approaches for precautionary management of fishing toavoid impacts on top predators. University of Glasgow. 2003. https://www.researchgate.net/publication/265012253

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August 18, 2016

VIA Electronic Mail

Atlantic Menhaden Board Members
c/o Chairman, Bob Ballou
Assistant to the Director FI DFW
235 Promenade St.
Directors Office, 4th Floor
Providence, RI 02908-5734

DFA Position Statement:

In 2012, the ASMFC Management Board for the first time in its history imposed catch limits on Atlantic menhaden even though the ASMFC Menhaden Stock Assessment Subcommittee ("SAS"), a subset of the ASMFC Technical Committee ("TC"), refused to make any recommendation for the adoption of catch limits. Eric Williams, the NOAA scientist who developed the Beaufort Assessment Model (BAM) used in the menhaden stock assessment knew that there was insufficient data on menhaden to suggest, let alone definitively conclude, that the species was overfished or that overfishing of menhaden was occurring. The only comprehensive scientific study of the species and its range was completed over three decades earlier. The fishing pressure on the stock had reduced significantly since that study. Only one reduction fishery, Omega Protein, remained on the entire Atlantic seaboard and its catch came primarily if not exclusively from the mid-Atlantic region. When the last scientific study of the species was conducted there were nine reduction processors harvesting along the Atlantic seaboard and active menhaden harvesting was occurring over a much wider expanse of the Atlantic coast. In the decade prior to 2012, menhaden were not being actively commercially harvested in New England, New York or south of the Virginia-North Carolina border. This significant reduction in harvesting contributed to the dearth of data on Atlantic menhaden.

In 2012, despite the warning of Eric Williams and the SAS that there was not a sufficient scientific and technical basis for imposing catch limits, the Management Board imposed draconian catch limits.

New data and observations have confirmed the health and abundance of Atlantic menhaden. The lack of scientific underpinning for the catch limits adopted in 2012 has been further exposed and confirmed.

The seafood industry wants sustainable fisheries. In the DelMarVa region, many harvesters are families that have been commercial fishermen for more than five generations. These families are not wealthy, but they have served as the backbone of the coastal regions and communities where they have lived for generations. They support a wide array of the local businesses from whom they purchase supplies and services and who transport and market their catches. Members of the seafood industry serve on the volunteer fire departments, on the parent-teacher associations, and as local officials. Sons and daughters of families from these communities dependent on the seafood industry have served in our armed forces for generations. Tourists and recreational boaters are attracted to the region and these communities in large part because of these harvesters and the seafood industry.

The regulations of the Counsel of Environmental Quality that implement the National Environmental Policy Act mandate that federal agencies and federally funded agencies to the fullest extent possible use all practical means to restore and enhance the quality of the human environment and to avoid or minimize adverse effects of their actions upon the quality of the human environment. 40 C.F.R. § 1500.2. The human environment includes not only the natural environment, but also the economic, cultural, and social environments of the coastal communities that are reliant upon the seafood industry and the many families whose livelihood is dependent directly or indirectly on the seafood industry. 40 C.F.R. §§ 1508.8 & 1508.14. Every time unnecessary and unwarranted restrictions are placed on the harvest of seafood, the human environment of these communities suffers. The menhaden catch limits are a sterling example of an unnecessary restriction that has harmed and has adversely impacted the human environments of coastal communities in the DelMarVa region.

As verified by the response to the question posed by N.J. Management Board member Adam Nowalski, the ASMFC Management Board has not imposed a catch limit on a species other than the Atlantic menhaden at a level where every run of the stock assessment model indicated that there was a zero percent (0%) chance that harvesting at such level would result in the over-fishing of the species.

The seafood industry wants to work with the ASMFC Management Board to maintain sustainable fisheries. When the Management Board imposes scientifically unmerited catch limits on the industry, the coastal communities whose livelihood and way of life is dependent upon the industry view such acts as a declaration of war on them, their human environment and their way of life. Such unnecessary and unmerited restrictions will erode the confidence of such communities in the mission of the Management Board.

The DelMarVa Fisheries Association (DFA) respectfully requests the Management Board to increase the Total Allowable Catch of Atlantic menhaden for 2017 by twenty percent (20%).

What follows is a more detailed discussion of why the 2012 action of the Management Board eroded the confidence of the seafood industry in the motives and objectives of the Board. DFA would view an increase by the Board of the total allowable catch of menhaden for 2017 as a step in the right direction to restore what should be a partnership between the industry and Board in maintaining the long term sustainability of the fishery.

Discussion of Underlying Facts:

A stock assessment is a statistical analysis designed to estimate how many fish there are and the state of the reproductive component of the stock.

The Beaufort Assessment Model ("BAM") was used by the ASMFC Menhaden Stock Assessment Subcommittee ("SAS"), a subset of the ASMFC Technical Committee ("TC"), to estimate the number of menhaden in state waters along the Atlantic coast and the spawning potential of those menhaden. (Sharov Dep. at 20-28.) The problem with the model is that there is not enough hard data about the population of menhaden along the Atlantic coast to generate scientifically meaningful estimates through the use of the model. (Sharov Dep at 37-39, 154 l. 7-18, 156 l. 21 – 158 l. 13; Aff. of Young ¶ 8; Fegley Dep. at 155 l. 2-15, 192 l. 2-12, 193 l. 21 – 194 l. 19, 271 l. 11 – 272 l. 11.)[1] The model, therefore, has generated conflicting estimates.

The 2012 Stock Assessment Update prepared by the TC documents how unreliable the BAM model was and how unreliable the conclusions reached about F, SSB and the overfishing determination were.[2] More specifically, at pages 24 and 26 of the assessment update, the TC reported:

> The retrospective pattern observed during this update assessment suggests that the **results** from the assessment may be **biased**, thus **projection results**, which start with terminal year estimates from the assessment may also be **biased**. However, the significance of such bias for projections results has not been investigated yet by the Technical Committee. If the projections are biased, then **the Atlantic Menhaden Management Board should be cautious when using this for management advice, especially if providing values for quotas for the fisheries**.
> …
> It is important to note that the projections include many sources of uncertainty and their cumulative effects are represented by a wide range of F, SSB and other parameters that are illustrated on projection graphs … .
> …
> The strong retrospective pattern suggests that **this model is not robust** to addition of new data. The results suggest that terminal year fishing mortality may be overestimated and the fecundity and [spawning stock] biomass may be underestimated. It is unclear exactly what is causing the retrospective pattern, but it appears that some data sources have developed discordance since 2003.
>
> Overall, the five criticisms indicated above cast **considerable doubt on the accuracy of the estimates from this update stock**

[1] Excerpts from the deposition of Alexei Sharov Ph.D. are attached as Attachment 5; excerpts from the deposition of Lynn Fegley are attached as Attachment 4, and the Affidavit of S. Stanley Yong. D. and his resume are attached as Attachments 9 and 10.
[2] "F" is fishing mortality and "SSB" is spawning stock biomass.

> **assessment**. Retrospective analysis suggests that the last 5-6 years of fishing mortality and overfishing status may be biased high, while fecundity and overfished status may be biased low.

(Emphasis added.) When the TC states that the BAM model is not robust, it means that the model is not reliable. (Sharov Dep. at 164 l. 2-4.)[3] In short, there is a dearth of data; no one will say that the stock is overfished; and no one will predict that the stock does not have the ability to continue to regenerate itself. The modeling process is insufficiently reliable to make any scientifically based regulatory determinations about the stock. The best available information admittedly did not support the catch limits adopted by the Management Board in 2012.

In the official notes of a July 9, 2012 teleconference of the TC, Dr. Eric Williams expounded on the lack of data and the concomitant uncertainty of the BAM model runs, observing:

> Dr. Williams: Reference points should have a science-based population dynamics goal. The board's current goal is simply to increase abundance. If population dynamics are modeled differently in future assessments (*i.e.*, dome-shaped selectivity) … The $F_{15\%}$ benchmark may not be very meaningful.
>
> …
>
> Dr. Williams: To be fair, we have really only collected fishery catch-at-age data over the history of this stock. **We don't have any reliable coast wide indices.**[4] So we really don't have all that much information on this stock.

(Attachment 2.)

Later during that same July 9, 2012 teleconference of TC members, the following conversation was reported:

> Dr. Sharov: So are we comfortable with this ad hoc approach or using projections from the previous benchmark?
>
> M. Cieri: This approach is what has been used in similar situations throughout the country.
>
> Dr. Williams: The difference with this situation is that we stand a good chance of producing a better assessment with the next benchmark. In many cases, there is little hope of achieving a better stock assessment in the short term.
>
> L. Daniels: **According to scuttlebutt (blogs, etc.), there is a sense we've got to do something … given the biomass is at an all-time low and**

[3] Ms. Fegley testified that "robust" was synonymous with adequate or valid. (Fegley Dep. at 38 l. 19 – 39 l. 2.)
[4] A coast wide index is an estimate of the population of menhaden along the entire Atlantic coast.

the age structure is truncated. Does the TC at least agree with these statements about the stock?

Dr. Williams: **The problem is that we can't agree with those statements**… the low biomass could be explained by the retrospective pattern, and the contracted age structure could be explained by a dome-shaped selectivity.

L. Daniels: Given that we wouldn't have a new benchmark for 3 years, what does the TC recommend as the most appropriate course?

…

M. Cieri: Do[es the ASMFC Management Board] need a preferred option from us?

M. Daniels: No, and it doesn't appear you'd be able to come to consensus anyway.

…

(Attachment 2.)

Louis Daniel, one of the speakers in the above exchange, was the Chair of the ASMFC Management Board in 2012. (Sharov Dep. at 105 l. 12-15.) The TC clearly was cognizant of and concerned about the political pressure being exerted by environmental activists to take regulatory action to impose menhaden catch limits. In fact, two leaders from prominent environmental activists, William ("Bill") Goldsboro, a longstanding official of the Chesapeake Bay Foundation, and Ken Hinman, the head of the National Coalition of Marine Conservation, monitored the conference call and offered comments at the end of the call. (Sharov Dep. at 15, l. 1-14, 184 l. 12-18; Attachment 2.) There was significant pressure being applied to the ASMFC Management Board by environmental activists of the Board to take regulatory action and to impose quotas even though the TC opposed the imposition of quotas based on the lack of scientific support and the lack of any data on the coast wide population of menhaden (often referred to as the coast-wide index of adult fish abundance). Dr. Williams and the majority of the scientists on the TC would not agree that the stock of menhaden was at an all-time low or that the age structure of menhaden was truncated.

Dr. Alexei Sharov, the Maryland Department of Natural Resources marine scientist who was a member of the TC, specifically testified about the unwillingness of the ASMFC Menhaden TC to make any recommendation of management action to the Management Board, stating:

Q. Did [the Technical Committee] make a recommendation as to which number to regulate to?

A. No, it didn't.

Q. Why not?

A. … [T]he [Technical C]ommittee could not conclude with confidence that the stock is being overfished. And the committee was not confident with the final year estimates of the spawning stock biomass because of uncertainties in the model based on the, what we call sensitivity analysis.

(Sharov Dep. at 52 l. 20 – 53 l. 14.)

Dr. Sharov elaborated more fully on the problem the majority of the TC members had with the 2012 stock assessment update when questioned about it as follows:

Q. Then Eric, I assume that is Eric Williams, says something to the effect, to be fair, we have really only collected fishery catch at age data over the history of this stock. We don't have any reliable coast wide indices, so we really don't have all that much information on this stock. What do you think that he was referring to?

A. Well, he is the [ASMFC TC] stock assessment committee chair. **He was the person who developed the model. He knows the data very well. He knows the model even better than the data.** The principal challenge with this assessment is that in an ideal situation we would always want to have a reliable index of the adult fish abundance and in some cases for other species we even have it by age group. … **In the case of menhaden we don't have a true coast wide index of adult fish abundance**. The only index we had, and we have used it in several stock assessments, and certainly the history of this model, is the PRFC[5] pound net index. The [Technical C]ommittee recognized it and reported it as the principal drawback for the weak points of the assessment. And we said, there is a lack of coast wide adult abundance index, because the population is distributed from Florida to Maine. Of course, those are you know, boundaries but still we are using the only thing that was available to us in terms of the adult index was the one that was based on the Potomac River Fisheries Commission.

Q. Which really targets 1 and 2 year olds?

A. Yes. … So that's what Eric says. To be fair, **we don't have a good coast wide index**. **True**.

Q. **And you agreed with that statement?**

A. **Yes. We don't have a coast wide, you know a good reliable coast wide index.**

Q. Continuing at the bottom of DNR 20720, "Alternatives to Projections for Setting Quotas," Matt's response is, "What has been used in similar situations throughout the country?" Eric responds, and I assume that is

[5] PRFC is the abbreviation for Potomac River Fisheries Commission.

> Dr. Williams, "The difference with this situation is that we stand a good chance of producing a better assessment with the next benchmark. In many cases there is little hope of achieving a better stock assessment in the short term." What is your understanding of what Dr. Williams was trying to encompass with that comment?
>
> A. Well, there is just a difference of opinion. I personally felt that we could rely more on the 2012 assessment update. It was my personal view. **Eric's view was because of the uncertainty of the issues that we have identified, we shouldn't be rushing and making management decisions based on that. And be cautious and work, since we identified issues, work towards resolving those issues through the next benchmark assessment, which is what they are currently working on**.
>
> * * *
>
> Q. And, therefore, for the model to be truly, to paint a truly meaningful picture, it is important to have good data about the older and heavier stock?
>
> A. It is important to have good data of everything, you know, all components, yes. It is important to have good data on everything that is being put into the model.

(Footnote added.) (Emphasis added.) (Sharov Dep. at 104-05, 117-121, 122-123, 130.)

ASMFC, pursuant to its Charter, requires that a FMP be based on the best available science. More specifically, the ASMFC charter states as follows:

> It shall be the responsibility of a PDT [Plan Development Team] to prepare all documents necessary for the development of an FMP, amendment, or addendum **using the best scientific information available** and the most current stock assessment information.
>
> The species stock assessment subcommittee shall use the **best scientific information available** and established stock assessment techniques.
>
> Conservation programs and management measures shall be based on the **best available scientific information.**

ASMFC Charter §§ 5(c), 5(g)(3), 6(a)(2). The ASMFC Charter defines best scientific information available as follows:

> 'Best scientific information available' ... includes but is not limited to that body of biological, environmental, ecological, economic, and social data concerning fish stock and fisheries which are the subject of an FMP or amendment, provided that the methods of

> collecting such information are clearly described and are generally accepted as scientifically valid. **Data may come from** state, federal or **private databases** and from published and **unpublished sources**. Information that becomes available during preparation of an FMP or amendment should be incorporated to the extent practicable.

ASMFC Charter § 8(f).

The Wildlife and Fisheries Service of the National Oceanic and Atmospheric Administration ("NOAA") also has developed National Standard 2, which defines and describes what constitutes best available scientific information. 50 C.F.R. § 600.315. National Standard 2 outlines the criteria to be considered in determining whether best available scientific information has been used. The criteria includes relevance, inclusiveness, objectivity, transparency and openness, timeliness, verification and validation, and peer review. 50 C.F.R. § 600.315(a)(6). The standard explains how to apply that criteria. The regulations provide, "Relevant local and traditional knowledge, *e.g.*, fisherman's empirical knowledge about the behavior and distribution of fish stocks) should be obtained … and considered when evaluating the best scientific information available." 50 C.F.R. § 600.315(a)(6)(ii)(C). The regulations, under the transparency and openness requirement, require the regulatory authority to explain any decisions to exclude data from analysis. 50 C.F.R. § 600.315(a)(6)(iv)(B).

ASMFC had virtually no data about menhaden in the northern regions of the Atlantic coastal states (*i.e.*, from New York to Maine). (Sharov Dep. at 154-157; Young Aff. ¶ 16 (Attachment 10); Victor A. Crecco Article (Attachment 3).) The largest, oldest menhaden with the greatest fecundity (*i.e.*, menhaden with the greatest spawning potential that produce the most eggs and sperm) migrate in February to that region and return to the Atlantic Ocean off of Cape Hatteras and points south in December of each year to spawn. There also is virtually no data of menhaden in the southern region (from the Virginia/North Carolina border to the tip of Florida). A meaningful stock assessment cannot be undertaken without data of menhaden from the northern and southern regions.

Omega Protein was concerned about the lack of data from those regions and the ability to generate a meaningful stock assessment without data from those regions. Omega Protein, therefore, funded a study by James Sulikowski, Ph.D., a marine scientist from the Marine Science Department of the University of New England, to conduct an aerial survey to determine if there was a population of mature, fecund menhaden in the northern region. (Attachment 1.) Over 17,000,000 pounds of mature menhaden were observed in approximately 54 hours of flight time from August 9, 2011 through October 25, 2011. (*Id*.) The observation sessions were interrupted for approximately two weeks by Hurricane Irene and the aftermath of Hurricane Irene. (*Id.)*

Dr. Sharov was familiar with the Sulikowski report. Dr. Sulikowski presented it to the TC in the fall or winter of 2011. (Sharov Dep. at 151.) There was an opportunity for TC members to question Dr. Sulikowski about the report. (*Id*.) Dr. Sharov agreed that Dr. Sulikowski accurately described the process used to generate the data and accurately reported the menhaden data based on the observations made during that aerial survey. (*Id*. at 149 l. 16 – 150 l. 6.) In ignoring the data developed by Dr. Sulikowski, which by admission was accurate and

reliable, and by failing to fully and meaningfully discuss in the stock assessment and FMP the data obtained by Dr. Sulikowski, the ASMFC Menhaden Management Board and the ASMFC Menhaden TC violated the requirements of the ASMFC Charter in 2012, which requires the use of the best available scientific information and the best available information.

The watermen in Maryland believe there is a year-round population of menhaden in the Maryland portion of the Chesapeake Bay (*i.e.*, a non-migratory population). I provided a letter to the SAS detailing the basis for that belief and documenting observations of Maryland watermen and MDNR employees who conduct the annual juvenile beach seine survey which support that belief. (Attachment 8.) Schools of menhaden in the channel of the Maryland portion of the Bay have been observed year round and menhaden full of roe and ready to spawn have been caught by pound netters annually during April – June of each spring. MDNR admits that it has never conducted a menhaden stock assessment of the Maryland portion of the Bay. (Fegley Depos. at 18 l. 6-13.) Likewise, MDNR has made no attempt to determine whether menhaden spawn in the Maryland portion of the Bay, despite the photographic evidence that roe filled menhaden are annually caught in the Bay. (*See* Ex. 4 to Attachment 8.) The juvenile beach seine survey that MDNR conducts is not designed to target menhaden young of year. DNR employees walk the seine net into the shallows of certain portions of the Bay from the shore. The noise and disturbance made by that survey process is not designed for targeting the young of year of a schooling fish such as menhaden that have a flight reaction to noise and disturbance generated by the beach seine survey process.

Federal cases that apply National Standard 2 have ruled that when the regulatory authority ignores data and information about a species that already exists without providing any explanation for why such data and information is ignored, it acts in an arbitrary and capricious manner. *Commonwealth of Massachusetts v. Daley*, 10 F. Supp. 2d 74, 77 (D. Ma. 1998) (stating, "The discretion afforded the Secretary in developing regulations on the basis of imperfect or incomplete information does not, however, give the Secretary the right to ignore data that already exists." (citing 50 C.F.R. §§ 600.315(b)(1) & 600.315(c)(3)); *Guindon v. Pritzker*, 2014 U.S. Dist. LEXIS 39964, 62-63 (Civ. No. 13-988 (BJR)) (D.D.C. March 26, 2014) (regulation held arbitrary and capricious where regulating agency failed to make a thorough review of all relevant information available at the time) (citing *Ctr. for Biological Diversity v. Blank*, 993 F. Supp.2d 125, 148 (D.D.C. 2013)) (quoting *N. Carolina Fisheries Ass'n, Inc. v. Gutierrez*, 518 F. Supp. 2d 62, 85 (D.D.C. 2007)). ASMFC ignored the data developed by Dr. Sulikowski, even though the data was admittedly valid and the data is the type of data (*i.e.*, unpublished data privately developed by a marine scientist) that the ASMFC Charter requires ASMFC to consider. Ignoring the critical data in the Sulikowski report without explanation is arbitrary and capricious and violates the requirement to consider best available information and best available scientific information. It also violates the inherent duty of government to be inclusive, objective, transparent, and open when exercising its discretion to manage a resource, the fishery, held in public trust for the citizens of the Atlantic coastal states.

Dr. Crecco, who analyzed the ASMFC 2004 and the 2010 stock assessments and the 2012 update to the 2010 stock assessment reported that the stock size "based on the previous age based models [run by ASMFC], has been very large at 5 to 30 billion fish and, as a result, has historically supported large and financially important commercial purse seine (reduction fishery) and bait fisheries along the Atlantic Coast." (Attachment 3.) Moreover, Dr. Crecco reports that reduction fishery landings and fishing effort (vessel weeks) have declined steadily since 1990.

Dr. Crecco further observes, because of the high coast-wide abundance of menhaden (5-30 billion fish), total annual egg production can exceed 10 trillion eggs [per year], as reported in the ASMFC stock assessments." (*Id.*) The population is abundant, not in decline.

Again, the F being referenced is an estimated sum based on the BAM model runs. Dr. Crecco puts this in perspective:

> The 2012 Stock Assessment was actually an update of to the 2010 assessment. To maintain continuity with the 2010 assessment, all methods, data sets and assumptions about BAM and the MSVPA [(*i.e.*,Multispecies Virtual Population Analysis)] were maintained in the 2012 assessment update. The results of the 2012 BAM run were certainly surprising to some people since the conclusions are completely at odds with the generally optimistic findings in the 2004 and 2010 assessments. The most recent (2011) F is now 3.6 times greater than the F Threshold of q.25 established in 2010, indicating that the Atlantic coast menhaden have suddenly become severely overfished and at risk of recruitment failure. Moreover, a fishing mortality (F) rate of 4.5 (equivalent to the annual removal of 91% pf the ages 2+ menhaden) would make Atlantic menhaden the most highly exploited finfish in the world! Such a sudden and spectacular rise in F over just a two year period is not plausible given that there was no substantial change in who engaged in commercial fishing or how commercial fishing was conducted. This change in F is indicative of a breakdown in model stability and a steep rise in parameter and model uncertainty. The 2012 BAM run indicated that population fecundity has fallen from 18.4 trillion eggs in 2008 to 13.3 trillion eggs in 2011, but stock fecundity was still above the threshold of 9.3 trillion eggs. This indicated that the 2011 menhaden stock is not yet in an overfished condition. Because the 2012 BAM run developed such very high and systematic retrospective bias in recent (2006-2011) fishing mortality (F) and fecundity estimates, BAM was considered to be unstable and not robust to the addition of 2009-2011 data. …**As a result, the [TC] concluded that the 2012 BAM run was too unreliable to provide sound management advice**.

(*Id.*) Dr. Crecco reports, that the results are unreliable and the management decisions, particularly those imposing catch limits, should not be based on the 2012 stock assessment. The 2012 amended stock assessment reports that the menhaden egg threshold (*i.e.*, the spawning stock biomass (SSB)) is **4 trillion** eggs above the level that would indicate the stock is overfished. It struck DFA members odd that the stock of Atlantic menhaden, which was 4 trillion eggs above the overfished threshold of a flawed model run was determined to be threatened. When catch limits are imposed under such circumstances, the seafood industry has to question the objectives of such catch limits.

Some environmental activists repeatedly assert that menhaden are the most important fish in the sea, a mantra taken from the title of the book authored by H. Bruce Franklin, a Rutgers

University English professor of American Studies known for his treatises on science fiction, who wrote a book titled: "*Menhaden, The Most Important Fish in the Sea*." (*See* Attachments 6 & 7, which detail Mr. Franklin's background, including his involvement with the San Francisco Bay Area Revolutionary Union (later renamed the Revolutionary Communist Party) and Mr. Franklin's advocacy of violent action that caused Stanford University to dismiss him as a professor at that university in the early 70s.) Dr. Sharov agreed that Mr. Franklin's book is devoid of scientific foundation. More specifically, he testified:

Q. Are you familiar with the book: The Most Important Fish in the Sea?

A. Yes.

Q. Have you read it?

A. Yes.

Q. Does it have any scientific validity?

A. It's [a] very passionate book. But all interpretations are very emotional. Yes. With a big heart at first. Yes. Written with a big heart.

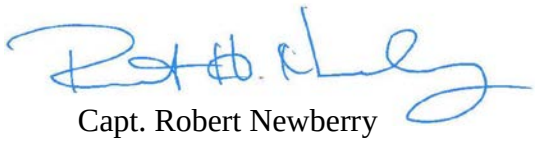
Q. But not by a scientist?

A. No. Not by a scientist.

(Attachment 5 at 160-61.)

Menhaden are a species that serves as a forage fish to other predators. By no means are menhaden the only forage species in the Atlantic coastal waters. The species is not deserving of special protection because an English professor who otherwise has authored science fiction treatises wrote an impassioned novel labeling menhaden as the most important fish in the sea.

Sincerely,



Capt. Robert Newberry
Chairman

cc: Mark Alexander (via electronic mail, with enclosures)
Rep. Craig A. Miner (via electronic mail, with enclosures)
David G. Simpson (via electronic mail, with enclosures)
Dr. Lance Stewart (via electronic mail, with enclosures)
Rep. Melissa Ziobron (via electronic mail, with enclosures)
John Clark (via electronic mail, with enclosures)
Roy Miller (via electronic mail, with enclosures)
David Saveikis (via electronic mail, with enclosures)
Craig D. Pugh (via electronic mail, with enclosures)
Rep. William J. Carson (via electronic mail, with enclosures)
Sen. Thad Altman (via electronic mail, with enclosures)
Jim Estes (via electronic mail, with enclosures)
Jessica McCawley (via electronic mail, with enclosures)
Bill R. Orndorf (via electronic mail, with enclosures)
Patrick Geer (via electronic mail, with enclosures)
Spud Woodward (via electronic mail, with enclosures)
Rep. Chad Nimmer (via electronic mail, with enclosures)
Nancy Addison (via electronic mail, with enclosures)
Pat Keliher (via electronic mail, with enclosures)
Terry Stockwell (via electronic mail, with enclosures)
Stephen R. Train (via electronic mail, with enclosures)
Sen. Brian Langley (via electronic mail, with enclosures)
Rachel A. Dean (via electronic mail, with enclosures)
Derek Orner (via electronic mail, with enclosures)
Ed O'Brien (via electronic mail, with enclosures)
William Rice (via electronic mail, with enclosures)
William Goldsborough (via electronic mail, with enclosures)
Del. Dana Stein (via electronic mail, with enclosures)
Capt. Robert Kersey (via electronic mail, with enclosures)
David Blazer (via electronic mail, with enclosures)
William A. Adler (via electronic mail, with enclosures)
Dan McKiernan (via electronic mail, with enclosures)
Rep. Sarah K. Peake (via electronic mail, with enclosures)
Dr. David Pierce (via electronic mail, with enclosures)
Sherry White (via electronic mail, with enclosures)
Dennis Abbott (via electronic mail, with enclosures)
Cheri Patterson (via electronic mail, with enclosures)
Sen. David H. Watters (via electronic mail, with enclosures)
Ritchie White (via electronic mail, with enclosures)
Russ Allen (via electronic mail, with enclosures)
Tom Forte (via electronic mail, with enclosures)
Jeff Kaelin (via electronic mail, with enclosures)
Adam S. Nowalsky (via electronic mail, with enclosures)
Chris Zeman (via electronic mail, with enclosures)
Robert Andrzejczak (via electronic mail, with enclosures)
Jim Gilmore (via electronic mail, with enclosures)
Emerson Hasbrouck (via electronic mail, with enclosures)

John G. McMurray (via electronic mail, with enclosures)
Sen. Philip Boyle (via electronic mail, with enclosures)
Dr. Michelle Duval (via electronic mail, with enclosures)
Rep. Bob Steinburg (via electronic mail, with enclosures)
Braxton Davis (via electronic mail, with enclosures)
Doug Brady (via electronic mail, with enclosures)
David Borden (via electronic mail, with enclosures)
Mark Gibson (via electronic mail, with enclosures)
Jason E. McNamee (via electronic mail, with enclosures)
Sen. Susan Sosnowski (via electronic mail, with enclosures)
Eric Reid (via electronic mail, with enclosures)
Robert H. Boyles, Jr. (via electronic mail, with enclosures)
Sen. Ronnie Cromer (via electronic mail, with enclosures)
Dr. Malcolm Rhodes (via electronic mail, with enclosures)
John Bull (via electronic mail, with enclosures)
Catherine W. Davenport (via electronic mail, with enclosures)
Marty Gary (via electronic mail, with enclosures)
Rob O'Reilly (via electronic mail, with enclosures)
Sen. Richard Stuart (via electronic mail, with enclosures)
Megan Ware (via electronic mail, with enclosures)

Attachments:

1. James Sulikowski, Ph. D. & Amy Carlson, *2011 Atlantic Menhaden Aerial Survey Final Report to Omega Protein*.

2. July 9, 2012 Atlantic Menhaden Technical Committee Conference Call transcript

3. Victor A. Crecco, Ph. D., *Model and Date Uncertainties Plague the Atlantic Menhaden Assessments* (Fishery News Sept. 21, 2013)

4. 3/4/2014 excerpts from Deposition of Lynn Fegley

5. 3/5/2014 excerpts from Deposition of Alexei Sharov Ph. D.

6. 3/20/2014 internet profile of H. Bruce Franklin

7. 3/20/2014 Rutgers University profile of H. Bruce Franklin

8. August 4, 2014 letter from R. Newberry to ASMFC Atlantic Menhaden SAS with six (6) Exhibits

9. Curriculum Vitae of S. Stanley Young, Ph. D.

10. Affidavit of S. Stanley Young, Ph. D.

2011 Atlantic Menhaden Aerial Survey Final Report to Omega Protein

Prepared by

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University of New England
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Biddeford, ME 04005

Introduction

Statement of the problem to be addressed

Over time, the Atlantic menhaden reduction fishery (historically comprising 80-percent or more of total landings) has dramatically contracted in terms of the geographical range over which it operates and also temporally, as the historical North Carolina fall fishery effectively ended over twenty years ago. As a result, the reduction fishery is now concentrated in the central range of the stock from approximately Cape Hatteras to northern New Jersey. The bait fishery for menhaden operates only in discrete regions, albeit over a broader range. In brief, there are very few landings and age samples from the northern range of the fishery, (north of Long Island), where tagging studies have shown that larger and older fish tend to migrate during summer.

Moreover, there is currently no fishery-independent source of information on distribution and abundance of mature menhaden outside of the normal fishery range. As a result, there potentially may be a substantial, but effectively unknown, portion of the age 3+ menhaden biomass in this age-stratified, migratory stock that is not subject to fishing mortality. The Beaufort Assessment Model, however, is premised on the assumption that all age-3+ menhaden are fully recruited to the fishery.

If this assumption is violated, because, for example, older age classes are outside the range of the fishery, the assumption of flat-topped recruitment to the fishery can potentially lead to severe overestimation of fishing mortality rates and underestimation of the spawning potential ratio, thus providing a biased estimate of the status of the resource. Without fishery-independent survey information, supplemented by biological sampling, there is no scientifically defensible means: (1) to prove whether or not the proper selectivity is flat-topped or dome-shaped, or (2) assuming the latter, to provide a scientifically robust estimate of the extent of the doming and hence the amount of menhaden biomass that exists beyond the range of the fishery (both temporally and spatially).

Why an aerial survey

Advisory bodies of the Atlantic States Fisheries Management Council (ASFMC), The National Marine Fisheries Service (NMFS), as well as the commercial fishing industry have identified the need for additional fishery-independent indices of abundance to be developed for Atlantic menhaden outside of the typical survey range. A coastwide aerial survey was first identified at a scoping meeting (May 12-13, 2008) as the most efficient and effective way to monitor adult menhaden along the Atlantic coast. Aerial survey methods have been used previously to estimate stock abundance for several surface schooling species such as sardine (Hill et al. 2007) as well as Atlantic menhaden (Churnside et al. 2011). On January 21, 2010, a survey working group met to develop a plan for moving forward with a pilot aerial survey.

As this problem statement suggests, the contraction of the reduction and bait fisheries over time has reduced the number of older menhaden in the commercial fishery. As the peer reviewers noted in their review of the 2010 menhaden stock assessment (ASFMC, 2011), the Beaufort Assessment Model assumes that all fish age 3+ are fully recruited to the fishery (i.e., selectivity is "flat-topped"). However, the bulk of the fishery occurs in the mid-Atlantic during the summer and early fall when older fish are not present in the region. Thus, peer reviewers suggested investigating the use of "dome-shaped" selectivity curves to for the southern fishery. The information gained from a survey outside of the normal fishing range will help provide an empirical basis to determine the existence and extent of such "doming."

This data is critically important because the inappropriate assumption of flat-topped recruitment to the fishery can potentially lead to severe overestimation of fishing mortality rates and underestimation of the spawning potential ratio ("SPR"), thus providing a biased estimate of the status of the resource. Given that the Menhaden Board is considering moving towards adoption of SPR-based reference points, and the proposed 37% reduction in the fishery, the need for this data takes on added importance.

Objectives

The purpose of the survey was to gather preliminary data on the biomass and age of menhaden in the northern range of the fishery during the summer and fall months-data that is necessary to fill in the aforementioned stock assessment gaps. The survey utilized digital images collected by fishery spotter airplanes to estimate menhaden school surface areas and fishing vessels operating at sea to capture menhaden schools in order to determine the relationship between menhaden school biomass and school surface area. The survey covered waters beyond the range of the fishery, from southern Long Island, New York, to Portland, Maine.

Material and Methods

Primary participants

The expertise of five individuals were utilized in the design, development and execution of the survey. Dr. James Sulikowski was the lead PI. He is an associate professor at the University of New England (UNE) who has published 47 peer reviewed articles on the biology and ecology of fish. George Purmont has been involved with commercial fishing since 1967 and began fish spotting in 1972. He has fished and spotted a variety of fish species for several scientific entities. Forrest Dameron is a 3rd generation fisherman who has 11 years of experience spotting and fishing for menhaden. Vincent Balzano is a 3rd generation commercial fisherman who has been actively involved in the management of New England fisheries. He has been fishing for menhaden since 2004. Amy Carlson is the primary graduate student of Dr. Sulikowski involved in this project. Her abilities include using the statistical package R, ArcGIS, Adobe Photoshop Lightroom 3.0 LI, and CS3 extended.

Survey design

The menhaden survey employed a two-stage sampling design very similar to the west coast aerial sardine survey (Jagielo et al. 2009). In this design, stage one consisted of aerial transect sampling to estimate the surface area of individual menhaden schools from aerial images and flight logs. Stage two involved at-sea point sampling to quantify the relationship between individual school surface area and biomass.

Transects and Spotter planes

In order to provide adequate spatial coverage needed to observe potential menhaden schools, aerial surveys were split between three *ad hoc* regions (Figure 1; Appendix 1). Region 1 consisted of southern Long Island, NY to southern Rhode Island; region 2 consisted of Rhode Island to Boston, MA; and region 3 from Boston, MA to Portland, ME. Each region represented approximately 130 square miles of coastline. One pilot and spotting crew was dedicated to each survey region (see below for more information). The total square miles for each region was partitioned into block transects; 15 miles long from coast to offshore, west to east and 3 miles wide, north to south (Figure 1). Due to the proximity of fish close to shore and our limited flight times (less than 5 hours per flight), we flew in a jigsaw pattern. This consisted of flying along the coast from the designated start point (airport of origin) to the end of the survey region. At this point a 90 degree turn was made that was flown approximately 3-5 miles, before another 90 degree turn was made back towards the airport of origin. This was continued until fuel levels necessitated the return to the airport. Again, this pattern was chosen due the proximity of fish to shore on all previous surveys and to cover as much survey area as possible in the given constraints of flight time.

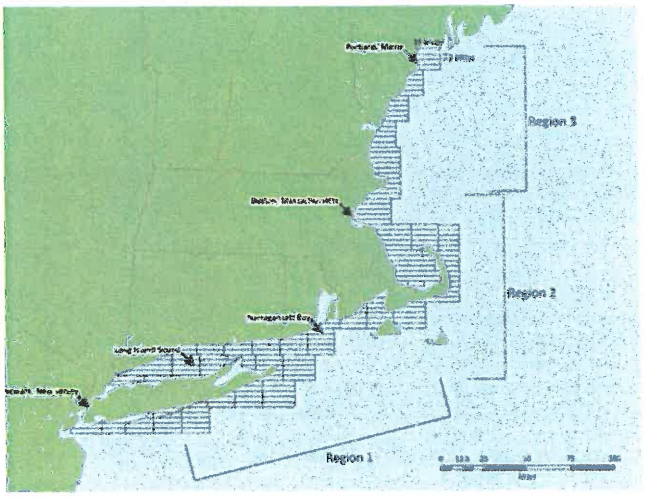

Figure 1. Transect areas along the Northeast US coast (Full transect details are given in the appendix)

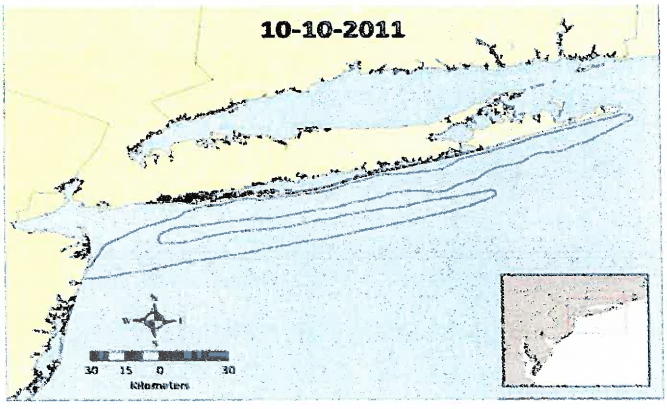

Figure 2: Representative flight pattern used in the survey.

Spotter plane information

Three airplanes participated in the survey, one designated for each region. Forrest Dameron flew region 1 using a 1973 Cessna Skyhawk owned by Omega Protein. George Purmont flew region 2 using his personal modified 1968 Piper Super Cub, and region 3 was flown by a chartered Maine Aviation pilot using a 1972 Cessna Skyhawk. Spotter planes flew approximate altitudes of 1000 ft and at speeds of approximately 100 mph while conducting aerial surveys. Each spotter plane departed from airports associated with their respective region. Originally, the survey began flying in the kill zone (2500 ft). However, after several hours of flying it was determined that identifying the smaller schools in region 2 and 3 was more effective at 1000 ft. In order to remain consistent throughout the survey area, an altitude of 1000 ft was chosen. In addition, since all images were taken at 1000 ft, flying at this altitude made this component of the survey more efficient (i.e less time was spent ascending and descending to investigate potential schools).

Flight logistics

For region 1, Dr. James Sulikowski and/or Amy Carlson (Dr. Sulikowski's graduate student) were co-pilots who recorded the survey data (i.e took digital images, recorded flight log, etc.). On the day of a designated survey, Forrest would fly from Reedville, VA to the Monmouth Regional Airport in Monmouth, NJ, the origin of region 1's survey. This flight took approximately 2 hours. Dr. Sulikowski and/or Amy Carlson would leave Maine the day prior to the survey and drive down (approximately 400 miles one way) to Monmouth, NJ. After the survey was completed, Dr. Sulikowski and/or Amy Carlson remained in Monmouth to analyze data then would return first thing to Maine the next morning. In the event that Dr. Sulikowski could not go on the designated survey, another graduate student in Dr. Sulikowski's lab would accompany Amy on the trip. This routine was determined to be the most cost and time effective (as opposed to flying from ME to NJ to meet Forrest at the origin). For region 2, George Purmont flew and recorded survey data via a flight log book and through digital images (Nikon D50 camera with a Nikon AF Nikkor 70-300 lens set to 70 mm). George flew out of New Bedford Regional Airport, New Bedford, MA. In region 3, Dr. Sulikowski and Amy Carlson, were co-pilots who recorded the survey data. The two of them drove to meet the pilot the day of the flight. All attempts were made to fly each region within three days of one another. Thus, the entire survey area was flown over the course of one week's time.

Menhaden adults stratify by size during the summer, with older, larger individuals found farther north. The oldest and largest fish migrate farthest, reaching the Gulf of Maine in May and June and begin migrating south from northern areas to the Carolinas in late fall. (ASMFC, 2001). To avoid the possibility of "double counting", transects were conducted in a North to south progression in regions 1 and 2. Due to the logistics of the airport associated with region 3 (northern end of the survey), the flight pattern was south to North.

Data Collection
Data from aerial surveys was collected from spotter logs and using a hand held Canon Mark IV and a Nikon D50 high resolution camera. Each camera was fitted with a 70-300 mm lens set to 70 mm and a polarized filter. In addition, GPS waypoints of spotted schools and survey track lines were recorded with either a Garmin Oregon 550t (regions 1 and 3) or a Garmin GPSmap 76CSx (region 2). An Olympus digital voice recorder was used to record aerial spotter plane estimates of the observed schools. Plane and camera angle, altitude, and position was accounted for with a MicroStrain 3DM-GX3-35 AHRS with GPS attitude sensor, mounted to the cameras in use. This system was connected to a Dell Latitude E6420 ATG laptop, which recorded this data real time. Communication to the at sea sampling boats was established with Standard Horizon HX290 handheld radios. Either a Duracell Powerpack 450 or Black and Decker Electromate 400 was used to power the equipment in flight.

Data Transfer
Images and flight log files were downloaded and archived at the end of each survey day. At the end of each flight, scientific personnel verified that the camera and data collection system operated properly and that images collected were acceptable for analysis.

Aerial Measurement Calibration
Each airplane photographed football fields from the altitude of 1000 ft. to provide the ability to ground truth the aerial estimates of menhaden. An aerial pass was made to place the target onto the right, middle, and left portions of the digital image. The observed vs. actual sizes of the objects were compared to evaluate photogrammetric error.

At Sea Point Set Capture
The fishing vessel (FV) North Star (Captain Vincent Balzano) was used for the at sea point sampling. This 45 foot steel hull vessel was equipped with a 175 by 15 fathom purse seine (4 cm mesh size). The goal of these point sets were to encircle (wrap) and fully capture the school selected by the spotter pilot for the point set. Any schools not "fully" captured would not be considered a valid point set for analysis. Both the spotter pilot and the purse seine captain independently made note of the "percent captured" on their survey log forms for this purpose. The scientific PI reviewed these estimates to ensure quality control.

Biological Sampling
Biological samples of individual point sets were collected either at sea or the fish processing plants upon landing. Each point set sample was individually bagged, identified with sample number and frozen with other fish in the subsample, clearly identified as to point set number, vessel, and location captured. All fish were transported to the University of New England where they were then shipped overnight to the NMFS Beaufort, NC laboratory where the fish were processed using standard techniques utilized in ongoing age analysis of this species (NMFS 1995).

Quantitative Analysis
Digital images were analyzed to determine the number, size, and shape of menhaden schools observed on each survey. Adobe Photoshop Lightroom 3.0 LI software was used to bring the menhaden schools into clear resolution and measurements of menhaden school size (m^2) and shape (circularity) were made using Adobe Photoshop CS3-Extended.

An estimate of total menhaden biomass for the survey area was obtained from: 1) measurement of individual school surface area observed on each survey, 2) estimation of individual school biomass (from measured school surface area and estimated school density), and 3) correlations between harvested schools and observed school size.

Quantifying menhaden abundance using the point sampling data
A linear regression model and regression parameters for the surface area – biomass relationship was used to create the following relationship:

Wt (lbs)= -1175.94 + (634.077*surface area (m^2))

Here, the surface areas of the two point sampling events (measured with Adobe Photoshop CS3-Extended) and the biomass (lbs) of menhaden from those discrete point sampling events were used in the regression analysis. These values were:

	Surface Area (m^2)	At sea sample (lbs)
RI	20.8	12000
NJ	380.3572548	240000

This regression model was used to quantify individual school biomass for photographed schools observed on the survey transects. However, it must be noted that this is under the assumption that the density of mass per square meter is constant regardless of total surface area of the school. This could be affected by many things, most notably behavior and size of the fish in the school. There is evidence that this relationship is not linear (Castillo and Robotham 2004) however, given that there were only two point estimates a linear relationship was the best option.

Quantifying total biomass
Observed individual school density was calculated by dividing the weight (mt) of the school by the school area (m^2). A regression model was run to calculate the predicted school density (d_i). The product of predicted school density (d_i) and surface area (a_i) was used to estimate individual school biomass (b_i) ($b_i=d_i a_i$) and the sum of the individual school biomass (b_u) was identified for each transect (u). The average sampled biomass ($\bar{b}$) was calculated as

$$\bar{b} = \sum_{u=1}^{n} b_u / n$$

The total biomass for each region ($\hat{B}$) was calculated by taking the product of the total number of transects possible in the region (N) and the average sampled biomass for the study area ($\hat{B}$=N*$\overline{b}$). N is calculated by dividing the width of the entire region (W) by the average transect width (w). The estimated variance ($\hat{V}(\hat{B})$) was calculated as

$$\hat{V}(\hat{B}) = N^2(1-n/N)S_e^2/n$$

Where n is the number of transect samples in the region and S_e^2 is the sample variance of $\overline{b}$.

Results

On July 19, 2011 a fixed price research agreement was finalized between Omega Protein and the University of New England (UNE). On July 20th, UNE worked with several vendors to expedite the purchases of supplies and equipment necessary for the survey. In addition, the research team consisting of pilots, planes and research vessels used in the survey were assembled at this time. Finally, the coordination and implementation of the survey began on August 9th, 2011 and ended on October 25, 2011. A total of 54.25 survey hours were dedicated to the aerial survey of menhaden. During those hours a total of 17,190,000 lbs (7797 mt) of menhaden were estimated from the air (Table 1). Although region 1 had the fewest hours flown, the total biomass observed was the greatest.

Table 1. Summary of menhaden biomass estimated by spotter planes during the 2011 survey.

Survey Region	Hours Flown	Total Biomass Estimated in lbs (from spotter plane)	Total Biomass Estimated in mt (from spotter plane)
1	13	16060000	7285
2	14.75	580000	263
3	26.5	550000	250

Point Sampling

A total of 29.5 hours of flight time were designated to the at sea/point sampling portion of the survey. On September 20th and 21st and again on September 25th and 26th, the at sea sampling portion of the survey was attempted in southern Maine. Since no fish were observed after extensive spotter plane flying, the decision to head south to Rhode Island in order to complete this component of the survey was made. Working with April Valliere and Jason McNamee from RIDFW Marine Fisheries, a scientific permit was obtained in order to conduct the research in upper Narragansett Bay (where fish had been repeatedly spotted by Ark Bait spotter planes). The intention was to begin the at sea sampling on October 3rd. However, poor weather conditions delayed this portion of the survey until October 8th. For this trip, Vince Balzano and his crew (George Manning, Joe Nickerson and Tom Casamassa) left Portland, ME on October 6 at 9:00 pm and arrived in Point Judith, RI on Friday, October 7th at 6:30 pm.

George Purmont and two of Dr. Sulikowski's graduate students (Amy Carlson and Caitlyn Little), flew out of New Bedford, MA on October 8th. They were in the air at 7:45 am. The boat was on sight in Narragansett Bay at 8:00 am. The spotter plane documented the presence of 50 plus schools in the upper bay (not counted in the biomass estimates of this study) and was able to direct the FV to several schools where a successful purse seine set was made (Figure 3). The spotter plane estimated the school in figure 3 to contain 10,000 to 15,000 lbs of fish. The point sampling results indicated 12,000 lbs of fish were captured. Due to inclement weather, the captain and crew headed back to Portland at 3:00 pm on the 8th, Dr. Sulikowski was transported back to Point Judith on a skiff, which later returned to meet up with the sea sampling vessel. One hundred fish captured in RI were sent to Joe Smith at the NOAA Beaufort, NC lab for ageing.

Figure 3: The North star getting ready to set on a school of menhaden quantified at 12,000 lbs.

On October 9th, Amy and Caitlyn flew to observe at sea sampling conducted by Lund's Fisheries, Inc. Here, they flew with a Lund's Fisheries, Inc. pilot out of Cape May, NJ who estimated the abundance of menhaden in the area from the air. His estimate was several million pounds (not counted in the biomass estimates of this study). In addition, he estimated the amount of menhaden in a specific school that a Lund's fishing vessel set around. From the air, that school was estimated to be between 200,000-300,000 lbs. These values were then cross checked with what was landed (240,000 lbs; 108 mt) at the dock. In addition, 60 fish were retained from this at sea sampling event and also shipped down to Joe Smith for ageing.

Table 2: Flight times associated with the point sampling component of the survey.

Date	Survey area	Hours Flown	Times flown
9/20/11	region 3	5	6am-11am
9/21/11	region 3	5	7am-12pm
9/25/11	region 3	6.5	6am-12:30
9/26/11	region 3	4	9am-1pm
10/8/11	region 2	4	6am-10am
10/9/11	Cape May, NJ	5	5am-10am

Menhaden abundance using the point sampling data

Using the linear regression model and regression parameters for the surface area – biomass relationship, the estimated spotter biomass was converted into the quantitative biomass (Table 3). While menhaden were observed from southern Long Island to southern Maine, the majority of fish were spotted in regions 1 and 2 over the course of the aerial survey (Tables 1 and 3). On several occasions, substantial schools of menhaden

were observed over the course of a single survey date. For example, 10,865,755 lbs (4923 mt) of menhaden were spotted on August 21st along the entire coast of Long Island over a 4.5 hour period. In addition, approximately 487,671 lbs (221 mt) and 264,451 lbs (120 mt) of menhaden where observed in regions 2 and 3 respectively on August 17th.

Table 3: Survey summary data from the 2011 Aerial Survey. Note on 7/28/11 and 8/1/11 exploratory flights were made to familiarize the PI with the survey area. Abundance data from these dates were not used in the final biomass estimates for this survey.

Date	Region	Hours Flown	Times flown	Observed weight (lbs)	Observed weight (mt)	Calculated weight (lbs)	Calculated weight (mt)	School Surface Area (m^2)	Hurricane
7/28/11	3	2	11am-1pm	10000	4.5	no pictures	0	0	pre Irene
8/1/11	3	4	10am-2pm	0	0	0	0	0	pre Irene
8/9/11	3	4	10am-2pm	290000	131	171796	78	273	pre Irene
8/12/11	2	3	9am-12pm	90000	41	57127	26	92	pre Irene
8/12/11	1	4.5	8am-12:30 pm	4800000	2177	4687829	2126	7395	pre Irene
8/17/11	3	4	12pm-4pm	340000	154	264451	120	419	pre Irene
8/17/11	2	3.25	12:20-3:45pm	520000	236	487671	221	771	pre Irene
8/21/11	1	4.5	8am-12:30 pm	11260000	51078	10865755	4929	17138	pre Irene
8/23/11	3	4	1pm-5pm	40000	18	34357	16	56	pre Irene
9/1/11	3	4	9am-1pm	40000	18	37572	17	61	post Irene
9/12/11	2	3	9am-12pm		0	0	0	0	post Irene
9/14/11	3	2	11am-1pm		0	0	0	0	post Irene
10/11/11	1	4	8:30-12:30		0	0	0	0	post Irene
10/23/11	2	3.5	9am-12:30pm	72000	33	54869	25	88	post Irene
10/25/11	3	4.5	9am-1:30pm		0	0	0	0	post Irene

Several events beyond the control of the PI limited the fight times at discrete points during the survey. Weather played the most important and confounding role in the survey. For example, due to hurricane Irene, regions 1 and 2 could not be flown from August 25 to September 2. In addition, poor weather conditions in the areas 2 and 3 (rough seas, rain, and high wind) after the hurricane passed did not permit spotting over these areas from September 6 to 12. Finally, a no fly zone over Long Island precluded the survey of the southern area region 1 over the September 11 weekend.

Total Biomass

The two largest individual schools (m^2) were observed in the region 1 (Table 4). The widest region and largest average transect widths were in the region 3, followed by region 1 and 2. The average biomass for the three regions ranged from a high of 2,819 mt in region 1 to a low of 123 mt in region 3. The total biomass was also highest in

region 1, 3,696 mt +/- 1,626 (CV 0.22), followed by region 2, 471 mt +/- 1,136 (CV 1.23) and total biomass was the lowest in region 3, 182 mt +/- 310 (CV 0.87) (Table 5).

Table 4. The region, individual school area (m^2), observed and predicted density and the predicted density residuals for transects in which fish were observed. Regions with zero observed schools on a given spotting event were not included in the table.

Region	School area (m^2)	Observed density ($mt/m^{2)}$	Predicted density ($mt/m^{2)}$	Residuals
3	419	0.29	0.62	-0.33
3	273	0.29	0.62	-0.34
3	61	0.28	0.63	-0.35
3	56	0.28	0.63	-0.35
2	771	2.9	0.61	2.26
2	92	0.29	0.63	-0.35
2	88	0.28	0.63	-0.35
1	17,138	0.29	0.29	0.0017
1	7,395	0.29	0.48	-0.19

Table 5. Parameter values (average biomass, total biomass, total number of transects possible in the region, width of entire region, average transect width, the estimated variance, CV, standard error of the total biomass and 95% confidence intervals)

Region	3	2	1
$\bar{b}$ (average biomass)	123	256	2,819
$\hat{B}$ (total biomass)	182	471	3,696
N (total number of transects possible in the region)	1.5	1.8	1.3
W (width of entire region)	138,460	111,240	116,450
w (average transect width)	93,656	60,456	88,808
$\hat{V}(\hat{B})$ (estimated variance)	1.11	0.99	0.74
CV (coefficient of variation)	0.87	1.23	0.22
SE ($\hat{B}$) (standard error of total biomass)	158	580	830
Confidence interval	310	1,136	1,626
+	492	1,606	5,323
-	-128	-665	2,071

Biological sampling

A total of 85 specimens were deemed viable for age analysis from the fish captured during the at sea/point sampling in Rhode Island. Of these fish, 61% were aged to year 4, while 25% and 14% were aged to 3 and 5 years respectively (Table 6).

Table 6: Age estimates and average fork lengths for the 85 fish captured during the point set sampling in Rhode Island on October 7th. The number in parenthesis is the number of fish associated with each age class. The average fork length values are expressed as mean ± standard deviations of the mean.

	Percent age 3	Percent age 4	Percent age 5
	25 (21)	61 (52)	14 (12)
Average Fork Length (mm)	453 ± 50	465 ± 50	481± 29

A total of 50 specimens were deemed viable for age analysis from the fish captured during the at sea/point sampling in New Jersey. Of these fish, 50% were aged to year 2, while 40% and 10% were aged to 3 and 4 years respectively (Table 7).

Table 7: Age estimates and average fork lengths for the 50 fish captured during the point set sampling in New Jersey on October 9th. The number in parenthesis is the number of fish associated with each age class. The average fork length values are expressed as mean ± standard deviations of the mean.

	Percent age 2	Percent age 3	Percent age 4
	50 (25)	40 (20)	10 (5)
Average Fork Length (mm)	332 ± 47	389 ± 41	391± 10

Summary and Conclusions

This survey was neither designed to, nor could it, supplant the need for an annual, stock-wide aerial survey, though the methods pioneered and experienced gained here can aid in the development and feasibility assessment of just such an annual survey. Moreover, it is not intended to provide an estimate of total biomass, but rather only a basis for estimating the age, numbers, and biomass resident in the northern waters beyond the range of the fishery. Despite the limited temporal period (August-October) significant amounts of menhaden were observed outside standard fishery areas. The observed menhaden represent a significant, and unrepresented, portion of menhaden biomass. Some of these spotting events represented millions of pounds of menhaden over a very finite time frame. For example:

a. As a whole, we observed approximately over 17 million lbs (nearly 8000 mt) of menhaden outside of the standard fishery area (southern Long Island to southern Maine) with approximately 50 hours of flight time.

b. Nearly 11 million lbs (4929 mt) of menhaden were spotted on August 21, 2011 along the entire coast of Long Island over a 4.5 hour period.

c. Approximately 264,000 lbs (120 mt) of menhaden where observed along the coast of southern Maine on August 17, 2011 over a four hour period

While menhaden schools were consistently observed from southern Long Island to southern Maine, the majority of menhaden were observed in regions 1 and 2 (approximately 16,100,000 lbs; 7302 mt). In addition, the state of Rhode Island opened up Narragansett Bay (region 2) to commercial fishing from October 14th to 27th, 2011 when an estimated 3,440,000 lbs (1542 mt) of fish were observed in the bay (this biomass was not included in the estimates provided herein as part of this Omega Protein sponsored aerial survey). Fish captured during at sea/point sampling trials in Rhode Island (October 8th, 2011) were significantly (ANOVA; $P< 0.001$) older and larger than fish captured off Cape May, New Jersey (October 9th, 2011). This older and larger fish stock represents an enormous reproductive potential (e.g. Jennings and Reynolds 2001) that is not incorporated into the current stock assessments. Finally, although spotter planes failed to observe any menhaden schools in Narragansett Bay, RI, after October 25th, several menhaden were captured in an unrelated bottom trawl survey conducted by Dr. Sulikowski in and around Block Island (RI). The capture of these fish by this method in early November in this area raises interesting questions as to the behavior and possible distribution of this species outside of the normal fishery.

Finally, the effects of severe storms or hurricanes on fish communities has been documented from many parts of the world (e.g. Bouchon et al. 1994; Greening et al. 2006; Greenwood et al. 2006). However, the effects of catastrophic storms on fish communities are still unclear and highly variable (e.g. Walsh 1983; Greening et al. 2006) but suggest such impacts do disrupt normal distributions and behaviors. When the pre (7516 mt) and post (42 mt) hurricane Irene menhaden densities are compared, it would appear that this catastrophic event may have affected the abundance of menhaden along the survey area. Especially since pre (33 hrs) and post (21 hrs) flight time were similar. Thus, it is possible that if this hurricane event had not transpired, the biomass of menhaden observed over the course of this survey may have been even greater.

Acknowledgements.

This work is the result of funding from Omega Protein. Without their support, the information provided herein would still be missing from the management process. In addition, the diligent efforts put forth by members of the Sulikowski lab who volunteered their time to help in the spotting and at sea point sampling logistics are also much appreciated. Thanks are further extended to Dr. Alexia Morgan for her help in the quantitative analysis used in the report. Finally, we would like to thank April Valliere and Jason McNamee from RIDFW Marine Fisheries for all of their help in obtaining the scientific permit and other logistics necessary to conduct the point sampling in Narragansett bay, RI and Lund's Fisheries, Inc, for their cooperation and coordination in the point set sampling off Cape May NJ.

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Atlantic States Marine Fisheries Commission

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Atlantic Menhaden Technical Committee
Conference Call Summary

July 9, 2012

Technical Committee and Stock Assessment Subcommittee Members: Jeff Brust, Joe Smith, Amy Schueller, Trish Murphy, Joey Ballenger, Behzad Mahmoudi, Alexei Sharov, Micah Dean, Kurt Gottschall, Rob Latour, Derek Orner, Jay McNamee, Erik Williams, Matt Cieri

ASMFC Staff: Genny Nesslage, Mike Waine

Audience: Mike Prager, Ron Lukens, Joe Grist, Shaun Gehan, Dick Brame, Theresa L, Allison F, Tom Rudolph, Louis Daniel, Bill Goldsborough, Ken Hinman

Stock Assessment Update Report

- Jeff – [*reviews changes to the update document – see Mike W for those changes*]

ISSUE #1 - Benchmarks

- Alexei – [*regarding the sentence from Section 10: "...the TC has not had the opportunity to evaluate whether selected reference points achieve a specific management goal..."*] - believes we did evaluate the benchmarks, and that there is a specific management goal
- Behzad – thought Rob summarized the development of the benchmarks well at the last meeting
- Rob – tend to agree with Alexei...we did provide an analysis based on projections, which constitutes an evaluation of the benchmarks
- Matt – unfortunately, based on the results of this update, we don't have confidence in the assessment model that was used to generate those benchmarks
- Alexei – we could drop this sentence from the document...it will not impact the board's decision
- Amy – suggest changing the text to "fully evaluate"
- Behzad – [*to Alexei*] do you we feel we have fully evaluated the reference points?
- Alexei – yes, we provided a range of %MSP options and explained what these represented
- Louis Daniel – from a management board perspective, I'm comfortable with the $F_{15\%}$ + $F_{30\%}$ reference points that were selected. It is understood that these are an interim step towards more ecosystem based reference points. At this point, we don't know what the "best" benchmarks should be.
- Jeff – [*to Erik*] since you initiated the language in this statement... any thoughts after hearing the Board perspective?
- Erik – reference points should have a science-based population dynamics goal. The board's current goal is to simply increase abundance. If population dynamics are modeled differently in future assessments (i.e. dome-shaped selectivity)....the $F_{15\%}$ benchmark may not be very meaningful
- Alexei – but the same would be true for any MSY-based reference points

EXHIBIT
tabbies ATCH 2

- Erik – disagree, if the reference points are connected to a population dynamics-based goal, they would be robust to changes in model structure
- Micah - what about removing the part about the TC evaluating the reference points. Suggest modifying the text to "*...TC wants to point out that selected reference points were not designed to achieve a specific management goal...*"
- Jeff – is this acceptable?
- Alexei – feels that there *were* clear management goals
- Erik – let's move on

ISSUE #2 – Utility of the Model for Management Advice

- TC – ok with changes

ISSUE #3 – Utility of Projections

- Alexei – believes the projections are not biased after ~3 years. They are more useful than the proposed *ad hoc* methods to set harvest limits
- Jeff – did you not agree at the last meeting that the projections should not be used to set TACs?
- Alexei – believes they could be used, but not in the traditional way of setting TACs
- Rob – the TC's reservations with projections were based on the lack of confidence in the assessment model. The population response you see in the projections is a function of the assumptions we've made (on stock-recruitment relationship, selectivity, etc)....the projections are essentially a deterministic outcome of these choices.
- Jeff – should anything be added to this section?
- Rob - no
- Alexei – still believes the projections are insensitive to the recruitment assumption, but let's move on

ISSUE #4 – Aerial Survey

- Alexei – no changes, but an aerial survey will likely not be forthcoming in the near future. We should be prepared to investigate an alternative way to address the lack of an adult index.

OTHER ISSUES (previously identified by Alexei)

- Jeff – [*goes through Alexei's comments...see Mike W for those edits*]

Response to Board Tasks

- Jeff – [*goes through letter from the TC in response to Board's tasks*]
- Jeff – [*to Louis*] have you had a chance to read this document?
- Louis – no, but the Board understands that the TC believes overfishing is occurring, yet it is unclear to what extent. We were looking for auxiliary information to help decide whether to move to some modest cut in harvest early and hold it till the outcome of an expedited

benchmark, which the board will likely push for. Given that the outcome of this update casts a "wide dark shadow" over the previous benchmark...can we glean a stock status from the previous benchmark's results?

- Matt – we are fairly sure that overfishing is occurring
- Louis – so are we saying that overfishing is *likely* occurring?
- Alexei - yes
- Rob – in the federal system, when an update fails, we go back to the previous peer-reviewed and accepted assessment, which would be the 2009 benchmark.
- Alexei – the reasons we are not confident with the current assessment are 100% applicable to the previous assessment
- Rob – disagree, the additional 3 years of input data are more in opposition than previous years' data
- Mike – we need to focus on the current update, not dwell on the previous benchmark
- Louis – so, which is a better approach: rely on the last assessment or follow *ad hoc* measures?
- Jeff – let's wait for Matt's review of *ad hoc* measures
- Alexei - [*regarding task 3a*] - wants to add in something about the JAI, and that some regional JAI's are more consistent with the age structure data
- TC – [*has similar discussion as in previous meetings about whether it's useful to include state-specific JAIs*]
- Alexei – can't believe there is such a hesitancy to provide recruitment input data
- Louis – whether it's correct or not, that is the perception of the board...that we've been studying this stock for years, and now there is a hesitancy to say much of anything about the stock
- Erik – to be fair, we have really only collected fishery catch-at-age data over the history of this stock We don't have any reliable coastwide indices. So, we really don't have all that much information on this stock
- Jeff – [*regarding statements about stock status and reference points*] - $SSB_{med.t}$ means threshold & SSB_{med} means target?
- Amy – yes
- Jeff – that needs to be checked throughout the document, I may have switched them in a few places

Alternatives to Projections for Setting Quotas

- Matt – [*gives presentation of examples from other fisheries*]
- Alexei – so are we more comfortable with this *ad hoc* approach or using the projections from the previous benchmark?
- Matt – this approach is what has been used in similar situations throughout the country
- Erik – the difference with this situation is that we stand a good chance of producing a better assessment with the next benchmark. In many cases, there is little hope of achieving a better stock assessment in the short term.

- Louis – according to scuttlebutt (blogs, etc), there is a sense we've got to do *something*...given that biomass is at an all-time low and the age structure is truncated. Does the TC at least agree with these statements about the stock?
- Erik – the problem is that we can't agree with those statements...the low biomass could be explained by the retrospective pattern, and the contracted age structure could be explained by a dome-shaped selectivity.
- Louis – given that we wouldn't have a new benchmark for 3 years, what does the TC recommend as the most appropriate course?
- Jeff – the Board has requested options...does the TC feel that what Matt has presented is useful?
- Joe S - [*regarding the precautionary multiplier*] - suggests providing more options between 0.75 and 1.00
- Rob – endorses this as a valid concept. There are multiple management objectives that are being discussed, which contributes to the confusion about how to proceed. If we are heading down the road of managing for ecosystem services and we want to get from $F_{8\%}$ to $F_{15\%}$, then some reduction in landings is warranted
- Matt – most SSCs around the country do this in increments of 25%...but there is no reason why you can't choose other values
- Behzad – [*to Louis*] - do you need a more formal assessment of these concepts?
- Louis – the way it is presented is good, but more options would be helpful
- Jeff – propose we put this table [*of precautionary multipliers*] from Matt's presentation forward, with more options (0.8, 0.9) and still recommend for an expedited benchmark assessment
- Matt – [*to Louis*] - do you need a preferred option from us?
- Louis – no, and it doesn't appear you'd be able to come to consensus anyway
- Matt – can we decide to suggest a 3 or 5-yr average?
- Jeff – first, can we add a caveat that says the closer you get to 1.0, the higher the probability that overfishing will continue?
- Louis – it would be nice to know what the projections from the 2009 benchmark model suggest would be required to end overfishing
- Matt – don't think you should use the projections from the 2009 model. You'd be ignoring all the data that has occurred in the past 3 years
- Mike – the PDT's plan was to include the projections from this update as a potential option to set the quota, as well as Matt's table of ad hoc options. Are you suggesting that we also include the projections that have already been done from the 2009 model?
- Jeff – yes. That work has already been done & previously presented to the board
- Mike – [*to Matt*] - regarding the *ad hoc* approach, since the councils are required to set a quota...how often do they often re-evaluate this precautionary multiplier?
- Matt – it's usually based on the specifications cycle...for Atlantic herring, it's a ~3 yr cycle
- Jeff- does the group agree to add a couple points to Matt's table and include some 09 model projections?
- TC – agreed

Mismatch between F and SSB reference points

- Jeff – [*goes through document describing the issue*]
- Jeff – anyone have issues with this?
- TC – no comments...document accepted as is

Minutes from 6/25 Meeting in Raleigh, NC

- Jeff – any edits to minutes from last meeting?
- TC – no comments...draft minutes accepted as is

Public Comment

- Ken H – very pleased that a good range of options will be presented to the board, including the *ad hoc* precedents, and the 2009 projections. Thinks that the reference point mismatch needs to be addressed... happy to see that the TC is recommending that we move to a $SSB_{15/30\%}$, which would put us in an overfished status. Good work so far.
- Mike P – heartening to see the SAS and TC go through so much protracted, sincere & studied debate...pushing for an expedited benchmark is the best option
- Ron L – concerned with the assumption that overfishing is "likely" occurring. We really don't know which direction the population is going. There are good reasons why there are more fish available (artificially low landings in prior years resulting from plant caps, a recent increase in landings, selectivity issues). Since 2008 was one of those years where the landings were truncated (capped by plant)...it completely makes sense that the 2009 benchmark is unreliable for making projections. Agree with statements made about the impacts that overly precautionary cuts would have on the industry
- Tom R – appreciate Matt's review of examples of *ad hoc* management in data poor situations. The background material as to where *ad hoc* multipliers came from is really important to include.
- Tom R - [*To Matt*] - is there a way to assign a probability of success to the different multipliers?
- Matt - No
- Tom R - Therefore, it would be helpful to have the 2009 projections, which do assign probabilities of success for comparison. A wide range of options would also be useful...perhaps go with the list of multipliers that has been used by SSCs in the past (0.25, 0.5. 0.75, 0.85, 1.0).

Model and Data Uncertainties Plague the Atlantic Menhaden Assessments

21 September, 2013 Science, Victor Crecco, PhD

The Atlantic menhaden (Brevoortia tyrannus) is a relatively small (8 to 15 inches total length) pelagic filter-feeding fish that consumes phytoplankton (algae) and zooplankton. The menhaden is a coastal and estuarine-dependent finfish that is distributed in tight schools mainly from the Gulf of Maine to northern Florida. The Atlantic menhaden stock size, based on previous age based models, has been very large (5 to 30 billion fish) and, as a result, has historically supported large and financially important commercial purse seine (reduction fishery) and bait fisheries along the Atlantic coast. The reduction fishery has been the dominant menhaden fishery, with annual landings from 1980 to 2003 comprising more than 90 to 95% of the total coast-wide landings. Reduction fishery landings and fishing effort (vessel weeks) have declined steadily since 1990. Menhaden landings from the bait fishery have increased from 1990 to peak levels in 2011. In 2011, bait fishery landings comprised a record high of 24% of total menhaden landings. There is an active pound net fishery in the Potomac River, Virginia that annually harvests about 1% to 2% of the coast-wide menhaden landings. Recreational landings and fishing effort (trips) of menhaden have also been estimated since 1981 along the entire Atlantic coast under the Federal Government's Marine Recreational Information Program (MRIP). Coast-wide recreational landings have varied without trend from 1981 to 2011 and recreational catches have seldom exceeded 1% of total landings.

The commercial landings from the reduction fishery are primarily used for fertilizer, fishmeal, and omega-3 protein, the latter of which has been shown to be very beneficial to human health by reducing the risk of heart disease and possibly Alzheimer's disease. The bait fishery landings are used primarily as scrap for the crab and lobster pot fisheries. The Atlantic menhaden fisheries are currently managed by the Atlantic States Marine Fisheries Commission (ASMFC), an Interstate compact that includes 15 Atlantic coast states, as well as two Federal agencies (National Marine Fisheries Service (NMFS) and the US Fish and Wildlife Service).

In this article, I chronicle the recent (2004- 2012) stock assessment history of Atlantic menhaden and focus on several assumptions implicit to the current age based models that appear to be seriously violated. Also, I attempt to show how predation effects on menhaden from a rapidly rising spiny dogfish stock have not been included in the 2010 and 2012 stock assessments. There is also strong circumstantial evidence, based on conflicting trends in regional juvenile production, that the epicenter

of menhaden spawning may have shifted in the early 1990's from primarily the mid- Atlantic (mainly Chesapeake Bay) to southern New England. Finally, I make the case here that the widely accepted policy of selecting a single "preferred" model in the menhaden and other single species stock assessments is shortsighted and greatly limits our ability to effectively examine the full range of model uncertainty especially when ecosystem factors are present.

Atlantic menhaden have evolved a complicated life history, and the main body of the stock undergoes extensive temporal and spatial migrations along the Atlantic coast that are difficult to monitor and nearly impossible to predict. Menhaden can live up to 12 years according to scale samples, but menhaden taken from the purse seine fishery are mostly between ages 1 and 4. Menhaden reach full maturity at around age 3, and a typical female normally produces from 80-400 thousand eggs per year primarily offshore. Because of the high coast-wide abundance of menhaden (5 to 30 billion fish), total annual egg production can exceed 10 trillion eggs. Emerging larvae are poor swimmers that often experience high predatory mortality from a variety of small finfish and invertebrates. Newly hatched larvae are passively transported from offshore toward the Atlantic coast by surface wind driven circulation referred to as Ekman transport. The magnitude, timing and direction of wind driven circulation can change dramatically within and among years, leading to unpredictable shifts in the location of larval dispersal along the Atlantic coast. When larvae are passively transported toward shore, further development of surviving juveniles eventually occurs within near-shore coastal and estuarine waters. Some direct spawning even occur in major Atlantic coast estuaries such as Chesapeake Bay, Delaware Bay, Long Island Sound and Narragansett Bay from late spring through early fall. Spawning has even been reported during winter off the North Carolina coast. Adult fish overwinter off the Carolinas, begin moving northward during March and April and remain in most years in their summer range off southern New England and the Gulf of Maine. Menhaden are distributed throughout the water column, so menhaden abundance indices (mean catch/tow) derived from State and Federal bottom trawl surveys are prone to serious measurement error, and thus are not very reliable measures of relative abundance. As a result, it is very difficult to establish one or more global indices with which to accurately monitor the coast-wide menhaden population. The selection of a reliable coast-wide abundance index is a major source of uncertainty in all previous stock assessment.

Because menhaden are relatively small and highly abundant during most years, this herring-like fish serves as a major keystone prey species for a variety of predatory finfish (striped bass, weakfish, bluefish and spiny dogfish), seabirds, seals and dolphins. Like other keystone prey finfish (Atlantic herring, bay anchovy and river herring), menhaden have evolved a suite of life history traits (early maturation, high egg production and rapid somatic growth) that permit them to coexist and remain stable even under high predatory and fishing mortality.

Before discussing the rationale behind some alternative to the preferred modeling approach for menhaden, let me first chronicle the findings of recent menhaden stock assessments. Menhaden stock assessments sponsored by ASMFC have been conducted in 2004, 2010 and 2012. The 2004 Stock Assessment was performed with an age based Forward Projection Model hereafter referred to as the Beaufort Assessment Model (BAM). BAM runs were made to reconstruct age-specific (ages 0-8+) stock numbers, biomass (kilotons) and fishing mortality (F) estimates from 1955 to 2002. The BAM was selected over the more conventional Virtual Population Analysis (VPA) because BAM includes the statistical package (Monte Carlo simulations) with which to quantify parameter uncertainty and to construct confidence limits. As a result, BAM was regarded as the preferred model in the 2004 and in all subsequent assessments. In all of the assessments so far, Atlantic menhaden have been treated as a single unit stock based on the findings from historical tagging studies. Other tagging evidence

suggests, however, that multiple stocks may exist including a stock located south of Cape Hatteras, another within Chesapeake Bay and still another within southern New England-Gulf of Maine.

There are several assumptions implicit to BAM that appear to me to be highly questionable and, if violated, could greatly enhance the degree of bias and reduce precision around the model output. Because there are no minimum size limits and quotas on menhaden, discards were assumed to be negligible in the reduction and bait fisheries. This assumption seems plausible given the nature of the menhaden fisheries. The 2004 BAM was run assuming a flat-topped (constant) partial recruitment (PR) vector starting at ages 2+, resulting in fishing mortality (F) estimates that were similar in magnitude across ages 2 to 8+. This assumption, also applied in subsequent assessments, seems questionable in my view since the catch-at-age matrices for the bait and reduction fisheries suggest a dome-shaped rather than flat PR vector from ages 2+. If the PR vector is dome-shaped, but the Menhaden Stock Assessment Subcommittee (MSAS) assume only a flat-topped PR vector, then BAM output should eventually become unstable, leading to a systematic bias in the ages 2+ fishing mortality (F) and ages 2+ stock biomass estimates.

Another assumption of BAM was that natural mortality (M) on menhaden was assumed to be age-specific but constant over time. Since small menhaden (< 9 inches) are thought to be particularly prone to smaller and more numerous predators, M was set very high on age 0 (M0 = 4.3) and age 1 (M1 = 0.98) and set much lower and constant (M2+= 0.55) on ages 2+. I agree that predation mortality (M) should be higher among smaller and younger menhaden, but temporal changes in age-specific M are expected to occur due to temporal shifts in the composition and abundance of menhaden predators. The MSAS alluded to non-stationary M in the 2004 assessment and attempts have been made in the 2010 and 2012 stock assessments to include time varying M in BAM.

Another controversial and, in my judgment, unsubstantiated assumption involves how coast-wide juvenile indices were weighted into a single coast-wide recruitment index. Coast-wide age 0 recruitment from 1955 to 2002 was expressed in the BAM as a weighted average index based on a variety of regional juvenile seine surveys from southern New England (SNE) (Connecticut and Rhode Island), Mid Atlantic (coastal Maryland and New York), Chesapeake Bay (Maryland and Virginia) and South Atlantic (North Carolina). The final index was weighted heavily towards Chesapeake Bay indices (69%); South Atlantic indices (17%) and Mid Atlantic indices (12.5%) with very little weight (1.8%) assigned to the SNE indices. This weighting scheme was used in all previous assessments and was based on results from a 1977 study comparing estuarine nursery acreage for menhaden from North Carolina to Rhode Island. To my knowledge, no additional follow-up studies of menhaden nursery areas have ever been conducted in the last 35 years to which the 1977 findings can be compared. Given the vagaries of larval dispersal mechanisms along the Atlantic coast and the possibility of multiple stocks, the major contribution of menhaden juvenile production by region could have easily shifted over time. Moreover, the overall menhaden juvenile indices from SNE have generally increased after 1992 during which the post 1992 indices from Chesapeake Bay have exhibited a persistent decline (Figures 1&2). So too, the trend in the post 1992 SNE indices were highly correlated with rising coast-wide bait fishery landings from 1992 to 2011 (Figure 4). These contradictory trends suggest that the current weighting scheme for juvenile indices is unsubstantiated, prone to serious error, may have shifted over time, and therefore should have been re-evaluated before the 2004 assessment.

Perhaps the most serious source of uncertainty in BAM concerns the assumption that the pound net catch per licensed fishermen (cpue) from the Potomac River is the most reliable coast-wide abundance index of ages 1+ menhaden. In support of the assumption, the Potomac River cpue indices have fallen for the most part after 1991 (there is a slight rise after 2003) in concert with declining

trends in both the Chesapeake juvenile indices and the reduction fishery landings (Figures 2&6). But all of these indices are concentrated either within or very near Chesapeake Bay. Moreover, in the mid 1970's, there were 12 menhaden processing plants operating in the reduction fishery, but after 2005, there is only one plant currently operating in Reedville, Virginia. This systematic closure of processing plants is wholly consistent with the 80% drop in fishing effort (vessel weeks) noted for the reduction fishery since 1980. Clearly the post 1992 decline in reduction fishery landing better reflects a drop in fishing activity and fishing mortality (F) rather than an assumed decline in coast-wide stock size.

A more serious problem is that the Potomac River indices have fallen in most years after 1992 (Figure 3) during which the SNE juvenile indices and the coast-wide bait fishery landings were rising (Figures 1&4). The coast-wide recreational cpue (mean catch/trip) indices have remained fairly stable from 1981 to 2011 (Figure 5). These contradictory trends, particularly for the more geographically expansive recreational cpue and bait landings, suggest that the Atlantic menhaden stock has either remained stable or has increased after 1991 rather than declined as suggested by the post 1991 decline in Chesapeake Bay juvenile indices, reduction fishery landings and Potomac River indices (Figures 2,3&6). If menhaden stock size has in fact increased after 1991, then tuning BAM solely with the Potomac River cpue would introduce enormous potential bias and uncertainty that will eventually show up in the model output and diagnostics. To address model bias, separate runs of BAM should have been made: one with the Potomac River cpue as the sole tuning index, and a second run with the coast-wide recreational cpue as the tuning index. The expected contradictory findings from both model runs could then be addressed by the full Technical Committee in light of all abundance data and an extensive statistical examination of the underlying facts. But the Menhaden Stock Assessment Subcommittee (MSAS) has continued to tune BAM in the 2004, 2010 and 2012 assessments only to the ages 1+ Potomac River indices despite evidence to the contrary.

In the 2004 assessment, the target and threshold fishing mortalities for Atlantic menhaden were expressed as F20% and F10%, respectively, based on the Thompson-Bell Dynamic Pool Model (DPM). The F10% threshold and F20% target are defined as the fishing mortality rate (F) that would generate 10% and 20% of the unfished (F = 0) biomass per recruit (Bmax) from the DPM. The resulting target and threshold was F20% = 0.80 and F10% = 1.40. The biomass target (metric tons, mt) and threshold levels were derived from a graphical approach that merges stock-recruitment data and output from the DPM referred to as Bmed. The resulting target biomass was 37,400 mt and the biomass threshold was 20, 570 mt. According to the control rule, Atlantic menhaden was considered to be overfished if the 2002 fully recruited (ages 2+) F estimate from BAM exceeded the F10% threshold, whereas the 2002 spawning stock was in an overfished condition if the 2002 spawning stock biomass fell below the Bmed biomass threshold. The validity of the DPM to generate reliable and robust threshold estimates (F10%) depends on the presence of equilibrium condition. Moreover, the DPM itself is also rigidly configured, allowing no potential feedback between temporal changes in menhaden abundance and the resulting growth, natural mortality, maturity and egg production levels. Fisheries scientists have recognized for some time that density-dependent and climate changes can induce major temporal and spatial shifts in somatic growth, natural mortality, fecundity and maturation of finfish and crustaceans.

The results from the 2004 BAM were stable, straightforward and very favorable to the sustainability of menhaden and its fisheries. None of my aforementioned concerns about violations of model assumptions were evident in the 2004 assessment. The 2004 Stock Assessment also passed Peer Review, but the reviewers wanted the F10% threshold replaced by Fmed so that the F and biomass thresholds (Bmed) would be compatible. The terminal age 2+ fishing mortality (F) in 2002 was 0.79,

a level that was at the target (F20% = 0.80) but considerably below the threshold (F10% = 1.40). The 2002 BAM revealed that fully recruited (ages 2+) fishing mortality (F) estimates on menhaden have remained below the overfishing threshold since the mid 1960's. The 2002 spawning stock biomass estimate from BAM of 91,900 mt easily exceeded both the biomass target and threshold. Thus, the 2004 Assessment concluded that Atlantic menhaden stock was not overfished and not in an overfished condition.

Many of the assumptions and methods used in the 2004 Stock Assessment were continued in the 2010 Assessment. The BAM model was used as the preferred model in 2010, a flat-topped PR vector was again assumed, natural mortality (M) was assumed to be age-specific and constant from 1955 to 1981, fully recruited fishing mortality (M) was ages 2+, the weighting scheme for juvenile indices used in 2004 was maintained and the Potomac River cpue was again assumed to be the sole coast-wide index for menhaden abundance. The overfishing threshold for fishing mortality (F) was changed from F20% to Fmed to maintain continuity with the Bmed biomass threshold. Also, the units of Bmed in the 2010 assessment were changed from spawning stock biomass (mt) to population egg production (billions of eggs).

The biggest change in the 2010 assessment concerned the use of a Multispecies Virtual Population Analysis (MSVPA) with which to estimate predator-induces natural mortality (M) from 1982 to 2008. The MSVPA is one of many so-called "minimally realistic models" that estimates predator consumption and the resulting predatory mortality on the prey. The MSVPA derives consumption and natural mortality estimates by merging dietary consumption data with abundance output from several separate age based models. The MSVPA uses a complex set of algorisms utilizing historical food habits and age based abundance data for a selected subset of menhaden finfish predators (striped bass, bluefish, and weakfish). These three finfish were selected as main predators on menhaden based on food habits studies which show that menhaden have historically comprised a major portion of their diet. The current configuration of the MSVPA does not permit inter –guild predation, which means that predators cannot consume other predators. This constraint seems unnecessary and not very realistic. According to the 2008 Peer Reviewed Assessment of Weakfish, the Atlantic weakfish population has declined to very low abundance since 2001 mainly due to enhanced predation by rising populations of striped bass and spiny dogfish.

The MSVPA model for menhaden was developed independently of BAM by scientists associated with the ASMFC Multispecies Technical Committee and the mathematics behind the model has been Peer Reviewed. Although I did not work directly on the MSVPA, I was a member of this Multispecies Committee for four years (2008-2011), so I have some working knowledge and insight about the MSVPA. All ecosystem models like the MSVPA attempt to simplify the highly complex structure of food webs, the nature of ecological interactions, and the resulting demographic structure of the predator –prey populations. Natural mortality (M) estimates arising from the MSVPA are likely to be particularly uncertain and even more difficult to validate on a timely basis. The inherent complexity of predator-prey dynamics also gives rise to additional complexity in the MSVPA. Like most mathematical models that attempt to uncover the secrets of natural systems, the MSVPA contains numerous untested assumptions, and insufficient food habits data with which to evaluate parameter uncertainty and model predictions. Moreover, complex models such as the MSVPA require a long set-up time (several weeks), dozens of arbitrary judgments about how to deal with missing food habits data across the time series, more arbitrary decisions about the selection and nature of input data with which to include in the internal age based sub-models, how to weight the consumption data by finfish species, and what initial conditions to place on the model. As ecosystem models like the MSVPA become more complex and widely used, fewer scientists will be able to run and understand them,

thereby losing sight of what is most important: the quality and quantity of the input data and the assumptions on which the model is based. The strength of the MSVPA lies in its ability to reveal the consequences of certain predator-prey assumptions, yet, ironically it biggest weakness is that the assumptions might be wrong.

Another more fundamental problem with the 2010 MSVPA is that spiny dogfish has not yet been considered as a major predatory finfish. The spiny dogfish clearly meets all the criteria as a major candidate predator on menhaden. Spiny dogfish abundance has risen steadily to high levels along the Atlantic coast since 2000 according to MRIP catch/private boast trip from the North Atlantic. Moreover, dogfish have been shown to exhibit a strong dietary preference for herring like fishes such as menhaden, and have been shown to overlap the spatial and temporal distribution of menhaden along the Atlantic coast. Furthermore, recent tag-recapture studies of spiny dogfish from scientists at East Carolina University indicate that dogfish abundance may have now exceeded one billion fish along the Atlantic coast. If so, a dogfish population size of a billion or so fish would easily surpass the current combined stock sizes of striped bass, bluefish and weakfish. Thus the exclusion of spiny dogfish data in the 2010 MSVPA run seems unnecessary and would greatly underestimate predation-based natural mortality of ages 0 and 1 menhaden.

The results from the 2010 BAM run were not as stable and straightforward as the 2004 assessment results. Although there was a drop in relative precision around the more recent F estimates and a higher level of retrospective bias in the 2006 to 2008 F and biomass estimates, the findings and conclusions were generally favorable to the sustainability of menhaden and its fisheries. As in the 2004 assessment, none of my stated concerns about violations of BAM assumptions were yet evident in the 2010 assessment. Given the array of tenuous assumptions on which the validity of the BAM rested, I really figured that BAM was so flawed that the output would have veered off course by now. The 2010 Stock Assessment even passed Peer Review, which really amazed me. But the reviewers were critical of several aspects of how the MSVPA was configured. The terminal age 2+ fishing mortality (F) in 2008 was 1.26, a level that basically the same as the Fmed threshold of 1.25. The 2010 BAM run revealed that fully recruited (ages 2+) fishing mortality (F) estimates on menhaden have risen by 30% since 2004 but still remained at the overfishing threshold. The 2008 fecundity production estimate from BAM of 18,449 billion eggs in 2008 easily exceeded the egg threshold of 9,314 billion eggs. Thus, the 2010 Assessment indicated that Atlantic menhaden was not overfished and was not in an overfished condition.

The 2012 Stock Assessment was actually an update to the 2010 assessment. To maintain continuity with the 2010 assessment, all methods, data sets and assumptions about BAM and the MSVPA were maintained in the 2012 assessment update. The results of the 2012 BAM run were certainly surprising to some people since the conclusions are completely at odds with the generally optimistic findings in the 2004 and 2010 assessments. The most recent (2011) age 2+ fishing mortality (F) estimate rose sharply from 1.26 in 2008 to 4.5 in 2011. The 2011 F is now 3.6 times greater than the F threshold of 1.25 established in 2010, indicating that Atlantic coast menhaden have suddenly become severely overfished and at risk of recruitment failure. Moreover, a fishing mortality (F) rate of 4.5 (equivalent to the annual removal of about 91% of the ages 2+menhaden) would now make Atlantic menhaden the most highly exploited finfish in the world! Such a sudden and spectacular rise in F over just a two year period is completely implausible, indicating a rapid breakdown in model stability and a steep rise in parameter and model uncertainty. The 2012 BAM run indicated that population fecundity has fallen from 18.4 trillion eggs in 2008 to 13.3 trillion eggs in 2011, but stock fecundity was still above the egg threshold of 9.3 trillion eggs. This indicated that the 2011 menhaden stock is not yet in an overfished condition. Because the 2012 BAM run developed such a very high and systematic

retrospective bias in recent (2006-2011) fishing mortality (F) and fecundity estimates, BAM was considered too unstable and not robust to the addition of the 2009-2011 data. As a result, the Menhaden Technical Committee (MTC) concluded that the 2012 BAM run was too unreliable to provide sound management advice. The MTC also recommended that the MTC and MSAS convene a joint meeting as soon as possible to re-evaluate all existing menhaden data and all available modeling options for the upcoming 2014 assessments.

The failure of the 2012 BAM run indicates that the choice of tuning indices and the myriad of model assumptions should be completely re-evaluated before the next assessments. Based on these problems and the model failures often reported elsewhere, it is clear that the widely accepted policy of selecting a single "preferred" model in stock assessments is shortsighted and greatly limits our ability to effectively examine the full range of model uncertainty. Unlike physics and engineering, where mechanical and chemical systems obey precise mathematical laws, fish populations do not adhere well to mathematical first principles given that fish birth, death, growth and movements are never consistent. As a result, the ability to predict menhaden stock collapse and stock rebuilding depends on a much broader set of knowledge and understanding than what is contained in a single model.

An alternative to the preferred model approach is to opt for an "ensemble" approach in which a wide array of model types is examined with differing structural assumptions about the presence of ecosystem effects. These models are then run in tandem in a manner that is analogous to weather forecasting and climate predictions. Although I am highly skeptical of stock predictions from large scale ecosystem models, it would still be very helpful to give equal treatment to the full ensemble of models. We should therefore examine the utility of whole ecosystem models such as Ecosim-Ecopath that attempt to quantify both bottom-up and top-down ecological processes. We should further consider a wide range of scenarios with dynamic multispecies models like the MSVPA. More traditional age structured models should also be considered in the mix, especially those models that directly estimate time varying natural mortality (M). Finally, we should definitely include the modest but more highly transparent extended production models, such as Steele-Henderson, that combines fisheries and predatory effects together to estimate overfishing thresholds, age aggregated natural mortality and surplus production. Since there is a long time series (1955-2013) of menhaden reduction landing, we could fit the model ensemble under different scenarios (I.e. fishing alone, fishing and predation, predation alone etc) to a recent portion of the time series (1981-2013) and then attempt to hind-cast the earlier portion (1955-1980). The scenario that yielded the best model fit to the earlier observed (1955-1980) catch would be given more thorough consideration in subsequent assessments.

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BURL LEWIS, et al.	IN THE
Plaintiffs	CIRCUIT COURT
vs.	FOR
MARYLAND DEPARTMENT OF	DORCHESTER COUNTY
NATURAL RESOURCES, et al.	CASE NO. 09-C-13-20925
Defendants	
_____/	

The deposition of LYNN FEGLEY as Corporate Designee was held on Tuesday, March 4, 2014, commencing at 9:07 a.m., at Department of Natural Resources, 580 Taylor Avenue, Annapolis, Maryland 21401, before Ronald E. Bennett, Notary Public.

REPORTED BY: Ronald E. Bennett

EXHIBIT
tabbies
ATCH 4

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Deposition of LYNN FEGLEY

March 4, 2014

PROCEEDINGS

Whereupon,

LYNN FEGLEY,

called as a witness, having been first duly sworn to tell the truth, the whole truth, and nothing but the truth, was examined and testified as follows:

EXAMINATION BY MR. BLOMQUIST

Q. Good morning, Ms. Fegley.

A. Good morning.

Q. Am I saying that correctly?

A. Yes.

Q. Thank you. Have you been deposed before?

A. No.

Q. All right. I'm here to ask you a series of questions. Obviously, make sure you understand my questions. If you don't, I assume that you will interrupt and get clarification of the question.

Can we operate on that basis?

A. Okay.

Q. I see you nodding your head. We are making a record here, so nods of heads and un-huh

and unh-huh are discouraged and will have to be clarified.

So I will try to remind you now, when you answer, answer yes, no, correct, incorrect or with whatever your answer may be. But the things that we can see and observe in this room don't come through on the transcript.

A. Okay. Noted.

Q. And, obviously, if you need to take a break, we'll take a break. I'd ask that you not take a break while a question is pending, if we can avoid it.

A. Absolutely.

Q. All right.

MS. WAZENSKI: And Jeff, just to make clear. We are here pursuant to a notice to take the deposition of a corporate designee.

MR. BLOMQUIST: Well, I was going to get there.

MS. WAZENSKI: If you are going forward with that, I'll let you say your piece and we'll see

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The Maryland Department of Natural Resources does not conduct a full stock assessment of menhaden in Maryland waters, because menhaden are a coastal stock. We do not have in Maryland specific population of menhaden.
Q. Okay. What do you mean when you say "stock assessment"?
A. A stock assessment is a statistical analysis that incorporates multiple data sources that is designed to estimate certain parameters about a stock. Generally how many fish there are, what the state of the reproductive component of the stock is --
Q. Do you call that fecundity?
A. In the case of menhaden we call it fecundity. Fecundity refers specifically to the amount of --
Q. I like that word.
A. Yes. It refers to the amount of eggs fish produce. It also, a stock assessment also measures rates of removal by fishing relative to benchmarks

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that determine how many fish can be safely removed without compromising either the stock's ability to reproduce itself or compromising its ecological goal.
Q. I think you said this, but I just want to be clear. DNR, no one in Maryland has ever conducted a Stock Assessment. All that DNR has conducted are surveys?
A. Correct.
Q. And when you say DNR has conducted surveys, what's the difference between a survey and a stock assessment?
A. A survey is a study to take certain measurements of the stock. In the case of Maryland, we survey juvenile menhaden. And what that provides us is a running time series of -- it's an index of juvenile abundance in the Maryland portion of the Chesapeake Bay.
It tells us something about trends in how many juveniles are entering our system each year.

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Q. And when you say it's a survey of juveniles, why do you say it's a survey of juveniles?
A. Because it's a survey specifically designed to target juvenile fish.
Q. And how is it specifically designed to target juvenile fish?
A. The survey is designed specifically to target juvenile striped bass. By virtue of its design, it targets anadromous juvenile fishes in the system, including menhaden.
Q. Okay. Say that word "anadromous".
A. Yes.
Q. Am I saying that right?
A. You are.
Q. When you say the juvenile survey, you're talking about the seine that's up from the beach?
A. Yes.
Q. Is there any other survey of menhaden conducted in Maryland waters?
A. We have biologists who survey pound net

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catch with cooperating commercial watermen. The results of those surveys, menhaden sampled during those surveys are, we take scale samples that allow us to determine the ages of the fish in the pound net.
Q. In other words, biological samples?
A. Yes.
Q. Okay. So you take scale samples for the age?
A. Yes.
Q. Do you take any other samples?
A. No.
Q. Is any other determination made, number of male, number of female?
A. No.
Q. Is any determination made about, I'm going to call it fecundity, number of eggs? Any sampling to determine number of eggs in any of the fish that are caught?
A. No. And I would clarify that it would be unlikely to come across an ovigerous female.

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MS. WAZENSKI: Are you asking whether she has personally read them or someone with DNR has read them?
MR. BLOMQUIST: That's what I'm asking -- her first.
THE WITNESS: Prior.
BY MR. BLOMQUIST:
Q. Did you have any responsibility for reviewing the Stock Assessment, Menhaden Stock Assessment?
A. No.
Q. Who at DNR was responsible for reviewing the Menhaden Stock Assessment?
A. Can you explain what you mean by "review"?
Q. If I say review to you, what does that mean?
A. To me review is in the context of determining whether it's robust.
Q. When you say "robust", what does that mean?
A. Whether it's adequate or --

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Q. In other words, whether it's valid?
A. Valid. Yes.
Q. Similar to a peer review, in other words?
A. Correct.
Q. Okay.
A. DNR participates in the stock assessment, in developing a stock assessment. Stock assessment is reviewed by scientists who have no affiliation with any state agency.
Q. So my question is, did you ever review, using the definition that you, in the context that you have just given us here, did you ever review the Menhaden Stock Assessment?
A. No.
Q. Okay. Do you know anyone at DNR who did review the Menhaden Stock Assessment?
A. No.
Q. Did anyone at DNR make an independent determination of the validity of the ASMFC stock assessment?
MS. WAZENSKI: Can you repeat that.

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(The reporter read back as requested.)
THE WITNESS: When you say "independent", what do you mean independent?
BY MR. BLOMQUIST:
Q. Did any group within the Department of Natural Resources review the ASMFC Stock Assessment to determine its validity or usefulness for promulgating regulations in Maryland waters relative to menhaden? That's what I mean.
A. Employees of the Department of Natural Resources participated in the development of the stock assessment. And in that participation detailed discussion about developing a valid model.
The assessment was then reviewed by an independent group of scientists who were not involved in its development.
Q. You have explained all that before. That is not my question. So you said that. You said it once. You have said it two or three times. I'm asking the question I asked.
Do you not understand the question?

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A. The question referred to independent review. I'm not clear on the meaning of the word "independent". And I'm a little less clear of the meaning of "review".
Q. I'm using the meaning that you ascribed to the term review. Independent meaning a review by anyone at DNR outside of what ASMFC conducted to determine the validity of the stock assessment relative to Maryland waters and relative to promulgating menhaden regulations in Maryland waters?
A. No.
Q. Now let's return to the juvenile survey. The juvenile survey was made primarily in fresh water?
A. Brackish tidal water. I believe we produced the data that showed a phyllodies at offsite samples.
MR. BLOMQUIST: Let's mark this as Deposition Exhibit 1.
(Fegley Exhibit 1 marked for purposes of

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Q. No. Those are samples. The second question -- you said menhaden are migratory species, correct?
A. Yes.
Q. And you agreed that the studies show, without naming any specific studies, but the studies and the science shows that the largest menhaden migrate the furthest north?
A. Yes. The older menhaden tend to migrate north.
Q. And you also agreed that the menhaden stratify and they migrate in schools that are like sized and, therefore, generally like aged?
A. I agree to that.
Q. And so -- and they are migrating from the spawning area, correct?
A. Yeah.
Q. And the spawning area for menhaden, the studies show, is from the Florida Coast through the Hatteras Coast, the Carolina --
A. And there is some evidence of some pockets

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further north.
Q. Well, there's actually evidence of multiple spawning, correct?
A. Yes.
Q. So there's evidence of spawning in some of the bays and sounds from Long Island north to Maine, correct?
A. Indeed.
Q. Although there's been no data of meaning collected relative to that spawning, correct?
A. I am not going to --
Q. No data that was used in the stock assessment, correct? In the stock assessment that went into the 2012 plan.
A. Correct.
Q. Okay. Why?
A. Why what?
Q. Why wasn't any data collected about the spawning habits in those northern Bays?
A. Which northern Bays?
Q. From the Long Island Sound north through

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Maine up into Nova Scotia?
A. I guess it depends on how you would define data referring to spawning habits. There is juvenile seine surveys that occur in New York that are incorporated.
Q. How are surveys conducted in New York any different than surveys conducted in Maryland?
A. I am not intimately familiar with the survey details for the seine survey in New York.
Q. You have already agreed with me that the surveys conducted in Maryland are highly unlikely to identify menhaden?
MS. WAZENSKI: I'm going to object.
THE WITNESS: No, I did not agree with that.
BY MR. BLOMQUIST:
Q. Menhaden travel in schools, correct?
A. Yes.
Q. Menhaden don't spawn in the Maryland portion of the Chesapeake Bay, correct?
A. Correct.

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Q. Menhaden spawn, if at all in Maryland waters, off the Atlantic Coastal Shelf, is that correct?
A. That is correct.
Q. There is no evidence that you are aware of that Maryland spawn at all off the Atlantic Coastal Shelf, correct?
A. There is no evidence that what?
Q. That menhaden spawn off the Maryland Atlantic Coastal Shelf.
A. I'm not sure about that at all.
Q. You can't point me to any literature that suggests to me that menhaden spawn off --
A. I would like to go back and look at some of the studies of Dr. Ed Hood and ongoing.
Q. Okay. But certainly, as we sit here today, you have no recollection of any study that would suggest that Maryland spawn off -- on the Atlantic Coastal Shelf within Maryland's jurisdiction?
A. Within Maryland's jurisdiction or --

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biologists and from advice from the scientists of ASMFC.
Q. Has ASMFC made a determination that overfishing of menhaden is occurring?
A. Yes.
Q. Basis of that determination?
A. The 2012 stock assessment update.
Q. That's the big packet we handed you?
A. No.
Q. How did ASMFC make the determination that overfishing was occurring?
A. Because the rate of fishing has exceeded the maximum allowable level or the threshold which is the level that is set to maintain 15 percent of the spawning potential of the stock.
Q. In order to make that determination you have to have a good stock assessment, correct?
A. You have to have a stock assessment.
Q. Doesn't have to be good?
MS. WAZENSKI: Object to the form. What is the standard for good? If you can answer that

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question.
THE WITNESS: You should have a stock assessment that has been peer reviewed and deemed robust for management by independent fishery science experts, as was the model used for the menhaden stock --
BY MR. BLOMQUIST:
Q. In developing the stock assessment there was considerable debate about the stock north of New Jersey, correct?
A. Can you clarify debate.
Q. Discussion, debate, talk.
A. About the stock?
Q. About the stock.
A. Specifically.
Q. About the stock north of New Jersey?
A. Can you clarify the nature of the debate?
Q. I'm asking you, was there a debate or discussion?
MS. WAZENSKI: Can you read back the original question, please.

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(The reporter read back as requested.)
THE WITNESS: The answer is, yes, there is debate. And that debate is outlined fairly clearly in both the stock assessment document -- it's outlined very clearly in the stock assessment document. And, in fact, there were sensitivity runs. They manipulated model inputs to show the impacts on the outputs of the model.
The nature of the discussion is whether or not there is a large number of older fish present in those northern waters that the fisheries aren't catching.
And currently there are no data upon which to pin modified inputs to the model. That was the reason for the Sulikowski aerial study.
BY MR. BLOMQUIST:
Q. Is there a fishery of menhaden north of the New Jersey waters?
A. Yes.
Q. Okay. Who conducts it?
A. New York, Connecticut, Massachusetts,

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Rhode Island, New Hampshire and Maine.
Q. It's no longer any production industry other than Reedville industry, correct?
A. Yes.
Q. Reedville doesn't go above New Jersey to harvest?
MS. WAZENSKI: I'm going to object to form. Reedville?
BY MR. BLOMQUIST:
Q. Omega Protein operating out of New Jersey to harvest.
A. I'm not going to speculate where Omega's boats go.
Q. Do you have any knowledge where they go?
A. I'm not going to speculate.
Q. I'm not asking you to speculate. I asked you do you have any knowledge?
A. I am just not going to speculate on where their boats go. It would be inappropriate for me to.
Q. How is data collected north of New Jersey

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about menhaden?
A. I believe I would like to look -- there is some data gathered from New York. In the stock assessment document would be the northern most juvenile survey. But there are limited data from the northern waters.
Q. And the reason why there's limited data is because the fishing in menhaden in the northern waters has been significantly curtailed, correct?
MS. WAZENSKI: I'm going to object to form. If you can answer that question, you may.
THE WITNESS: I don't think I can answer that question.
BY MR. BLOMQUIST:
Q. Why isn't there more data from the northern waters?
A. Because there's no fishery dependent data from the northern waters, because the fisheries are occurring further to the south.
Q. I'm sorry?
A. Fisheries are occurring further to the

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south. So Massachusetts ships are traveling south.
Q. How do you know that?
A. Based on descriptions in the stock assessment and personal communications with Massachusetts.
Q. Who from Massachusetts?
A. Dr. David Pierce.
Q. How does he know?
A. He's a Massachusetts state regulator.
Q. You haven't talked to any Virginia state regulators to determine where Omega Protein harvests?
A. No.
Q. Why not?
A. Stock assessment scientists are the ones producing the model.
Q. When you say "producing the model", what model?
A. Stock assessment scientists are the ones developing the models. As a manager, I rely on the input of the scientists.

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Q. Is there anyone on the Department of Natural Resources staff that inquires as to the validity of the science coming out of ASMFC?
A. To the extent that the Department of Natural Resources may participate in developing the terms of reference for an independent peer review and stock assessment.
Q. I don't understand the answer. Is there someone who is reviewing the validity of the science? And if so, who?
A. There is no one at DNR directly reviewing the validity of the stock assessment out of the stock assessment. That is done by the independent experts.
Q. Going back to my question about discussion or debate of the lack of data north of New Jersey. Have you had any conversations with anyone about the lack of data or stock assessment north of New Jersey?
THE WITNESS: Can you repeat the last part of that question.

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(The reporter read back as requested.)
THE WITNESS: Yes. It's been discussed at the Management Board. I believe it's on the record.
BY MR. BLOMQUIST:
Q. When you say the "Management Board", you're talking about ASMFC?
A. Yes.
Q. And when you say "it's on the record", what do you mean by that?
A. The transcripts are available on the website.
Q. Okay. Other than -- so that's when you are actually sitting in a formal Board meeting and getting either reports from staff or from subcommittees or committees or having some discussion about the Board members --
A. Yes.
Q. Outside of discussion at a Board meeting, have you discussed that with anyone?
A. Yes.
Q. Who and when?

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Those are what those benchmarks adopted via -- when I say benchmarks, those are what the fishing morality rate target and threshold adopted in Addendum 5 were based on. And the bulk of that is in the record of the ASMFC --

BY MR. BLOMQUIST:

Q. But you haven't answered my question. Did any of the species compared have as little data as there is on the menhaden? And particular as little data as in the last 20 years?

MS. WAZENSKI: Objection to form. You may answer, if you can.

THE WITNESS: I have not in detail reviewed all of the stocks that they reviewed in comparison to menhaden. But it is, among others, it's not the only paper out there that has reached this conclusion. It has been, it is in the peer-reviewed scientific literature. So as a manager, I rely on peer review scientific literature.

BY MR. BLOMQUIST:

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Q. What is in the peer reviewed scientific literature?

A. The articles citing appropriate reference points for managed fish stock.

Q. Before we get to the reference points, my question was, was there a formula for determining overfishing or a model for determining overfishing?

A. Overfishing, the state of overfishing is determined through a stock assessment. That is the stock assessment, that 2012, that is the formula.

Q. Everything is determined through a stock assessment. If you don't have an assessment of the stock, you can't determine whether there's overfishing, you can't determine what the projected time is for recovery of the species, you can't make any determinations without a stock assessment.

So we agree that the stock assessment is the basis. And do you agree, I think you have agreed, one of the most important parts of the population, the northern population, the age and the fecundity of that population, there's very scant

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data relative to it in the last 20 years. So --

MS. WAZENSKI: Objection to form. If you are able to answer that question.

THE WITNESS: That wasn't a question. That was --

MS. WAZENSKI: I believe somewhere in there was "don't you agree".

THE WITNESS: I believe I agreed. It's an oversimplification of what I agreed to. What is the question? What is the meat of the, the guts of the question?

BY MR. BLOMQUIST:

Q. Just continually going back and saying it's based on the stock assessment doesn't answer the question was there a formula for determining overfishing?

A. Define formula. Define formula.

Q. Could have all different kinds. You could look at F current versus F maximum spawning yield divided by that. And if it's greater than 1, there is overfishing. If it's less, there is not

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overfishing.

There's different ratios. I want to know, is there a formula, did you use a formula to make your overfishing determination or did you just look at the stock assessment and say it's overfished?

A. I understand the question now. The formula is, is the ratio of F divided by F threshold. If that number is greater than 1, in other words, if F threshold is 1 and your F3 is 2, you are overfishing. Does that answer your question?

Q. Yes. I'm sorry. I may have asked it very inartfully. That's what I was trying to understand.

A. We are good. By the way, that is in that table we were referring to earlier, those ratios.

Q. Right. That's where I think we had the 151 and the 152 or something. In other words, there was a difference of several hundredths. I'm with you.

Now the F threshold is what you're

BURL LEWIS, et al.		IN THE
	Plaintiffs	CIRCUIT COURT
vs.		FOR
MARYLAND DEPARTMENT OF		DORCHESTER COUNTY
NATURAL RESOURCES, et al.		Case No. 09-C-13-020925
	Defendants	
_____/		

The deposition of ALEXEI SHAROV, Ph.D., was held on Wednesday, March 5, 2014, commencing at 9:00 a.m., at the offices of the Department of Natural Resources, 580 Taylor Avenue, Annapolis, Maryland 21401, before Ronald E. Bennett, Notary Public.

REPORTED BY: Ronald E. Bennett

EXHIBIT
tabbies
ATCH 5

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Deposition of ALEXEI F. SHAROV, Ph.D.

March 5, 2014

PROCEEDINGS

Whereupon,

ALEXEI F. SHAROV, Ph.D.,

called as a witness, having been first duly sworn to tell the truth, the whole truth, and nothing but the truth, was examined and testified as follows:

EXAMINATION BY MR. BLOMQUIST

BY MR. BLOMQUIST:

Q. Have you ever been deposed before?

A. No.

Q. I'm going to be asking you a series of questions. I obviously represent the watermen in the case concerning the regulations. If at any time you don't understand one of my questions, please get it clarified.

A. Okay.

Q. And just as you just did, you have been nodding your head. I know you are following what I'm saying and I'm following your responses. It's important to say yes, no and verbalize your responses, not uh-huh, unh-huh or nods of the head

and things of that nature.

A. I understand. Okay. I'll try.

Q. We'll all try. And if you catch me, you can hit me. And if I catch you doing that, I'll hit you and try to make sure we have a record.

MS. WAZENSKI: There will be no physical contact.

BY MR. BLOMQUIST:

Q. If at anytime you need to take a break, let me know. I would ask you not to take a break while a question is pending. Anytime other than when a question is pending, if you need a break, you can let us know and we'll take a break.

Do you have any questions about the process?

A. No. But if I have any question during the process, can I ask?

Q. Absolutely. We want you to. Because the purpose is to get a clear understanding of what your understanding is. It's not a test type of thing. It's conveying of information.

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in it.
MR. BLOMQUIST: Let's mark this as Exhibit 1.
(Sharov Exhibit 1 marked for purposes of identification.)
Q. For the record, I think we had some question it was spelled one way on your email and spelled a different way on your resume.
Can you spell your complete name.
A. A-L-E-X-E-I, F. S-H-A-R-O-V. There is a misspelling in my email attribute. There's a missing "E" in there.
Q. That's why I wanted to make sure.
A. That's what the IT did when they sign up for my email address. It's never been corrected.
Q. I'm showing you what has been marked as Exhibit 1. Have you seen that document before? Have you seen those documents before?
A. Yes.
Q. For the record, it runs from DNR 2705 to DNR 2722.

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Who is Bill Goldsborough?
A. Bill Goldsborough is the scientist with Chesapeake Bay Foundation.
Q. What is his field of expertise?
A. I believe he's a fishery biologist.
Q. Why do you say that?
A. I don't know what his formal training is.
Q. I mean, why do you say he's a fishery biologist?
A. By the nature of my interactions with him, as he represents the Chesapeake Bay Foundation at the various meetings. He's also a representative of the State of Maryland on the Atlantic Menhaden Management Board. One of the three representatives.
Q. And the other two representatives are Ms. Fegley?
A. Ms. Fegley.
Q. On behalf of the Governor?
A. Yes.
Q. And their representative is generally Dize?

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A. Currently, yes. It's usually --
Q. Representative of a political figure?
A. Yes.
Q. Russell Dize was the representative during the period when the modeling and the Amendment 2 to the Atlantic States Marine Fisheries Commission, Fishery Management Plan for Menhaden was adopted?
A. You mean the Addendum 2. I believe so, yes. We could double check that.
Q. But, I mean, it's your recollection, as we sit here today, that he was the other representative during that time period?
A. It's my recollection, yes.
Q. What was the purpose of sending information to Mr. Goldsborough about what was happening with the development of the stock assessments?
A. Right. These are the memos from the technical committee that were prepared for the management board. So this was just simply to inform as to what the information that technical committee

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has prepared for the management board with respect to technical advice.
Q. Is there any reason why Russell Dize or Senator Colburn were not copied on this?
A. I assume that this was as a result of the request, response to, maybe to his email asking as to whether the technical committee has developed the memos. Because both memos were produced in response to the board request, the management board request of which he's a member.
Q. Both -- what did you say?
A. Both memos that are here.
Q. But the attachment you are saying to this email?
A. Yes. This attachment are the product of the technical committee recommendations that were produced at the request of the management board.
Q. Let's go to the second page, July 16, 2012, memo. What were the problems that were presented and discussed in this memo?
A. Right. So the problem that is defined as

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the problem in the, statement of the problem in this document is simply a reminder to the management board that we have, since the 2010, the previous benchmark assessment in 2010, we have changed the fishing mortality reference points. But we have not changed --

MS. WAZENSKI: Can you let him finish the answer before you ask another question.

THE WITNESS: Yes. So we changed the fishing mortality reference points. But spawning stock biomass reference points have not been modified after the 2010 assessment.

So conceptually they were not matching each other. And that is the purpose of this whole memo is to explain, to advise the board that it will be best for the board in the TC's opinion to revise the spawning stock biomass reference points to bring them in line with the fishing mortality reference points.

BY MR. BLOMQUIST:

Q. Okay. What was the change to the fishing

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mortality reference points?

A. What was the change? The fishing mortality reference points that were adopted by the board were more conservative than the mortality reference points that existed prior to that. That was in response to the peer review of the previous stock assessment.

Q. And who conducted the peer review of the previous stock assessment?

A. The peer review was conducted by independent scientists, fishery stock assessment scientists that are hired by the Center of Independent Reviews, CIE.

Q. What is the Center of Independent Reviews?

A. What is?

Q. Yes. Is it a government organization?

A. I don't think so. I don't know for sure. They are associated with University of Miami. The center is regularly being used by the National Marine Fishery Service that apparently considers the Center of Independent Reviews a source of truly

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independent reviews or other place which can provide such reviews.

Q. When you say "fishing mortality", is there a symbol for fishing mortality?

A. Yes. Traditionally in fishery science the capital letter "F" is being used as the determination of the fishing mortality. It's a short-term.

Q. And when you say "fishing mortalities", is that all mortalities?

A. It's a mortality related to the fishing activity, which would include the act of the actual catch, as well as the discards, discarded fish that die as a result of --

Q. Would what is represented by "M" be all mortalities?

A. The "M" is the term that is being used for what we call natural mortality, mortality that is due to all natural causes such as gradation, disease, et cetera.

Q. What is SSB Med?

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A. It's the, what we call SSB Med is the spawning stock biomass that corresponds to the median fishing mortality. Med is short-term for median.

Q. And how is that determined?

A. The estimate of the fishing mortality, the median fishing mortality is the F Med. It's estimated based on the stock assessment results where you run the stock assessment model and you obtain time series of fishing mortalities where you would have an estimate for each year of the analysis.

And then you calculate the median fishing mortality from that. And then you take the median recruitment for that period.

Q. And how is median recruitment determined?

A. The median recruitment is determined as the, effectively as the median value from estimates obtained by the assessment model.

In other words, you run the assessment model. As a result of the modeling

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analysis we have an estimate of recruitment for each year of the analysis. Say, for example, from 1955 through 2010, for each year we have an estimate of the age zero menhaden of so many billion fish. So you have --

Q. When you say "age zero", that's the same as young of --

A. That's the same as young-of-the-year. That is what we use as the term for recruitment, the age zero fish.

Q. And is there data that is used to provide or to determine what the age zero fish are?

A. You mean in terms of the absolute abundance or define what is the age zero?

Q. Well, I'm trying to figure out how recruitment is determined.

A. Okay.

Q. I understand what you mean by recruitment is, recruitment is all age zero fish or young-of-year fish that are added to the stock in any given year?

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A. Correct.

Q. Is that fishing year or is that calendar year?

A. It's a fishing year which in its assessment runs from March 1st through --

Q. The last day of February. And when you say "in this assessment", are you talking about the 2012 assessment or the 2010 assessment?

A. Either of them.

Q. All right. Was the same model used for both assessments?

A. Yes.

Q. And what was the model?

A. It's a statistical catch at age model. In the document it is defined as B-A-M, Beaufort Assessment Model.

Q. And Beaufort, because it was developed by the NOAA facility in North Carolina?

A. Yes, correct.

Q. And Dr. Young -- I'm sorry. Eric Williams is one of the scientists at Beaufort?

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A. Yes.

Q. How long has he been a scientist at Beaufort?

A. I don't know the exact --

Q. Significant period of time?

A. In my recollection probably slightly over ten years.

Q. Was he familiar with that model?

A. He's the one who developed it.

Q. How do you know he developed the model?

A. From personal direction.

Q. And would you agree, he would be an expert on that model?

A. Absolutely.

Q. Is the Beaufort Assessment Model premised on the assumption that all age 3 plus menhaden are fully recruited to the fishery?

A. Age 3 plus, yes.

Q. What does that mean?

A. That means that the age 3 and older menhaden experienced the highest mortality levels

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among all age groups of menhaden within any particular year.

In other words, concept of fishery selectivity in fishery science suggests that, when we apply fishing effort to catch the fish, different age groups of any population experience different levels of fishing pressures, fishing mortality.

And some are as a result of fishing activity, some ages are exploited lighter and some heavier. In other words, we take a higher percentage of certain age groups and lower percentage of other age groups.

And usually for younger ages you have a lower fishing mortality and for older ages higher, because of, for example, the impact of the netting. So that the small fish can escape and some undersized fish are escaping, but the larger and older fish are fully retained.

And for that reason in fisheries models often the selectivity curve is used, where your fishing mortality, if you would flood it across

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the ages, it goes up and then reaches the maximum. And at certain age fish of certain age and older experience that highest level of fishing mortality, which is called Full F. You will find that in the assessment document, full fishing mortality.

That is the fishing mortality that is highest of the age groups and it's usually, in case of menhaden, that's what is referred to in the BAM model was ages 3 and older. I'm sorry, if it was too long.

Q. No, no. I'm trying to understand it as a layman.

A. Yes.

Q. And why was it important that the fishing mortality benchmark matched the spawning stock biomass benchmark?

A. The fishing mortality levels that were selected to be the target as threshold, the so-called F15 percent and F30 percent, are essèntially fishing morality levels that will result in the long-term in the population having about

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15 percent of the spawning potential available for spawning or 30 percent that say, if we fish at the fishing mortality that we call F15 percent, what that means is, the fishing mortality level that will result in the number of spawners that will survive and spawn, if we would estimate their total biomass and total number of eggs, this would be equivalent to 15 percent of eggs compared to the unfished population.

And spawning with the F30 percent means that this is the fishing mortality and if we keep it indefinitely, despite all the variability on average, the spawning stock biomass would be equivalent to 30 percent of the spawning stock biomass of the unfished population.

So obviously then, if we are theoretically able to maintain fishing mortality at F15 percent, our spawning stock biomass should be generally equivalent to the 15 percent of the unfished population.

So that's why the technical committee

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advised to the board that, if we choose fishing mortality target and threshold of this level, then we should pick the spawning stock biomass target and threshold levels that biologically and logically connected to fishing mortality targets and thresholds.

Q. Why?

A. Well, it's because, like I said, if I were God, and I could set fishing mortality constant and keep it straight through 500 years, and I would be able to measure spawning stock biomass each year, that spawning stock biomass would be equivalent to the 15 percent because -- so that's how the numbers work.

Q. Well, do you assume a linear relationship -- does that assume a linear relationship between the ability of certain ages to spawn and how many eggs and ovaries they release?

A. No. It's not linear relationship, but the concept is similar to what you are thinking. That is, we start with the level of recruitment and we

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have an estimate of natural mortality. And we have an estimate of fishing mortality, which is 15 percent.

And we have an estimate of growth rates and we have an estimate of fecundity and we have an estimate of fishery selectivity. And we put it all -- and project how the population will change, you know, from age zero to age 1, to age 2, to age 3 and so on until it dies as the year climbs.

And so, yes, if you would keep the parameters constant, that's what you would end up with.

Q. I'm just trying to understand how that works for menhaden. My understanding for menhaden is that the amount of ovaries increases geometrically as the fish ages, not linearly?

A. Yes, you are right. That is the reason why we in this assessment the menhaden spawning potential is defined in the numbers of eggs, not in the spawning stock biomass, not in the weight of fish, but in the numbers of eggs.

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variable distribution of ages of fish along the Atlantic Coast.

All taken together, as a result of their fishing, their choices they are making where to catch the fish in Chesapeake Bay or in New Jersey or in Massachusetts.

Collectively we remove fish of certain sizes and certain ages, not because we choose to do specifically that. But that's how it works altogether.

The model in the end attempts to accomplish cumulative effect of the fishery on the population. And so we are trying to estimate the fishing mortality like in that F15 percent that will accommodate the existing structure of the fishery.

That is, we assume that the fishery and the fishermen will continue to operate the way they will operate. And given this level of fishing mortality and their way of fishing, we will end up with the spawning stock potential of 15 percent.

I don't know if that answers your

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question? I'll try the other way around that is, if you would try to save specifically older fish, that may require an additional modification of the fishery, that is, you will have to tell fishermen you cannot catch them here, but you cannot use this particular fishing gear, because you will be catching too many of the older fish.

This way you essentially are saying, we assume that the fishery will continue to operate the way it's operated. We only will limit the rate of the removals.

BY MR. BLOMQUIST:

Q. When you say you assume that it will operate the way it's currently operational, there's significant differences in the gear that is allowed to be used from state to state?

A. Yes.

Q. How does the model account for that?

A. The model does not account for every single pound net or every single gill net or every single purse seine.

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The way the model accounts for it is through the data on the total landings in terms of the weight, the total landings in terms of the total number of fish that were harvested along the coast and the size and the egg structure of the catch.

That's how it accounts for it. Because there is a huge number of operators or fishermen along the coast and they use different gears. They take bits and pieces from one huge population that moves all around the Atlantic Coast and changes it where they are seasonally, their numbers are changing, there are strong year classes, there are weaker year classes.

But altogether, all that matters is what is the total number of fish of age 1 that we removed collectively, what is the total number of age 2 that removed collectively, et cetera. So that's how it's done.

Q. What if no fish are removed?

A. If no fish were removed, then we would call it unfished population.

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Q. How would you get that on -- in other words, my understanding is with Dr. Sulikowski, if I'm saying that right, Sulikowski described this the northern region of the fishery from the Long Island Sound north to the Nova Scotia Bay there is very little data, because there is very little fishing.

A. Correct.

Q. In other words, Russian ships used to come there, correct?

A. Yes, I'm familiar with that.

Q. The Russian ships left last in what, 1997?

A. No. The last year was 1993. I think that it was a joint venture of the Russian processor and the State of Maine fishermen that were catching the fish, bringing it to the processor. It lasted for about 4 or 5 years.

Q. And the reason Maine was doing that was because they couldn't get a place on land process due to land use issues and other regulatory issues, correct?

What is your understanding of why

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Russian ships were brought in to process menhaden, as opposed to doing processing on land in the states?
A. As far as I recall, there were no processing plants in the Gulf of Maine. So for that reason, obviously, there was no processor. And I would speculate that the --
MS. WAZENSKI: Don't speculate.
THE WITNESS: Okay.
BY MR. BLOMQUIST:
Q. I think you have answered the question. In other words, there no longer are any reduction factories in New England, right?
MS. WAZENSKI: Objection. That is not what he said. If you can answer the question, you may.
THE WITNESS: All right. So that I'm not confused, can you ask the question again.
BY MR. BLOMQUIST:
Q. Sure. There are no longer any reduction fisheries in New England for menhaden, correct?

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A. Yes, correct.
Q. And the services that were being provided by the Russian ships were equivalent to the services that would be provided by a reduction processing facility?
A. Correct. I would agree with that.
Q. So once the Russians left in 1993, the amount of fishing or the amount of stock fished from the Long Island Sound through to Nova Scotia is now diminutus, right?
A. Yes.
Q. Therefore, there's not really continuing data about what, if any, stock inhabits that region?
A. There is a little bit of data. If you are saying there is no data in terms of the size of landings, there are no landings because there are no appreciable -- no appreciable sighting of menhaden in the region.
The joint venture, the reduction of menhaden in the Gulf of Maine stopped because the fish disappeared. There were no more as large and

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older menhaden as they used to catch. That is the reason why it stopped.
Q. How do you know?
A. Generally it's common knowledge, but, I guess, my major source would be information as Mr. Joseph Smith from Beaufort Laboratory National Fishery Service, who historically has been collecting, is in charge of collecting the catch, menhaden catch data on the Atlantic Coast.
Has been doing this for over 30 years, I would say, or maybe more. So he's the principal, you know, data depository person at Beaufort Laboratory.
Q. But you would agree, there would be no reason for New England fishermen to go out and fish the way they used to do, when they were getting reduction processing, because there's no reduction factory for them?
A. There is no fishery, if menhaden were present in the Gulf of Maine, they would have caught them. They weren't there.

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Q. Why do you say they would have caught them?
A. Because there is always a market. There's a bait market. And, as we know, for example, like in recent years there is very high demand for the bait. Which clearly is demonstrated in the significant increase in the bait fish landings of menhaden along the coast.
Q. What gear does Maine allow to be used for menhaden fishing?
A. I would have to look at -- if you want me --
Q. If you don't know, say "I don't know."
A. Yeah, I don't know. Clearly they used to use purse seines. That's how they used to catch. And they also use trawls, catch herring with trawls. If menhaden are present, and they could catch them with trawl, they would have caught with a trawl.
But menhaden is being caught in, just a little bit south of Maine, in Rhode Island. Whenever they are available, they catch them.

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A. You mean in terms of the absolute numbers?
Q. Yes.
A. That probably we could look at the Table 1 comparison.
Q. Just for the record, you are looking at Table 1 on Page 2708?
A. Yes, correct. So this table provides a comparison of different variables, including the SSB median and SSB 15 percent and SSB 30 percent. They were estimated by the model using different model runs, as we call them, or different versions of model runs.
Q. And when you do model runs, different versions of model runs, are you changing some of the assumptions in the runs?
A. Yes.
Q. And so, when I see this left-hand column on this table with different descriptions, that description is kind of how you characterize for the technical committee the assumptions upon which the particular model is being run?

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A. Correct. Yes.
Q. All right. And now you were going to tell me the difference between SSB median versus the SSB 15 percent. And I assume that SSB 15 percent is just a typographical error?
A. It is a typographical error.
Q. And SSB 30 percent?
A. Correct. So the numbers that are here show that the SSB 15 percent and SSB 30 percent are higher overall in terms of absolute numbers.
Q. Well, the first question, just so I'm clear, what are these numbers; what is being measured? Is it number of fish, poundage of fish, metric tons?
A. No. As I said earlier, generally the SSB, always reported in terms of the number of eggs.
Q. All right. And so for the base run, the very first row, if you will, SSB median is 19,092. 19,092 represents what?
A. This would be number of eggs. But it's not -- there is not a full description in terms of

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the units, I think, because we generally reported in trillions of eggs.
Q. Here it says billions?
A. Right. So 19 trillions, right. So 19 trillions for the SSB Med in base run versus 30 billion in SSB 15 and 61 billion, sorry, trillion for SSB 30.
Q. So was the debate over whether you're going to make that, in other words, under the benchmark that was being used in 2012, prior to the Amendment 2, the benchmark was 19 trillion, correct?
A. Yes, correct.
Q. And after the amendment the threshold was 30 trillion, the benchmark was 61 trillion?
A. They are both benchmarks, the target. Threshold, which is the lower number and the target number --
Q. Which number do you regulate to?
A. I don't regulate.
Q. When the catch limits were -- did you make a recommendations as to which number to regulate to,

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the technical committee?
A. No, I didn't.
Q. Why not?
A. Because the technical committee concluded that the assessment results were robust enough to determine that the overfishing is occurring, which means that the fishing mortality is exceeding the threshold level of fishing mortality.
But the committee could not conclude with the confidence that the stock is being overfished. And the committee was not confident with the final year estimates of the spawning stock biomass because of some uncertainties in the model based on the, what we call sensitivity analysis.
Q. On what you called what?
A. Sensitivity analysis.
Q. All right. And what is the sensitivity analysis?
A. That is what we talked about earlier on this Table 1, when after you do your base run, which is -- you evaluate your data, the data workshop, you

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2009 benchmark.
A. Yes.
Q. So he's disagreeing with you, correct?
MS. WAZENSKI: I'm going to object to your question to the extent that they are asking him to step into the mind of the person asking. If you want to ask what he understood Rob to mean, that's one thing.
MR. BLOMQUIST: Okay. All my questions are what your understanding is. That's all I can get. I'm not asking you to step into the mind of anyone. I'm asking for your understanding with respect to what's happening here.
THE WITNESS: My understanding here with respect to Rob Latour's comment is that, he's not necessarily arguing with us. He's making a comment in relation to the uncertainty in the assessment update, the lack of full confidence due to the fact that the committee could not say to what extent are we overfishing.
So he reminds us that in the Federal

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System, if the assessment is uncertain or if people are questioning it, the default is then that, if we cannot use this knowledge, this analysis for the management purposes, then our only last accepted information is the previous assessment. That's what he's trying to say.
BY MR. BLOMQUIST:
Q. He said the 2009 benchmark. It was done in 2009, but it was published and agreed upon by the management committee in 2010, correct?
A. Yes.
Q. And then you state: The reason -- you state something to the effect, because I'm not saying this is not a word-for-word transcript.
The reasons we are not confident with the current assessment are 100 percent applicable to the previous assessment.
What do you mean by that?
A. Well, at least at that time my reasoning was that based -- we conducted limited number of the sensitivity runs. I mean we couldn't do 100 of

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different, and not that necessarily we needed to.
But of the runs that we have conducted, most of them told us, that they confirmed each other, they were not different. Only one that was different was where you assign a dome shape selectivity to both fisheries.
And what I was saying, if you would do this the same in 2010 assessment, you will get the similar results. And, therefore, you know, had we done this before, we probably would have been, you know, equally debating whether, you know, we are confident or not confident. That's what I was trying to convey.
Q. Although you had not actually run the data with the different --
A. No, I didn't.
Q. -- sensitivities, selectivities for the 2009 data?
A. Yes. It was my personal opinion that, I felt that, you know, like when five runs, you know, show you that they are altogether, they are giving

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you the same picture. And you have only one run that is different, I personally felt that we had more confidence in the results.
But the group disagreed with me. And then that's normal. We are always, you know, we have to come up with a consensus in the end. But we go back and forth.
So the committee was more cautious than I preferred, the majority. I personally felt, I thought that the results were more convincing from my point of view.
Q. All right. And skipping down. So Lewis -- Lewis would be who?
A. Daniels. The chair of the management board.
Q. And he's listed under "public" on the attendance. What does that mean? He's not part of the technical committee. He's just someone who is on the conference call outside of the technical committee?
A. I would -- yes. He was certainly not a

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the one single coast wide juvenile index to present a panel of figures that would show state specific juvenile indices and their trends.

So that those could be compared and deal with the other local indices or regional catch and see if there's any regional processes that we could be overlooking by looking only at the coastal.

Q. Makes sense. I'm with you. And then Lewis: Whether it's correct or not, that is the perception of the board that we have been studying this stock for years and now there is a hesitancy to say much of anything about the stock.

What does that refer to?

A. Well, that is because the -- it's unfortunate that the species was, I mean it certainly became, from the species that nobody cared about because it's smelled so badly to a species that all of a sudden and growingly everybody was concerned about.

I mean 20 years ago nobody knew what menhaden is. And now people are more

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environmentally concerned and so they know about menhaden it's a consistent function. It's more important commercially for, you know, bait fishery or reduction fishery --

Q. Has there been any change --

MS. WAZENSKI: I'm going to object. If you could let him finish his answer to the last question. He was still answering.

THE WITNESS: Yes. I lost myself. I'm trying to --

BY MR. BLOMQUIST:

Q. You were telling me about how there's more public attention.

A. Right. What was the original question? I got it. Generally I think Lewis expressed his -- he was saying that we have been talking about stock for years. We studied it for years.

We had a model that we built and was a technical committee. And for two benchmarks in a row we found that no fishing was, there was no overfishing; overfishing was not occurring.

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Then with the last one we said finally, well, this time the model says overfishing is occurring. And even more so that overfishing has been occurring in the past very frequently. That's what the outcome of the 2010 was, that fishing mortality has been shown to be over threshold for many years in the past.

And so the board finally under, based on this information and based on the pressure from certain public groups --

Q. Environmental groups.

A. Was finally getting ready to make some action. Then we do an update and we come and we say we are not totally certain whether the model tells us everything that we want to know.

So that was the frustration that, when they were ready to act, the technical committee all of a sudden started saying that we are not fully confident in the model results.

Q. Has there been an increase in the last five years in social and political pressure to do

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something about menhaden?

A. It's hard for me to say -- I mean not necessarily five years, but I could say that in general through my roughly, I guess, 15 years or so of being familiar with the problem, there was much more, there was growing awareness and involvement I would say on both sides, if I could say that -- environmentalists and the industry as well. So, yes.

Q. All right. Certainly the fact that the Chesapeake Bay Foundation had someone on the management board shows their involvement, correct?

A. Well, Goldsborough -- I forget what his official -- governor's designee.

Q. Bill Goldsborough. He's one of the Governor's designees.

Then Eric -- I assume that is Eric Williams, says something to the effect, to be fair, we have really only collected fishery catch at age data over the history of this stock. We don't have any reliable coast wide indices, so we really don't

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have all that much information on this stock.
What do you think that he was referring to?
A. Well, he is the stock assessment committee chair. He was the person who developed the model. He knows the data very well. He knows the model even better than the data.
The principal challenge with this assessment is that in an ideal situation we would always want to have a reliable index of the adult fish abundance and in some cases for other species we even have it by age group.
So we have an index, for example, for striped bass, we have an index of age 5, 6, 10, 15. In case of menhaden we don't have a true coast wide index of adult fish abundance.
The only index that we had, and we have used it in several stock assessments, and certainly in the history of this model, is the PRFC pound net index. The committee recognized it and reported it as the principal drawback for the weak

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points of the assessment.
And we said, there is lack of coast wide adult abundance index. Because the population is distributed from Florida to Maine. Of course, those are, you know, boundaries but still we are using the only thing that was available to us in terms of the adult index was the one that was based on the Potomac River Fisheries Commission.
Q. Which really targets 1 and 2 year olds?
A. Yes.
Q. And some with 3 year olds. But clearly, you know, older fish are not very frequent there. You could catch them in early spring, when they are migrating. But beyond that you are not catching them effectively.
Therefore, the index -- in the absence of anything else, it serves as an index. But we recognize the limiting sort of coverage of that index.
That could be cured with an independent assessment, correct?

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MS. WAZENSKI: I'm going to object to form. If you know what he means by that, you may answer.
THE WITNESS: Well, I mean, if you could repeat --
BY MR. BLOMQUIST:
Q. That could be cured with an independent survey, correct?
A. Yes. Well, not just independent. Ideally it should be fishery independent and ideally it should cover at least the major range of the stock.
Yes, we argued that when we use the PRFC because the PRFC index, it's an index from area of the center of the population distribution. Mid Atlantic area is the center of the menhaden distribution.
But it certainly does not cover spatially the true range. And as you probably read, maybe you have questions about the, this spatial coverage and we had this discussion of how potentially we could develop this index of coast

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wide abundance in the future.
So that's what Eric says. To be fair, we don't have a good coast wide index. True.
Q. And you agree with that statement?
A. Yes. We don't have a coast wide, you know, a good reliable coast wide index.
MR. BLOMQUIST: All right. We'll break now.

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AFTERNOON SESSION 12:45 p.m.
BY MR. BLOMQUIST:
Q. Continuing at the bottom of Page DNR 2720, alternatives to projections for setting quotas.
You pose a question -- so are we more comfortable with this ad hoc approach, using projections from the previous benchmark?
Matt's response is, what has been used in similar situations throughout the country. Eric responds, and I assume that is Dr. Williams, the difference with this situation is that we stand a good chance of producing a better assessment with the next benchmark. In many cases there is little hope of achieving a better stock assessment in the short-term.
What is your understanding of what Dr. Williams was trying to encompass with that comment?
A. Well, there is just a difference of opinion. I personally felt that we could rely more on the 2012 assessment update. It was my personal

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view. Eric's view was because of the uncertainty of the issues that we have identified, we shouldn't be rushing and making management decisions based on that.
And be cautious and work, since we identified issues, work towards resolving those issues through the next benchmark assessment, which is what they are currently working on.
Q. On the next page Lewis says: According to scuttlebutt blogs, et cetera, there is a sense we have got to do something given the biomass is at an all time low and the age structure is truncated. Does the technical committee agree with these statements about the stock?
What is the scuttlebutt blogs; do you know what Lewis was referring to with that comment?
A. I don't know. I'm not supposed to speculate.
Q. But you can tell me what your understanding is.
A. My understanding would be that --

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MS. WAZENSKI: If you have an understanding. Don't make one up.
THE WITNESS: No, no, no. Yes, I do have an understanding, that we reported that the assessment results. And according to the assessment results, unfortunately, the recruitment seemed to be next to the lowest in time series. I think 2011 estimated recruitment.
So the general sense of the assessment was, despite all the fluctuations that the population size in absolute numbers is declining. And the most recent recruitment was nearly the lowest on record.
And that said, the public, the environmentalists and whatever, affirmative that the management board, the commission needs to do something to improve the status of the menhaden population. That's what he was referring to.
BY MR. BLOMQUIST:
Q. I think what you said was that the 2011 recruitment was an all time low, correct?

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A. Nearly. Second to the lowest. You could see in the graph, yes.
Q. And, again, just so I'm clear. So 2011 recruitment would be the measure 2011 year or beyond?
A. Yes.
Q. And I guess -- how familiar are you with the 2013 catch numbers of the different jurisdictions?
A. Not familiar at all except for Maryland.
Q. Okay. It's true in 2013 Maryland went on to the catch limits, correct?
A. As required, yes.
Q. And even though it went on to the catch limits, it had a very good harvest in light of the catch limits, didn't it?
MS. WAZENSKI: Objection to form. You can answer, if you are able.
THE WITNESS: Well, I mean good harvest relative to the historical harvest, right.
BY MR. BLOMQUIST:

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nonetheless. That's what he's pointing out.
Q. All right. I think you had said that the juvenile abundance index for Virginia was very good in 2010?
A. Probably '09. Because I was comparing the 2011, the data on 2011 landings with the juvenile index. I think it should be two year lag because mostly age 2 fish. So most likely was the 2009 juvenile index. Unfortunately, we did not include the state specific indices, but if we find a graph and we will probably see that.
Q. In other words, that's one of your observations, as you have been working in this fishery, if you have a good young-of-year or juvenile recruitment index, then in the Mid Atlantic region you might expect to see the harvest increase two years after that since the majority of harvest in this kind of mouth of the region is two year?
A. I personally did the analysis with the Maryland juvenile index not, and not only me, other people before me did that as well. A colleague of

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mine James Abcott from Maryland DNR as well, has looked at -- Maryland juvenile index, take it, you know, from longterm perspective, seemed to be providing a relatively good indication of the strength of the year class.
I didn't work that much with Virginia data. There was only one particular observation of that particular year with a particular outcome. But overall in my own experience I know that, if we would look at the Maryland juvenile index, whenever we had a strong year class, like two years later, we would certainly see an increase in landing see there, you know, for the whole Chesapeake Bay or Maryland or Virginia, et cetera.
It's not -- the correlation was not very strong but sufficiently strong.
Q. I want to show you what we marked yesterday as Fegley Deposition Exhibit 2A. And when we talk about the index, are you talking about the -- I keep wanting to say geometric mean index. Is that right?

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A. Yes. A different way of mathematically calculating the index.
Q. I think one of these, it may not -- is a Bay wide?
A. Right.
Q. 2C from Ms. Fegley's deposition was a Bay wide. What you're saying is, you have looked at it and you think there is a correlation between what you see as Bay wide geometric mean index for juvenile abundance with what you see approximately two years later in terms of harvest?
A. Yes. But that is for the long time period which includes the juvenile index that historically was much, much higher than what we observe recently.
So the past 20 years we have nearly flat and very low juvenile abundance. So just plot it like from '91 through 2013, then, yes, there will be like, for example, 2005 is certainly like a peak in the recruitment index in the past 20 years history.
And then you could find some

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indication of the increased harvest in '07. But that certainly fades compared to the, you know, the full-scale of the events when we include the history of JAI and --
Q. The '70 to the '90 timeframe?
A. Right.
Q. All right. I think I understand what you are saying. From a statistical standpoint how much, how much of an impact does fluctuation in the Maryland harvest have on the overall coast wide population?
A. Well, this is not even statistics in terms of the statistics as a science of uncertainty, but statistics in terms of just simply telling the results can tell you that overall coast wide of the total harvest Virginia takes 85 percent, New Jersey 11 percent, each with decimal points. So together that's 96-point something percent.
So the rest of it, 3 and something percent of the total coast wide harvest, that's Maryland and what, 12 other states?

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A. No. Certainly not. I would not -- I could disagree, and probably would disagree with the conclusions, but not with respect to the process or what they reported. I totally believe that what they reported they saw and measured, and saw and measured.
Q. As I read the report, you know, I could be mistaken, as I read the report, they at least got samples, biological samples and surrounded and confirmed the range specified by the aerial survey as being the mass that was then existed from the ground tripping, if you will, from the ships going out and seining and circling.
And they took biological samples that were supposedly sent to Beaufort. I don't know what happened. There's no report of the outcome of what those biological samples -- actually there is a report of what those biological samples showed?
MS. WAZENSKI: Is there a question in that?
BY MR. BLOMQUIST:

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Q. Whatever is reported in that regard, you would say that's accurate?
MS. WAZENSKI: I'm going to object.
THE WITNESS: I have no means of disputing it.
BY MR. BLOMQUIST:
Q. Was this report submitted or presented to the technical committee on menhaden for ASMFC?
A. It was presented at the technical committee meeting.
Q. Was it presented just by way of a paper report or was there --
A. Dr. Sulikowski was present.
Q. There was an opportunity for question and answer?
A. Yes.
Q. And I'll show you what we marked yesterday as Fegley Deposition Exhibit 4. You recall that as being the report that was presented to the technical committee and a report that you have seen before?
A. Yes, I believe that is the report that was

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presented.
Q. What, if anything, did the technical committee do with the data or information contained in that report?
A. There has to be -- I believe that there was a report or at least a comment from the technical committee to the management board that was served by the TC, by the technical committee, to the management board with respect to TC evaluation of the report.
My recollection was that the TC had looked at it as a pilot study. That certainly the only sets, sort of the initial means of developing an estimation procedure for the future.
But the TC didn't feel like the direct results would have been applicable immediately or the results of this particular observations have any meaning in terms of the stock assessment or status.
Q. Why?
A. Because the survey was opportunistic; that

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is, that there was no specific, you know, statistical design. And despite the coverage they tried, they covered sufficient distances, but still in terms of the actual area covered.
Q. How they covered it you mean?
A. No, the actual total area of coverage was really small. And it was not done in any sort of randomized design where you could expand the results to the area. The expansion they were trying to make is that, you know, to a total area. That's what is questionable.
Q. In other words, the significance they were trying to import for the data that they collected was questionable?
A. Right. The inferences. That is, yes, by flying over this range, they encountered 8 or 9 schools. Which, you know, total to the estimated, you know, so many thousands of menhaden. But expanding this to a total area of the potential area of the habitat of menhaden in New England waters was not appropriate.

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Q. I'm following what you said. Was there any discussion among technical committee members that the report raised a concern about the lack of either fishery dependent or fishery independent data that was being collected in the northern or New England region?
A. I would say the opposite. The report in itself is the reaction to the technical committee long-term discussions of the lack of the coast wide -- of abundance or insufficient amount of sampling effort in New England waters or waters say north of New Jersey with respect to the status of the population there.
Because so far the only information that we get the collections are from, you know, smaller artisanal type of fishing for menhaden for wide information on size and age structure but not on relative abundance.
Q. And, again, I think what you have defined as artesian is single boat watermen?
A. Yes.

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Q. Is there any size boat typically associated with that type of watermen -- less than 100 feet?
A. I would say probably less than 50 or less than 40.
Q. Fair enough. One-man family type operation?
A. Yes.
Q. And I guess what you just told me is that you think Omega was motivated to conduct the study because of what the technical committee had identified as a lack of information in that northern, in or from that northern region that could be used in the stock assessment process?
A. Right. Generally it was understood that Omega Protein was hoping to demonstrate that there is a lot of menhaden of the older age and larger size present in New England waters.
But normally, when they are present there, there is a good fishery immediately that has been generated around it. And unfortunately that

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part has been missing.
There's like a bait company in Massachusetts, New Hampshire that supplies bait to lobstermen. And they were sending their fleet to New Jersey to catch menhaden for the bait purposes, because they couldn't find any in New England. Why would they burn that much?
Q. Do you know what type of gear or methodologies that were being used by that bait, that New England bait fishery?
A. Well, I'm not totally sure -- certainly either the seine or a trawl. Probably the trawl, that is because what -- the New England folks usually use trawls. But menhaden are good at avoiding trawls.
Q. Because of the noise in that operation?
A. And the water resistance. They are pretty good swimmers. And the water resistance -- the trawl has to move fast enough to keep them from switching to the sides and avoiding them.
Q. Has the technical committee made any

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requests or recommendations with respect to obtaining more information about the population, if any, in the northern region?
A. I think it's perennial research recommendation in the stock assessment reports. We get every stock assessment report. We have the research recommendations and we even tried to arrange, prioritize them. This is one of the highest top priorities.
Clearly, the issue is primarily how can we do that? If there was a fishery, we could have used the fishery. There is no well developed fishery.
So what are the alternatives? Alternatives are fishery independent surveys. In case of menhaden, the only practical, so far, seems to be, aerial survey. But because of the extent of the area it is going to be very expensive.
And so that's -- we even had -- TC had one or two meetings, one workshop, in Virginia where we met with the industry representatives, the

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pilots. And talked about their experience, you know, that Omega Protein is using airplanes to spot menhaden. So those were invited, as well as the pilot who works in Rhode Island.
Q. In the Narragansett Bay?
A. Yes. Was invited as well. And we were discussing the development of the coast wide aerial survey, how it potentially could be done. And even attempted to produce some rough estimates of the amount of effort that would require hours to fly, number of airplanes, pilots, observers, combinations of people watching and counting or having mounted video cameras, et cetera, et cetera.
Q. Did you come to any kind of cost estimate?
A. I believe so. Some rough estimates were produced. But even more than that there is a better news that Robert Latour cited in here. Actually has been the principal investigator.
The project of the study, whatever we call it, funded I believe by Virginia Marine Resources Commission. And I think he was supposed

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to finish, maybe he has finished it, specifically to design such a coast wide aerial survey.
He also worked together with the scientist from the West Coast, who developed similar survey to fly over and estimate abundance of sardines on the Pacific Coast.
So the study design is probably completed. I have not seen the report. It has not been presented to the technical committee. But Rob's feeling is that at some point he will be presenting that. But it will be an issue to the management board or whatever how to fund it.
Q. And do you know any of the sources of funding for the activities of ASMFC?
A. The commission generally doesn't have resources to fund specific projects. Occasionally they funded some. I'm not an expert as to how they budget.
But I do know that -- I happen to be a code DI on the study about 8 or 9 years ago of the wider study here in the Chesapeake Bay, which was

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funded by the commission, by the Atlantic States Marine Fisheries Commission, because it was one of the periods of the peak interest in menhaden and how to try to -- people really wanted to find a way of estimating abundance.
So there was one of the few opportunities when commission, indeed, funded the particular study.
Q. Are you familiar with the book: The Most Important Fish in the Sea?
A. Yes.
Q. Have you read it?
A. Yes.
Q. Does it have any scientific validity?
A. It's very passionate book. But all the interpretations are very emotional. Yes. With a big heart at first. Yes. Written with a big heart.
Q. Not by a scientist?
A. No, not by a scientist.
(Sharov Exhibit 6 marked for purposes of identification.)

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BY MR. BLOMQUIST:
Q. We have marked this as Deposition 6. It starts with DNR 17531 and goes to 17538. And I think it reads from back to front.
MS. WAZENSKI: For the record, there are marks on this exhibit, both highlighter and probably ballpoint ink. Are those in the original document or are those your markings?
MR. BLOMQUIST: I believe those are my markings. They are my markings.
In looking at this I get the sense that this was initially generated by who?
A. Well, we were working on the sections of the stock assessment report update. And so once the draft of each section was prepared by whoever was in charge, those were sent around and we were supposed to comment.
Q. These emails are review and comment?
A. Yes.
Q. And I want to look at DNR 17534, which is Page 4. These comments by Dr. Williams. Here's the

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issue. We have a sentence in Section 10 strawman -- that is -- strawman is draft, I presume?
A. Yes.
Q. Despite these concerns the characterization of the stock is overfished and having overfishing occurring given the newly adopted benchmarks seems robust.
This is incorrect because the newly adopted -- this is incorrect because the current board approved biomass benchmark SSB median and does not indicate an overfished condition.
Furthermore, I would interpret use of the term robust to mean that we have run many different runs and came to the same conclusion. We have not exactly run a whole bunch of runs to test the robustness.
And actually have not computed the stock status from the dome shape selectivity runs because it requires computing new reference points based on the new selectivity pattern.
I think some of this we have already

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discussed.
MS. WAZENSKI: Is there a question?
THE WITNESS: You have not asked a question yet. I'm just encouraging you to ask the question.
BY MR. BLOMQUIST:
Q. The part of this that we discussed is the management committee had not yet changed the spawning stock biomass index from the median to the SSB 15, correct?
A. Yes. He reminds us that the current, at the moment of writing the report, the reference point for the biomass SSB Med.
Q. When this comment was written, was this before the dome shape selectivity that we discussed in the table or Figure 1 in Figure 1 had been run?
A. No. I think he knew exactly the outcomes of the -- the sensitivity runs whether -- so that was probably before the Table 1 was generated.
Q. Okay. It had been run but the table hadn't been generated?

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A. Right.
Q. Gotcha. Is "robust" a term of art?
A. Robust essentially in this context is synonymous to reliable.
Q. In a paragraph in the middle of the page Dr. Williams says: Is a strike tangent, and, again, not being familiar with the ASMFC way of doing things, I am wondering if there is language which defines overfishing, overfished and appropriate reference points? Are the reference points supposed to mirror any type of MSY concept? MSY is --
A. Maximum Sustainable Yield.
Q. Are there any ASMFC definitions of overfishing and overfished?
A. Yes.
Q. Is that in the charter?
A. No. I think it's sort of the -- the rule of the trade or the term of the trade or essentially -- it's to me this is surprising whether, you know, that he raises this question.
Because universally in fishery

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science, well, at least in the past 20 years, the term overfishing is used when fishing mortality exceeds the fishing mortality threshold that is set up by the management plan.
And the term "overfished" is used when this spawning stock biomass falls below the spawn stock biomass threshold that is set by the plan.
It's the same whether Federal Councils. It's the same with National Marine Fishery Service. The MSY is different; that is, the reason he's asking is, because he is so focused on this. He works for the National Marine Fishery Service.
The Federal councils and Federal Stock Assessment Scientists are guided by the Magnuson-Stevens law, which is all based on the concept of MSY, Maximum Sustainable Yield.
So the law requires, it defines -- the law defines an overfishing when the fishing mortality exceeds the F MSY or fishing mortality

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at age determined?
A. Well, generally through the field observations; that is, you check the samples of the mature fish and you also estimate the age. And you have sufficient number of samples of fish at age 1, 2, 3 and 4 and whatever. And you estimate the percent of fish in each age group that have been defined in your sample as mature versus immature.
Q. But so, in other words, for example, with respect to the Department of Natural Resources, does in terms of sending someone along with the pound netters to take fork lengths, is that how you get that information?
A. No. We don't have this data for Maryland. And generally the fish, when the fish are in Maryland's waters, they are not exhibiting any spawning behavior. And so they are not in the state where --
Q. Lay eggs?
A. Yes. So generally there are only a few, I think three studies, three scientific publications

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that have looked at the maturity of age and historical ones recently we, I mean the ASMFC community, let's call it, certain surveys that in recent years have collected menhaden and determined maturity as well.
And those are currently being summarized for the assessment but those studies are very limited they are not many studies.
Q. In other words, they are not at the point of being comfortable to make scientific generalizations or statistical generalizations?
MS. WAZENSKI: Objection to form. You may answer.
BY MR. BLOMQUIST:
Q. I'm trying to understand what you are driving at --
A. By my comment was just simply to say that there are very few studies or scientific studies that were focused on the, that reported the estimates of maturity.
Like I said, there are only three

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papers that are published and all of them from decades ago.
Q. What is the utility of the maturity at age analysis?
A. The maturity at age defines the spawning stock size. Generally speaking, if you have 10 percent of fish of age 2 being mature, then when you calculate spawning stock biomass, you would have to estimate what is the total abundance of age 2 fish. What is the 10 percent of age 2. Multiply it out by fecundity.
Q. Who is Ken Hindman, if you know?
A. Yeah, I know. What is correct name? He's the head of the environmentalist group -- National --
Q. National Coalition for Marine Conservation?
A. Yes.
Q. Is he a member of the management board?
A. No.
Q. Does he have any affiliation with ASMFC?

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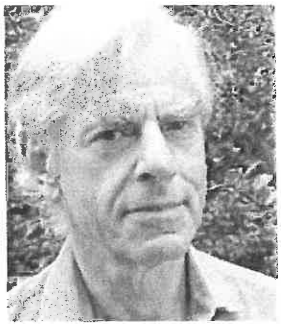
A. Well, he's an active member of the public. There was a period when the management board had discussed actively the -- the ecosystem based management option for Atlantic menhaden. The ecosystem effects of menhaden removals, et cetera.
At some point they developed a working group of the Atlantic Menhaden Management Board. I'm not sure -- that's why I'm trying to recall whether he was a member, if they adopted him as a member of that working group, or at least he was actively advising -- that was the only possible connection of him directly being involved with them.
But he's certainly one of the active, you know, members of the policy groups or, you know, people that actively are trying to --
Q. He's part of that blogosphere?
A. Apparently for sure.
MR. BLOMQUIST: I was waiting for the objection.
MS. WAZENSKI: I was waiting to figure out exactly what the objection would be. Perhaps we'll

Profile: H. Bruce Franklin

Professor

Faculty
Department of English, Graduate Program in American Studies



One of America's leading cultural historians, H. Bruce Franklin is the author or editor of nineteen books and more than 300 articles on culture and history published in more than a hundred major magazines and newspapers, academic journals, and reference works. He has given over five hundred addresses on college campuses, on radio and TV shows, and at academic conferences, museums, and libraries, and he has participated in making four films. He has taught at Stanford University, Johns Hopkins, Wesleyan, and Yale and currently is the John Cotton Dana Professor of English and American Studies at Rutgers University in Newark.

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Associated Programs

Courses Taught

Education

Publications

BOOKS (selected)

THE WAKE OF THE GODS: MELVILLE'S MYTHOLOGY. Stanford University Press, 1963. xii+240 pages. Second (revised) edition and paperback edition, 1966. Third (revised) edition, 1983.

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Awards

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H. BRUCE FRANKLIN

- English professor at Rutgers University
- Co-founder of the Bay Area Revolutionary Union, a Maoist vanguard
- Founder of the violent group Venceremos
- Editor of *The Essential Stalin.* ("Stalin is the opposite of what we in the capitalist world have been programmed to believe.")
- Member of Historians Against the War

Born in 1934, H. Bruce Franklin is the John Cotton Dana Professor of English and American Studies at Rutgers University. The author or editor of 19 books and hundreds of articles, Franklin earned his doctorate at Stanford University, where he went on to become an associate professor of English. He was a prominent activist in the anti-Vietnam War movement of the 1960s.

In 1969 Franklin co-founded the Bay Area Revolutionary Union (BARU) as a Maoist vanguard. His partners in creating the organization were Robert Avakian (who would later become the cult leader of the Revolutionary Communist Party) and Stephen Charles Hamilton, formerly a member of the Progressive Labor Party, also a Maoist group. Based in the San Francisco Bay area and drawing many of its members from Stanford, Professor Franklin's group embraced the ideals of armed struggle in the hopes of establishing a "dictatorship of the proletariat" in the United States.

In 1971 a factional dispute caused Franklin to leave the organization, taking about half of its 500-odd members with him. The dispute centered on the issue of "armed struggle." Robert Avakian's faction maintained that violent revolution should not begin for another fifteen years or so, while Franklin and his followers wanted to commence with acts of terror immediately. Avakian eventually renamed BARU as the Revolutionary Communist Party. Meanwhile, Franklin established a new organization, Venceremos (Spanish for "We will win" and a slogan of Fidel Castro and Che Guevara). Calling for the victory of

Maoism everywhere, Venceremos demanded that its members maintain a passionate commitment to armed struggle; supported the victory of the North Vietnamese; and voiced its commitment to violence to support the Communist side in the war.

A *San Francisco Examiner* reporter who interviewed Franklin at the time, summarized the Venceremos agenda as Franklin described it to him: "[Do] not to fight the draft. Go to Vietnam and shoot your commanding officer. Become an airplane mechanic and learn to sabotage planes. . . . [A]ll police and members of their families must be killed and law enforcement demoralized. All jails and prisons must be opened and inmates liberated."

An outgrowth of Venceremos was the terrorist Symbionese Liberation Army (SLA) that kidnapped Patricia Hearst in 1974. Venceremos provided most of the SLA's members and support.

In 1972 Franklin was fired from his tenured professorship at Stanford for having delivered three on-campus speeches that led to violent rioting. He later sued the university in an unsuccessful attempt to regain his job.

Also in 1972, Franklin edited *The Essential Stalin*. Identifying himself as a Communist, Franklin wrote: "I used to think of Joseph Stalin as a tyrant and butcher who jailed and killed millions. . . . But, to about a billion people today, Stalin is the opposite of what we in the capitalist world have been programmed to believe. . . . If we are to understand Stalin at all, and evaluate him from the point of view of either of the two major opposing classes, we must see him, like all historical figures, as a being created by his times and containing the contradictions of those times. . . . From a Communist point of view, Stalin was certainly one of the greatest of revolutionary leaders. . . ."

In 2000 Franklin published a book titled *Vietnam and Other American Fantasies*, which, according to one enthusiastic reviewer, "is the product of [his] long history of critical analysis of the United States' imperial arrogance." This text is widely used in college courses.

In the March-April 2002 edition of the *International Socialist Review* (also known as the *Journal of Revolutionary Marxism*), Franklin wrote an article -- titled "Vietnam: The Antiwar Movement We Are Supposed To Forget" -- glorifying the memory of the 1960s peace movement in America. In Franklin's view, that movement qualified as "one legitimate source of great national pride about American culture and behavior during the war." "In most wars," he said, "a nation dehumanizes and demonizes the people on the other side. Almost the opposite happened during the Vietnam War. Countless Americans came to see the people of Vietnam fighting against U.S. forces as anything but an enemy to be feared and hated."

Added Franklin: "[We cannot] understand what America is becoming if we fail to comprehend how the same nation and its culture could have produced an abomination as shameful as the Vietnam War and a campaign as admirable as the 30-year movement that helped defeat it."

Franklin is correct in his assessment that the anti-war movement helped bring about America's defeat in Vietnam. As David Horowitz explains his article, "An Open Letter to the `Anti-War' Demonstrators: Think Twice Before You Bring The War Home":

"Every testimony by North Vietnamese generals in the postwar years, has affirmed that they knew they could not defeat the United States on the battlefield, and that they counted on the division of our people at home to win the war for them. The Vietcong forces we were fighting in South Vietnam were destroyed in 1968. In other words, most of the war and most of the casualties in the war occurred because the dictatorship of North Vietnam counted on the fact [that] Americans would give up the battle rather than pay the price necessary to win it. This is what happened."

By lauding the movement that facilitated the Communist victory, Franklin implicitly condones the subsequent genocide which that victory brought about in Indochina -- albeit as the lesser of two evils, the greater of which, in Franklin's view, would have been an American victory.

In 2003 Franklin was a signatory to the Historians Against the War denunciation of America's invasion of Iraq.

August 4, 2014

Via Electronic Mail
Atlantic States Marine Fishery Commission
Atlantic Menhaden Stock Assessment Subcommittee
1050 N. Highland Street Suite 200 A-N
Arlington, Va. 22201
gnesslage@asmfc.org
mwaine@asmfc.org
micah.dean@state.ma.us
Attention: Amy Schuler, Matt Cieri, Genny Nesslage, Alexei Sharov, Micah Dean, Joe Smith and Behzad Mahmoudi

Re: Atlantic Menhaden

Ladies and gentlemen:

I represent Maryland watermen who are out working the Bay on a year-round basis for 5 to 6 days per week.

There is a non-migratory population of menhaden that are in the Maryland portion of the Chesapeake Bay in addition to the migratory population that enters the Maryland portion of the Bay. Watermen regularly observe schools of menhaden in the channels of the Maryland portion of the Bay from December through March through the use of sonar. During the other months of the year, schools of menhaden regularly are seen on the surface of the Bay as well as being readily spotted through the use of sonar.

Attached as Exhibit 1 is a picture from the sonar of waterman Burl Lewis taken in February 2014. The picture depicts a huge school of menhaden at a depth of between 50-60 meters in the channel of the lower Maryland Bay. Mr. Lewis knows very well how menhaden appear on his sonar. He has first-hand confirmation that what he identifies as menhaden on his sonar are in fact menhaden. He uses gill nets to catch rockfish (striped bass) during the winter months. He has had the misfortune of setting gill nets too close to a school of fish observed on his sonar that turned out to be menhaden, and were present in the vicinity of rockfish that he was trying to catch. He was using 8" gill net and he assumed the menhaden would swim through the net and he would catch the rockfish. When he pulled his gill nets, the nets were full primarily with menhaden, with much fewer rockfish. Maryland requires the use of dual filament gill net.

Fish, therefore, cannot be shaken out of the gill net; the entrapped fish must be individually picked out by hand from the gill net. Mr. Lewis lost money because of the amount of time that he and his crew took to clear his gill nets of the menhaden (menhaden only sell for cents per pound and gill netting is profitable only for catching fish that sell for multiple dollars per pound). Even though he was using 8" gill net, the menhaden, which swim in circles when they are under attack, became twisted and stuck in the dual filament gill net. Mr. Lewis no longer will set his gill nets in the channel during the winter months when he detects a large school of menhaden in the vicinity and he pulls his nets if he detects a school of menhaden swimming towards the gill nets that he has set.

Watermen learn from experience and first-hand observation what different species of fish look like on their sonar equipment. For example, during the warmer months when large schools of menhaden typically are observed at or close to the surface of the water, a watermen will note how the school appears on his sonar so that he can identify the school as menhaden when located at depth.

Attached as Exhibit 2 is a Facebook tweet and sonar photographs from a recreational fisherman who was in the midst of a large school of menhaden, which also are referred to as "bunker." Most individuals with sonar know how different species of fish appear on their sonar.

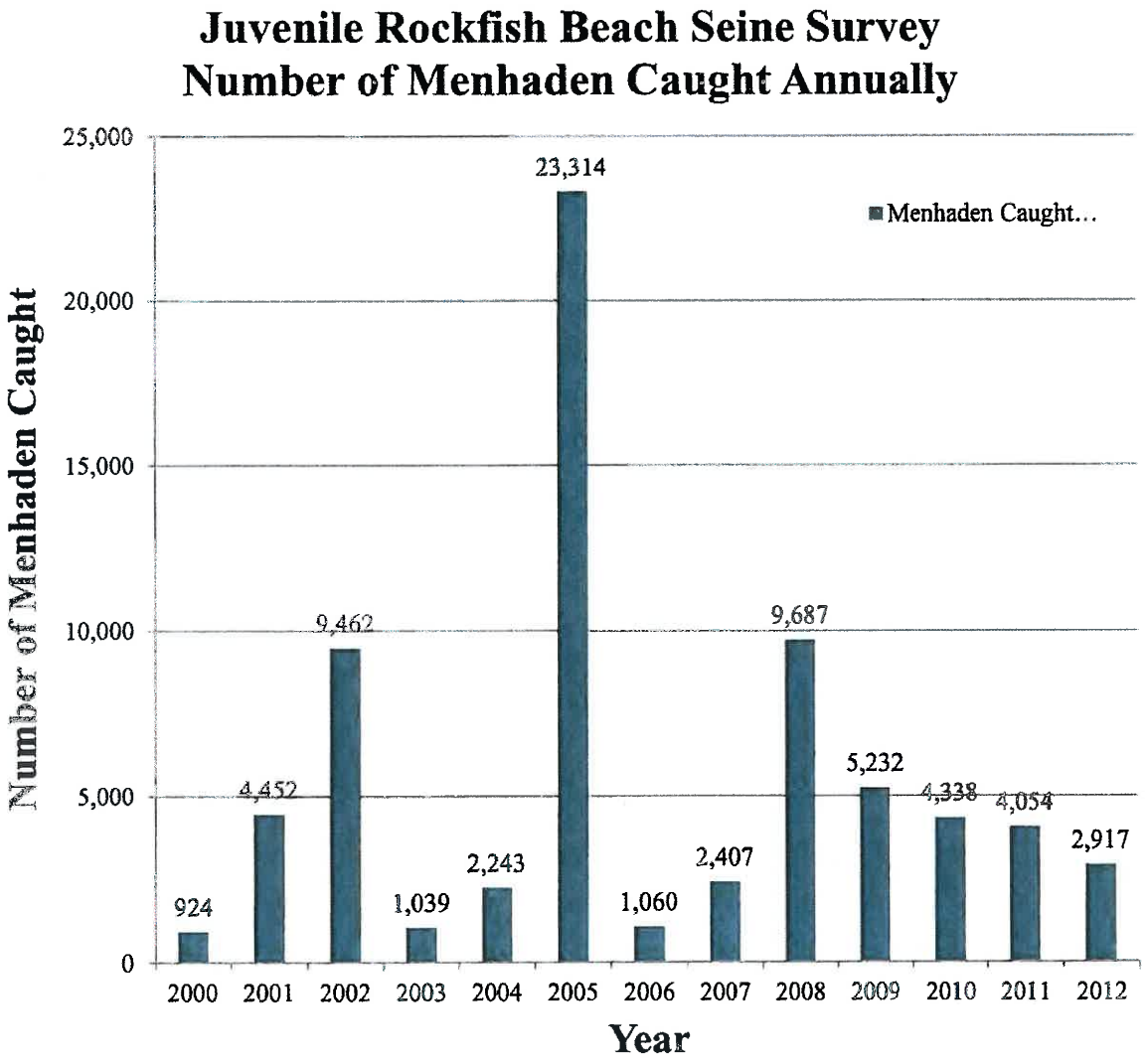
For at least the last 8 years, there has been an abundance of spawning menhaden in the Maryland portion of the Bay.

Usually, when menhaden first leave the channel of the Maryland Portion of the Bay as they begin moving toward the Bay tributaries in the early spring (March or April – depending on water temperature) the females are full of roe and the males are full of malt. Attached as Exhibit 3 is a photograph of menhaden caught by a Maryland Bay pound netter that was taken in April 2014. Most of the menhaden caught were 10" to 12" long. Attached as Exhibit 4 is a photograph of one of the females cut open to expose the roe that she was carrying. Menhaden spawn in the Maryland portion of the Bay throughout the summer months.

Attached as Exhibit 5 is a photograph of young-of-year menhaden that were caught in the Maryland portion of the Bay in early June 2014. Maryland watermen have regularly observed huge schools of such young-of year menhaden in the Bay tributaries from June through August 2014. When watermen leave their docks in the early morning hours, huge schools are regularly observed in tributaries shallows jumping in the lights cast by the docs and the departing boats of the watermen.

In October to early November of each year for the past eight years, huge schools of young-of-year menhaden less than four inches long regularly are observed on the surface of the water by watermen throughout the Maryland portion of the Bay. The young-of-year menhaden are swimming out of the tributaries and into the deeper water of the Bay. Rockfish, bluefish and drum often are simultaneously observed feasting on the schools.

Set forth below is a table showing the numbers of young-of-year menhaden caught by the teams of workers from the Maryland Department of Natural Resources ("DNR") that conduct the juvenile rockfish beach seine surveys along portions of the Maryland Bay and in several Maryland Bay tributaries from June through August of each year. The data is taken directly from the data recorded by Harry Rickabaugh, the DNR scientist that manages the juvenile beach seine survey teams. DNR produced Mr. Rickabaugh's data in response to a document request in litigation between DNR and two Maryland watermen who maintain a pound net fishery and have caught hundreds of thousands of pounds of menhaden in the Maryland portion of the Bay during each of the last 8 years.



The juvenile rockfish beach seine survey is not a particularly effective way to catch young-of-year menhaden. DNR has maintained a video on its website page titled Juvenile Index, which shows and explains how DNR personnel conduct the juvenile striped bass beach seine survey. The video states that DNR uses a seine that is one hundred feet (100') long, four feet (4') wide and has one-quarter inch (1/4") mesh openings. The video shows one DNR employee standing on the beach holding one end of the seine while another employee extends the seine into the water and walks while pulling the seine in a circular pattern to catch whatever fish are trapped in the seine while it is manually pulled in a circular pattern out away from the shore and then back into the shore.

Menhaden are a schooling fish and they are very skittish. Young-of-year menhaden rarely are observed along the shore where DNR conducts its rockfish juvenile beach seine surveys. A school of young-of-year menhaden generally will be observed closer to the shore only farther up the Bay tributaries and when the menhaden are just moving from the larval stage into the fish stage of their life. The manner in which DNR conducts the survey is unlikely to catch large numbers of a schooling fish such as menhaden because the fish will flee the area before the net is closed and pulled into shore given the noise made by the persons who conduct the survey and the speed with which menhaden swim and flee from any perceived danger.

The way individuals catch young-of-year menhaden for chum or bait generally is to attract a school early in the morning by shining a light in the water and using a cast net that is cast over the school and rapidly closed as he cast net is being drawn into a boat or dock.

Attached as Exhibit 6 is a table of the DNR data extracted from Mr. Rickenbaugh's multi-page electronic spreadsheet of data. The results depict that on the vast majority of occasions when young-of-year menhaden are aught, less than 25 are caught by the teams conducting the juvenile rockfish beach seine survey, but there are numerous occasions when less than 30 menhaden are caught. When less that thousands of young-of-year menhaden are caught, that provides evidence that a school of thousands of young-of-year menhaden was in the vicinity, but before the samplers closed the net and walked it back to shore, the school escaped and moved away from the samplers, or the few caught are stragglers that got separated from a school.

There are approximately ten commercial watermen who harvest approximately 70% of menhaden caught in the Maryland portion of the Bay using stationary gear – pound nets. The vast majority of the remaining 30% of menhaden that are harvested in Maryland are caught by another group of 10 or so pound netters who use smaller pound net systems and take the majority of their catch in Maryland tributaries to the Bay. DNR could easily speak to such individuals and quantify the level of effort they use each year to harvest menhaden and could develop an adult abundance index based on the information obtained from such watermen. DNR has refused to engage in such effort.

The Maryland watermen who harvest 70±% off the menhaden annually in the Maryland portion of the Bay use pound nets that do not catch menhaden that have a fork length of less than 6-inches, and generally have a fork length of 8 " or more. That is because the pound nets used in

the Maryland portion of the Bay have a mesh in the hedge that allows menhaden smaller than 6" to swim right through the hedge. Maryland wholesale byers generally are unwilling to purchase menhaden less than 8" long, except when local Bay crabbers as willing to purchase smaller menhaden as crab bait. The Maryland fishery, therefore, generally does not harvest menhaden that serve as forage for the majority of the species found in the Maryland portion of the Bay.

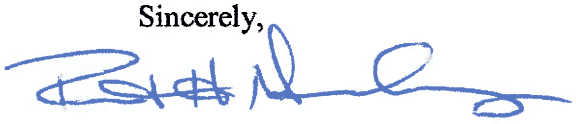
Maryland watermen have observed a year-round population of menhaden in the Maryland portion of the Chesapeake Bay. There has been a growing abundance of menhaden in the Maryland portion of the Bay over the last eight years. Maryland watermen harvest the vast majority of menhaden using stationary gear. There is no purse seine harvest in Maryland. The vast majority of harvesters do not use gear capable of catching menhaden that serves as forage for the vast majority of species that dine on menhaden.

There has been an abundance of menhaden in the Maryland portion of the Bay during the last eight years. In 2013 and 2014, more menhaden have been observed in the Bay than in the prior decade by Maryland watermen.

Given the low price per pound of menhaden, which has no commercial value as a food fish for humans, the only commercial gear permitted to be used in Maryland that can harvest menhaden in an economically viable manner are pound nets, which is a stationary gear.

There is no rational basis for imposing catch limits on the quantity of menhaden caught in the Maryland portion of the Bay given the restrictive harvest methods permitted by DNR.

Sincerely,



Robert Newberry

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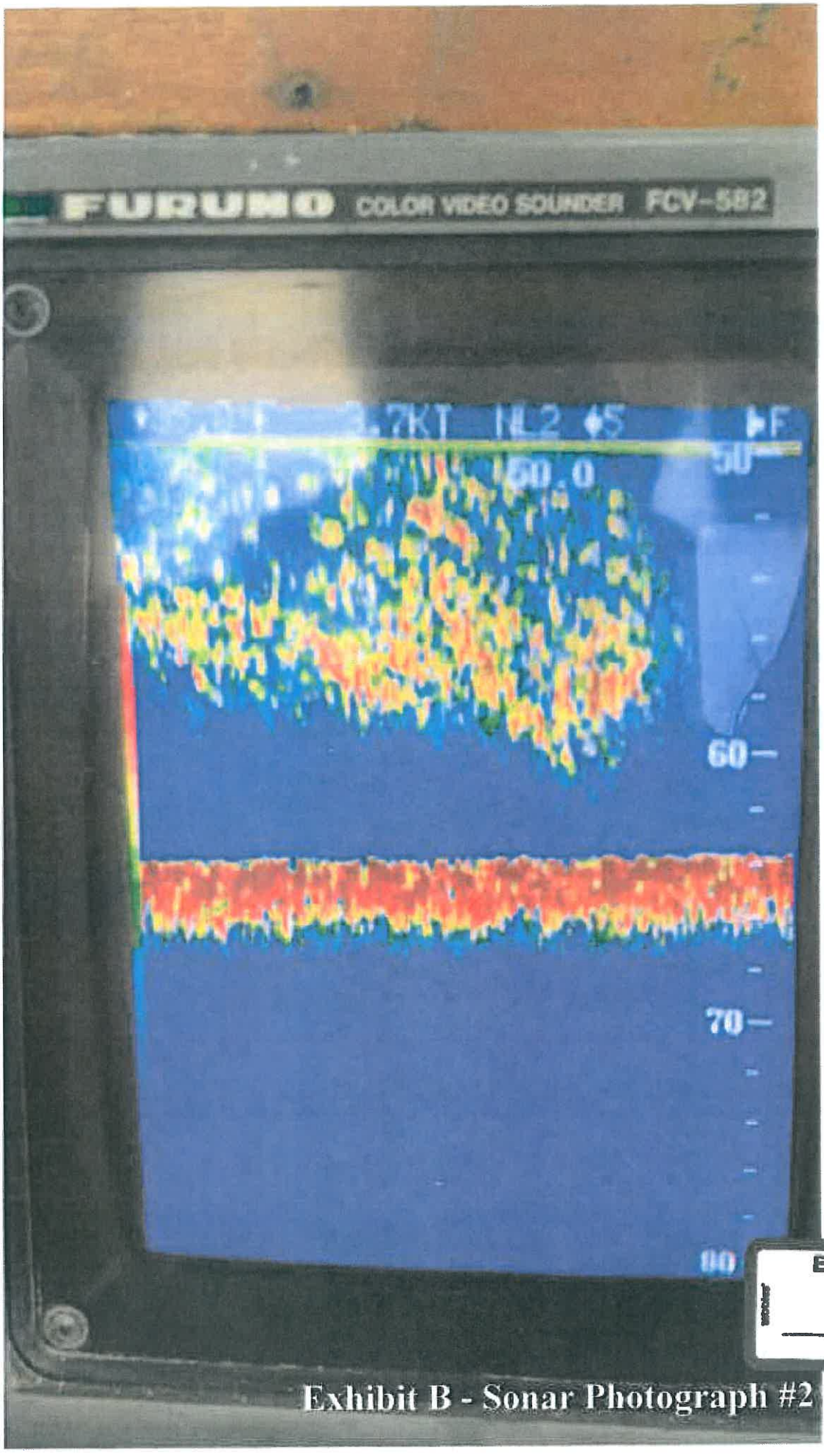

EXHIBIT
witness
1

Exhibit B - Sonar Photograph #2

Howard Insley [illegible] on this.

3 New Stories

Brad Taylor ▸ **Delmarva Fishing, Waterfowl, And Rut Report**

3 hours ago

The bait is ridiculous. We snagged huge bunker a few times throughout the day.

EXHIBIT 2

3 comments

Exhibit A - Sonar Photograph #1

EXHIBIT

3

EXHIBIT
4

Exhibit C - Menhaden Roe Photograph

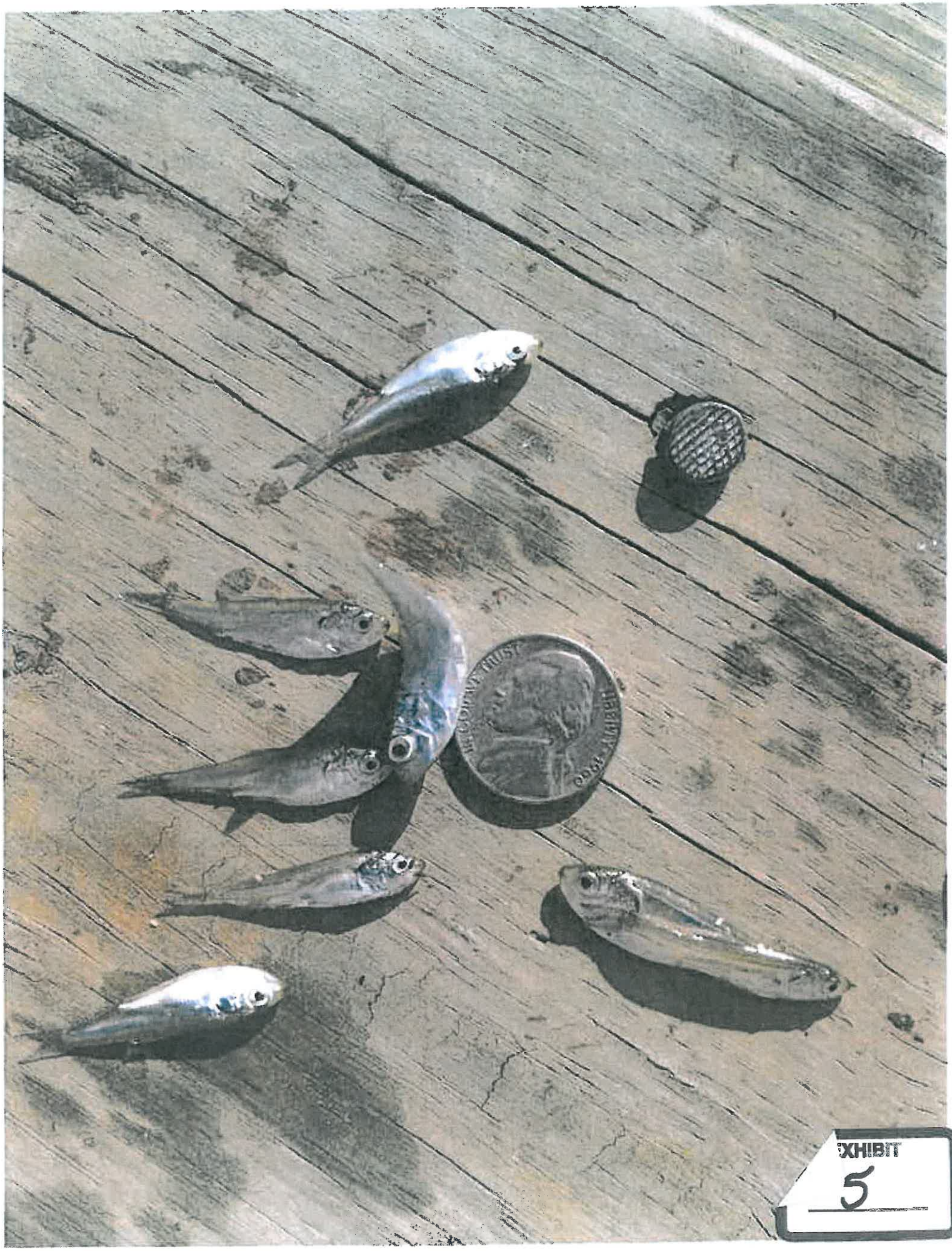

EXHIBIT
5

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2000	7	10	Choptank	8
2000	7	10	Choptank	3
2000	7	10	Choptank	3
2000	7	10	Choptank	4
2000	7	11	Nanticoke	27
2000	7	11	Nanticoke	9
2000	7	11	Nanticoke	157
2000	7	20	Patuxent	1
2000	7	20	Patuxent	1
2000	8	7	Choptank	3
2000	8	7	Choptank	1
2000	8	8	Nanticoke	1
2000	8	8	Nanticoke	1
2000	8	8	Nanticoke	45
2000	8	8	Nanticoke	12
2000	8	16	Bohemia	3
2000	8	16	Bohemia	2
2000	8	16	Elk River	5
2000	8	16	Elk River	7

EXHIBIT
6

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2000	8	18	Susquehanna	4
2000	9	5	Worton Creek	20
2000	9	5	Worton Creek	3
2000	9	6	Nanticoke	37
2000	9	6	Nanticoke	4
2000	9	6	Nanticoke	30
2000	9	6	Nanticoke	33
2000	9	6	Nanticoke	389
2000	9	6	Nanticoke	91
2000	9	12	Nanticoke	16
2000	9	12	Bohemia	4
2001	7	9	Choptank	1008
2001	7	9	Choptank	765
2001	7	9	Choptank	59
2001	7	10	Nanticoke	57
2001	7	17	Potomac	5
2001	7	17	Potomac	340
2001	7	18	Susquehanna	1
2001	7	19	Patuxent	2

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2001	8	6	Choptank	9
2001	8	6	Choptank	16
2001	8	6	Tuckahoe	51
2001	8	6	Choptank	68
2001	8	6	Choptank	847
2001	8	8	Potomac	128
2001	8	13	Nanticoke	2
2001	8	13	Nanticoke	1
2001	8	14	Potomac	26
2001	8	14	Potomac	610
2001	8	15	Susquehanna	13
2001	9	4	Choptank	218
2001	9	4	Choptank	28
2001	9	4	Choptank	5
2001	9	4	Tuckahoe	119
2001	9	6	Nanticoke	1
2001	9	6	Nanticoke	4
2001	9	6	Nanticoke	16
2001	9	13	Patuxent	28

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2001	9	19	Potomac	8
2001	9	19	Potomac	17
2002	7	9	Nanticoke	1
2002	7	9	Nanticoke	2
2002	7	9	Nanticoke	5
2002	7	10	Potomac	11
2002	7	16	Northeast	20
2002	7	17	Susquehanna	7
2002	7	18	Patuxent	564
2002	8	5	Choptank	1
2002	8	7	Potomac	56
2002	8	13	Potomac	51
2002	8	14	Susquehanna	16
2002	9	3	Tuckahoe	308
2002	9	3	Choptank	8253
2002	9	4	Nanticoke	9
2002	9	5	Potomac	28
2002	9	9	Worton Creek	1
2002	9	10	Elk River	1

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2002	9	11	Susquehanna	82
2002	9	19	Potomac	26
2002	9	19	Potomac	20
2003	7	7	Choptank	12
2003	7	7	Choptank	38
2003	7	8	Nanticoke	551
2003	7	9	Potomac	1
2003	7	10	Potomac	14
2003	8	4	Choptank	1
2003	8	4	Choptank	1
2003	8	5	Nanticoke	20
2003	8	5	Nanticoke	3
2003	8	6	Potomac	3
2003	8	6	Potomac	5
2003	8	11	Sassafras	1
2003	8	11	Sassafras	1
2003	9	2	Choptank	267
2003	9	2	Choptank	94
2003	9	3	Nanticoke	3

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2003	9	4	Potomac	2
2003	9	4	Potomac	21
2003	9	4	Potomac	1
2004	7	12	Nanticoke	1
2004	7	15	Nanticoke	2
2004	7	16	Nanticoke	9
2004	7	16	Nanticoke	26
2004	7	23	Patuxent	405
2004	8	10	Nanticoke	33
2004	8	10	Nanticoke	269
2004	8	10	Nanticoke	6
2004	8	10	Nanticoke	32
2004	8	10	Nanticoke	1407
2004	8	17	Northeast	12
2004	8	19	Patuxent	5
2004	8	19	Patuxent	36
2005	7	11	Choptank	5
2005	7	11	Choptank	5
2005	7	11	Choptank	85

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2005	7	11	Choptank	233
2005	7	11	Choptank	82
2005	7	12	Nanticoke	6
2005	7	12	Nanticoke	353
2005	7	12	Nanticoke	365
2005	7	12	Nanticoke	336
2005	7	14	Potomac	1
2005	7	18	Sassafras	3
2005	7	21	Patuxent	10
2005	8	8	Choptank	255
2005	8	8	Tuckahoe	2402
2005	8	8	Tuckahoe	2594
2005	8	8	Choptank	13745
2005	8	9	Nanticoke	10
2005	8	9	Nanticoke	50
2005	8	9	Nanticoke	132
2005	8	9	Nanticoke	24
2005	8	9	Nanticoke	136
2005	8	17	Susquehanna	9

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2005	8	17	Ches Bay	1
2005	8	18	Patuxent	743
2005	8	18	Patuxent	1
2005	9	6	Choptank	26
2005	9	6	Choptank	5
2005	9	6	Tuckahoe	662
2005	9	6	Tuckahoe	194
2005	9	7	Nanticoke	3
2005	9	7	Nanticoke	1
2005	9	7	Nanticoke	1
2005	9	7	Nanticoke	232
2005	9	14	Susquehanna	604
2006	7	10	Choptank	184
2006	7	10	Choptank	15
2006	7	11	Nanticoke	6
2006	7	11	Nanticoke	3
2006	7	11	Nanticoke	4
2006	7	11	Nanticoke	2
2006	7	12	Potomac	11

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2006	7	17	Worton Creek	9
2006	7	17	Worton Creek	1
2006	7	18	Bohemia	31
2006	7	20	Patuxent	1
2006	7	20	Patuxent	1
2006	8	7	Choptank	1
2006	8	7	Choptank	6
2006	8	7	Choptank	13
2006	8	7	Choptank	15
2006	8	7	Choptank	71
2006	8	8	Nanticoke	431
2006	8	8	Nanticoke	110
2006	8	8	Nanticoke	5
2006	8	8	Nanticoke	17
2006	8	8	Nanticoke	43
2006	8	17	Patuxent	14
2006	9	6	Nanticoke	13
2006	9	6	Nanticoke	43
2006	9	6	Nanticoke	8

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2006	9	6	Nanticoke	1
2006	9	18	Patuxent	1
2007	7	9	Tuckahoe	6
2007	7	9	Tuckahoe	9
2007	7	9	Tuckahoe	1
2007	7	10	Nanticoke	68
2007	7	10	Nanticoke	229
2007	7	10	Nanticoke	30
2007	7	11	Potomac	2
2007	7	17	Elk River	1
2007	7	17	Bohemia	1
2007	7	18	Susquehanna	1
2007	7	19	Patuxent	29
2007	7	19	Patuxent	3
2007	7	19	Patuxent	24
2007	8	6	Choptank	46
2007	8	6	Choptank	61
2007	8	6	Choptank	39
2007	8	7	Nanticoke	183

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2007	8	7	Nanticoke	4
2007	8	7	Nanticoke	76
2007	8	7	Nanticoke	5
2007	8	7	Nanticoke	1330
2007	8	7	Nanticoke	55
2007	8	8	Potomac	16
2007	8	8	Potomac	17
2007	8	14	Bohemia	32
2007	8	15	Susquehanna	1
2007	8	20	Patuxent	72
2007	9	4	Choptank	25
2007	9	5	Nanticoke	7
2007	9	5	Nanticoke	5
2007	9	5	Nanticoke	3
2007	9	5	Nanticoke	13
2007	9	5	Nanticoke	5
2007	9	5	Nanticoke	5
2007	9	11	Bohemia	3
2008	7	7	Choptank	24

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2008	7	7	Choptank	60
2008	7	7	Choptank	6
2008	7	7	Choptank	1
2008	7	8	Nanticoke	10
2008	7	9	Potomac	11
2008	7	9	Potomac	3
2008	7	15	Elk River	22
2008	7	16	Susquehanna	177
2008	7	16	Ches Bay	42
2008	7	17	Patuxent	20
2008	8	4	Choptank	695
2008	8	4	Choptank	67
2008	8	4	Tuckahoe	379
2008	8	5	Nanticoke	113
2008	8	5	Nanticoke	1144
2008	8	5	Nanticoke	233
2008	8	5	Nanticoke	111
2008	8	5	Nanticoke	7
2008	8	5	Nanticoke	24

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2008	8	6	Potomac	1
2008	8	13	Susquehanna	195
2008	8	14	Patuxent	1
2008	8	14	Patuxent	859
2008	9	2	Tuckahoe	127
2008	0	2	Tuckahoe	208
2008	9	3	Nanticoke	6
2008	9	3	Nanticoke	6
2008	9	3	Nanticoke	10
2008	9	3	Nanticoke	5
2008	9	3	Nanticoke	1
2008	9	8	Sassafras	3339
2008	9	9	1097	1097
2008	9	9	Bohemia	650
2008	9	11	Patuxent	33
2009	7	6	Choptank	3162
2009	7	6	Tuckahoe	1
2009	7	6	Tuckahoe	1
2009	7	7	Nanticoke	2

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2009	7	7	Nanticoke	4
2009	7	7	Nanticoke	481
2009	7	8	Potomac	13
2009	7	8	Potomac	2
2009	7	13	Patuxent	4
2009	7	13	Patuxent	9
2009	7	14	Bohemia	1
2009	8	3	Choptank	70
2009	8	3	Choptank	696
2009	8	3	Choptank	36
2009	8	4	Nanticoke	12
2009	8	4	Nanticoke	73
2009	8	4	Nanticoke	284
2009	8	5	Potomac	4
2009	8	12	Bohemia	17
2009	8	12	Bohemia	1
2009	8	31	Choptank	56
2009	8	31	Choptank	115
2009	9	1	Nanticoke	10

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2009	9	1	Nanticoke	15
2009	9	1	Nanticoke	8
2009	9	1	Nanticoke	50
2009	9	1	Nanticoke	64
2009	9	2	Potomac	25
2009	9	3	Potomac	1
2009	9	8	Patuxent	7
2009	9	8	Patuxent	4
2009	9	9	Bohemia	4
2010	7	12	Choptank	74
2010	7	12	Choptank	10
2010	7	12	Tuckahoe	81
2010	7	12	Tuckahoe	86
2010	7	13	Nanticoke	23
2010	7	13	Nanticoke	22
2010	7	13	Nanticoke	3
2010	7	13	Nanticoke	6
2010	7	13	Nanticoke	22
2010	7	13	Nanticoke	3

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2010	7	14	Potomac	1
2010	7	15	Potomac	2485
2010	7	19	Patuxent	4
2010	7	20	Sassafras	1
2010	7	21	Bohemia	2
2010	7	22	Susquehanna	1
2010	8	9	Choptank	144
2010	8	9	Choptank	664
2010	8	9	Choptank	1
2010	8	9	Tuckahoe	2
2010	8	10	Nanticoke	12
2010	8	10	Nanticoke	11
2010	8	10	Nanticoke	13
2010	8	10	Nanticoke	5
2010	8	10	Nanticoke	5
2010	8	10	Nanticoke	21
2010	8	10	Nanticoke	82
2010	8	11	Potomac	1
2010	8	12	Potomac	247

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2010	8	16	Patuxent	255
2010	8	16	Patuxent	6
2010	8	18	Bohemia	11
2010	9	7	Choptank	14
2010	9	8	Nanticoke	9
2010	9	8	Nanticoke	2
2010	9	9	Potomac	1
2010	9	9	Potomac	2
2010	9	13	Patuxent	6
2011	7	11	Choptank	204
2011	7	11	Choptank	108
2011	7	11	Choptank	157
2011	7	11	Choptank	1
2011	7	11	Choptank	2296
2011	7	12	Nanticoke	2
2011	7	12	Nanticoke	29
2011	7	12	Nanticoke	5
2011	7	12	Nanticoke	34
2011	7	13	Potomac	3

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2011	7	13	Potomac	3
2011	7	14	Potomac	1
2011	7	18	Patuxent	13
2011	7	18	Patuxent	64
2011	7	19	Worton Creek	1
2011	7	19	Worton Creek	16
2011	7	19	Worton Creek	1
2011	8	8	Choptank	14
2011	8	8	Choptank	40
2011	8	8	Choptank	12
2011	8	8	Choptank	21
2011	8	9	Nanticoke	398
2011	8	10	Potomac	1
2011	8	10	Potomac	322
2011	8	11	Potomac	5
2011	8	11	Potomac	1
2011	8	15	Patuxent	45
2011	8	16	worton Creek	3
2011	8	17	Sassafras	1

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2011	9	6	Nanticoke	11
2011	9	6	Nanticoke	1
2011	9	6	Nanticoke	49
2011	9	9	Choptank	191
2011	9	13	Patuxent	1
2012	7	9	Choptank	2
2012	7	9	Choptank	118
2012	7	9	Tuckahoe	8
2012	7	10	Nanticoke	31
2012	7	10	Nanticoke	5
2012	7	10	Nanticoke	26
2012	7	16	Patuxent	2
2012	7	17	Sassafras	3
2012	7	17	Worton Creek	6
2012	7	18	Elk River	154
2012	7	18	Bohemia	4
2012	7	18	Bohemia	17
2012	7	18	Elk River	1
2012	7	19	Susquehanna	15

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2012	8	6	Choptank	99
2012	8	6	Choptank	11
2012	8	6	Choptank	6
2012	8	6	Tuckahoe	492
2012	8	6	Tuckahoe	22
2012	8	7	Nanticoke	6
2012	8	7	Nanticoke	15
2012	8	7	Nanticoke	3
2012	8	7	Nanticoke	1
2012	8	7	Nanticoke	1
2012	8	7	Nanticoke	8
2012	8	13	Patuxent	3
2012	8	13	Patuxent	43
2012	8	15	Elk River	5
2012	8	15	Bohemia	22
2012	8	15	Bohemia	7
2012	8	16	Susquehanna	42
2012	9	4	Choptank	1025
2012	9	4	Choptank	449

Spreadsheet of H. Rickenbaugh Data
Juvenile Rockfish: Beach Seine Survey

YEAR	MONTH	DAY	RIVER	MENHADEN CAUGHT
2012	9	4	Tuckahoe	2
2012	9	4	Tuckahoe	126
2012	9	6	Potomac	6
2012	9	6	Potomac	1
2012	9	7	Nanticoke	38
2012	9	7	Nanticoke	3
2012	9	7	Nanticoke	2
2012	9	7	Nanticoke	84
2012	9	7	Nanticoke	3

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BS, MES, PhD, 1966, 1968, 1974, North Carolina State University, Raleigh, NC

Postions

1972-1987	Research Statistician, Eli Lilly&Co.
1987-2000	Principle Consultant, GlaxoWelcome
2000-2002	Director, Statistical Research, GlaxoSmithKline
1996-	Adjunct Professor of Statistics, NCSU
1998-	Adjunct Professor of Statistics, University of Waterloo
2002-	CEO, CGStat, LLC
2002-	Assistant Director for Bioinformatics, NISS
2004-	Adjunct Professor of Statistics, University of British Columbia

Other Experience and Professional Memberships

1972-	American Statistical Association
1972-	Biometrics Society
2004	Program Chair, ASA's Section on SPES
2003	Program Chair, Midwest Biopharmaceutical Statistics Workshop

Honors

1980	Best Statistics Paper, SAS Users' Group International
1989	Best Statistics Paper, SAS Users' Group International
1990	Fellow of the American Statistics Association
1991	Best Statistics Application Paper, ASA
1998	Statistics in Chemistry Award, ASA
1999	Virtual Screening Conference, Marburg Germany
2000	Statistics in Chemistry Award, ASA
2000	Participant of "Biostatistics Workshop" at the Oberwolfach Institute in Germany
2000	Participant of "Computational Chemistry Workshop" Beilstein Institute of Germany
2006	Fellow of the American Association for the Advancement of Science
2006	Statistics in Chemistry Award, ASA

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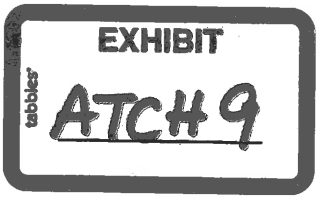

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BURL LEWIS, et al.	*	IN THE
Plaintiffs,	*	CIRCUIT COURT
v.	*	FOR
STATE OF MARYLAND, et al.	*	DORCHESTER COUNTY
Defendants.	*	CASE NO.: 09-C-13-20925

* * * * * * * * * * * * *

AFFIDAVIT OF S. STANLEY YOUNG

I, S. Stanley Young, hereby make oath in due form of law as follows:

1. I am over eighteen (18) years of age, I am competent to testify, and I have knowledge and expertise relative to the matters set forth below.

2. I have a B.S., an MES and Ph.D. in statistical science from the North Carolina State University. I have worked as a statistical scientist from 1972 to the present. I have worked in the private sector as a statistical scientist and I have been and currently am an adjunct professor for the North Carolina State University System and at several other universities. I currently serve as the Assistant Director for Bioinformatics at the National Institute of Statistical Sciences and I have been a member in good standing of the American Statistical Association for more than 40 years. I am an expert in statistics, statistical analysis, statistical modeling and statistical science. Attached hereto is my resume which provides further information about my education, my work experience, and my papers and publications.

3. A statistical model is a compilation of different mathematical formulas that are used to examine existing data about a subject and to attempt to make mathematically based predictions about the status of the subject being modeled. To develop a model, scientists with expertise in a particular scientific field get together and discuss the scientific facts know about

the subject being modeled and the existing and obtainable data about the subject being modeled. Then, with the assistance of statistical (computer and mathematical) scientists, the subject matter scientists develop mathematical formulas that are manipulated so that when the known and opinion based (*i.e.*, assumed and estimated) data are fed into the mathematical formulas, the predictive outcomes generated by the model are confirmed by observable relationships of the subject being modeled and existing and obtainable data of the subject being modeled. Many of the formulas have tuning parameters which have to be estimated from data or estimated based on expert opinions. The usefulness of the model and the scientific validity of the model is based on the ability of the model to "fit" the know data and for predictive results of the model to match or fit later observable data, which might then be used in predicting observations for a later time point.

4. A model is only as good a predictor of the status of a subject as the data about the subject and the scientific understanding as formulated into mathematical formulas of the subject. The better the data and the scientific understanding of the subject, the better the model will serve to predict the status of the subject. The worse the data and the scientific understanding of a subject, the more unreliable the model will be in predicting the status of the subject and the less useful the model will be in establishing policy or making decisions relative to the subject.

5. The Atlantic States Marine Fisheries Commission (ASMFC) has used the Beaufort Assessment Model ("BAM") to conduct a stock assessment of Atlantic menhaden. More specifically, the Technical Committee of the ASMFC ("TC") and a subgroup of the TC, the Menhaden Stock Assessment Subcommittee ("SAS"), have collected and analyzed available data about the menhaden and have run the data through the BAM in an attempt to determine whether the BAM is a good predictor of the fishing mortality ("F") and spawning stock

biomass ("SSB") of Atlantic menhaden. The BAM model is a deterministic model, meaning that once the input data and the internal formulas in the model are fixed, the output of the model is deterministic. The same input data and formulas will generate the same output.

6. I have reviewed the 2010 Atlantic menhaden stock assessment published by ASMFC and the 2012 update to the 2010 stock assessment published by ASMFC. Copies of those stock Assessments are attached to this Affidavit as Exhibits 1 and 2.

7. I have discussed the Beaufort Assessment Model ("BAM") and the use of that model to conduct a stock assessment of the Atlantic menhaden with the scientist Dr. Amy Schueller. Dr. Schueller is a marine scientist who works at the Sustainable Fisheries Branch of the National Oceanic and Atmospheric Administration Southeast Fisheries Science Center located in Beaufort, North Carolina. Dr. Schueller took the place of Dr. Eric Williams and now serves on the TC and the Menhaden Stock Assessment Subcommittee of the TC in his stead. I have read a peer review article of the 2004 ASMFC Menhaden Stock Assessment, the 2010 ASMFC Menhaden Stock Assessment and the 2012 ASMFC Menhaden Stock Assessment Update published by Victor Crecco, Ph.D. a copy of which is attached hereto.

8. It is my opinion, based on a reasonable degree of scientific certainty, that there is insufficient data and information about Atlantic menhaden formulated into the mathematical model for the BAM to make meaningful predictions of the fishing mortality (F) of menhaden along the Atlantic Coast of the United States, or to make meaningful predictions of the spawning stock biomass (SSB) of menhaden along the Atlantic Coast. It is my conclusion, therefore, that ASMFC does not have a good mathematical model basis for concluding that the spawning stock biomass of menhaden along the Atlantic Coast is insufficient to continue to regenerate or to

renew the Atlantic coast population of menhaden. This is due in large part to inadequate input data and the limitations of the computer modeling process, as I explain in more detail below.

9. I have read the affidavits of Dr. Alexei F. Sharov [16] and Lynn Fegley. They do not disclose any independent scientific basis, aside from the work of the TC and ASMFC the MSAS and the menhaden stock assessments previously reference, that there is a scientific basis for concluding that the spawning stock biomass of menhaden along the Atlantic Coast is insufficient for menhaden to continue to regenerate and renew its Atlantic coast population.

10. Attached as Exhibit 3 is a true and correct copy of a PowerPoint presentation that Dr. Schueller provided in conjunction with one of our communications about the Atlantic menhaden stock assessment. Page 7 is a flowchart diagram of the different "boxes" of mathematical formulas that comprise the BAM. This is what the marine scientists, mathematicians and the statisticians developed pursuant to the process described in Paragraph 3 above. You will observe that most of the parameters that are fed into the BAM to generate an estimate of the SSB and the predicted landings in future years are not based on actual data but are based on estimates (*e.g.*, fishing mortality, recruitment, catchability coefficients, selectivity and the stock recruitment curve are all estimated values). Such estimates vary in quality from reasonably hard data to scientific guesses. Generally, as noted on page 10 of Exhibit 3, the only absolute data that is fed into the model is the reported fishing mortality and the estimated ages of the fish that are caught. In addition to the mixed signals given by the BAM for "overfishing" and "over fished", Figure 37 from the 2012 Atlantic Menhaden Stock Assessment Update is instructive as to the reliability of model predictions. The greater the spawning stock the greater should be recruitment, all other things being equal. Figure 37 plots these two model predictions, one against the other and any relationship is tenuous at best. One possibility is that internal

model adjustments are made so that the model fits landings, but of course landings to not necessarily reflect abundance. This means that the assumptions on which the mathematical formulas in the different "boxes" of the model are predicated are flawed, or the data being fed into the different boxes of the model is incomplete or flawed, or the assumptions being made based on the existing data are flawed, or there are unknown unknowns that are not being taken into account, or some combination of the foregoing.

11. As Dr. Crecco observed:

> The results of the 2012 run of the BAM for menhaden were at odds with the results of the 2004 and the 2010 run results and the most recent (2011) age 2+ fishing mortality (F) estimate rose sharply from 1.26 in 2008 to 4.5 in 2011. The 2011 F, therefore, was 3.6 times greater than the F threshold of 1.25 established in 2010, indicating that Atlantic menhaden suddenly become severely overfished and at risk of recruitment failure. Moreover, a fishing mortality (F) rate of 4.5 (equivalent to the annual removal of about 91% of the ages 2+menhaden) would now make Atlantic menhaden the most highly exploited finfish in the world! Such a sudden and spectacular rise in F over just a two year period is not plausible given that there was no substantial change in who engaged in commercial fishing or how commercial fishing was conducted. This change in F is indicative of a breakdown in model stability and a steep rise in parameter and model uncertainty...**As a result, the [TC] concluded that the 2012 BAM run was too unreliable to provide sound management advice.**

(Emphasis added.) (*See* the Crecco Report attached hereto.)

12. The first thing to note is that no comprehensive survey of menhaden has been conducted in well over a decade. There is, therefore, no real benchmark that the model can be trained to, or made to fit.

13. The landings data (i.e., the catch reports of commercial fishermen) do not necessarily reflect fish availability. For example, in Maryland and other states where there are gear restrictions that limit how and/or where menhaden may be caught, many menhaden in the region are not harvested or reported and counted. Now that catch limits have been put into effect, menhaden that are caught and released in order to comply with the catch limits are not

reported and counted. We know that Plaintiffs, Burl Lewis and Larry Powley released many of the menhaden they caught in April through June last year because their buyer was having his coolers repaired and expended, and did not have the capacity to buy and to store/freeze all of the menhaden that they caught. After the catch limits went into effect, they regularly released some of the menhaden that they caught, because they were prevented from taking more than 12,000 pounds per day. We also know that certain gear will not catch certain sizes of fish. There have been times when Omega has stopped harvesting because its rendering plant in Reedville has reached its production capacity. If not enough schools have been spotted or they have been spotted too far from the location of a harvesting vessel, a fisherman will forgo harvesting because the cost to harvest will be greater than the revenue generated by the harvest. In short, commercial landings data does not directly reflect fish availability or population size; they also reflect fishing effort, regulatory impacts, and other economic factors.

14. There are a number of plausible explanations for the disparity between model predictions and subsequent data based observations. Dr. Scheuller and the Beaufort scientists who have discussed the issue with me, and on whom I rely in part in reaching my conclusions, attribute the predictive disparity to the lack of meaningful data about the Atlantic menhaden population and the spawning habits of Atlantic menhaden. Stated another way, there are far too many data deficiencies and unknown unknowns about the Atlantic menhaden population to make any reliable determinations about the health of the population based on the BAM.

15. There are two types of data about menhaden: fishery dependent data, which is data from the catch made by fishermen, and independent data, which is data from studies of menhaden. The vast majority of the annual data collected on menhaden comes from the catch made by commercial fishermen in the mid-Atlantic region.

16. Close to 98 percent of the menhaden caught are caught in the mid-Atlantic region – between the southern Virginia/northern North Carolina border and the northern New Jersey border. Over 83% of the menhaden caught are caught by Omega Protein Company. Thus, there is extensive catch data from the mid-Atlantic region. However, there is virtually no catch data from the southern region (North Carolina to Florida) or the northern region (New York to Maine) about menhaden.

17. The last significant tagging study of menhaden was conducted by NOAA in 1963. Much of what is known and assumed about the spawning and migratory habits of menhaden is based on that 1963 study and follow up studies conducted in the 1960s to 80s. Again, there is virtually no meaningful independent data about the menhaden population south of North Carolina or north of New Jersey and very little independent data in the mid-Atlantic region.

18. The 2011 Atlantic Menhaden Aerial Survey Final Report to Omega Protein evidences the uncertainty created by the lack of a recent stock assessment and the lack of any meaningful data from the northern and southern Atlantic coastal regions. In its harvest of menhaden for rendering, Omega Protein uses airplanes and pilots to spot schools of menhaden from the air before dispatching vessels to harvest the menhaden that were are spotted. This is because schools of menhaden feeding and traveling in the mid-Atlantic region often can be spotted from the sky on the surface of the Ocean. It is more economical to use planes to spot the schools so that the large vessels can be directed to the schools utilizing a minimum amount of fuel and time at sea. Patterned after their harvesting practices, Omega lent several of its pilots to and funded a University of New England marine science professor, James Sulikowski, Ph.D. to assess whether ~~three~~ ere was a stock of menhaden in the northern region. Dr. Sulikowski designed a survey and had the pilots and his assistants fly for 54.25 hours during 13 days between 8/9/2011

and 10/25/2011 to attempt to spot menhaden from Long Island to Maine. Approximately 17,190,000 pounds of menhaden, most of them 3+ years of age, were spotted during such flights. ASMFC did not use any of the data from the study in its 2012 stock assessment update. Clearly, there are menhaden in the northern region with a maximum spawning potential due to their age and size that are not taken into account in the ASMFC stock assessment or the BAM model. For purposes of the ASMFC BAM modeling process, such fish are unknown, even though in reality the existence of such fish has been documented and proven.

The diet of menhaden may change as they age and older menhaden may not spend as much on or close to the surface of the Ocean. That is an unknown unknown that would affect the stock assessment and therefore would affect the results generated by the BAM model.

There could be many more menhaden in the northern region that would escape detection by an aerial survey. That is an unknown unknown that would affect the results generated by the BAM model.

A reliable picture of F and SSB cannot be modeled without knowledge of the foregoing factors and without a stock assessment of the menhaden population not only in the northern region, but all along the Atlantic coast. The catch dependent data that exists does not provide sufficient information to conduct a reliable stock assessment.

19. The observations of the Maryland watermen suggest that there are important unknown unknowns about the menhaden that would affect the utility of the BAM. The watermen report that through their sonar equipment and incidental gill net catch, they have observed schools of menhaden in the Maryland portion of the Chesapeake Bay on a year round basis. There may be non-migratory schools of menhaden all along the Atlantic coast in addition

to the migratory schools assumed by the BAM. A reliable picture of F and SSB cannot be modeled without such knowledge and without data of such populations.

20. The observations of Maryland watermen suggest that there is not reliable information about juveniles and recruitment. The Maryland Department of Natural Resources rockfish/striped bass juvenile seine survey has detected negligible numbers of juvenile menhaden in the Maryland portion of the Chesapeake Bay. The watermen, on the other hand, state that they have regularly seen schools of young menhaden in the Maryland portion of the Bay and the tributaries to the Maryland portion of the Bay. The Maryland watermen further state that the juvenile seine survey used by DNR is unlikely to catch juvenile menhaden. The Maryland watermen state that the pound nets and the gill nets used in Maryland waters generally will not catch juvenile menhaden. The Maryland watermen also have reported catching menhaden with row and sperm that are ready for spawning. Menhaden are known to spawn more than once a year. Menhaden clearly appear to be spawning in the Chesapeake Bay, although the recruitment estimates run in the BAM do not assume such spawning in the Maryland portion of the Chesapeake Bay is occurring.

Menhaden could be spawning more than once a year all along the Atlantic coast. If such spawning is occurring, it is not being taken into account by the BAM and the ASMFC stock assessment, because nothing in the BAM model accounts for spawning outside of the end of fish year (December through February) spawning period in the southern region.

Again, a reliable picture of F and SSB cannot be modeled without such knowledge and without reliable juvenile/recruitment data. Again, this is because any computer model needs to be verified against actual juvenile recruitment data and actual stock assessment data. The

observations of Maryland watermen suggest that the juvenile recruitment data is suspect, and there simply has been no coast wide stock assessment data collection effort.

21. The TC did not make any regulatory management recommendations to the ASMFC Management Board for Atlantic menhaden because the majority of its members concluded there was insufficient data and the BAM results were not sufficiently reliable to support any regulatory management recommendations.

22. H. L. Mencken, the sage of Baltimore, noted, "For every complex problem there is an answer that is clear, simple, and wrong." It is unlikely that there is any simple answer why the BAM computer model is wrong – why the results generated by the model do not fit the observable data. Given the lack of meaningful data about the menhaden stock, including the number and age distribution of menhaden in the Atlantic off of the US coast, it is unlikely that a scientifically valid model can be used to project F and SSB for the Atlantic Coast population.

23. I agree with the observations of Dr. Sharov and, given the limitations of the BAM model, the lack of meaningful data, and the unknown unknowns, as well as given how small the Maryland harvest is and the fact that Maryland gear generally will not harvest fish less than 6 to 8 inches long, there is no statistical or scientific reason to conclude that reducing the Maryland harvest by 6 million pounds or less will, to a reasonable degree of scientific certainty, do anything to conserve, preserve or regenerate the stock of menhaden in the Atlantic Coast or in Maryland waters.

I SOLEMNLY SWEAR AND AFFIRM under the penalties of perjury and based upon my expertise, my scientific training, and the information I have read from reliable scientific sources about menhaden, the information I have learned about the BAM and the menhaden stock assessment from my communications primarily with Dr. Schueller, and the information conveyed to me by Messrs. Robert Newberry, Larry Powley and Burl Lewis, as well as information from the depositions of Dr. Alexei F. Sharov and Lynn Fegley, and the Victor Crecco review, that my opinions and conclusions are based on a reasonable degree of scientific certainty. Some of the

word usage and sentence structure was drafted with the assistance of counsel for Plaintiffs, Messrs. Lewis and Powley. I carefully read and reviewed this Affidavit.

Dated: April 10, 2014

S. Stanley Young, Ph.D.

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