Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

October 20, 2020
9:00 a.m. – 12:00 p.m.
Webinar

Draft Agenda

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

1. Welcome/Call to Order (*S. Woodward*) 9:00 a.m.

2. Board Consent 9:05 a.m.
   - Approval of Agenda
   - Approval of Proceedings from August 2020

3. Public Comment 9:10 a.m.

4. Update on Fecundity Estimates Associated with Ecological Reference Points and Set 2021-2022 Fishery Specifications *(S. Woodward*) **Final Action** 9:20 a.m.
   - Technical Committee Report *(C. Flora)*
   - Advisory Panel Report *(J. Kaelin*)

5. Other Business/Adjourn 12:00 p.m.

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

MEETING OVERVIEW

Atlantic Menhaden Management Board Meeting Webinar
October 20, 2020
9:00-12:00 p.m.

Chair: Spud Woodward (GA) Assumed Chairmanship: 03/20	Technical Committee Chair: Corrin Flora (NC)	Law Enforcement Committee Representative: Maj. Robert Kersey (MD)
Vice Chair: Mel Bell (SC)	Advisory Panel Chair: Jeff Kaelin (NJ)	Previous Board Meeting: August 2020
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 2020

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

4. Update on Fecundity Estimates associated with Ecological Reference Points and Set 2021-2022 Specifications (9:20 a.m.– 12:00 p.m.) Final Action

Background

- The Board sets an annual or multi-year Total Allowable Catch (TAC) using the best available science. From 2018-2020, the Board set the TAC at 216,000 metric tons with the expectation that setting of the TAC in subsequent years guided by menhaden-specific Ecological Reference Points (ERPs).
- In August, the Board approved ERPs to manage Atlantic menhaden. The approved ERPs also adjust the fecundity (FEC) reference points outlined in Amendment 3. The Board tasked the Technical Committee (TC) and EEP Workgroup (ERP WG) with updating the FEC reference points based on the newly approved ERPs as well as exploring a range of TAC alternatives and to determine the percent risk of exceeding the F_{target} in order to inform setting specifications for 2021-2022.
- In September, the TC and ERP WG met to complete the Board tasks on developing a range of TAC alternatives and updating the FEC reference points. **(Briefing Materials**)
- In October, the Advisory Panel met to review and provided comments on the TC's memo. (**Supplemental Materials**)

Presentations

- TC and ERP WG Reports by C. Flora

• Advisory Panel Report by J. Kaelin
Board Actions for Consideration • Approve Updated FEC Reference Points • Consider setting fishery specifications for 2021-2022

6. Other Business/Adjourn

Atlantic Menhaden

Activity level: High

Committee Overlap Score: High (SAS, ERP WG overlaps with American eel, striped bass, northern shrimp, Atlantic herring, horseshoe crab, weakfish)

Committee Task List
• TC, SAS, ERP WG – various taskings relating to management response to the 2019 benchmark stock assessments • TC – April 1st: Annual compliance reports due

TC Members: Corrin Flora (NC, Chair), Joey Ballenger (SC), Jason McNamee (RI), Lindsey Aubart (GA), Jeff Brust (NJ), Matt Cieri (ME), Ellen Cosby (PRFC), Micah Dean (MA), Kurt Gottschall (CT), Jesse Hornstein (NY), Rob Latour (VIMS), Chris Swanson (FL), Ray Mroch (NMFS), Josh Newhard (USFWS, Vice-Chair), Derek Orner (NMFS), Amy Schueller (NMFS), Alexei Sharov (MD), Jeff Tinsman (DE), Kristen Anstead (ASMFC), Kirby Rootes-Murdy (ASMFC)

SAS Members: Amy Schueller (NMFS, SAS Chair), Matt Cieri (ME), Micah Dean (MA), Robert Latour (VIMS), Chris Swanson (FL), Ray Mroch (NMFS), Jason McNamee (RI), Alexei Sharov (MD), Jeff Brust (NJ) Kristen Anstead (ASMFC), Kirby Rootes-Murdy (ASMFC), Joey Ballenger (SC)

ERP WG Members: Jason Boucher (DE), Matt Cieri (ME, BERP Chair), Michael Celestino (NJ), David Chagaris (FL), Micah Dean (MA), Rob Latour (VIMS), Jason McNamee (RI), Amy Schueller (NFMS), Alexei Sharov (MD), Howard Townsend (NFMS), Jim Uphoff (MD), Kristen Anstead (ASMFC), Katie Drew (ASMFC), Sara Murray (ASMFC)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC MENHADEN MANAGEMENT BOARD

Webinar
August 4 and 5, 2020

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

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for Pat Keliher (AA)
Sen. David Miramant, ME (LA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Nichola Meserve, MA, proxy for Dan McKiernan, (AA)
Raymond Kane, MA (GA)
Rep. Sarah Peake, MA (LA)
Conor McManus, RI, Proxy for Jason McNamee (AA)
David Borden, RI (GA)
Eric Reid, proxy for Rep. Susan Sosnowski (LA)
Justin Davis, CT (AA)
Matt Gates, CT, proxy for Sen. Miner (LA)
Bill Hyatt, CT (GA)
Jim Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Houghtaling (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
G. Warren Elliott, PA (LA)
John Clark, DE (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Lynn Fegley, MD, proxy for Bill Anderson (AA)
Russell Dize, MD (GA)
Allison Colden, MD, proxy for Del. Stein (LA)
Steve Bowman, VA (AA)
Bryan Plumlee, VA (GA)
Sen. Monty Mason, VA (LA)
Steve Murphey, NC (AA)
Jerry Mannen, NC (GA)
Mel Bell, SC, proxy for P. Maier (AA)
Malcolm Rhodes, SC (GA)
Sen. Ronnie Cromer, SC (LA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Jim Estes, FL, proxy for J. McCawley (AA)
Sen. Thad Altman, FL (LA)
Marty Gary, PRFC
Derek Orner, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Corrin Flora, Technical Committee Chair
Matt Cieri, Ecological Reference Point WG Chair

Staff

Bob Beal
Toni Kerns
Kristen Anstead
Max Appelman
Pat Campfield
Maya Drzewicki
Lisa Havel
Chris Jacobs
Jeff Kipp
Sarah Murray
Kirby Rootes-Murdy
Caitlin Starks
Deke Tompkins
Michael Schmidtke
Geoff White
Katie Drew

Guests

Karen Abrams, NOAA
Michael Academia
Fred Akers
Bill Anderson, MD DNR
Mike Armstrong, MA DMF
Steve Atkinson
Pat Augustine, Coram, NY
Jerald Ault, Univ Miami
Michael Auriemma, NJ DEP
Joey Ballenger, SC DNR
Bob Ballou, RI DEM
Richard Balouskus, RI DEM
Vincent Balzano, ME
Chris Batsavage, NC DMF
David Behringer, NC DENR
Rick Bellavance, Narragansett, RI
John Bello, VSSA
Peter Benoit, Ofc. of Sen. King, ME
Alan Bianchi, NC DENR
Karl Blankenship, *Bay Journal*
Deidre Boelke, NEFMC
Ellen Bolen, VMRC
Jason Boucher, DE DFW
Rob Bourdon, MD DNR
Dick Brame, CCA
Jeff Brust, NJ DEP
Andre Bucheister, Humboldt Univ

Steve Cadrin, U MASS-Dartmouth
Mike Celestino, NJ DEP
David Chargaris, Univ FL
Benson Chiles, Chiles Consulting
Germain Cloutier
Zack Cockrum, NWF
Allison Colden, CBF
Caitlin Craig, NYS DEC
Robert Crockett
Jane Crowther, Omega Protein
Jessica Daher, NJ DEP
Maureen Davidson, NY DEC
Pamela D'Angelo
Jeff Deem, Lorton, VA
Monty Deihl, Ocean Fleet Svcs
Jon Deroba, NOAA
Greg DiDomenico, Cape May, NJ
John Duane, Wellfleet, MA
William Dunn
Maddie Dwyer, MD DNR
Paul Eidman, Tinton Falls, NJ
Steven Epstein
James Fletcher, Wanchese Fish
Christine Fletcher, Pew Trusts
Jared Flowers, GA DNR
Tony Friedrich, SGA
David Frulla, ME
Erica Fuller. CLF
Mel Gardner
Lacie Gaskins, Reedville, VA
Matt Gates, CT DEP
Shaun Gehan, Gehan Law
Pat Geer, VMRC
Lew Gillingham, VMRC
Angela Giuliano, MD DNR
Willy Goldsmith, SGA
Zoe Goozner, Pew Trusts
Zach Greenberg, Pew Trusts
Max Grezlik, Humboldt Univ
Jon Hare, NOAA
Brendan Harrison, NJ DEP
William Harward
Marin Hawk, MSC
Dave Hersch
Pete Himchak
Ken Hinman, Wild Oceans
Carol Hoffman, NYS DEC
Jesse Hornstein, NYS DEC
Ed Houde, UMD
Asm. Eric Houghtaling, NJ (LA)
Rusty Hudson
Annie Innes-Gold
George Jackman
Cameron Jaggard, Pew Trusts
Jeff Kaelin, Lund's Fisheries
Julia Kaplan, MA DMF
Pat Keliher, ME
Richard Klyver
Aaron Kornbluth, Pew Trusts
Adrienne Kotula, CBF
Alexa Kretsch, VMRC
Ben Landry, Omega Protein
Rob LaFrance, CT
Thao Le, NOAA
Tom Lilly, Menhaden Project
Tom Little, NJ Legislature
Carl LoBue, TNC
Bob Lombardi
Mike Luisi, MD DNR
Dee Lupton, NC DENR
Chip Lynch, NOAA
Pam Lyons Gromen, Wild Oceans
Shanna Madsen, VMRC
John Maniscalco, NYS DEC
Dan McKiernan, MA DMF
Kevin McMenamin, MD
Jason McNamee, RI DEM
Steve Meyers
Fred Michaud
Mike Millard, FL FWS
Drew Minkiewicz, Kelley, Drye,
Chris Moore, CBF
Will Mosley
Brandon Muffley, MAFMC
Allison Murphy, NOAA
David Mussina
Ken Neill
Josh Newhard, FL FWS
Patrick Paquette, MSBA
Rich Pendleton, NYS DEC
Olivia Phillips, VMRC
Ellen Pikitch, Stony Brook Univ
Nick Popoff, FL FWS
Jill Ramsey, VMRC
Dave Ress, *Daily Press*
Harry Rickabaugh, MD DNR
James Rogers
Mike Ruccio, NOAA
Tom Rudolph, Pew Trusts
Charlotte Runzel, Audubon Society
Brandi Salmon, NC DENR
Christine Santora, Stony Brook
Eric Schneider, RI DEM
Bret Scholtes, Omega Protein
Amy Schueller, NOAA
Tara Scott, NOAA
Alexei Sharov, MD DNR
Andy Shiels, PA F&B
Dave Sikorski, CCA
Melissa Smith, ME DMR
Nick Sterrett, Omega Protein
David Stormer, DE DFW
Helen Takade-Heumacher, FL FWS
Howard Townsend, NOAA
Jim Uphoff, MD DNR
Sarah Vogelsong, *Virginia Mercury*
Mike Waine, ASA
Craig Weedon, MD DNR
Anna Weinstein, Audubon Society
Hannah Welch, UNE
Catlyn Wells, SC DNR
Holly White, NC DENR
Kelly Whitmore, MA DMF
Angel Willey, MD DNR
John Williams, CBF
Charles Witek, W. Babylon, NY
Chris Wright, NOAA
Phil Zalesak
Erik Zlokovitz, MD DNR
Renee Zobel, NH F&G

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Tuesday, August 4, 2020, and was called to order at 1:30 p.m. by Chairman A. G. "Spud" Woodward.

CALL TO ORDER

CHAIRMAN A. G. "SPUD" WOODWARD: Good afternoon everybody, this is Spud Woodward, Governor's Appointee from Georgia, and your current Chair of the Atlantic Menhaden Management Board. I appreciate everybody joining in for the Board meeting today.

As if virtual meetings weren't challenging enough, now we have an unpronounceable tropical storm that is rolling across the eastern seaboard, so we will do the best we can. Before I get into the business of the Board, I would like to call on Justin Davis. He would like to make a brief introduction to the Board.

DR. JUSTIN DAVIS: It is my pleasure to introduce Rob LaFrance, who is going to be a new voice for us around the table on the Connecticut side. Rob is going to be serving as the ongoing proxy for our Governor's Appointee, Bill Hyatt, so I expect he'll be filling in for Bill periodically. Rob is a former employee of our agency, the Connecticut DEP. He worked as our agency's legislative liaison.

He also worked in our office of legal counsel, during which time he worked really closely with the Bureau of Natural Resources Programs, including Marine Fisheries. Essentially, he was our lawyer, and he managed to keep me from doing anything too stupid, and getting in trouble, which is no small feat. Rob has since retired from the Agency, and he is now serving as an adjunct professor of Environmental Law at Quinnipiac School of Law, and he is also the Policy Director for Audubon, Connecticut, so welcome, Rob!

CHAIRMAN WOODWARD: Thank you, Justin, and welcome, Rob. We appreciate you joining us, and look forward to your input.

ROBERT LAFRANCE: Thank you very much, I appreciate it.

APPROVAL OF AGENDA

CHAIRMAN WOODWARD: A little brief overview of our agenda. As you can tell this will be a split meeting. We have an hour to do our business this afternoon, and then we will reconvene tomorrow afternoon at 2:45 to complete our business, so an hour we've already used up five minutes of our hour, so I'm going to try to keep us moving along quickly. We have an agenda before us. Are there any modifications to the agenda? If so, please raise your hands and you can be recognized by Toni.

MS. TONI KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: No modifications recommended, I'm going to use consent to approve our agenda, and also our proceedings. If there is any opposition to accepting the agenda as presented, please raise your hand.

MS. KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: All right we will consider the agenda accepted by consent.

APPROVAL OF PROCEEDINGS

CHAIRMAN WOODWARD: We also have the proceedings from our May, 2020 meeting, they have been provided to you in the materials. Are there any modifications to the proceedings?

MS. KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: Is there any opposition to accepting the proceedings as submitted, raise your hand?

MS. KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: We'll consider the proceedings accepted by consensus.

PUBLIC COMMENT

CHAIRMAN WOODWARD: Next, we have an opportunity for public comment for items that are not on the agenda. We would want to see this as brief as we can. I know we have two individuals that have stated that they want to speak during this public comment period. Each have been informed that they have three minutes, so we're going to keep you pretty tight to that so we can get our business done. Raise your hand if you would like to provide public comment at this time, and identify yourself.

MS. KERNS: We have both Phil Zalesak, and Steve Cadrin.

CHAIRMAN WOODWARD: Okay, well Phil, I'll let you go ahead and start with your public comment, and please keep it at three minutes, sir, if you will.

MR. PHIL ZALESAK: I will. Good afternoon, my name is Phil Zalesak. My remarks are in your e-mail as of noon today. I have four basic questions. What was the actual Omega Protein harvest of Atlantic menhaden in the Virginia portion of the Chesapeake Bay in 2019? They were supposed to harvest no more than 51,000 metric tons.

However, they harvested 66,000 metric tons. That is 31 percent of the total allowable catch for the entire Atlantic coast of 216,000 metric tons, or 46 times the Maryland harvest of 1422 metric tons in the Chesapeake Bay. In the past Omega Protein has been allocated over 110,000 metric tons of menhaden, over 500 million fish harvested per year.

What has been the impact on the commercial harvest of predator fish in Chesapeake Bay and its tributaries? Striped bass, bluefish and weakfish are highly dependent on Atlantic menhaden as a primary source of food, and are among 22 other predators, which forage on Atlantic Menhaden in the Chesapeake Bay. Over the last 22 years, the commercial harvest in the Chesapeake Bay and its tributaries have declined by 34 percent for striped bass, 76 percent for bluefish, 98 percent for weakfish. What are the other significant impacts of the Chesapeake Bay and its tributaries?

Over the last 20 years commercial harvesters have declined by 43 percent in Maryland, 40 percent in Virginia, and over the last 20 years for-hire trips have declined by 43 percent in Maryland, and 62 percent in Virginia. The economic damage to the Atlantic Coast commercial and recreational fishing industry is incalculable. However, in 2016, the Atlantic striped bass recreational fishery alone supported over 100,000 jobs, and the economic impact was 7.7 billion dollars.

What is the solution to overharvesting the Atlantic menhaden in the Chesapeake Bay? The southern Maryland recreational fishing organizations Board of Directors has reviewed several proposals submitted by members of this Board, Maryland recreational fishermen, Maryland charter captains, and they evaluated the pros and cons of each proposal. Based on their evaluations they recommend an addendum to the current fishery management plan, which would require one sentence, one sentence change.

Under Chesapeake Bay reduction fishery cap, the sentence would simply read, reduction fishing is prohibited within the Chesapeake Bay, and within the three-nautical mile limit of the economic exclusive zone. This proposal would seem the least disruptive, and would have no impact on the current allocation among the states. Science and 22 years of empirical data demand action now, as this issue is over 16 years old. I thank you for your time.

CHAIRMAN WOODWARD: Thank you, Phil, we appreciate the comments, and I appreciate you keeping it within the three minutes. Next, we have Dr. Steve Cadrin.

DR. STEVE CADRIN: Thanks to the Chair and the Management Board for your time, I know you're on a tight schedule. For those of you who don't know me, I'm Steve Cadrin, I'm a professor of Fisheries and Oceanography at the University of Massachusetts, Dartmouth School for Marine Science and Technology.

The Science Center for Marine Fisheries asked me to review the SEDAR 69 stock assessment of Atlantic menhaden, including the analysis and ecological reference points, which I think represent a substantial amount of work by the Menhaden Technical Committee, and Ecological Reference Points Working Group, and they all provided information for fisheries management.

I think the most relevant scientific guidance for the management board is public briefing (inaudible)…by Ray Hilborn and his colleagues that 2017 paper titled, When Does Fishing Forage Species Affect Their Predators? (inaudible). In each of these…

MS. TINA BERGER: Steve, I'm sorry to interrupt you, but you're cutting in and out.

DR. CADRIN: Sorry about that, that could be my connection. Should I proceed?

MS. BERGER: Let's try again, yes.

DR. CADRIN: The factors that we have to consider for the issue on forage fish but can serve as predators is the high natural variability, and the high natural mortality rate. We have had a direct estimate of natural mortality, which is better than most assumptive stock assessments, a weak stock recruit relationship. The fishery does not target the juvenile menhaden, which are the primary food source for predators, and the changes of spatial distribution has not been fully addressed in the multispecies model.

Therefore, I ask the Menhaden Board to consider the decision of Hilborn and his colleagues for Atlantic menhaden, and the likelihood that the impact of the forage fish multispecies model is less than estimated by the model. The impact of fishing on forage fish is less than indicated by the model. I would be happy to supply further details of my review, and thank you for your time and consideration.

CHAIRMAN WOODWARD: Thank you, Dr. Cadrin. We appreciate your input. You also had some material presented in the supplemental from Dr. Cadrin for Board review, so everybody has had access to those. All right, is there anyone else that would like to make a public comment about anything that is not on the agenda? Any hands raised, Toni?

MS. KERNS: No, I do not see any other hands.

CHAIRMAN WOODWARD: Very good. That concludes our public comment period. There is one housekeeping matter that needs to be attended to, and I'll call on Bob Beal for that.

EXECUTIVE DIRECTOR ROBERT E. BEAL: I just want to let you know that Steve Bowman is having technical difficulties due to the storm. He doesn't have power, doesn't have internet, so he's asked Shanna Madsen to sit in as his meeting-specific proxy for this session. He hopes to be back online tomorrow afternoon, so I just want to let everyone know that Steve can't make it, Shanna should be here for the meeting.

CHAIRMAN WOODWARD: All right, thank you, Bob, we appreciate it.

REVIEW OF THE ECOLOGICAL REFERENCE POINT WORKING GROUP ANALYSIS

CHAIRMAN WOODWARD: Our next item on the agenda will be a review of the Ecological Reference Point Working Group Analysis. As everyone remembers, we have tasked this group with a formidable challenge, and we have continued to ask them to answer questions about the NWACS-MICE model and various scenarios, so I'm going to ask for Dr. Matt Cieri to next present the results of this latest analysis for us, so Matt, it's all yours.

DR. MATT CIERI: Hopefully you guys can see my title screen.

CHAIRMAN WOODWARD: Yes.

DR. CIERI: Excellent. My name is Matt Cieri; I am with the Maine Department of Marine Resources, and I'm also the Chair of the Ecological Reference Point Working Group. Today we'll be talking about ecological reference point assessments, some additional analysis charged by the Board. Just to give

you an idea, we're first going to go over an introduction, which will probably be a little lengthy. Then we'll go into some additional analysis, most of which you guys have seen before. We'll then follow up with some conclusions and recommendations, and then we'll take questions and we'll wrap this puppy up.

The ERP Working Group back in February recommended a combination of the BAM single-species model and the NWACS-MICE model tool, to allow managers to evaluate the tradeoffs between Atlantic menhaden predator biomass, and to establish reference points and quotas for menhaden that account for menhaden's role as a forage fish.

The ERP Working Group developed an example ERP target and threshold, based on striped bass, and where striped bass reference points are, with an ERP target being the maximum F on menhaden that sustains striped bass at their B target, when striped bass are fished at their F target, and an ERP threshold being the maximum F on menhaden that keeps striped bass at their B threshold, when they're fished at their F target.

In this sort of example scenario, all other ERP species are fished at their 2017 levels in this example. At that meeting, the Atlantic Menhaden Board tasked us with conducting additional runs of the NWACS-MICE tool, to explore sensitivities of the ERP, so different assumptions about ecosystem conditions. I'm going to go over those again. I believe we saw these during the spring meeting as well. I tend to talk with my hands, so I'm going to talk with a pointer.

We have a series of scenarios here, including our example ERP under 2017 status quo conditions. Scenario 2 is all at the target, and as you can see this is accomplished by fishing striped bass at its F target, and then the other species at their F targets, all at the threshold, with striped bass being fished at its F target, and everybody else being fished at their F threshold. Then Scenario 4 would be just to have bluefish and Atlantic herring at their B target.

It's important to note here that when we say F target and F threshold, this sort of particular example. This is the F that is required to keep these species at their target or at their threshold levels, respectively. Just to sort of remind you guys of what status quo 2017 conditions really are, at the time Atlantic herring for its status was not experiencing overfishing, was below its target, but not yet overfished.

Bluefish were overfishing and overfished. Spiny dogfish were below its F target, and above its SSB target, and for weakfish its mortality was too high, and its biomass was considered depleted. Putting some numbers on these, you know on each of these examples. We dropped Scenario 4. Scenario 4 was exactly the same as Scenario 2.

We have an ERP target and an ERP threshold. In our example ERPs, the ERP target is 0.19, and an ERP threshold of 0.57. For Scenario 2, everybody at their B target, the ERP threshold was 0.36. I'm sorry, the ERP target was at 0.36, and the threshold was undefined, and I'll get to that in a minute. With Scenario 3, everybody at their B threshold, the ERP target was 0.03, and a threshold of 0.32.

Now for comparison purposes you can look at the single-species biological reference points with a target of 0.31, and a threshold of 0.86. The Scenario 2, what we found was that Atlantic herring when they were at their biomass target, striped bass was fished at their F target. The ERP threshold was undefined, meaning that there wasn't really a menhaden F value that we explored that could push striped bass to their biomass threshold. In sort of a graphic representation of what this all looks like.

First, let's start off here on this axis with striped bass biomass over its B target. At the ratio, this is a ratio, and so at a ratio of 1, striped bass would be at their target, and a little bit below this 0.8, striped bass would be at its threshold. The example here for status quo in the dark line. Then you can see that it crosses both the B target and the B threshold.

What you can do is you can sort of drop a line from where this line sort of crosses the B target and B threshold dotted lines. You can end up with this is Atlantic menhaden full F. You can end up with the F that would be associated with that relationship here. As you can see, this is everybody at status quo, except for striped bass.

When we looked at Scenario 2, where everybody was at their B target, you can see that the line doesn't quite actually make it to the B equals B threshold for striped bass. This is because Atlantic herring biomass just simply didn't allow it to reach that point. You can also see that when everyone was at their B threshold, you could also see that Atlantic menhaden F would be a lot lower if you were to drop a line.

Atlantic herring are an important component of striped bass diets, certainly in some regions and in some seasons. Sensitivity analyses indicate that the model may be overestimating the importance of Atlantic herring, however, especially on a coastwide or an annual level. It was observed that when we looked into this further that the model predicted a higher proportion of Atlantic herring diets of striped bass than what we've actually observed in coastwide studies.

To explore this a little bit further, we instituted some seasonal variability sensitivity runs in the Atlantic herring and striped bass relationship. When we were finished with this, and I won't really bore you with the details. This predicted lower levels of Atlantic herring in the striped bass diet, compared to the peer review model without seasonality that we showed during the assessment process.

But when we did this, we found that the data was more in line with the observed diet data that was seen. The sensitivity to Atlantic herring in the NWACS-MICE model therefore, seems to be due to the lack of seasonal and spatial dynamics, rather than reflecting realistic ecological dynamics consistently.

I'm going to show you a little bit graphically what this kind of looks like. This is basically the same graph that we looked at before, with striped bass B over B target. The target here is a ratio of 1. The B to B threshold just below 0.8. Atlantic menhaden fall out here on this axis, and again in the dark solid line you have our status quo, the example ERP.

Scenario 2, everybody at their B target here, and everybody at their B threshold here. The blue line is the current menhaden F in 2017. When you add in seasonality, I want you to take a look at, here we had seasonality. Again, it's the same sort of graph. But what I do want you to notice is that there are three interesting changes that have happened. The first is that all of those scenarios sort of converge, particularly near the B target. The second thing is that the Number 2, Scenario 2, everybody at their status quo is now the lowest line here. It's gone from here down to here in relationship.

The second thing is that the entire line, all of the lines have moved up to the right, meaning that there is a greater distance between the menhaden effort in 2017, and the ecological reference point that would come from this that would be derived from this. However, this is only used for exploration. It only accounts for the seasonality between Atlantic herring and striped bass, rather than for all the predators and prey.

As you can imagine, you would have to institute the seasonality, not just between Atlantic herring and striped bass, but between menhaden and striped bass, between menhaden and dogfish, between menhaden and bluefish. We haven't really totally examined or tested this as a working group, but only use this as an exploratory analysis.

Look at sensitivity. This really needs to be fully vetted through a peer review process prior to management, simply because the model seems to be sensitive to assumptions about seasonality. We need to look at this more in the future, probably during our next benchmark for this tool. What conclusions can we draw from this?

The ERP Working Group and the Menhaden TC recommend the example ERP Scenario 1, based on status quo 2017 F levels, with near-term management of Atlantic herring. The example ERP was able to provide enough menhaden to sustain striped bass, the most sensitive predator in our models, when striped bass are at or near their biomass target under these conditions.

Sensitivity to Atlantic herring biomass shown in Scenarios 2 and 3, are likely due to a lack in spatial dynamics, rather than reflecting realistic economic dynamics in the system. But this isn't a source of uncertainty that the Board could consider when setting specifications, especially given Atlantic herring are now well below their biomass target, and as you will find out in the next couple of days, pretty far below its threshold as well.

The Board can take a look at this or approach this uncertainty kind of in two ways. One would be to apply a buffer to whatever TACs it generated out of this management action, and the other is to adjust the probability of reaching your F target. This is based on the Risk and Uncertainty Policy Working Group's document that you guys will be reviewing in the next couple of days as well, so we can get into more of that a little bit later.

Again, just to give you an overall summary of what we're talking about here would be Example Scenario 1 ERP reference points. These are exactly as it was presented at the 2020 winter meeting. We're looking at an F target of about 0.19, a threshold of about 0.57. The current menhaden F for 2017 was at 0.16, so overfishing is not occurring.

The probability of exceeding the ERP target from 2019 through 2021 at a 216,000 metric ton quota, would range between 60 and 70 percent. The probability of exceeding that ERP threshold would be pretty much 0. What are the next steps? We have identified and recommended the example ERPs there in Scenario 1. The next steps would be to start generating TACs of the probabilities, to reach that ERP target. This would be based on the Board's risk tolerance level. You could certainly see how you would maybe want to look at different probabilities of achieving that ERP F target, and then have a series of TACs that are associated with them.

With that I am going to wrap up and take questions. The Ecological Reference Point Working Group is a mad group of huge numbers of scientists who have worked on this continuously, not only during the peer review, but afterwards in doing some of this additional analysis and additional work requested by the Board. With that I will take any questions.

CHAIRMAN WOODWARD: Thank you, Matt, and again on behalf of the Board, we appreciate the work this group has done, and it has been a monumental undertaking, and it really is just a beginning of a bold phase, hopefully in fisheries management. We do appreciate you and the others taking the lead on this, and moving us down the line towards better fisheries management. With that I'll open up the floor for questions. Just raise your hand and we'll work through you one by one.

MS. KERNS: Spud, I just want to see if I can get Conor's voice on here. Connor, can you give it a try right now?

MR. CONOR McMANUS: Hey Toni, can you hear me?

MS. KERNS: I can. Okay, so Conor, if you have questions just text me, and then we'll be able to get it in that way.

MR. McMANUS: Perfect, thank you.

MS. KERNS: Spud, you have Lynn with a question.

CHAIRMAN WOODWARD: Go ahead, Lynn.

MS. LYNN FEGLEY: Thank you, Matt for that. I really appreciate it. It is interesting to me that when you put those spatial dynamics in for herring and striped bass that those scenarios came in line. But my question is really, I just was looking for sort of an affirmation from you, and hopefully help the Board.

Right now, if the TAC is maintained at 216,000 metric tons that results in this 60 to 70 percent probability of exceeding the ERP target over the next couple of years. Just stated another way, that implies that if the TAC remains the same then F will rise. Is that correct?

DR. CIERI: That would be correct.

MS. FEGLEY: Okay, thanks.

CHAIRMAN WOODWARD: Nice question, Lynn. That is a good clarifying question. Who is next?
MS. KERNS: We have Allison Colden, and then Emerson Hasbrouck.

CHAIRMAN WOODARD: All right, go ahead Allison, and Emerson you're on deck.

DR. ALLISON COLDEN: I just want to echo the Chair's comments, thanking the TC and the ERP Workgroup for all the great work they've done. Every presentation you give, Matt, I learn more and more about the model and the dynamics. This is really a great presentation to learn more about that.

I wanted to sort of ask two clarifying questions to make sure I'm understanding things correctly. Related to some of the exploratory runs' you guys did including seasonality, did you say that the ERP target that was generated when you included seasonality was more conservative than the ERP that is generated when you don't take that into account?

DR. CIERI: Hopefully you can still see my screen. What ends up actually happening is it would be a little bit less conservative in that regard. There would be a higher menhaden F that would be associated. If you were, for example to, can you see my cursor? If you were to drop a line here down, and compare that to here and down.

DR. COLDEN: Okay great, thanks, and while we're there the other question is sort of, Lynn talked on this a little bit too. It was interesting to see the conversion of those three scenarios, and I'm sort of wondering. Is that related to you know the conclusion or the observations that the model is most sensitive to striped bass, and that is why they are closer, once you sort of address that model artifact of seasonality?

DR. CIERI: It's mostly because when you include the seasonality you drop the importance of Atlantic herring, and most of these scenarios were built around Atlantic herring, as you can imagine. I would be really, really careful about making sort of any sort of decisions based around the seasonality component.

Simply because it just includes the seasonality between Atlantic herring and striped bass. That is what drives it. It doesn't include, you know we don't know what would happen if you include the seasonality between other predators and other prey in the model. That is something that we need to explore.

DR. COLDEN: Great, thanks Matt.

CHAIRMAN WOODWARD: Okay, Emerson, you're next. Anybody on deck, Toni?

MS. KERNS: No one else has their hand up so far.

MR. EMERSON C. HASBROUK: Thank you, Dr. Cieri, for your presentation, and thank you to the entire Working Group for all their work on this. One of the recommendations that came out of the Working Group is that the Board may want to consider applying a buffer when setting the TAC, when Atlantic herring are at a low biomass. That is a fairly subjective statement. Was there any discussion about what the Committee meant by low biomass? Does that mean below their target, below their threshold, some other biomass reference number?

DR. CIERI: We were just sort of trying to come up with options for the Board to take. You know certainly the status of Atlantic herring is an uncertainty within this sort of framework, simply because it is at a very, very low level. One approach would be to simply, you know again because it's an uncertainty.

Like any uncertainty there are sort of two ways the Board could approach it. One would be to set a

precautionary buffer, if that is the Board choice. While we didn't have anything specific in mind, it is something that you are of course always able to do when you guys are facing an uncertain future.

MR. HASBROUCK: A follow up, Mr. Chairman.

CHAIRMAN WOODWARD: Go ahead.

MR. HASBROUCK: Then from your answer then the Board would also have the ability, if we chose to have a buffer, we would have the ability to discuss what low biomass means, and define that ourselves.

DR. CIERI: Exactly. This is more of an opportunity for you guys, what's a low biomass for you? How low does it have to be in order to increase your uncertainty? How big is that uncertainty? If it's too big then you may wish to account for it.

MS. KERNS: Mr. Chairman, you have Justin Davis, Nichola Meserve, and Lynn Fegley, and Allison, I'm not sure if your hand is up again, or if you forgot to take it down.

CHAIRMAN WOODWARD: You've still got Justin, Nichola, and who? Lynn?

MS. KERNS: That's correct.

CHAIRMAN WOODWARD: Go ahead, Justin.

DR. DAVIS: Matt, I want to see if I understand correctly. This will follow up a little bit on Emerson's question, so this concept you brought up of having a buffer on the TAC to adjust for uncertainty around Atlantic herring. The way I was taking this, and maybe I'm not interpreting this correctly, is that the status quo for Atlantic herring under the modeling runs that were done, reflect a population status for Atlantic herring that may not be the case now, they might be at a lower biomass than the 2017 situation.

Because they are sort of the other primary prey item here, the Board might want to adjust for that probability by putting that precautionary buffer around the TAC. If that is correct, what I'm wondering, is there any way to provide any sort of mathematical advice on the magnitude of that buffer, using this modeling framework by doing additional runs under a lower Atlantic herring biomass scenario, if that makes any sense.

DR. CIERI: Yes, it does. We of course did that. That would be here for everybody at their threshold, including Atlantic herring. The one caveat is that we think Scenario 3 and Scenario 2 are likely more due to the lack of spatial dynamics. In this particular case, we could take a look at what different buffers might look like.

But, because when we input this into the model the model is sensitive to Atlantic herring, we're going to get results that look like the blue or the orange line here, depending on where you put Atlantic herring. This was simply put up as a vehicle for the Board, as a way of accounting for uncertainty if they chose to do so.

CHAIRMAN WOODWARD: Follow up on that Justin or are you good?

DR. DAVIS: I'm good, thank you that was a good answer.

CHAIRMAN WOODWARD: Nichola, you're next, and Lynn, you're on deck.

MS. NICHOLA MESERVE: Thank you Matt, I appreciate the work of the Work Group and the TC to do these additional analyses to vet the example ERPs, especially at a time when I'm sure you are all ready to think about something other than menhaden for a bit, It does seem that it was important that we did take this pause on the motion to adopt the ERPs that conduct these additional analyses.

To understand that these particular ERPs showed some sensitivity that they're appropriate for the near term, in the words of the Work Group, and that additional consideration of seasonal and spatial parameters are going to be years in the future. My

question is your definition of a near term. Was the Work Group comfortable in the use of these particular ERPs up until the next benchmark, for example, five years away?

DR. CIERI: To sort of your first point. We will be eating, sleeping, and breathing this stuff for quite a while beyond this, because we have a series of scientific papers coming out, and most of us are actually bum rushing the AFS with a bunch of presentations. Be looking for that if you attend AFS online this year.

Having said that sort of plug, to answer your question, yes. We felt comfortable using these ERPs the Scenario 1 examples that we presented in February, for near term management until the next benchmark. In that time, we're going to be working on seasonal and spatial aspects of this model, to bring you a better product after that benchmark.

CHAIRMAN WOODWARD: All right, Lynn, got anybody on deck, Toni?

MS. KERNS: No one on deck as of yet.

MR. JOHN CLARK: Can you put John Clark in the queue?

CHAIRMAN WOODWARD: Yes sir, I've got you, John. Go ahead, Lynn.

MS. FEGLEY: Really, Justin Davis almost exactly asked my question, but I was curious about how to get at this "precautionary buffer" in some objective way, and my question is, how would setting a precautionary buffer differ from applying the Risk and Uncertainty Policy, and wouldn't picking a probability of, you know like if we went down to a 50 percent probability of exceeding F.

Wouldn't holding the fishery at the ERP target, giving the uncertainty with herring. Wouldn't that provide us more in the near term, like Nichola said. It seems though we're taking one step. I'm just curious just to really how we get to that precautionary buffer. I guess I'm losing my train of thought, I'm sorry. But I guess I'm confused about the difference between the precautionary buffer and the risk and uncertainty policy.

DR. CIERI: Sure, let me see if I can give you an idea of what that might look like. These lines that give you a menhaden full F. Those are based on 50 percent probabilities. What you could do, for example, is set your ERP target to be this particular number, which ends up being 0.19. That produces a quota.

That quota has a 50 percent chance of achieving that F target. You could have a different probability, and therefore would get a different TAC associated with it. Say for example that you wanted a 65 or a 70 or an 80 percent probability of achieving your F target. That would decrease that TAC, increasing your probability.

The opposite is also true, you could choose a 40 percent chance of achieving your F target that would give you a higher TAC. That would be one way of actually accounting for some of this uncertainty, is to say for example that you want to have a higher probability of achieving your F target when Atlantic herring are at a low biomass, say for example at or below its threshold.

That is one approach. That other approach would be to use the 50 percent probability or some other probability. Then say, because Atlantic herring are in a not such a good place, we want to add a precautionary buffer of X percentage just because, on more of an ad hoc basis. Does that make sense the differences between the two?

MS. FEGLEY: Yes, that was excellent, thank you.

CHAIRMAN WOODWARD: Thank you for that question, Lynn and thank you, Matt. All right, John Clark.

MR. CLARK: Thanks for the presentation, Matt, and all the great work the ERP Work Group has done. I was just curious, something you said earlier in response to a question, putting the seasonality in there for Atlantic herring, and increased F on menhaden. Were those the only two species in the model that are actually

prey, so lowering the importance of one would automatically raise the other?

DR. CIERI: To answer your question, generally for the most part. I mean you only have two prey items in this particular model. The difficulty here is the seasonality component is only between Atlantic herring and striped bass. You may get different results when you put in seasonality between menhaden and striped bass. We don't know what that is going to look like until we try it. But you know putting seasonality in, determining what magnitude it is, and other aspects along with that are a lot of work, and not something that we can do in any short, reasonable amount of time.

Even if we were able to do it, that is probably going to require a peer review. But to answer your question more completely, yes that is pretty much how it works, in which you sort of shift striped bass predation off of Atlantic herring and more than likely on to menhaden, with again one caveat. If you do that for all of the species, you may get very different results.

DR. KATIE DREW: Hey Matt, sorry this is Katie. I was just going to add to that to say there actually are a couple of prey species in there. We do have bay anchovy, and then we also have sort of general other prey in there as well. But I think the overall concept is yes, there is limited amounts of place for some of that predation or that natural mortality to go and to come from, and so that is certainly a consideration.

MS. KERNS: John, you're breaking up again on us.

CHAIRMAN WOODWARD: Looks like we lost John. John, we can't hear you. You broke up and then we lost you. All right, well maybe we can get him back. Is there anybody else in the queue for questions, Toni?

MS. KERNS: No one that I saw. Nichola and Lynn's hands were raised, but I put them down, because I think they were from before.

MR. WOODWARD: All right we'll conclude our question and answer period. Again, thank you, Matt for the presentation and thanks to the people in the Work Group. We do appreciate it. Your answers have certainly helped us all to understand better what we're trying to accomplish here.

CHAIRMAN WOODWARD: We've got about 11 minutes left on our allotted time.

What I wanted to do with the remaining time is put up the two postponed motions that are for us to consider at this meeting, just so we can read them once again. I want to make sure that we're clear understanding what those motions do. Those motions, we don't need any action by the Board to bring them forward for consideration, they were postponed not tabled, so they are live motions.

I just want to make it clear to everyone that no management action, further than approval by this Board at this meeting is necessary but not lose focus. It doesn't require an addendum; it doesn't require an amendment. Amendment 3 authorized us to adopt ecological reference points. We're clear there from a procedural standpoint. Can we get those motions up where everybody can see them? There we go. This is the first one.

You notice in there it does not have a number. There is not a number, this refers to a process, and we have had recommended to us a scenario with associated numbers. I don't want to get into deliberations about these motions in our remaining time. What I wanted to do is ask Kirby, if he's got enough time, to give us a summary of the very extensive public comment we have received related to this issue. Kirby, are you ready to do that?

MR. KIRBY ROOTES-MURDY: Yes, sir. I just need to get the presentation up. All right, it looks like Maya's got it now. Great! We'll just switch over to the next slide. I just wanted to offer up a brief summary. Leading up to this week's meeting we received a lot of public comment on the postponed motions.

Based on when it was received, these comments were included in briefing materials, supplemental materials, and additional supplemental materials that were sent out last Friday. While you all have had the ability to review these comments, given the volume of them I provided a brief summary, just a general breakdown of some of the numbers. In terms of organizations. We received 16 letters from organizations that in many instances had cosigning organizations.

In combination there were over 100 organizations that had endorsed or cosigned on public comments that we received. Regarding form letters, we received at least three different types of form letters for three different organizations, and in total we received over a thousand respondents.

In terms of individual comments in the form of e-mail, we received over 200 comments from each individual. In terms of those comments, an overwhelming majority of the public comment indicated support for the Board approving ERPs to manage Atlantic menhaden. Most of the public comments did not define the ERP that should be implemented.

Comments highlighted a range of predators from whales to birds that benefit from menhaden's role as an important forage species, and adopting ERPs for management would help ensure enough fish are left in the water for these predators. That being said, there were many comments to specify that the Board should adopt ERPs defined such that it allowed stripe bass to rebuild to its biomass target.

In speaking to either general or specific ERPs definition the Board should adopt, many commenters also noted the importance of menhaden to coastal economies, business that rely on the water, and in particular recreational anglers in supporting industry. That is just a summary of some of the comments we've received that you all should have been able to review in the materials we've provided. That concludes my presentation, Mr. Chair.

CHAIRMAN WOODWARD: These comments have come in after we have received numerous comments as we've been going through this process for the last several years. All in support in the public for adopting ecological reference points moving forward with a paradigm shift in management, the way that we've been hopefully working towards.

Are there any questions about the postponed motions, about them themselves, or about comments? At this point we can ask those questions. If not, what I would like to do is recess. We will reconvene tomorrow at 2:45 p.m. and at that point I am going to allow some public comment about the postponed motions, and open up the floor for a discussion and deliberation on the postponed motion. Then we will move after we make a decision, we will move into the next agenda item that is going to be dealing with the timing and tasks to setting the 2021-2022 fishing specifications, and we'll receive a presentation on that. We've already had some preparatory questions sort of leading us in that direction. Then we'll also be electing a Vice-Chair. Are there any questions about the motions?

We divided this meeting into two parts, because I wanted to give everybody a chance to think about the presentation from Matt, and have an opportunity to caucus amongst the delegations, have some time to reflect on this, so that when we reconvene tomorrow everybody will be prepared to go into decision-making mode. We've been deliberating on this for a long time, and now we come to the point of we need to make a decision. Are there any questions or comments from the Board at this point?

MS. KERNS: Emerson Hasbrouck.

CHAIRMAN WOODWARD: Go ahead, Emerson.

MR. HASBROUCK: I have a comment on the public comment, and I think as we go forward here the Board has some responsibility to manage expectations. I haven't read all of the public comment, but I've looked at a lot of it. I think a lot of the public perceives adopting ERPs as a panacea.

That by adopting ERPs we're going to save the striped bass, save the bluefish, save the weakfish, save the whales, save the birds, save other wildlife. That is not what this is. It's not a panacea that is going to fix everything for all species. I think we need as a Board to try to manage those expectations.

CHAIRMAN WOODWARD: I certainly appreciate and agree with those comments. It's easy to think that this will fix all the woes of fisheries management, but the reality is, we all know this that we're not going to create ecological reference points that is going to bring weakfish back to a healthy condition.

You can't bring back striped bass without controlling fishing mortality directing on striped bass, so there is a lot. I appreciate that, saying that on the record, because I do think it is important for us to manage those expectations to be realistic. Are there any other questions or comments? Any hands raised, Toni?

MS. KERNS: Hold on one second. I was just unmuting a Commissioner that we had lost before. I have Adam Nowalsky.

CHAIRMAN WOODWARD: Go ahead, Adam.

MR. ADAM NOWALSKY: As I think about where we were at the last meeting, the task we sent the TC back to do and what they've come back with us. I'm left with the sense that the best available science the TC is comfortable putting forward, would basically define ERPs at the present time as limiting to bluefish, striped bass, herring, and menhaden. I'm wondering if one, if that is a fair assessment, and two if there was some guidance from leadership and or staff, to think about over the next 24 hours about if there would be some way to move forward with ERPs, but classifying them at this time just as such, only to include striped bass, bluefish, herring and menhaden, since that is what it seems the advice we're being given is. And so I appreciate confirmation if my chacteristic of if the ERPs being referenced and recommended is accurate, and if there was a way forwardthat they could be defined as such for the time being.

CHAIRMAN WOODWARD: I guess if Matt is still on here, I would sort of bounce that question back to you, because the current motions basically specify the relationship between menhaden and striped bass, and not necessarily, they don't mention specifically bluefish and herring. Is that something you feel comfortable addressing, Matt?

DR. CIERI: Yes. I think it's important to note that the NWACS-MICE model was built around those particular species, in particular for striped bass. Striped bass is the most sensitive one in the model. As Adam I'm sure knows, we ran the full NWACS model of the northeast shelf and I actually do have a slide, but I don't have access to you guys anymore.

What it shows is that striped bass and birds were the most sensitive in the full model. However, the idea that always has been behind this is that reference points that are based around striped bass are likely to cover all of those other species, given that they're less sensitive to the changes in menhaden.

That has been the whole push behind using a less complex, intermediate complexity approach, because including something like all of the full NWACS model for everything. It just becomes way too cumbersome for management purposes. Basically, setting this up for striped bass will set you up for all the other species involved, given the striped bass are the most sensitive.

CHAIRMAN WOODWARD: Thanks for that. Does that answer your question, Adam?

MR. NOWALSKY: I guess so. I guess then the takeaway from that and with the motions as they're before us. I guess that the takeaway is that if we want to define the ERPs to include the four species I mentioned that would require modifications to the motion, because right now the motion is specific to the F target or the threshold. Depending on the motion for only menhaden and striped bass, but does keep everything else status quo, with everything else not being limited to bluefish and herring.

We would include all of those things, but one potential option, I guess could be to modify the second part of both of these motions to say, all other ERP species as defined in the NWACS-MICE model could we considerl, menhaden and bluefish and herring as defined in the NWACS-MICE model. Could the model run only on those species? My concern here is that with the second part, we've gone far down the road here.

I think the expectation is that we continue to move forward with it, and I think what our challenge is, is to find the right intermediate step. I think there are three steps. After we took one step (inaudible). We'll figure it out as we…designed in that step. I think what it provided us with is definitive information that we're definitely not ready to move forward with ERPs based on a large number of other species. We definitely have to define the scope of what those species are that we think the science can provide a reasonable level of information to us as managers, to make a decision that we think one, we can justify to the public, and two, we think realistically is going to provide a tangible outcome, in line with our management decisions.

I think that is what I'm looking for. I have concerns that this whole (inaudible)…motions, and trying to get some information about what the middle ground might look like for consideration in the next 24 hours.

CHAIRMAN WOODWARD: Again, we're four minutes over, so we've got to be judicious with the time we have, I don't want to impinge on striped bass. Is there anything, Matt that you can add that you haven't already said, to maybe address what he said? If not then fine, and we can continue this discussion tomorrow when we reconvene.

DR. CIERI: Yes, just that we built the ERP examples based around striped bass, their targets and their thresholds, simply because they were the most sensitive within the model. Yes, by doing things to striped bass you do end up being precautionary for the other species in the model.

CHAIRMAN WOODWARD: Thank you Matt, and thank you for that question, Adam. We can certainly carry this discussion forward tomorrow when we reconvene at 2:45. Hopefully the weather system will be moved up farther to the north away from us. At this point I am going to recess the Board, until we reconvene tomorrow at 2:45 p.m. Thanks again everyone for being here.

(Whereupon the meeting adjourned at 2:30 p.m. on August 4, 2020)

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ATLANTIC STATES MARINE FISHERIES COMMISSION
ATLANTIC MENHADEN MANAGEMENT BOARD

Summer Meeting Webinar

AUGUST 5, 2020

WEDNESDAY AFTERNOON SESSION

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission reconvened via webinar; Wednesday, August 5, 2020, and was called to order at 2:45 p.m. by Chairman A. G. "Spud" Woodward.

CALL TO ORDER

CHAIRMAN A. G. "SPUD" WOODWARD: This is Spud Woodward; Georgia's Governor's Appointed Commissioner, and Chair of the Atlantic Menhaden Management Board. The recess of our Board is ended, and I am going to call the meeting to order. We have until 4:15 to conduct our business today. Hopefully that will be enough time for us to do what we need to do.

CONSIDER POSTPONED MOTIONS FROM FEBRUARY 2020

PUBLIC COMMENT

CHAIRMAN WOODWARD: I want to start off the Board meeting with an invitation for some public comment about the motions that are under consideration. We'll limit it to comments of these motions. Also, I would ask anyone who is going to make public comment if you'll please try to keep it to three minutes.

We want to make sure that we give plenty of time for the Board to have necessary discussions about the pending motions, but also about the other item we have, which will be a discussion about setting the fishery specifications. With that Toni, who do we have in the queue?

MS. TONI KERNS: We have Steve Cadrin in the cue, and Maya, if you don't mind putting the postponed motions up so folks can see what those are that would be great.

CHAIRMAN WOODWARD: Okay, Dr. Cadrin, you've got the floor, if you'll please just keep it to three minutes if you can.

DR. STEVE CADRIN: Thanks again, Chair, and to the Board for your time and the second opportunity for input. I know you're on a tight schedule. Once again, I'm Steve Cadrin, a professor at the UMass Dartmouth School for Marine Science Technology, and I asked the Menhaden Board to consider the conclusions of Ray Hilborn and his colleagues for Atlantic menhaden, specifically four important factors.

Trying out for variability of the forage fish which applies to menhaden, a weak stock recruit relationship of the forage species, again applies to menhaden, size selective predation, in which most of the predators are consuming sizes that are smaller than the sizes and ages being targeted by the fishery, and changes in spatial distribution of the forage fish.

What Hilborn and his coauthors conclude is that when these factors are applied, the likelihood that the impact of fishing forage fish on the predators is actually less than estimated from multispecies models, because of those factors. Revealing the SEDAR 69 assessment, it is fairly clear that the updated and revised single-species Beaufort assessment model as applied to Atlantic menhaden, is the best scientific information available for fishery management.

The SEDAR 69 ecological reference point report suggests that the single-species management target for menhaden actually performs quite well for meeting menhaden and striped bass management objectives. There is little apparent benefit to striped bass with other predators from fishing menhaden at a lower target fishing mortality.

Our revised scenarios of the SEDAR 69 peer reviewed model suggest that the results are highly sensitive to assumed conditions for other species in the model. For example, reducing fishing on menhaden doesn't appear to be needed to rebuild striped bass if other stocks are managed at their target. I would be happy to provide further details from my review, and thank you again for your time and consideration.

CHAIRMAN WOODWARD: Thank you, Dr. Cadrin, we appreciate that. Anybody else, Toni?

MS. KERNS: I see Jeff Kaelin with his hand up, and then just for any other members of the public, if you want to speak, you just push on that hand button and it will raise your hand, and I will be able to see you. Then in the queue is Jim Fletcher.

CHAIRMAN WOODWARD: All right, go ahead, Jeff.

MR. JEFF KAELIN: Thank you, Chairman Woodward and members of the Menhaden Board. I'm Jeff Kaelin with Lunds Fisheries in Cape May New Jersey. We've been active in the menhaden bait fishery for a long time. We kind of specialize in pelagics. I appreciate the chance to speak briefly, and all I wanted to say was that you know I've been tracking this.

I think I've been to every one of these meetings, you know going back over the last few years. One of the things that Matt Cieri said yesterday that really kind of seems to have been missing from the presentation that the Board has received to date, and hopefully we can get into this in more detail between now and October.

Matt said that the peer review supported the BAM single-species model, a combination of the BAM projections and the NWACS-MICE as a tool, to kind of tune where we're trying to go, where the Commission is trying to go dealing with all the species under management. We didn't see anything about that yesterday.

We didn't see any of the BAM projections, and because we have tuned into this for a number of years, and we've done everything, certainly since 2012 that we've been asked to do as a fishery. We really think that the status quo harvest is pretty darn close to these ERP projections, and that means the Board has done a good job over time. We may actually be in the happy zone, which is what used to be discussed in these assessments many, many years ago.

I just hope that we can see some BAM projections in October, and also of course consider the issue of striped bass F, and the fact that under the management, the management board for striped bass, the stripers won't be at their target until 2029. We certainly hope we can avoid nine years of cutting back on menhaden fishing against that day, Mr. Chairman, so thanks again for the opportunity to make a few comments.

CHAIRMAN WOODWARD: Thank you, Jeff, we appreciate it. Jim Fletcher, you're next.

MR. JAMES FLETCHER: This isn't what you're voting on, but you need to go back and look at the hybrid menhaden that were in the St. Augustine River, and supported the Nassau Fishery Menhaden Plant down in the fifties and the sixties. The other thing that is not being discussed is the effect of surfactants as a chemical, and other chemicals that are in the water, and affecting the reproduction of menhaden and all fish.

We're running around saying we're using best science and we have people making models, but they are not into the science of what is in the water produced by man that is affecting the reproduction of menhaden. The example in Virginia is ketone. Now it is not fair to the American public to have us importing 92 to 93 percent of the seafood we eat that is probably the product from fish like menhaden, by not using good science. It's not what you're voting on today, but we have got to get into the chemicals in the water, and the surfactants and how they affect our fish. That is just an input, rather than doing what we're doing now, we need to look at the underlying cause. I would point out that the bald eagle did not die because of people shooting them, it was because of the chemicals. Thank you for your time.

CHAIRMAN WOODWARD: Thank you, Mr. Fletcher, anybody else, Toni?

MS. KERNS: We have one last person with their hand up, Jerry Ault.

CHAIRMAN WOODWARD: All right, go ahead, Dr. Ault.

DR. JERALD AULT: Yes, this is Jerry Ault; I'm a professor and Chair of the Department of Marine Ecosystems and Society at the University of Miami's Rosenstiel School of Marine and Atmospheric Science. I've been following the process very carefully over the last number of years, and like I said in my letter to the Board, I do appreciate what I would define as herculean efforts of both the Board and the ERP Work Group in putting together, I think a solid piece of work that allows the management process to move forward.

This process really is groundbreaking, trendsetting. I think it is the appropriate way to move in the context of ecosystem-based management. You know it's going to be a difficult road forward, because so many things are being considered, but I think there was a question yesterday about number of animals in the model, and I think the scaled-down model is about six, six of the premium, primary species that are under management of the Atlantic States Marine Fishery Commission.

I point out that five of the six basically are in overfished state. Moving forward, rather than getting the rosy glasses on. I think really acting with the

precautionary tone moving forward is the appropriate way to look at this, but I absolutely support the Board's acceptance of the ERP process, and I think moving forward is the appropriate thing to do, and I think the issues that are involved in the context for science can be worked out through meaningful discussion and analysis. Thank you very much for your time, and I support your efforts.

CHAIRMAN WOODWARD: Thank you, Dr. Ault, we appreciate it. Anyone else, Toni?

MS. KERNS: I do not see any additional hands raised.

CHAIRMAN WOODWARD: All right, very good. I appreciate those folks who made public comment. All right, at this point we have two motions to be considered by the Board. What I would like to do is, we had some discussion yesterday afternoon. Adam had brought up some concerns, so I want to invite him to continue his query about that. We can address that and then after that I will open up the discussion on the pending motion. Adam, would you like to speak again to what you brought up yesterday?

MR. ADAM NOWALSKY: Thank you very much, I appreciate it. The question I had asked yesterday as was just referenced by our public speakers revolved around what specific species we're including, and what our steps might be for making sure that those species are completely clear to all of us around the table, as well as the public, for whatever decision we ultimately make today, knowing what the scope of that would be. I am appreciative of other Board members who reached out to me to continue that discussion, as well as staff for taking time, both last night and again this morning, to continue that ongoing discussion.

Again, as we discussed this yesterday, and as I've thought about the ERPs, my goal would be that if we do move forward as a Board with implementing the ERPs today that we're very clear on what the scope of species are that are considered in the model, and what those impacts are going to be on those species, and our menhaden TACs as we move forward. Let me try to briefly summarize what I think I heard, and then I would like to turn back to staff, to make sure the information that I got was in fact accurate.

What I believe I've heard to this point is that the NWACS-MICE model focuses on, and basically uses sliders, if you will, with regards to menhaden and striped bass, as well as weakfish, bluefish, spiny dogfish, and herring. The model itself uses a number of other species as prey, including bay anchovies, zooplankton, and a number of other species that probably have Latin names that I would grossly mispronounce in the model, but that those are not directly affected by our choices.

What I also heard was that the biggest driver in TACs that were associated with target and threshold reference points, were going to be largely driven by the assessed status of the menhaden resource and its availability. One of the biggest drivers, however there remained significant sensitivity in the model from Atlantic herring. That was learned in having taken this time to have the TC do the initial analysis they wanted to do that was helpful in informing us.

The conversation I had with some additional Board members was that they supported the suggestion that whatever our final motion be, be it the ones that are presently before us, or some modification of those. Do at a minimum go ahead and label those six upper level species. I'll refer to them as, including striped bass, menhaden, spiny dogfish, bluefish, herring and weakfish, so that we're very clear what it is that we're talking about.

But that we have on the record that there is the need for these other species to be part of the model, and any removal of these species or addition of other species to the model, would likely require the model go back to peer review, and after the outcome of that peer review the Board go ahead and then reconsider that for management use. That gives a recap of the help I've received in answering the question I asked 24 hours ago.

I remain in support of, again staff just going ahead and making sure that what I thought I heard I am correct on, or correcting me for whatever is not. Then as we move forward, making references specifically to the species, so that there isn't any misconception here by the public or any other new Board members in the future that take this on. That somehow these ERPs we have introduced and accepted at this point in time, are in full encompassing of all environmental species that come into play with menhaden.

CHAIRMAN WOODWARD: Kirby or Dr. Drew, would either of you like to just respond back to Adam's concerns, and maybe give the Board some guidance on what do we need to do, if anything, to these postponed motions?

DR. KATIE DREW: I will just say, Adam correctly summarized the discussions that we've had, following up with him about what exactly is included in the NWACS-MICE model, as well as the fact that adding or removing predators to the NWACS-MICE model or other species to the NWACS-MICE model, would require a peer review, and so the motion as it stands right now.

You know those ERP species as is defined in the stock assessment now, does sort of lock that into place until the next benchmark, should this or a version of this be accepted by the Board. The question I think also came up about what is going to be the sensitivity of the reference points as we do an update, and whether that will be a big driver of future TAC setting.

I think, you know obviously you can't predict everything with model performance, but once we sort of lock in this definition of, this definition or another definition of the ecological reference points going forward, the changes to the predator biomass in the short term that we're managing this over, should have a minimal impact to the reference points and the larger changes, if we see any for the TAC would be as a result of changes in the menhaden biomass, and fishing mortality rates that are picked up by the BAM.

CHAIRMAN WOODWARD: All right, so at this point I'll open up the floor for comments, further discussion, questions about the proposed motions.

MS. KERNS: Mr. Chairman, I see Justin Davis.

CHAIRMAN WOODWARD: Go ahead, Justin.

DR. JUSTIN DAVIS: Just a question to follow up on the statement that Dr. Drew just made. My understanding would be we're sort of locking a definition here of the NWACS-MICE model, in terms of the species that are included. I would assume that we're also sort of locking it, in terms of the data sources or the types of information that were included in this modeling run.

If for instance between now and the next benchmark a new study became available, a new diet study on predator/prey interaction between some of these species, which might be informative to the model. The idea would be that could not be incorporated until another benchmark was done. Is that correct?

DR. DREW: Yes, that is generally how ASMFC assessment updates have worked, so significant other data sources could not be included in the assessment update that we'll be doing in a couple of years. However, if updates to the stock assessment for any of those species occur, we could incorporate some of that information. But something like major changes to the diet information would not.

CHAIRMAN WOODWARD: Are you good, Justin?

DR. DAVIS: Yes, thank you.

CHAIRMAN WOODWARD: Also, before we have further discussion, just to make clear that we're going to be considering both of these motions together. They will not be treated as separate motions for the purposes of voting, whenever we get to that point. Okay, who is next?

MS. KERNS: You have Allison Colden, and Lynn Fegley in the queue.

CHAIRMAN WOODWARD: All right, go ahead, Allison.

DR. ALLISON COLDEN: I just want to clarify to Adam's point, and make sure that I'm understanding this correctly. I think Katie, did you just mention that the reference to the MICE model in the motion does sort of implicitly lock in, as Dr. Davis just put it, the six species that are currently included as "focal species" in that model? I just want to make sure I am understanding that definition.

DR. DREW: Yes. The six ERP focal species, which I think is how we refer to them in the assessment document, as well as some of the complementary or supporting species groups that are a little more generic within that model. That whole configuration of the NWACS-MICE model is locked in, because that was the version that was peer reviewed and accepted by the Peer Review Panel.

Changes to that would be kind of a significant revision of the model that staff and the ERP Work Group feels would not be appropriate for an assessment update. I think that could be included explicitly within the model, or within the motion, but it's also, I think implied in kind of the way the peer review and the peer review process at ASMFC, and the way that that model was reviewed and structured implies that as well.

CHAIRMAN WOODWARD: Lynn.

MS. LYNN FEGLEY: I think this might be a question for Kirby. I just want to make sure that the Board is clear on the triggers, if you will, that are outlined in Amendment 3, and how these new reference points relate to that. In Amendment 3, in Section 2.6.4, it talks about the definition of overfishing and overfished, and depleted.

Amendment 3 is very well written, and I think that it is clear that the fishing mortality reference point could be either the single species or the multispecies, depending on what the Board does. But there is language at the end of the last paragraph, well the last paragraph starts by saying, reference points will direct the Board on when additional management measures are needed.

The first part of it talks about F, which I think is fine, but then it talks about biomass, and it says if the current biomass/fecundity is below the threshold level, the Board will take steps to increase biomass/fecundity to the target level. My question is, on adopting these new reference points, if the Board chooses that route, and we find ourselves in a situation, that the stock becomes overfished, based on the single-species model, the F reference point is no longer linked. Actually, I'm not sure they were linked in the single-species model. But it strikes me that our ability to really manage biomass, you know with the multispecies F, which is more conservative, would be possible. I just kind of want to make sure that everybody is aware, you know and does this mean that if we get in an overfished situation, we would have to figure out some way to bring that back up.

CHAIRMAN WOODWARD: Kirby.

MR. KIRBY ROOTES-MURDY: Not to punt too much, but my understanding of the management document is that these would effectively, by being approved by the Board, replace the single-species reference points we would be working under in managing menhaden, and defined through either this motion or a subsequent motion.

Depending on how those reference points are evaluated and come out in the next assessment update, the Board would need to respond to those accordingly. I think that is, at this point, the extent I would might be able to offer without looking in the document a bit further, maybe Katie Drew or Matt has other input they would want to offer.

DR. MATT CIERI: I'll let Katie go first.

DR. DREW: Thanks, Matt. I was just going to say right, the ERP assessment focused on the F reference points for development. The current single-species reference points take kind of a similar approach, where you have an F reference point based on the

empirical performance of the fishery, and that sets a target and a threshold.

Then the equivalent fecundity levels associated with fishing at that target and threshold, are what's used to establish the fecundity target and threshold for Atlantic menhaden, again under that single-species framework. Something similar could be done to develop equivalent fecundity or biomass targets for Atlantic menhaden, based on the ERP F levels.

To say, you know if we fish at this level of fishing mortality this is the long-term biomass that would be associated with that to help provide that forage base. We could redefine the biomass reference points or the fecundity reference points as well, to be consistent with these F values. Those biomass or fecundity values would be lower than what you would expect under the single-species biomass and threshold, target and threshold levels.

But similarly, so if the biomass did go below that target or that threshold, according to the BAM, either the single species or the multispecies reference points, then you would have to take some kind of action to reduce the fishing mortality below either of the single species or the ERP target and threshold, in order to bring the population back up.

MS. FEGLEY: Okay thank you, very much.

DR. CIERI: This is Matt Cieri, and just to sort of reiterate that. Once you guys decide on the F rates, the target and threshold, we can go back and produce your biological base/fecundity base reference points for managing biomass. We can do that for you, hopefully by the October annual meeting.

MS. FEGLEY: Awesome, thank you.

CHAIRMAN WOODWARD: Thank you, good question, Lynn. Who is next?

MS. KERNS: You have Eric Reid.

CHAIRMAN WOODWARD: Go ahead, Eric.

MR. ERIC REID: My question is about the F rates. I'm concerned about Atlantic herring. If we're going to maintain the F rate at status quo over some period of time, then I'm not so concerned. But right now, there are issues with Atlantic herring, there is some seasonal factors based on Atlantic herring, which we don't understand. Could somebody give me some comfort on how long we're going to maintain status quo at these F rates? It doesn't sound like it will be very long, is that correct?

CHAIRMAN WOODWARD: Well I'll attempt to answer that, because I think what we've got to do, assuming that we accept these motions and put into practice the use of ecological reference points, the next thing we better do on this agenda is to discuss the timeline and the tasking for setting the fishery specifications.

You're going to be hopefully getting some projections for our deliberations at the October meeting, where we can look at risk associated with various projections of catch, as it relates back to F target. That is going to be the time that we really have to consider sort of the herring component of this. Certainly, Kirby or Katie or anybody else can add to that, especially if I've misspoken.

DR. CIEIRI: That is about right. I think it's important to understand that this is going to be for a relatively short time period, five years. Within that sort of time, Atlantic herring may not be as abundant as it was in 2017. The issue is that when we start putting in some of the seasonality components that we think are more probable, then it doesn't seem to make that much of a difference. However, it is an uncertainty, and that's one of the things I talked about yesterday. This is an uncertainty that you could either put a buffer, to help ease that uncertainty, or to choose a higher probability of achieving a target.

CHAIRMAN WOODWARD: We will have another BAM model assessment of menhaden conducted in 2022, is that correct?

DR. CIERI: That is correct.

CHAIRMAN WOODWARD: We'll have new information available from that single-species assessment that will also be available to use to inform decision making, because we were considering setting the fisheries specification for two years, recognizing that we're going to have new information available from the status of the Atlantic menhaden stock in 2022 for consideration. Does that help, Eric?

MR. REID: Yes, I appreciate that Mr. Chairman, thank you very much. When you talk about a buffer, is that a positive and negative buffer surrounding a point, or is it a one-directional from a point, one way? I would prefer the earlier, around as opposed to a one way from a point.

CHAIRMAN WOODWARD: That depends on the purpose of the buffer. Is it a stock status buffer? Is it a buffer to provide for greater opportunity of access? I think it depends on how you define it. Matt or Katie or Kirby all certainly jump in here.

MR. ERIC REID: Okay, thank you, Mr. Chairman.

CHAIRMAN WOODWARD: All right, who is next?

MS. KERNS: I don't see any other hands raised. Hold on, no, no, I changed my mind. We have Jim Estes, Adam Nowalsky, and Emerson Hasbrouck.

CHAIRMAN WOODWARD: All right, Jim Estes, Adam and Emerson. All right, go ahead, Jim.

MR. JIM ESTES: I would like to echo a little bit of what I think that Mr. Nowalsky was getting at a little bit yesterday and today. I think you briefly mentioned this yesterday also. First of all, I wholeheartedly support both of these postponed motions. Don't get me wrong here, but reading a lot of the comment that we got back from the public, and talking to quite a few people on the phone.

I don't want to give anybody the impression that population dynamics and all the variables that go into it, are as simple as if you feed them more, there will be more. I think that is kind of what the impression is at the public, that if we do this or we decrease the TAC or something to increase the amount of menhaden in the water.

I think that they believe that everything is going to get better. But there are many other factors, environmental factors that come into play besides what they eat, and I hope that we somehow, and this might be Tina's math, because she does this fairly well. I hope somehow when we describe what we did here that we assure the public that we don't think that this is going to cure everything.

CHAIRMAN WOODWARD: Adam, and then Emerson on deck.

MR. NOWALSKY: Building on a couple of the other comments we've heard, and referencing the earlier public question, and going back to the ERP Review Panel Report, where they recommended the combination of the BAM single-species assessment model with the NWACS-MICE. Two questions. One, assuming these motions or some variant of them that achieved something similar passes.

When we do projections, will it be up to us to provide guidance later on today? It sounds like we're going to start the discussion or have the entirety of the discussion., what projections were looking like. I expect they would be looking for guidance about what range of probabilities we would want to be taking a look at. Would we be providing guidance to get a BAM projection as well that we could compare it to? That would be first question one. Are these motions by themselves, what are we going to get in the way of projected TACs when we come back and actually need to set the TAC?

Then the second question, if I heard you correctly. When the next assessment is done, if these motions pass, will we do both the single-species and our ERP assessment from this day forward until we say stop one or the other, or by virtue of passing these motions, will we only be doing the ERP based assessment moving forward?

CHAIRMAN WOODWARD: I will try to answer those questions, Adam, and I'll certainly lean on Kirby and Katie and everybody else. After we dispense with the proposed motions or some variation thereof, we'll have a presentation from Corrin Flora, our TC Chair about options for determining projections for our consideration in the future.

In regard to the model, it is my understanding that we will use the BAM based model for single-species assessment, and then there will be another benchmark run of the NWACS-MICE model five years from now. But as long as that NWACS-MICE model is valid and in effect, we'll use it in concert with the BAM model, and the projections are based on the BAM model. If I'm misstating any of that Katie or Matt or Kirby or somebody, you can probably say it better than I did.

DR. DREW: Spud, you are correct, and I would just sort of amplify what you're saying to say, the way we envision this combination working is that the NWACS-MICE tool provides strategic long-term advice about reference points and fishing mortality levels for menhaden that account for its role as a forage species, and helps sustain the predator base. That is where we get the reference points from.

However, because of the way the NWACS-MICE model works, it tends to smooth over some of the sort of short-term dynamics, and we feel that the BAM is better for capturing that short-term population dynamics, especially that variable recruitment. Once you guys approve the reference points, if you approve them here from the NWACS-MICE model, the NWACS-MICE model basically goes on the shelf, until the update.

In the meantime, we switch over and we take those reference points from the NWACS-MICE model, and use them in conjunction with the BAM model, to do the projections that you all have seen before, and that you're all familiar with. It's just that instead of using the single-species reference points we'll be using the ERP reference points to provide those TAC and those risk levels.

DR. CIERI: Just to jump in here. I think it's important to note that we will be running both of these models together during the next update. We're not going to wait until the next benchmark to rerun the NWACS-MICE model.

CHAIRMAN WOODWARD: Thanks for that clarification, Katie and Matt. All right, Emerson, you're next.

MR. EMERSON C. HASBROUCK: These proposed motions then suggest that we set the menhaden target at a level that is going to maintain striped bass biomass at its target, and that we will set the menhaden threshold at a level that is going to maintain Atlantic striped bass at its threshold biomass.

Right now, striped bass is below both the target and the threshold. Based on our discussion yesterday, at the Striped Bass Board, the pleasure of the Board was to take a slow approach at rebuilding striped bass. That is going to be a many year process, to get up to the threshold, and certainly a long process to get to the target.

In fact, it was pointed out yesterday in the Striped Bass Board that striped bass has never been at the target biomass. What is the purpose of having, I'm going to say these excess menhaden, then in the water right now? If striped bass is neither at its threshold nor at its biomass, and it's not going to be there for some period of time.

Do we need to have all of these menhaden there available for striped bass at their target? Then also, relative to what Jim Estes said a couple minutes ago. You know see them more and there will be more. As Jim said, that is not true. In fact, I don't remember if it was our May meeting or our February meeting.

It was pointed out that we can just stop fishing on menhaden, and that is not going to solve the striped bass problem. I don't know if there is an answer there about what we can do with these extra menhaden. I

keep calling them extra menhaden, maybe people refer to them as something else.

CHAIRMAN WOODWARD: I think that's an important question as we cross the boundary from single-species management into ecosystem-based management as one that we're all going to have to wrestle with. I do think there is a lot of folks that would probably consider there is no such thing as extra menhaden. That is kind of like having extra money, we never seem to have extra money, any of us. But I'll certainly invite Matt or Katie if you would like to provide a response to that.

DR. DREW: I'll jump in first and say, first this is absolutely a conversation that the Board should have, and talk about what is your goal with ecological reference points. I think this particular definition of a reference point is sort of, leaving enough menhaden in the water that striped bass can rebuild themselves, and they are not food limited.

As Emerson points out, we'll probably be leaving extra in compared to say, what if we just assumed striped bass are going to stay overfished for the next five to ten years. They would need less prey than if they are rebuilt to the target, either now immediately, or in the long run. I think you could think of those as either extra menhaden.

You could think of them as a buffer for some of this uncertainty about Atlantic herring, as well as you know general uncertainty about the model. But if you wanted to pursue a different formulation of a reference point to say, you know we're going to leave enough menhaden in the water to sustain striped bass as they are now, is going to require probably more attention in the long run, in terms of developing a reference point that would request that, and then monitoring it so that you continue to crank back on menhaden as striped bass recover. Again, I think the Board can think of their goal as setting these species up for recovery, with a strong forage base, as opposed to you know.

As has been mentioned, it's not a magic wand that is going to fix everything, but it's also a way for the Menhaden Board to support these other predators as they attempt to rebuild through the other Board actions. I don't know if that answers your question. I don't know if this is something the Board wants to get more in-depth analysis on.

Obviously if the Board wanted to see some of those numbers the ERP Work Group would have to come back in October to present some of those results. But it is up to the Board about how you want to interpret extra menhaden, if such a think exists.

CHAIRMAN WOODWARD: Thank you, Katie. Go ahead, Matt.

DR. CIERI: You can certainly make the argument, and some people have that as you're trying to rebuild striped bass, you also don't want to make them food limited. It is sort of a chicken and an egg argument. You may not have the striped bass to consume the menhaden, but if you don't have the menhaden then you won't have the striped bass to rebuild.

CHAIRMAN WOODWARD: I think it's also very important for us to continue to remember that this is the beginning of a process. That we are starting down a road that we all think we should go down. Like any journey sometimes the hardest part is starting. Is there anybody else that would like to speak to these motions? We're getting close on our time. I certainly don't want to constrain Corrin and her presentation, and our discussion about the fisheries specifications, and how that is going to need some deliberation. Anybody, Toni?

MS. KERNS: You have Allison Colden, John Clark, and then Adam, I'm not sure if your hand is up as new, or is that from before?

CHAIRMAN WOODWARD: Okay, go ahead, Allison.

DR. COLDEN: I just want to say I appreciate the discussion that's been going on so far, and I think some very important questions have been asked and addressed regarding, sort of the next step when it comes to how these ERPs in these postponed motions

would be implemented, and what the next steps are following that.

But I sort of wanted to bring it, zoom out a little bit, you know 30,000-foot view. I think some of the comments that have been made recently, in my viewpoint, are more about our next step of quota projections, and so I wanted to bring it back generally to the motion, and that we've got this peer-reviewed model.

The motions I believe, and Katie or Matt can correct me on this, reflect the recommendations of the TC and the ERP Working Group that have been developed over the last three years. I know there are a lot of outstanding questions out there about what this means for the future. But trying to stare into that crystal ball, I think is a rabbit hole that we can spend the rest of the afternoon going down. I just wanted to reiterate those couple of points, and try and zoom out a little bit back on these motions.

CHAIRMAN WOODWARD: John.

MR. JOHN CLARK: I just wanted a quick clarification on something that Katie said about the NWACS-MICE being used for the next five years. Is the Ecological Reference Point Working Group still working on more of those more sophisticated models that have been looked at, and if some of those start coming to fruition before the five years are up, would that be something we would look at as changing what ecological reference point model we use to set these ERPs?

DR. DREW: The ERP Work Group will continue working on both on developing the NWACS-MICE model, and the other models that we looked at, as well as anything else that looked interesting or promising. But those wouldn't be available for management use until they were peer reviewed in five years, as is the Commission standard.

CONSIDER POSTPONED MOTIONS FROM FEBRUARY 2020 (CONTINUED)

CHAIRMAN WOODWARD: **All right, unless there is anyone else clamoring to speak, I think it's time for us to make a decision about these motions, and like I said before we're going to take them together, and because this is a final action it will be a roll call vote.** I assume that each state's Administrative Commissioner or their proxy will be casting the vote. Kirby, anything we need to add before we start the process?

MR. ROOTES-MURDY: No, that's it, Mr. Chair.

MS. KERNS: Could I get you to clarify, you know to Lynn's point that she had made. If the Board adopts these motions, and these are the reference points that we'll be using, obviously for the fishing mortality target. But if we don't make changes to the biomass target, I believe we would be sort of managing on half and half, until we had a biomass target on the ERP model. I just want to make sure that that is clear.

CHAIRMAN WOODWARD: All right. Well Kirby, proceed.

MS. KERNS: Does anybody need a caucus, Spud?

CHAIRMAN WOODWARD: Yes, if you can caucus. Let's just take a couple three minutes, while Kirby gets set up to do this. Let's plan on starting the roll call vote at 3:38. Okay, Kirby, are you ready?

MR. ROOTES-MURDY: I will begin to call the roll call. I will start with the state of Maine.

MS. MEGAN WARE: Yes.

MR. ROOTES-MURDY: New Hampshire.

MS. CHERI PATTERSON: Yes.

MR. ROOTES-MURDY: Massachusetts.

MS. NICHOLA MESERVE: Yes.

MR. ROOTES-MURDY: Rhode Island.

MR. CONOR McMANUS: Yes.

MR. ROOTES-MURDY: Connecticut.

DR. JUSTIN DAVIS: Yes.

MR. ROOTES-MURDY: New York.

MR. JAMES J. GILMORE: Yes.

MR. ROOTES-MURDY: New Jersey.

MR. JOE CIMINO: Voting yes.

MR. ROOTES-MURDY: Pennsylvania.

MR. KUHN: Yes.

MR. ROOTES-MURDY: Delaware.

MR. CLARK: Yes.

MR. ROOTES-MURDY: Maryland.

MS. LYNN FEGLEY: Yes.

MR. ROOTES-MURDY: Potomac River Fisheries Commission.

MR. MARTIN GARY: Yes.

MR. ROOTES-MURDY: Virginia.

MR. STEVEN BOWMAN: Yes.

MR. ROOTES-MURDY: North Carolina.

NORTH CAROLINA: Yes.

MR. ROOTES-MURDY: South Carolina.

MR. MEL BELL: Yes.

MR. ROOTES-MURDY: Georgia. Georgia, you may be on mute right now. Okay, we'll come back to Georgia. Florida.

JIM ESTES: Yes.

MR. ROOTES-MURDY: U.S. Fish and Wildlife Service.

Mr. MILLARD: Yes.

MR. ROOTES-MURDY: NOAA Fisheries.

DEREK ORNER: Yes.

MR. ROOTES-MURDY: Circling back to Georgia.

MS. KERNS: Kirby, I don't see Doug on the call, actually.

MR. ROOTES-MURDY: We'll mark Georgia as absent then?

MS. KERNS: They're not absent, just blank.

CHAIRMAN WOODWARD: I just texted him, he says he's in his office.

MS. KERNS: I'm not seeing him showing up on the webinar.

CHAIRMAN WOODWARD: Hold on a minute, I'll call him. He had a lapse of memory, he's logging in. He wants to make a dramatic entrance. Well, it's a little awkward for the Chair to be from Georgia. Hmm.

MS. KERNS: Did he tell you his vote?

CHAIRMAN WOODWARD: No, but I think I know what it is.

MS. KERNS: Doug, you are unmuted if you would like to cast your vote for Georgia.

MR. DOUG HAYMANS: I apologize. Could I have just one moment please. If you hold on, I'll be right back to you.

MR. ESTES: Perhaps the Chair could talk to us about his latest fishing trip.

CHAIRMAN WOODWARD: My latest fishing trip was really good until the last 30 minutes, when I got caught between two thunderstorms, and it went from 2 to 3 to 4 to 6, with about a 3-second interval. I got

reminded that I'm not 25 years old anymore, and I needed a bigger boat.

MR. HAYMANS: Thank you, Mr. Chair. Now that I've had an opportunity to confer, our vote is yes, please. Thank you.

MR. ROOTES-MURDY: Thank you. The results of the vote are 18 yes, 0 no, 0 abstain, 0 null.

CHAIRMAN WOODWARD: Thank you, Kirby, so the motions are approved unanimously. Thank you very much to the Board, and thank you again to all the folks who have worked so hard on this with the ERP Work Group. We're starting to see this come to fruition. Yes, there are a lot of questions that remain, probably will be.

But anytime you start something as bold as this, there always be some questions and there will be some discomfort, and hopefully we can work through that. As far as managing expectations, I'll certainly work with Tina to assure that in the press release that we address the fact that this is not the cure-all for all fisheries management problems. It's a step in the right direction.

It's going to be a marathon, not a sprint, but it's a step forward and not a step back.

CHAIRMAN WOODWARD: With that we'll move on to our next agenda item, and this is, Discuss the Timeline and Tasking to Set the 2021-2022 Fishery Specifications. I want to call on Corrin Flora, our TC Chair for a presentation, which will give us some advice and some requests from the TC for guidance on setting these specifications.

MS. KERNS: Mr. Chairman, before Corrin goes into that, you had three people that had had their hands raised. I'm not sure if it's in follow up to the motion that was just passed. But you have Lynn Fegley, Joe Cimino, and I'm not sure if Pat Geer also had his hand up. It has come down since. Joe Cimino's hand just came down, but Lynn's is still up.

CHAIRMAN WOODWARD: Okay, go ahead, Lynn.

MS. FEGLEY: I just wanted, to Toni's point, make sure that we didn't need to offer some clearer guidance to the TC or ERP to produce those biomass reference point estimates. I'm assuming we're good to go, but I just wanted to make sure we didn't leave that unpeeled, thanks.

CHAIRMAN WOODWARD: I would think that the questions and the follow up answers and discussions have made it clear that we want to see the adjustments made as necessary. Toni, do we need anything more formal then the record of the conversation we've had here?

MS. KERNS: With that tasking it will be put to the TC.

CHAIRMAN WOODWARD: Thank you very much, and thank you, Lynn. Corrin.

DISCUSS THE TIMELINE AND TASKING TO SET THE 2021-2022 FISHERY SPECIFICATIONS

MS. CORRIN FLORA: I am here, can you all see my presentation?

MR. ROOTES-MURDY: Yes.

MS. FLORA: Okay, good. Thank you all for allowing me to present here today. I am going to be discussing setting the 2021-2022 specifications for Atlantic menhaden. My presentation today will give you some background on this process, since we haven't addressed it since 2017. Then we will pose some questions for Board consideration, and I will end with a timeline on moving forward. In the past the Board has set annual or multi-year tasks on using the best available science.

I'm going to give a brief overview on how those projections are run, as a refresher. Now that the Board has established ecological reference points, Katie touched on this a moment ago. We will be running these projections using the BAM model, since this model is better for short-term projections.

There are slight differences from the 2017 projections to the BAM model. Of course, now we will be using

the ecological reference points in this model. Also, there has been an update to how recruitment is projected. Traditionally, projections are done after the Board considers the level of risk acceptable in exceeding the F target.

Previously under the single-species reference, the Board buffered the acceptable risk to a lower probability, since it was just under the single species. Now that the Board has established the ERP reference points, you may consider the level of risk acceptable, which is higher or lower than the single-species reference points used previously.

The BAM model uses Monte Carlo bootstrap runs of the 2020 benchmark as the basis for these projections. As I touched on in the previous slide, one difference from the 2017 projections is recruitment. Traditionally, recruitment projections were based on median recruitment from each bootstrap run.

Now, recruitment is projected using nonlinear time series analysis. This model uses the state space of the current recruitment value to predict the space of recruitment in the next year. The projections incorporate uncertainty in recruitment, 2017 abundance, natural mortality, and selectivity.

In the past there have been two approaches the Board has taken, two projection runs. These have been based on a percent increase to the current TAC, and a percent probability of falling below the F target. Previously, these included a range of options for increases to the TAC, or a range of probabilities of exceeding the F target.

Here are examples of analysis from the 2017 projections. The top table being the risk of exceeding the F target at the current TAC, and increased levels of TAC from there. The bottom projections table shows the risk of exceeding F target and F threshold at probability of risk levels, and the associated TAC with those probabilities.

This brings us to what the TC needs from the Board today. The Board may choose risk levels at which the TC will provide the TAC, at requested probabilities of exceeding the ERP target, or the Board may choose TAC levels to which the TC will provide the risk of exceeding ERP target and threshold. The Board can choose either or both of these options. If you choose Number 1, the TC needs to know what level of risk do you want projections run under to develop the TAC. Two ways to move forward with this. Looking at the level of risk exceeding the target, or the level of risk exceeding the threshold. When considering risk level projections, it would be helpful for the TC to know if the Board wants to see a maximum percent chance over the next two years with a single TAC over that two years, because if we run it in the individual years, you will have a TAC for each year.

If you choose Number 2, the TC needs to know what TAC levels do you want to see analysis for. I will return to this. What is the timeline for TAC analysis? Today you all have approved ERPs, and we will be looking to you for direction on these projections. Over the next two months the TC will work, have a couple of meetings, and develop a memo for you for the annual meeting in October.

At the annual meeting the Board will receive the TCs work, and set the TAC for 2021 and 2022. I would like to note that if the TAC is not set at the annual meeting in October, the 2021 TAC will be 216,000 metric tons, which was the 2018-2019 TAC. Then moving forward, at the annual meeting in 2022, the Board will receive an assessment update, new projections available based on this update, and we'll have the opportunity to set the 2023-2026 TAC. With that I can take questions, and I could also go back to the slide with the questions.

CHAIRMAN WOODWARD: Thank you, Corrin, I appreciate that. I'm sure we've got some questions, so Toni, who has their hands raised.

MS. KERNS: We don't have any questions from Commissioners, you do have one member of the public that has a question.

CHAIRMAN WOODWARD: Okay, I'll take that. As long as we can be brief.

MS. KERNS: Phil, you can unmute yourself and ask your question.

MR. PHIL ZALESAK: Spud, I'll be good, really quick. It looks like the overall biomass of Atlantic menhaden are pretty good. However, Amendment 3 refers to a reduction cap of 51,000 metric tons. As we all know that is based on history, not science or a decline in the commercial harvest of the predators. My question is, when will that cap be addressed again? That's it.

CHAIRMAN WOODWARD: That cap will be addressed again whenever a Board member brings it up as an issue, and has adequate support for us to initiate a management action to address it, is my understanding, and Kirby, correct me if I'm wrong.

MR. ROOTES-MURDY: That is correct.

MR. ZALESAK: All right, thank you.

CHAIRMAN WOODWARD: You're welcome. All right if there are no.

MS. KERNS: You do now have two Commissioners that have their hands raised, Allison Colden and Nichola Meserve.

CHAIRMAN WOODWARD: Go ahead, Dr. Colden.

DR. COLDEN: It actually wasn't a question, but I was ready to sort of throw out some ideas related to this question from the TC, if and when you're ready for that.

CHAIRMAN WOODWARD: Let me call on Nichola with her question, and then I'll give you the floor again. Nichola.

MS. MESERVE: In looking at the Technical Committee memo that shows the 66 percent chance of the current TAC exceeding the ERP target in 2021. I was wondering if that is a projection that would change with an update. Was that based on, for instance preliminary 2019 landings that are now finalized or any other assumptions that would change, that that may be a projection that needs to be redone, plus adding in 2022.

CHAIRMAN WOODWARD: Okay, Corrin.

MS. FLORA: That does need to add in 2022, and it does not include the 2019 landings. That is a question for the TC of including the actual landings from 2019, and also does need to include projections through 2021, or as I stated before, if the Board would like a projection that includes 2021 and 2022 together, if they would like a single TAC for both years.

CHAIRMAN WOODWARD: Does that answer your question, Nichola?

MS. MESERVE: It does, thank you.

CHAIRMAN WOODWARD: All right, Allison, I'm going to give you the floor again.

DR. COLDEN: Recognizing that we had somewhat of a robust discussion yesterday, following Matt's presentation and the TC recommendations related to buffers and model uncertainty, and the current status of herring. I wanted to put on the table for discussion and consideration a couple of risk levels that take into account, as I said, you know the current status of herring and uncertainty associated with the model.

I think sort of as a standard, a projection that shows the TAC associated with a 50 percent probability of exceeding the ERP target is sort of a standard, given the projection that Nichola just mentioned that we've already seen. That the current TAC is expected to result in a 66 percent probability of exceeding the target in 2021.

You know I think we should aim for 50 percent at a minimum, and then taking that concept of a buffer into account. I know the TC was not able to provide us with specific advice or recommendations on the magnitude of that. Just trying to consider a range and another end number I would put forward similarly to the 50 percent, a 25 percent probability. Understanding if I'm correct, and staff please correct

me if I'm wrong, is that we could still pick a TAC that falls anywhere within those two probability ranges. But those are the two that I would like to put forward for discussion.

CHAIRMAN WOODWARD: All right, so we have something put forward for the purpose of discussion, so I'm going to open up the floor for discussions on that, the recommendations provided by Dr. Colden.

MS. KERNS: You have Lynn Fegley.

CHAIRMAN WOODWARD: Go ahead, Lynn.

MS. FEGLEY: I'm going to be a little careful with this. I think because we're blind right now, these projections will include 2019 landings, so we really don't know what we're looking at, in terms of you know what those TACs are going to look like relative to the current TAC. I'm wondering about asking for a TAC projection, in addition to the ones Dr. Colden mentioned.

I'm wondering about if you were to reduce the current TAC by 10 percent, which I think goes down to 194,000 metric tons. What would those risk probabilities look like? I would like to do that, because I would like for the Board to have some context ahead of time, in terms of any sort of reduction magnitude we might be looking at.

CHAIRMAN WOODWARD: What you're suggesting is they sort of take both approaches that have been outlined in the presentation.

MS. FEGLEY: Correct, it would be the third choice that's right.

CHAIRMEN WOODWARD: Dr. Colden's would basically be a risk level analysis, and yours would be a tech level analysis, is that correct?

MS. FEGLEY: Correct.

CHAIRMAN WOODWARD: Is that unduly burdensome on the TC, Corrin?

MS. FLORA: No, that's not. That sort of fits under Number 2, how we would do that in the past, with having a TAC level and then percentages above or below that TAC level. Yes, we could definitely. That is not overly burdensome at all to do both.

CHAIRMAN WOODWARD: Just to get, I think what has been mentioned in some other discussion, so have the current TAC analyzed for its risk of exceeding the ERP target and threshold, with the inclusion of 2019 data. Then project a 10 percent reduction in the current TAC, and provide a risk of exceeding ERP target and threshold. Then project TAC at a 50 percent probability of exceeding F target, and project a TAC at a 25 percent probability of exceeding F target. Now, the folks that have made those suggestions, have I captured that correctly?

DR. COLDEN: Looks right for me, Spud.

CHAIRMAN WOODWARD: Did I get to what you were concerned about, Nichola, in terms of analyzing the current TAC?

MS. MESERVE: It did, thank you, Mr. Chairman, and I also wanted to voice support for the range that Allison has suggested of 25 to 50 percent, and also would hope that the TC would do a couple more steps in between them, you know 30 or 40 percent. I'm assuming it's not going to be a linear change between 25 and 50 percent in the TAC. It would be helpful to have at least one point in between that we can see how it changes in between those two risk levels.

CHAIRMAN WOODWARD: We have some recommendations, and we don't need to approve these in the form of a motion. It's my understanding they are recommendations and guidance to the TC. Are there any concerns about these suggestions provided to the TC relevant to projections?

MS. KERNS: You've had several other people raise their hands throughout the discussion.

CHAIRMAN WOODWARD: All right, give it to me.

MS. KERNS: You have Justin Davis, Megan Ware, Adam Nowalsky, and Steve Bowman.

CHAIRMAN WOODWARD: All right, Justin you're up, and Megan is on deck.

DR. DAVIS: Nichola more or less covered my point that for the projections of risk level bracketed by 25 and 50 percent that I think we would need to see some projections in between there to have an idea if we were going to set something in between there, where we're going to end up. I mean I don't know if one or two in between there is going to be enough. I don't know how onerous it is to the TC to run these projections, but I would think almost having one at every 5 percent step between 25 and 50 percent would be desirable.

MS. FLORA: The reason we ask for a range is that we will definitely hit steps between that range, it won't just be the beginning and end of that range. In discussions that we've had so far, I don't feel 5 percent may be necessary, but if we get into analysis along the lines that we do see that that becomes a necessary level of analysis. It just depends on what the projections are showing us. But we definitely will have more steps between those two to guide the Board. Then also, I just wanted to ask as well if the Board only wants the 10 percent decrease, or if there is a range in that as well.

CHAIRMAN WOODWARD: Let me go through these folks that have raised their hands, and then we'll put that back out for some response. Megan.

MS. WARE: This is a question for Allison on her projections. Are the, for example the 50 percent probability, is that a single number over two years, or is that what is the TAC in 2021 at 50 percent, and what is the TAC at 2022 at 50 percent?

DR. COLDEN: I think the goal there is to set for the 2021 and then hold that. I'll let you know if I change my mind on that though.

MS. WARE: Can I respond then, Mr. Chair?

CHAIRMAN WOODWARD: Sure, go ahead.

MS. WARE: In that case, thank you, Allison. I might add as like a sub bullet to Allison's that I would like to see what the number is in 2021, and if it is a different number in 2022, I would like to know that. Corrin, that answer is kind of the second part of your question for Number 1 here.

CHAIRMAN WOODWARD: Corrin, you've got that?

MS. FLORA: Megan, let me get this straight. Allison, you're just asking for 2021 and to hold that into 2022. Megan, you would like both years separate?

MS. WARE: Yes, please, so if there is, making up numbers, but 200,000 in 2021 and 205,000 in 2022. I would like to know that they are different, and not what the single number is over those two years.

MS. FLORA: Yes, okay. I was just making sure you wanted them separate not together, as one TAC. If we combine 2021 and 2022 projections together for a 50 percent.

MS. WARE: Correct, I would like them separate. If someone wants them together that's cool too. But I just want to make sure we have a separate run. Thank you.

CHAIRMAN WOODWARD: All right Adam, and then Steve, you're on deck, Steve Bowman.

MR. NOWALSKY: I'll go ahead and be that person that requests them combined. That gives us the opportunity to set not just the one year, not just the two year with a changing TAC, but I would like to see the projections run with a combined, a same TAC offered in 2021 and 2022 combined that would allow us to keep the measure status quo over a two-year period.

The question was also asked about a range with regards to a percent of TAC levels. I would like to see a projection within a range between 10 percent below and 10 percent above. My reason for asking for that is because our discussion about this so far today with these ERPs, and the direction we're giving the TC, has been only to go in a more conservative direction on the management of menhaden.

I think that message that we've been trying to send is that we as a Board are interested in ERPs, because we believe it's the best available science is a message we need to continue to pass along. Not that we're only interested in ERPs to be more conservative, to take less fish out of the water if the best science says we can.

I think we need to be able to respond to that, we've heard some testimony already today from some published individuals on the topic, and I think we need to be responsive. If we're going to ask for that. Unfortunately, or fortunately, depending on which side of the aisle you're on in this discussion. I suspect a 50 percent probability is probably going to wind up being our upper cap. I'm not sure where that is. But I think we at least need to provide the direction that conveys to the public that we are truly interested in this in a two-way street. For that reason, I would ask for a 10 percent in either direction increase or decrease of the TAC level, relative to the Number 2 strategy.

CHAIRMAN WOODWARD: I think Kirby wanted to jump in here really quick before you, Steve.

MR. ROOTES-MURDY: I would just take a second to pause. We have Corrin, our TC Chair, who has obviously given the presentation, and is I think struggling a little bit with some technical issues right now. She's hopefully going to put up on the screen if she can, some of these requests that the Board has put out, so that you all can see these, because ultimately at the end of the day, we want people to understand what they've asked for, that it's clear to everybody, and so that we can move forward with addressing all those requests.

I will at this stage, at the very least, offer that it's important to keep in mind that for all of the requests that this TC is great and can get this work done. But at the end of the day, keep in mind that the volume of different TAC levels under either evaluating the risk of exceeding the F target or the threshold versus different TAC levels relative to the current TAC, and evaluating those risks.

That will ultimately be that many more options, so to speak, for you all to choose from, in terms of the TAC. As Corrin has noted, and I believe Amy and other members of the TC, Amy Schueller, excuse me, can indicate we can get this work done. But I'll just caution to keep in mind that the more different variations or options you want to look at for TACs will ultimately be more that you have to choose from in the end.

Corrin is working to get some of these written down on the screen, for you all to take a look at. We might just give her a moment to do that.

One last thing, Mr. Chair. There was a question to Adam's request about the step increments, in terms of the range. If you could clarify that, Adam, that would be helpful.

CHAIRMAN WOODWARD: Go ahead, Adam.

MR. NOWALSKY: I think 5 percent increments, if that is not asking too much, would be more than reasonable. I don't think we would need to be any more discreet than that. If it had to be three numbers, a minus 10 percent, a 0 and a 10 percent deviation due to workload. That would certainly give us the full range to choose from if we choose something else. But if it wasn't too arduous to provide the 5 percent either way numbers, so that they're in front of us, without us having to have to guess or do it on the fly. That would be appreciated.

CHAIRMAN WOODWARD: Corrin, I think if you'll put a plus 10 in front of that other 10 percent or minus 10 percent to that plus 10 percent. I think that is what Adam was speaking to. Is that correct, Adam?

MR. NOWALSKY: It appears correctly on the screen to me right now.

MS. FLORA: That was my intention there.

CHAIRMAN WOODWARD: Okay Steve, thanks for your patience.

MR. STEVEN G. BOWMAN: Yes sir, and I'm going to be very brief. We would like to support Mr. Nowalsky's proposal located at the bottom, and we would ask. I'm not sure whether that is Allison's motion or whatever, but the TAC at the top. If we could do the top number at 60 percent probability as a friendly amendment, so that we could get a little bit more flexibility and oversight. I think that would be a good thing. I just feel very strongly about that. Not to beat it to death, but we would really, really prefer that.

CHAIRMAN WOODWARD: Is there anybody strongly opposed to that? Any hands, anybody? If not.

MS. KERNS: I have Allison and Lynn's hands up. They've been up for quite some time, so I'm not sure if they forgot to put their hands down before.

CHAIRMAN WOODWARD: All right, Allison.

DR. COLDEN: Just to comment very quickly on that. I'm not strongly opposed to Steve's suggestion, but to Corrin's point earlier about investigating. You know by setting that range and investigating risk probabilities within that range, I just want to make sure if we change it to 60 percent that 50 percent is one that we get to see specifically, because I think that is kind of a standard risk probability assessment. I would want to make sure that that one is included in whatever resolutions the TC decides to use within that range.

MR. BOWMAN: We have no problem with that as well. We would like to see all the numbers in making a good decision.

CHAIRMAN WOODWARD: Very good, I think she has captured that. Lynn.

MS. FEGLEY: Sorry that was a holdover, I have nothing to say.

CHAIRMAN WOODWARD: Okay, very good. Okay, so we have presented to the Board the range of requests for projections to be analyzed by the Technical Committee, and be provided to us so that we can review them, and hopefully make a decision about fisheries specifications for 2021 and 2022 at the October meeting. We're a little bit already over time, so is there anybody that has real heartburn with these, or thinks that there is something to speak that's absent, if you'll raise your hand and be recognized.

MS. KERNS: Megan Ware.

CHAIRMAN WOODWARD: Go ahead, Megan.

MS. WARE: I'm just looking to confirm that that second bullet, negative 10 that's left in. That also would include a run, excuse me current TAC. I'm just trying to confirm that.

MS. FLORA: The percentages from that were from the current TAC, and so yes, we will start at the current TAC, go 10 percent down, 10 percent up with those projections.

CHAIRMAN WOODWARD: All right, is everybody satisfied with that? Are we satisfied that this is going to give us what we need to make a decision in October?

MR. ROOTES-MURDY: Mr. Chairman this is Kirby. I just wanted to clarify. For the range, the 25 to 60 percent probability. I had it in my notes that the Board wanted to see those in 5 percent increments going from 25 up to 60 percent, is that correct? The other is whether the Board wanted to see that same 5 percent increment from the current TAC, you know down 5 percent to negative 10 percent, and then 5 percent above to 10 percent above. Just looking to clarify that.

CHAIRMAN WOODWARD: Does anybody want to opine on that?

MR. BOWMAN: Yes sir, 5 percent is what the Commonwealth of Virginia was asking.

CHAIRMAN WOODWARD: Okay, so you've got that Corrin, 5 percent increments on the minus ten to plus ten analysis as well?

MS. FLORA: Yes. I do want to just point out again what was said earlier that that is going to be a lot of decisions and conversation at the October meeting. We are fine giving it to the Board that just might complicate some discussions, but if you want 5 percent on both of them, we can do that.

CHAIRMAN WOODWARD: Well it seems that is what we want. Anything else on this?

MS. KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: Very good, well thank you all. Thank you, Corrin. It is kind of like being told to go to a restaurant and get takeout orders for 45 people. Everybody wants something different. We appreciate you being with us, appreciate your guidance, and we look forward to seeing the products of this analysis.

ELECTION OF VICE-CHAIR

CHAIRMAN WOODWARD: We are at our final agenda item, and that is the election of the Vice-Chair. I would like to open the floor for nominations.

MS. KERNS: We have Malcolm Rhodes.

CHAIRMAN WOODWARD: Go ahead, Malcolm.

DR. MALCOLM RHODES: If it pleases the Board, I would like to nominate Mr. Mel Bell to assume the vacant position of Vice-chair.

CHAIRMAN WOODWARD: All right, do I have a second?

MS. KERNS: You do, Steve Murphy.

CHAIRMAN WOODWARD: All right very good, so we have a motion and a second to appoint Mel Bell as the Vice-chair of the Atlantic Menhaden Management Board. Any discussion on the motion? Any opposition to the motion? Signify so by raising your hand.

MS. KERNS: I see no opposition; I'm just going to let Maya know that the seconder was Mr. Murphy.

CHAIRMAN WOODWARD: Steve Murphy, very good. It's unanimous and Mel Bell will be assuming the auspicious role of Menhaden Vice-chair. I know he'll do a great job.

OTHER BUSINESS/ADJOURNMENT

CHAIRMAN WOODWARD: With that we're at Other Business. Is there any other business to come before the Atlantic Menhaden Management Board?

MS. KERNS: I do not see any hands raised.

CHAIRMAN WOODWARD: Thanks everyone. This has been a long time coming. I think we've accomplished a lot. Again, I'm going to heap praise on the ERP Work Group and their efforts, and the Technical Committee. They do a lot of hard work and get very little praise for it, and certainly very little formal recognition for it.

But without them we wouldn't be able to do anything. When you have a chance, the folks that work with you and for you, they are all in these groups. Please communicate our appreciation to them. Do I have a motion to adjourn the Board? Raise your hand.

MS. KERNS: Allison Colden has raised her hand.

CHAIRMAN WOODWARD: I have a motion to adjourn, all right, second?

MS. KERNS: Mel Bell.

CHAIRMAN WOODWARD: Very good, thanks everyone very much.

(Whereupon the meeting adjourned at 4:25 p.m. on August 5, 2020)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Atlantic Menhaden Technical Committee

DATE: September 30, 2020

SUBJECT: Stock Projection Memo

The Atlantic Menhaden Management Board (Board) will discuss the 2021-2022 total allowable catch (TAC) for menhaden at its October 2020 meeting. Per Amendment 3, the TAC is set through Board action, either on an annual basis or for multiple years, based on the best available science. If the Board does not set a TAC for 2021 by the Annual Meeting, next year's TAC will automatically be set at the level of the 2020 TAC. At the August meeting, the Board tasked the Atlantic Menhaden Technical Committee (TC) with developing projections using the ecological reference point (ERP) and the single-species assessment model (Beaufort Assessment Model, or BAM). Specifically, the Board requested the following projections:

- The TACs that have a 25%-60% probability of exceeding the ERP fishing mortality rate (*F*) target, in 5% increments, using 2021-2022 combined and as separate years.
- The percent risk of exceeding the ERP *F* target and threshold if the current TAC was changed by -10% to +10% in 5% increments, including 0% (the current TAC).

This memo outlines the methods for the projections and the results of the analysis the Board requested to support the specifications process.

TAC Setting Process

As in recent years, the TAC has been informed by the results of projection analysis, which explores a range of TAC alternatives to determine the percent risk of exceeding the F_{TARGET} or the $F_{THRESHOLD}$. Monte Carlo Bootstrap (MCB) runs of the base model run from the Beaufort Assessment Model (BAM) are used as the basis for the projection analysis (see stock assessment report for details on BAM base run and MCB runs; SEDAR-69 2019). Projections were run for 2018-2022 using reported landings for the years of 2018 (191,500 mt) and 2019 (208,800 mt), a TAC of 216,000 for 2020 (actual 2020 landings will not be available until next year; Table 1), and the requests from the Board for 2021-2022. Reported landings for 2018-2019 were compiled from NOAA's Beaufort Laboratory (reduction landings) and state compliance reports (bait landings). The starting conditions of the projection analysis include initial numbers at age, which were the estimated numbers at age, N_a, for year 2018 from the BAM for each MCB run.

Numbers at age after the initial year were calculated as:

$$N_{a+1,y+1} = N_{a,y} e^{-Z_{a,y}}$$

where $Z_{a,y}$ was age and year specific mortality and equaled natural mortality for each age plus the fishing mortality rate for each age and year times the selectivity at age. The vector for natural mortality for each projection was the vector from each MCB run. Selectivity was a vector from each MCB run for each fishery with the northern and southern commercial reduction fishery; selectivities were the values in the last time period. Fishing mortality was estimated using the optimize function in R in order to match the annual landings (level of landings denoted above). Annual landings were calculated using the Baranov catch equation and weight of landings.

The methods are consistent with previous projection methods with two exceptions. With the accepted peer-reviewed benchmark stock assessments in 2019, recruitment is now projected using non-linear time series analysis or empirical dynamic modeling as demonstrated in Deyle et al (2018), not using a median recruitment value from the MCB runs. Additionally, with the Board action to adopt ERPs, the following reference points are used in the projections:

- **ERP target**: the maximum *F* on Atlantic menhaden that sustains Atlantic striped bass at their biomass target when striped bass are fished at their *F* target
- **ERP threshold**: the maximum *F* on Atlantic menhaden that keeps Atlantic striped bass at their biomass threshold when striped bass are fished at their *F* target.

As usual, projections are highly uncertain and subject to model assumptions (i.e., no changes in fishing effort, seasonality of the fishery is not modeled, there is no structural model uncertainty in projections). Since the implementation of coastwide quota management the TAC has been set at the following levels: 170,800 metric tons (2013–2014); 187,880 metric tons (2015–2016); 200,000 metric tons (2017); and 216,000 metric tons (2018–2020; Table 1).

Results

One of the Board requests was to provide TACs that have a 25%-60% probability of exceeding the ERP target, in 5% increments, using 2021-2022 combined and as separate years. For the projections using 2021 and 2022 as separate years, a TAC has been calculated (Table 2). There were two approaches for combining the years that the TC discussed. One approach was to provide the average value of the risk as the probability level; however, there was not one unique solution with respect to the average and there were concerns that this would result in confusion. The second approach was to provide a TAC that does not exceed the level of risk for either year, or the lower of the two TACs provided in Table 2. Therefore, the TAC for 2021-2022 combined would be the TAC from 2021 when the years were calculated separately.

The second request from the Board was to calculate the percent risk of exceeding the ERP target and threshold if the current TAC was changed by -10% to +10% in 5% increments. The results are presented in Table 3.

Additionally, the TC notes that a TAC in 2021 does affect the TAC in 2022 and therefore a value may not have the same associated risk in Tables 2 and 3. For example, in Table 2, the probability of exceeding the ERP target by 60% results in a 2021 TAC of 197,200 mt and a 2022 TAC of 216,200 mt. Conversely, if one was to maintain the current TAC of 216,000 mt for both

2021 and 2022, the risk of exceeding the ERP target in 2021 and 2022 is 66% and 60%, respectively (Table 3). The TAC in 2022 is 216,000 mt for both of the exercises, but the associated risk is different because the TAC in 2021 is different (197,200 mt in Table 2 and 216,000 mt in Table 3).

Instead of providing figures for all the of scenarios the Board requested, the TC provided figures of the fecundity, recruits, full *F* fishing mortality rate, and landings for the current TAC, a TAC of 237,600 mt (10% increase to TAC), and the scenarios where the risk of exceeding the ERP target in 2021 and 2022 was 25% and 60% (Figures 1-4). These four plots provide the bounds of the highest and lowest risk scenarios (25% and 60%) the Board requested in addition to the highest TAC requested (237,000 mt) and the current TAC (216,000 mt). **Please note:** the projection runs in the four plots use actual landings for years 2018-2019 while 2020, 2021, and 2022 use the TAC value.

Table 1. The TAC and landings for 2017-2020. In 2017, *F* was 0.16, below both the ERP target (0.19) and ERP threshold (0.57).

Year	TAC	Landings
2017	200,000 mt	173,000 mt
2018	216,000 mt	191,500 mt
2019	216,000 mt	208,800 mt
2020	216,000 mt	Not available

Table 2. The TACs (in mt) associated with a 25-60% probability of exceeding the ERP target (0.19) for 2021-2022 combined and as separate years.

Probability of Exceeding the ERP Target	TAC for 2021-2022	TAC for 2021	TAC for 2022
25%	148,700	148,700	150,800
30%	153,200	153,200	157,200
35%	158,000	158,000	162,900
40%	163,100	163,100	169,400
45%	169,400	169,400	177,300
50%	176,800	176,800	187,400
55%	186,600	186,600	200,600
60%	197,200	197,200	216,200

Table 3. Percent risk of exceeding the ERP target (0.19) and ERP threshold (0.57) for five different total allowable catch (TAC) projections.

TAC	Probability of Exceeding ERP Target		Probability of Exceeding ERP Threshold	
	2021	2022	2021	2022
194,400 mt (-10%)	58.5%	52.5%	0%	0%
205,200 mt (-5%)	63.5%	56.5%	0%	0%
216,000 mt (current TAC)	66%	60%	0%	0%
226,800 mt (+5%)	68.5%	62.5%	0%	0.5%
237,600 mt (+10%)	70.5%	65%	0.5%	0.5%

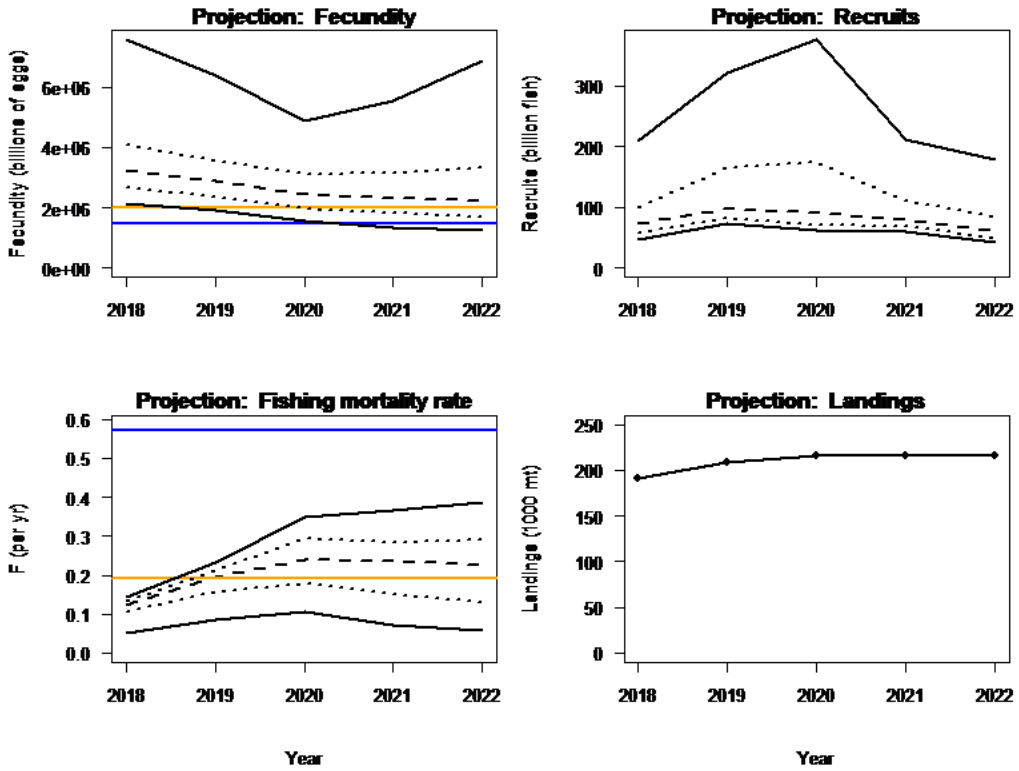

Figure 1. Fecundity, recruits, full *F* fishing mortality rate, and landings for projections done with the current TAC of 216,000 mt. The blue lines indicate the ERP thresholds and the orange lines indicate the ERP targets. The dashed black line is the 50th percentile (median), the dotted black lines are the 25th and 75th percentiles, and the solid black lines are the 5th and 95th percentiles.

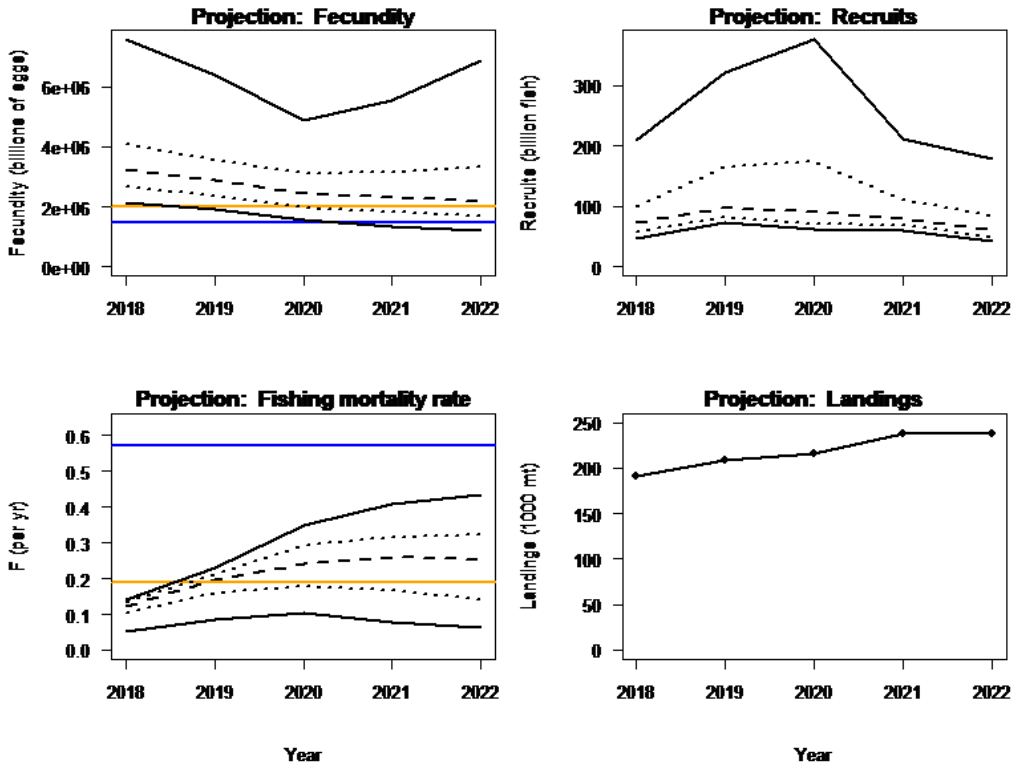

Figure 2. Fecundity, recruits, full *F* fishing mortality rate, and landings for projections done with the current TAC of 237,600 mt, representing a 10% increase to the current TAC. The blue lines indicate the ERP thresholds and the orange lines indicate the ERP targets. The dashed black line is the 50th percentile (median), the dotted black lines are the 25th and 75th percentiles, and the solid black lines are the 5th and 95th percentiles. Note that the run for 237,600 mt doesn't show any risk of exceeding the threshold, but does show some risk in Table 3 (0.5%). It does not show up in the figures because the risk is outside the 5th and 95th percentiles.

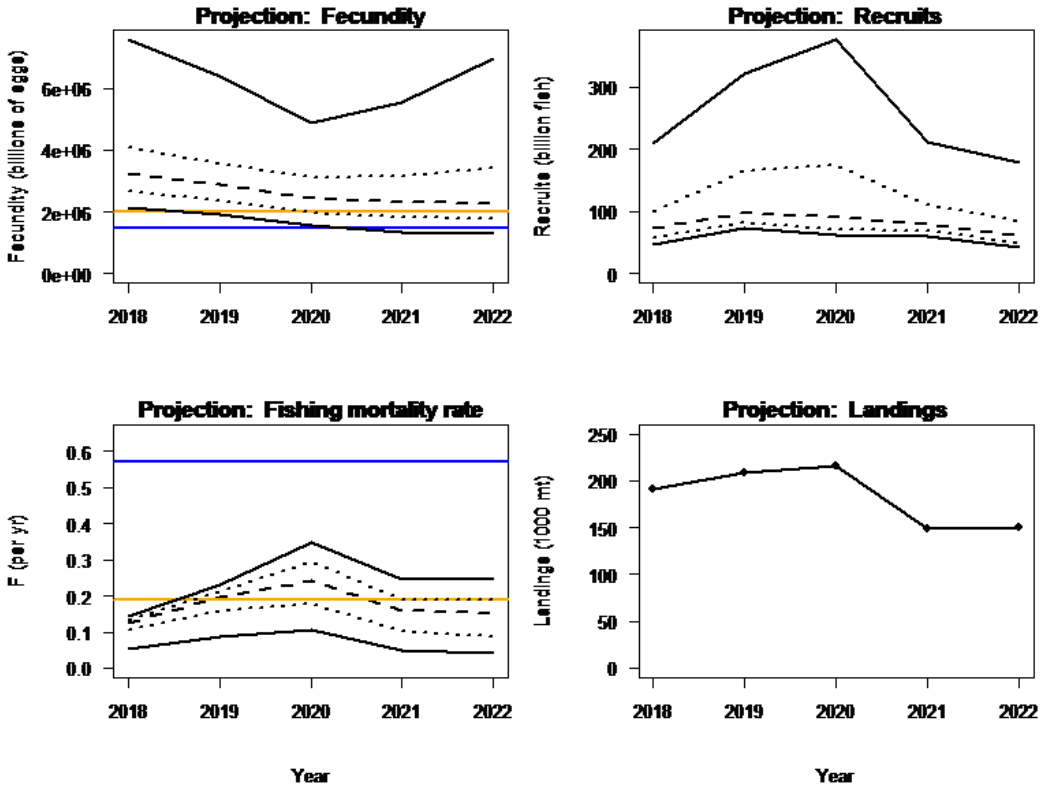

Figure 3. Fecundity, recruits, full *F* fishing mortality rate, and landings for projections that result in a 25% risk of exceeding the ERP target in 2021 and 2022. The blue lines indicate the ERP thresholds and the orange lines indicate the ERP targets. The dashed black line is the 50th percentile (median), the dotted black lines are the 25th and 75th percentiles, and the solid black lines are the 5th and 95th percentiles.

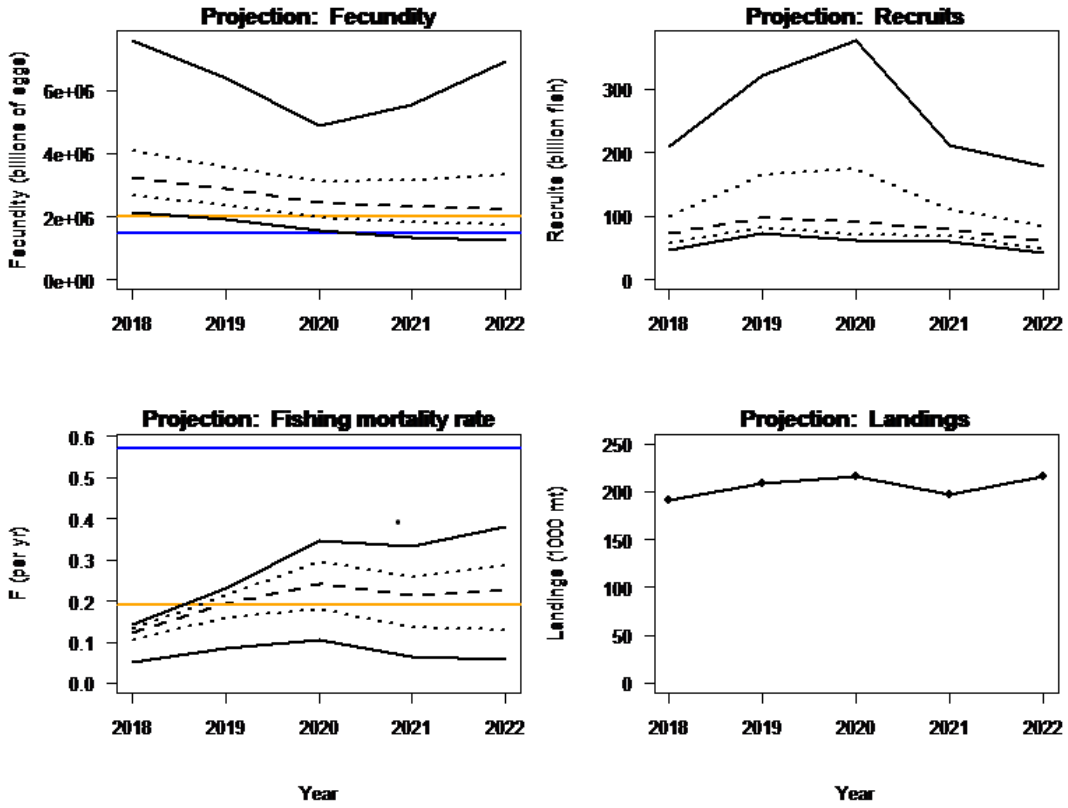

Figure 4. Fecundity, recruits, full *F* fishing mortality rate, and landings for projections that result in a 60% risk of exceeding the ERP target in 2021 and 2022. The blue lines indicate the ERP thresholds and the orange lines indicate the ERP targets. The dashed black line is the 50th percentile (median), the dotted black lines are the 25th and 75th percentiles, and the solid black lines are the 5th and 95th percentiles.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Atlantic Menhaden Management Board

FROM: Ecological Reference Point Work Group and Atlantic Menhaden Technical Committee

DATE: September 30, 2020

SUBJECT: Fecundity Reference Points Memo

At the 2020 Summer Meeting, the Atlantic Menhaden Management Board approved the use of ecological reference points (ERPs) in the management of Atlantic menhaden to account for its role as an important forage fish. The ERP fishing mortality (*F*) target and threshold are defined as:

- **ERP *F* target**: the maximum *F* on Atlantic menhaden that sustains Atlantic striped bass at their biomass target when striped bass are fished at their *F* target
- **ERP *F* threshold**: the maximum *F* on Atlantic menhaden that keeps Atlantic striped bass at their biomass threshold when striped bass are fished at their *F* target.

All other focal species in the model (bluefish, weakfish, spiny dogfish, and Atlantic herring) were assumed to be fished at 2017 levels.

The Board tasked the ERP Work Group with producing an ERP fecundity target and threshold that correspond with the ERP *F* reference points.

Results

The ERP fecundity target and threshold (Table 1), defined as the equilibrium fecundity that results when the population is fished at the ERP *F* target and threshold respectively, were calculated using the same methodology that was used to produce the single-species fecundity reference points in the past. The 2017 estimate of fecundity was above both the ERP target and threshold, indicating the stock was not overfished.

Table 1. The equilibrium fecundity associated with the ERP *F* target and threshold

Reference Points	ERP Fecundity (Billions of Eggs)	Single Species Fecundity (Billions of Eggs)	2017 Fecundity Estimate (Billions of Eggs)
ERP $FEC_{TARGET,}$ Equilibrium Fecundity at F_{TARGET}	2,003,986	1,945,613	2,601,550
ERP $FEC_{THRESHOLD,}$ Equilibrium Fecundity at $F_{THRESHOLD}$	1,492,854	1,463,344	

From: Caroline Karp
To: Comments
Cc: Tina Berger; Dr. Syma A. Ebbin; Jason E. Mcnamee
Subject: [External] COMMENTS re ERPs, Fishery data and Uncertainty
Date: Monday, August 10, 2020 11:46:37 AM

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10 August 2020

Dear ASMFC Commissioners,

I have three major but related comments for the Commission's consideration. The first concerns the Commission's decision on whether to start adopting Ecological Reference Points (ERPs) for a variety of fishes that transit Atlantic state waters. The second concerns the types of socio-economic data the Commission and its advisory committees should consider in developing stock assessments. The third suggests a reasonable protocol to be used by the Commission when the technical advisory committees deem there to be high uncertainty about the status of species under the ASMFC's jurisdiction.

1. I urge the Commission to build on the Menhaden Management Board's recommendation to adopt an for Atlantic menhaden that recognizes the menhaden's contribution to marine and avian food chains.

I think this approach should also be used to address multi-species fisheries, fisheries with significant bycatch, and fisheries that have significant gear-related impacts on marine habitats related to dragging and/or derelict gear.

2. In my view, it is a dismal proposition for the future of fish, marine ecosystems and the fisheries for the ASMFC to allocate the remnant 10-20% of the so-called un-fished biomass of species under ASMFC jurisdiction among the coastal states and between commercial/recreational users without accounting for:

· Other significant human sources of mortality (e.g., habitat destruction, thermal effluents, impoundments/diversions, climate change);

· Ecosystem service effects of fishing on non-/target species and habitats, e.g., food chain and C contribution of prey species;

· Trend in capacity of fishing fleets (# vessels, # fishermen, technology and *catchability*);

· Sources of fishing, processing and supply chain waste in addition to bycatch;

· Availability and economic effect of cultivated species on wild fisheries;

· Market-distorting effects of subsidies, fleet consolidation related to catch shares programs, supply chains, consumer preferences, and availability of domesticated or industrial substitutions (e.g., for menhaden);

· Political pressures on the States and the ASMFC by different non-/fishing interest groups;

· Effects of different regulatory and market-based strategies and best practices on administrative efficiency, welfare and fish stocks (SSB); and

· Administration, compliance, enforcement by the States,

in addition to the CESS' traditional economic analysis of tradeoffs between use and conservation at low stock levels.

I think all of these bulleted items are fundamentally "socio-economic" and/or issues that can be addressed using social- and economic theories and tools. In my view, the various SAs, TCs, PRTs and PDTs would benefit from CESS involvement, as would the Commission, whose decisions affect the social and economic welfare of non-/fishermen who have many non-/use interests in "sustainable fish" and "sustainable fishing"..

3. In the absence of the information described above, I think the Commission should reduce ABCs/ACLs/TACs by 10 - >20% to account for:
- uncertainty re the socio-economics of fishing (capacity, catchability), markets, supply chains, waste and the value of non-/use interests in coastal shell-/fish and aquatic ecosystems; and

- the public's intergenerational possessory/public trust interest in marine shell-/fish.

Thank you for your consideration of these comments. In closing, I wish the Commission and my former colleagues on the CESS well, as always. The Commission could hardly have a better partner in this endeavor than Drs. Jason McNamee and Syma Ebbin.

With best wishes and regards,

Caroline A Karp

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