Atlantic States Marine Fisheries Commission

Atlantic Menhaden Management Board

August 4, 2020
1:30 – 2:30 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*) 1:35 p.m.

2. Board Consent 1:35 p.m.
   - Approval of Agenda
   - Approval of Proceedings from May 2020

3. Public Comment 1:40 p.m.

4. Review Ecological Reference Point Work Group Analysis *(M. Cieri)* 1:50 p.m.

5. Consider Postponed Motion from February 2020 *(S. Woodward)* **Final Action** 2:20 p.m.
   Move to adopt:

   An Atlantic menhaden ecological reference point F target equal to the maximum F on Atlantic menhaden that maintains Atlantic striped bass at its biomass target when striped bass is fished at its F target and all other ERP species as defined in the NWACS-MICE model are fished at their status quo F rates.

   An Atlantic menhaden ecological reference point F threshold equal to the maximum F on Atlantic menhaden that maintains Atlantic striped bass at its biomass threshold when striped bass is fished at its F target and other ERP species as defined in the NWACS-MICE model are fished at their status quo F rates

6. Recess 2:30 p.m.

Reconvene August 5, 2020
2:45 – 4:15 p.m.

7.	Consider Postponed Motion from February 2020, *continued*	2:45 p.m.
8.	Discuss Timeline and Tasking to Set the 2021-2022 Fishery Specifications *(C. Flora)*	3:30 p.m.
9.	Elect Vice-Chair *(S. Woodward)* **Action**	4:00 p.m.
10.	Other Business/Adjourn	4:15 p.m.

MEETING OVERVIEW

Atlantic Menhaden Management Board Meeting Webinar
August 4, 2020; 1:30-2:30 p.m.
August 5, 2020; 2:45 – 4:15 p.m.

Chair: Spud Woodward (GA) Assumed Chairmanship: 05/20	Technical Committee Chair: Corrin Flora (NC)	Law Enforcement Committee Representative: Maj. Robert Kersey (MD)
Vice Chair: VACANT	Advisory Panel Chair: Jeff Kaelin (NJ)	Previous Board Meeting: May 5, 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 May 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. Review Ecological Reference Point Workgroup Analysis (1:50 – 2:20 p.m.)

Background

- The 2019 Atlantic menhaden single-species and ecological reference point (ERP) benchmark stock assessments was accepted by the Board in February.
- The Board tasked the ERP Workgroup to conduct additional analysis evaluating different ERP scenarios to help inform management moving forward, including the importance of Atlantic herring for striped bass diets.
- The ERP Workgroup met multiple times in June and once with the TC to review analysis and provide recommendations to the Board on ERPs and Harvest Strategies for Menhaden. **(Briefing Materials**)

Presentations

- Presentation of ERP Workgroup Analysis by M. Cieri

5. Consider Postponed Motions from February 2020 (August 4th from 2:20 – 2:30 p.m.; August 5th from 2:45-3:30 p.m.) Final Action

Background

- The Board postponed the following motions at its February 2020 meeting:
  Move to adopt:
  An Atlantic menhaden ecological reference point F target equal to the maximum F on Atlantic menhaden that maintains Atlantic striped bass at its biomass target when striped bass is fished at its F target and all other ERP species as defined in the NWACS-MICE model are fished at their status quo F rates.
  An Atlantic menhaden ecological reference point F threshold equal to the maximum F on Atlantic menhaden that maintains Atlantic striped bass at its biomass threshold when striped bass is fished at its F target and other ERP species as defined in the NWACS-MICE model are fished at their status quo F rates

- The motions are back on the table.

Board Actions for Consideration

- Consider action on the postponed motion

8. Discuss timeline and tasking to set the 2021-2022 Fishery Specifications (3:30-4:00 p.m.)

Background

- The Board sets an annual or multi-year Total Allowable Catch (TAC) using the best available science.
- In 2017, the Board set the TAC at 216,000 metric tons for 2018 and 2019 with the expectation that the TAC for subsequent years will be guided by menhaden-specific ERPs.
- If the Board approves ERPs, the TC will need guidance in developing projections to inform the Board discussion at the Annual Meeting for setting the TAC for 2021 and 2022 fishing seasons.

Presentations

- Timeline and tasking to set the 2021-2022 Fishery Specifications by C. Flora

Board Actions for Consideration

- Provide guidance to the TC in developing projections to inform setting the TAC for 2021-2022

9. Elect Vice-Chair (4:00-4:15 p.m.)

10. 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), 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), Derek Orner (NMFS), Amy Schueller (NMFS), Alexei Sharov (MD), Jeff Tinsman (DE), Kristen Anstead (ASMFC), Max Appelman (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), Max Appelman (ASMFC), Joey Ballenger (SC, TC chair)

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
May 5, 2020

Draft Proceedings of the Atlantic Menhaden Board Meeting Webinar
May 2020

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)
Sen. David Miramant, ME (LA)
Cheri Patterson, NH (AA)
Ritchie White, NH
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Nichola Meserve, MA (Chair)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Conor McManus, RI, proxy for J. McManus (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Rep. Sosnowski (LA)
Justin Davis, CT (AA)
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, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Lynn Fegley, MD, proxy for B. 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)
Spud Woodward, GA (GA)
Doug Haymans, GA (AA)
Jim Estes, FL, proxy for J. McCawley (AA)
Sen. Thad Altman, FL (LA)
Derek Orner, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Matt Cieri, ERP Workgroup Chair

Staff

Bob Beal
Toni Kerns
Max Appelman
Maya Drzewicki
Kirby Rootes-Murdy
Dustin Colson Leaning
Tina Berger

Guests

Jim Uphoff, MD DNR

Additional guest attendance unknown as meeting held via webinar

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Tuesday, May 5, 2020, and was called to order at 10:45 a.m. by Chairman A.G. "Spud" Woodward.

WEBINAR ATTENDANCE ROLL CALL

MR. MAX APPELMAN: This is a coastwide Board. I hope everyone can hear me. I'm going to run through the list of names again from north to south, so bear with me. Some of these names I have not read out loud to myself before, so if I butcher your name I apologize in advance. Starting with Maine, Megan Ware.

MS. MEGAN WARE: Yup, I'm here.

MR. APPELMAN: Steve Train. Not hearing anything I'll mark Steve as absent. Senator Miramant.

SENATOR DAVID MIRAMANT: Hello, I'm here.

MR. APPELMAN: New Hampshire, Cheri Patterson.

MS. CHERI PATTERSON: Here, good morning.

MR. APPELMAN: Ritchie White.

MR. G. RITCHIE WHITE: Present.

MR. APPELMAN: Dennis Abbott.

MS. TONI KERNS: I know he's here, Max. Let me just.

MS. TINA L. BERGER: He's self-muted right now.

MR. APPELMAN: We can circle back to Dennis. Continuing on with Massachusetts. Nichola Meserve.

MS. NICHOLA MESERVE: Present.

MS. KERNS: Max, Dennis has his microphone on now, so he should be able to speak.

MR. ABBOTT: I'm present.

MR. APPELMAN: Thank you, Dennis. Ray Kane.

MR. RAYMOND W. KANE: Present.

MR. APPELMAN: Representative Peake, hearing none I'll mark Representative Peake as absent. Moving to Rhode Island.

MR. KANE: This is Ray Kane; Sarah Ferrara is her proxy. She should be on. I'll text her.

MR. APPELMAN: Thank you very much. Sarah Ferrara

MS. SARAH FERRARA: Here.

MR. APPELMAN: Rhode Island, Conor McManus.

MR. CONOR McMANUS: Here.

MR. APPELMAN: David Borden.

MS. KERNS: David, you're self-muted so you need to unmute yourself. It looks like he's trying, Max.

MR. APPELMAN: Okay we'll circle back. Eric Reid.

MR. ERIC REID: Yes.

MR. APPELMAN: Connecticut, I have Justin Davis.

DR. JUSTIN DAVIS: Here.

MR. APPELMAN: Bill Hyatt.

MR. WILLIAM HYATT: Present.

MR. APPELMAN: Senator Miner. Mark Senator Miner as absent. Jim Gilmore, New York.

MR. JAMES J. GILMORE: Here.

MR. APPELMAN: Emerson Hasbrouck.

MR. EMERSON C. HASBROUCK: Here.

MR. APPELMAN: John McMurray.

MR. JOHN G. McMURRAY: I'm here.

MR. APPELMAN: Moving to New Jersey. Joe Cimino.

MR. JOE CIMINO: Present.

MR. APPELMAN: Tom Fote.

MR. THOMAS P. FOTE: Here.

MR. APPELMAN: Adam Nowalsky.

MR. ADAM NOWALSKY: Present.

MR. APPELMAN: Moving to Pennsylvania. Kris Kuhn.

MR. KRIS KUHN: Present.

MR. APPELMAN: Loren Lustig.

MR. LOREN W. LUSTIG: Good morning and thank you.

MR. APPELMAN: Thank you. Warren Elliott.

MR. G. WARREN ELLIOTT: I'm present.

MR. APPELMAN: Delaware now, John Clark.

MS. KERNS: He might be muted by the organizer. He does not have zeroes, Dustin.

MR. APPELMAN: John Clark can you hear me?

MR. DUSTIN COLSON LEANING: He's unmuted so he should be able to speak now.

MR. APPELMAN: John Clark might be having audio issues.

MS. KERNS: He is.

MR. APPELMAN: Okay, moving on, Roy Miller.

MR. ROY W. MILLER: Present.

MR. APPELMAN: Craig Pugh.

MR. CRAIG D. PUGH: Here.

MR. APPELMAN: Moving to Maryland. Lynn Fegley.

MS. LYNN FEGLEY: I'm here.

MR. APPELMAN: Russ Dize.

MR. H. RUSSEL DIZE: Here.

MR. APPELMAN: Allison Colden.

DR. ALLISON COLDEN: Present.

MR. APPELMAN: PRFC, Marty Gary.

MR. MARTIN GARY: Here, Max.

MR. APPELMAN: Now to Virginia, Steve Bowman.

MR. STEVEN G. BOWMAN: Here.

MR. APPELMAN: Bryan Plumlee.

MS. BERGER: He might be muted. Nope.

MR. APPELMAN: Bryan, you are self-muted if you're trying to speak. We'll circle back to Bryan. Senator Mason.

SENATOR MONTY MASON: Here.

MR. APPELMAN: North Carolina I have Steve Murphy.

MR. J. BRYAN PLUMLEE: I'm sorry, Bryan Plumlee here.

MR. APPELMAN: Great, thanks Bryan. Steve Murphey.

MR. STEVEN W. MURPHEY: Here.

MR. APPELMAN: Jerry Mannen.

MR. JERRY MANNEN: Here.

MR. APPELMAN: Great. Mike Blanton.

MS. KERNS: He's not in attendance.

MR. APPELMAN: Hearing none I will mark absent. South Carolina, Mel Bell.

MR. MEL BELL: Here.

MR. APPELMAN: Senator Cromer, hearing none I will mark as absent. Malcolm Rhodes.

DR. MALCOLM RHODES: Here.

MR. APPELMAN: Georgia, Doug Haymans.

MR. DOUG HAYMANS: Here.

MR. APPELMAN: Spud Woodward I know you are here. Representative Rhodes. Hearing none I will mark as absent. To Florida. Jim Estes.

MR. JIM ESTES: I'm happy to be here, Max.

MR. APPELMAN: That's great, Jim. I have William Orndorf, hearing none I will mark as absent. Representative Altman.

REPRESENTATIVE THAD ALTMAN: I'm here.

MR. APPELMAN: From U.S. Fish and Wildlife Service, Mike Millard.

MR. MIKE MILLARD: I'm here, Max.

MR. APPELMAN: Thanks Mike, and from National Marine Fisheries Service, Derek Orner.

MR. DEREK ORNER: Yes, present Max.

MR. APPELMAN: Do we have resolution for John Clark?

MS. BERGER: We're working on it right now. John, I sent you a message, and call the number I just sent you.

MR. APPELMAN: Do we have resolution with David Borden?

MS. KERNS: David is self-muted; he just needs to unmute himself. He might be either on the phone or away from his computer maybe. I don't know. I know he has sound though, because he did speak earlier.

MR. APPELMAN: Okay, other than those two Mr. Chair, we have full attendance. Everyone has been accounted for.

CALL TO ORDER

CHAIRMAN A. G. "SPUD" WOODWARD: Thank you Max, and thank you everyone for taking the time to join this, I guess first ever webinar-based meeting of the Atlantic Menhaden Management Board. Whenever I decided to accept the nomination for Vice-Chair and Chair, I had no idea that we would be in the situation that we're in now, but we will certainly make the best out of it. Please bear with us. We might have a few technical difficulties, but we will get through them.

APPROVAL OF AGENDA

We have an agenda before us. Are there any recommended modifications to the agenda as presented? Just raise your hand if you have a recommendation.

MS. KERNS: Joe Cimino has his hand up, Spud.

CHAIRMAN WOODWARD: Okay, go ahead, Joe.

MR. CIMINO: I just had a request to add something during other business, just an item for discussion. I would appreciate it, thank you.

CHAIRMAN WOODWARD: All right will do, thank you, Joe. Are there any other changes to the agenda?

MS. KERNS: I do not see any other hands up.

CHAIRMAN WOODWARD: All right then we'll accept it by consent. Thank you.

APPROVAL OF PROCEEDINGS

CHAIRMAN WOODWARD: Our next agenda item is the approval of the proceedings from our February meeting. Everyone should have had a copy of that. If there are any changes, modifications, corrections, please raise your hand so that we can get those on the record.

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

CHAIRMAN WOODWARD: All right, then we will consider the proceedings accepted by consent.

REVIEW OF ECOLOGICAL REFERENCE POINT WORKGROUP ANALYSIS

CHAIRMAN WOODWARD: We have a pretty simple agenda for our meeting this morning. We have really one item, and it's an informational presentation by Dr. Matt Cieri, and it is a follow up to the motion to postpone at the February meeting on the acceptance of ecological reference points.

Just a little reminder of a motion made by Megan Ware, seconded by John Clark that passed the Ecological Reference Point Workgroup with some specific actions to evaluate the ecological reference points. What we've got this morning is a presentation to provide us information on the results of that analysis that you requested. I assume that Matt is onboard and ready to go.

DR. MATT CIERI: I am.

CHAIRMAN WOODWARD: All right very good, well you have the helm.

DR. CIERI: Can you all see my presentation?

MS. KERNS: Yes.

DR. CIERI: All righty. Thank you everyone. My name is Matt Cieri, and I'm with Maine DMR. I am the Ecological Reference Point Working Group Chair. I'll be providing you today with an updated analysis based around the Board's charges from what seems like a lifetime ago, the February meeting. Just to give you sort of an outline of where we're going today. I'm going to give you a little bit of an introduction, go over some of the additional analysis suggested by the Board, give you some of the results associated with that analysis, go over some of the uncertainties, some of the next steps in the process, as well as some questions and wrap up. Before moving on it might be useful to just simply go over the terms of references that the Board wanted to look at while we were going to the benchmark. These are the more pertinent, in terms of reference associated with the benchmark, and these included to develop models to estimate population parameters that take into account menhaden's role as forage.

Also, to develop methods to determine reference points and total allowable catch for Atlantic menhaden that account for menhaden's role as forage. Just to give you sort of a more introductory information. At the end of the benchmark the Ecological Reference Point Working Group recommended a combination of both the BAM single species assessment, and the NWACS-MICE model as a tool to help evaluate tradeoffs between menhaden harvest and predator biomass into established quotas.

As you guys probably remember, what we in the group called the rainbow plot shows striped bass biomass here on the Y axis, I'm sorry, striped bass F here on the Y axis, menhaden F here on the X. The current striped bass F target here at 0.2, the menhaden current F here as of 2017 in the dash line. There are higher striped bass amounts as abundance here in population size down near the 00 mark near the origin, and as you move up to the right fewer and fewer striped bass.

The solid lines here represent B target and B threshold. At the end of the benchmark assessment as we presented in February, the ERP had developed example ERPs. These were based on a maximum F for menhaden that would sustain striped bass at their B target, when striped bass were fished at their F target.

Then we had an example ERP threshold of the maximum F on menhaden that keeps striped bass at their B threshold when striped bass are being fished at

their F target. In that example, all other ERP species were fished at their status quo or 2017 levels. Hopefully you guys sort of remembered this particular graph.

Here we have striped bass B over B target, so basically if this is at 1, striped bass biomass is at B target here, and then the threshold value here in this dashed line. What you can see is in the gray we have the current status quo F for menhaden, which is down here. The ERP target is in this green solid line, and it's where this relationship line between striped bass and menhaden crosses the B target.

We also have the same thing for the threshold in which this dash line here is where this relationship line crosses the B threshold. Then we have the single-species BAM targets and BAM thresholds here in blue, with this being the target and this being the threshold. Hopefully that's a little bit of a refresher.

At the end of the work that we presented in February, we had defined sort of an ERP target and threshold based around that graph that I just showed. This sort of gives you an idea of the F target in that example was 0.19, with a threshold of 0.57. The current F as estimated in 2017 was 0.16. To meet the current striped bass management objectives, the F target and threshold for Atlantic Menhaden should be lower than the single-species target and threshold, and that the current F is below the target ERP target and threshold, indicating that the stock is not experiencing overfishing. At the end of that meeting the Board tasked the ERP Work Group with conducting additional runs of the NWACS-MICE tool, to explore some different sensitivities to ERPs under different assumptions of ecosystem conditions. These were the additional analysis that the Board wanted to see.

They included all other species fished at their 2017 status quo levels. This is the example ERP that we presented at the winter meeting. Another run was that all species were fished at their target that allowed them to reach their target biomass. Third was that all species were fished at an F level that would keep them all at their biomass threshold.

For a fourth, it was to have Atlantic herring and bluefish only fished at a rate that allowed them to reach their biomass target, while spiny dogfish and weakfish were fished at their status quo levels. Speaking of status quo levels, this is pretty much what we're talking about. For status quo what was used for the 2017 status was that Atlantic herring was not overfished. It was below its target but not yet overfished.

Bluefish was both overfished and overfishing occurring, spiny dogfish was below its F target but above its SSB target, and for weakfish that the total mortality was too high and its status was depleted. Now to give you sort of an idea of this sort of ECOSIM ecosystem scenario sort of laid out as a table. Here is each one of the examples from 1 to 4.

For example, here is the ERP examples that we showed in February, and then here is Scenario 2, Scenario 3 and Scenario 4. This is each of the species and their F target, or status quo or F threshold. It's important to note here that for some of the stocks involved the F target and F threshold were defined as the F rates within the NWACS-MICE model that would let these species approximate their targets and thresholds respectively.

What this means is in some cases, for example for bluefish and for Atlantic herring, the F in the model was set at something different than what is in the management plan to allow these stocks to achieve either their B target or their B threshold as appropriate. Going over some of the results. What you can see here is we have the first scenario, the example ERPs that were presented in 2020 winter meeting.

We have the targets and thresholds that I went over a little bit earlier. Down here we have the probability of exceeding the ERP target using a quota of 216,000 metric tons, which was what was being analyzed. This

gives the probability that that quota will exceed the ERP target in 2019, 2020, and 2021.

As you can see, the relative probability is 60 percent 71, and 66. Also we have the probability of exceeding this particular ERP threshold, and that is in 2019 through 2021 is 0. For Scenario 2, all of the stocks at biomass target, and just sort of to sum up here, the negative aspects of rebuilding bluefish and spiny dogfish and weakfish as competitors here was outweighed by the rebuilding of Atlantic herring, which serves as sort of an alternative prey source.

Here the ERP threshold ended up being undefined, which I'll explain in a minute. If striped bass was fished at an F target in Atlantic herring biomass approached its biomass target, increasing F on menhaden wouldn't actually drive striped bass to its threshold over the ranges of F that we explored. This is Scenario 2, note that this is our F target under this scenario for ERP, and the probability of exceeding that using this 2016 quota was very, very low through 2019 through 2021, and just about 0 for 2019 through 2021 for the threshold.

For Scenario 3, kind of the opposite; everything at its biomass threshold rather than its target. Some of the positive aspects of reduced competition on striped bass were outweighed by negative aspects of lower Atlantic herring biomass. You can see the ERP threshold and targets here. Note that the target is like a tenth of what it was in the previous example.

Here the F threshold was defined, and you can see that the probability of exceeding a target with 216,000 metric tons is very high, around 100 percent. The probability of exceeding the ERP threshold however, was relatively low, 0 in 2019, and about 13 percent in 2020 and 2021. For Scenario Number 4, this is with Atlantic herring and bluefish at their target biomass.

This is nearly identical to Scenario 2, everything at target. Again, negative aspects of rebuilding bluefish are outweighed by rebuilding of Atlantic herring. Now as you can see, the F targets is pretty much the same. Our F threshold ERP is still undefined, very low probability of exceeding the ERP targets, and almost no probability of exceeding the ERP threshold.

Just to sort of sum up and wrap up some of the results. Again, here are our scenarios. Here is the ERP target from each one of the examples. Here is the ERP threshold, and note here is our example at 119. For Scenario 2 and Scenario 4 the ERP target increases above the ERP example, but declines for Scenario 3.

Note that the ERP thresholds are undefined for Scenario 2 and for Scenario 4. It's important to note that when Atlantic herring are at their biomass and striped bass were fished at their F target, again the ERP threshold was undefined. I'm going to show you this graphically in a second. This is similar to the plot that I showed earlier with the blue and the gray dotted lines.

As you can see the status quo, the example ERPs are here in the gray. You can see this relationship line between striped bass biomass and Atlantic menhaden F crosses the B target and the B threshold, just as we talked about earlier. When everything goes to biomass target you can see we get this sort of straight-ish line.

When Atlantic herring is actually at a fairly high biomass, you actually over the Atlantic menhaden F that we evaluated, you actually never get to this B threshold line. When everybody is at their biomass threshold you can see that the line moves down and to the left here in the blue, and it crosses the B target for striped bass much closer to the origin, as well as when it crosses the B threshold.

You can see for bluefish and Atlantic herring at its target biomass they're again right on top of each other with the results from Scenario 2. Into a lot of rainbow plots. I'm going to go over these rainbow plots. Each panel is each one of the scenarios, Scenario 1, Scenario 2, Scenario 3, and Scenario 4. Striped bass full F over here on the Y axis, menhaden full F down here. The horizontal dash line here that is your striped bass F target. Where it crosses here in B

target and B threshold, here in for example in the example ERPs, this is going to be your ERP target, in this vertical dash line and the threshold. Moving from status quo, Scenario 1 to everybody at their biomass threshold. You can see that high striped biomass is down near the origin in purple, lower striped biomass here in the red. You can see that that line ends up getting pulled downward, right. The ERP target under this all at biomass threshold, Scenario 3 example, is really, really close to the origin and the threshold is moved a little bit to the left.

For me I always find it useful to look at where these lines intersect. You can see that when everybody is at their threshold the ERP targets and thresholds move a little bit to the left. Going over here to everybody at its biomass target, you get sort of a different sort of picture. For one thing, your ERP threshold ends up becoming undefined, which means that at a striped bass F at its target it never quite gets to its B threshold, no matter what F that you actually look at.

You can see in general that of course striped bass tends to be a little bit, there is not a lot of red associated with this, and the line actually ends up becoming a little bit more horizontal. Again, for Scenario 4 exactly the same picture as Scenario 2, where you see that it again doesn't cross the B threshold.

We're going to look at the results for bluefish. We've kept the lines exactly the same, sort of an F target for striped bass, as well as an F target for Atlantic menhaden. Here the colors indicate the abundance of bluefish. As you can see between Panels 1 and Panel 3, there isn't a whole lot of difference.

There is not much change, everything is pretty much red, which indicates that bluefish are still going to be overfished. Going on to Panel 2 and Panel 4 however, they are pretty much the same thing. You can see that there has been a dramatic change in bluefish, and that is because bluefish under that scenario they are fully rebuilt above their BMSY proxy.

You can see what that looks like. Note that at a striped bass F that is at its target, and a menhaden F near its target, you can see that we're looking at bluefish biomasses approximating 1.2 as opposed to 1, so above its biomass target. The same similar type of a plot for weakfish. Again, the color and these contours here represent weakfish biomass.

Again, striped bass target F from the vertical dash line, and the ERP target in the dashed line that is on the vertical. What you'll see is that there is not much change among any of these particular panels. In fact, none of the surface plots, none of the stuff that we did seemed to affect weakfish a lot. Those are our results. I now want to go over a little bit of the uncertainties.

The stocks here were fished at rates that allowed them to sort of approximate their biomass targets or thresholds, and this isn't going to line up with the values from the FMP, particularly for federally managed stocks. There are a couple of reasons for that. In order to get these stocks to their biomass targets or their thresholds, required in some cases a little bit lower F than what we see in the FMP.

Part of that is the result of using an EwE, using the NWACS-MICE model to predict things, also, this sort of discrepancy between that and single species assessments. Weakfish under any of the scenarios that we did didn't rebuild, in keeping with a lot of the high natural mortality that the recent assessment has suggested, and that this M wasn't really something that we could attribute well to the predators or prey within the modeling structure that we looked at. As you probably gathered, the relationship between Atlantic herring and striped bass was really, really strong, and was sensitive in the model estimates based around herring vulnerability.

The model's response to herring predicted a higher consumption of Atlantic herring at high biomass. This was a little bit more than what we had expected. While we understand that herring is probably an important component of striped bass diets, we felt

that the model may be overestimating the importance of Atlantic herring on a coastwide basis, especially on an annual level. As we get into next steps, we think that there is more work needed around this particular relationship.

It seems to be that the relationship between striped bass and menhaden is somewhat attenuated by the biomass of Atlantic herring. For next steps, you want to look at some additional analysis for the next Board meeting. These include exploring alternative herring biomass scenarios, and this is particularly relevant given the uncertainty of Atlantic herring recruitment.

Atlantic herring like Atlantic menhaden are a recruitment driven stock, and there might be some uncertainty in the future about recruitment events. It might be a good idea to take a look at potentially lower herring biomasses, and how that might affect the ERPs. We also really want to explore the sensitivity of model parametrization for Atlantic herring and striped bass relationship.

I think this is particularly important. We do think the model may be overestimating the importance of Atlantic herring. We know that they are important, but we're not quite sure if they're that important. We do want to take a look at some of the parametrization, particularly look at some of the seasonal components associated with that.

We also want to explore scenarios in which some of those ERP focal species are fished at their actual single species F reference points, to see whether or not, for example, rebuilding of Atlantic herring or for bluefish is possible, without having to tweak the Fs further down, compared to what is in the federal FMP. After that I want to thank all the other collaborators on this project, everybody on the Committee, and take your questions.

CHAIRMAN WOODWARD: All right, thank you Matt that was a very informative presentation. It's a complex issue, and you have done a great job of distilling it down to terms that most of us can understand. Before we get into questions, I just want to make sure that we've got David Borden and John Clark back on audio, if you all would both chime in and let me know you're there.

MS. KERNS: David, you should be able to speak. You are self-muted right now, if you just unmute yourself.

MR. DAVID V. BORDEN: Yes, I'm here.

CHAIRMAN WOODWARD: How about John?

MS. KERNS: We might have to unmute him, one second. Dustin, you may well find him faster than me.

MR. COLSON LEANING: He's unmuted.

MS. KERNS: John, we cannot hear you.

MR. COLSON LEANING: His microphone is green, so he shouldn't be muted by any means. It's maybe something on his end with his software or computer.

CHAIRMAN WOODWARD: Okay, well we'll hopefully continue to work on that. In the meantime, if you have questions for Matt just raise your hand and get in the queue, and Toni will be bringing you up.

MS. KERNS: For the queue I have Lynn Fegley and then Allison Colden, John McMurray, Justin Davis, Nichola Meserve, and Emerson Hasbrouck, so Lynn you're up, Allison you're on deck.

MS. LYNN FEGLEY: I counted to ten before I raised my hand, hoping that I wouldn't be first. Thanks, Matt, for this presentation. As always, it's an incredible amount of work. I guess I have one question and one comment or request, and the first is when I saw this the results were pretty counter intuitive at first blush, because of the fact that when we went to the scenario where everybody is at their biomass target, the reference points went way up, or to say it another way.

You could very much liberalize your fishing on menhaden, in the scenario where everybody is at their biomass target, which is not what I expected. I understand that the reason for that is because if you rebuild herring it really doesn't matter what you do to menhaden. If your objective is that menhaden are not limiting to striped bass that objective is met solely by putting a lot of herring out there.

What that does is it gives us a situation where on one of your slides earlier in the presentation it says, to meet the current striped bass management objectives, the F target and F threshold for menhaden should be lower than the single species target and threshold. What I'm saying is, it's a little bit counterintuitive that we suddenly have an ERP that is much greater than the single-species reference point.

I would question that it is at all realistic, given the fact that we're probably not going to get herring back to its target biomass anytime in the near future, and given that the F that was used in the simulation, or in this analysis, is the F from the NWACS model, not the FMSY that herring is managed under.

I guess my question is, how do we reconcile what would appear to me to be this unrealistic influence of herring. That is one. Two is, is there any scenario where an ecological reference point for menhaden could realistically be higher than the single-species reference point.

That leads me to my third, and I know this is a lot, I'm sorry. When we get to discussing these next steps, I would certainly like to understand for the outcomes of each of these next steps, what is the management utility of those for the Board. For example, if we for the first bullet explore alternate Atlantic herring biomass scenarios, given the uncertainty in future recruitment.

I think we know if we have continued low herring biomass those ERPs are going to look pretty different. To me that kind of seems obvious, so maybe I'm missing something. I think it's important for the Board, because this is so complicated, and because we could really start to travel down a rabbit hole. It would be good for us to understand for each of these next steps, what are the discreet pieces of information that the Board can then take and apply to its next management decision? Thank you for your patience that was a lot.

DR. CIERI: Okay, where do you want me to start first?

MS. FEGLEY: I guess start with the question about the influence of herring, the question about the striped bass objective, and whether an ERP could realistically be higher than the single-species reference point.

DR. CIERI: Theoretically it can. One of the things that when you start looking at ecological-based fisheries management is when you start drawing in multiple different species as predators, of course you also have to start drawing in multiple different species as prey. There is the ability within an ecosystem for predators to swap from one small silvery fish to another.

I think that the ERP Work Group shared your concerns about the importance of Atlantic herring. I think part of that is actually a seasonal difficulty within the model. I do think it's something that we need to work on, and I think it is something that I think that we've outlined as something to do more sensitivity runs around, and to see if we can sort of look at the vulnerabilities.

That said, Atlantic herring is an important component of striped bass diets, particularly in certain times of the year and in certain locations. I wouldn't be too surprised that adding in alternate prey items into the model would change your reference points. But I agree, I don't think Atlantic herring probably is as important as the model is currently portraying it.

That is something that we want to work on. But it is certainly very possible that you can get ERP reference points that are less conservative than a single species, particularly if the estimate of natural mortality within a single-species model is quite a bit higher than what you would expect from an ERP model, particularly if

you allow for prey switching. That is, I think your first question, so for your second question. Sorry.

MS. FEGLEY: No, you're good, sorry go on.

DR. CIERI: What was your second question? Sorry, I'm going to break this down, because I'm not sure if I can remember from one explanation to another. Your second question?

MS. FEGLEY: Yes, I apologize. The second one just really, you know we can mop it up. It just had to do with the management utility for each of these next steps.

DR. CIERI: Yes, and I think it's important to understand that particularly for federally managed species, by law they have to be rebuilt. I know certain species can languish below their BMSY or their BMSY proxy, but the long-term federal management is to have Atlantic herring and bluefish at their BMSY proxies.

I mean it is not unreasonable Atlantic herring, you know prior to these recent difficulties in recruitment, was at and actually well above its biomass target for decades. I don't think it is unreasonable to assume that that is the long-term place where Atlantic herring is going to be managed at.

I think the sort of tradeoffs between Atlantic herring biomass and menhaden removal is something that the Board has to sort of examine in their risk-appropriate approach. Do they set ERPs that account for lower herring biomass, even though Atlantic herring is probably going to end up going back to its BMSY value?

That is sort of a risk/reward calculation that the Board has to do. But what I think is really important is I think we do need to take a look at some of the biomass scenarios, which don't have herring quite as rebuilt as above BMSY, which you guys can then use as sort of a proxy to give you an understanding of what happens if herring isn't rebuilt, or isn't rebuilt in a timely enough fashion to mitigate your risks.

CHAIRMAN WOODWARD: Thanks Matt, I guess Allison you're up next.

DR. COLDEN: Thank you Matt for that presentation, can you all hear me?

MS. BERGER: Yes.

DR. COLDEN: Okay, thank you. Matt, I wanted to follow up to Lynn's question and explore the next steps around the herring biomass a little bit, and then I have one other question. Do you expect, I think the way you just described it was somewhere in between, you know not quite rebuilt. Do you expect any of the herring scenarios that you would explore would fall outside of the scenarios that are already included, between Scenario 2 and 3 with herring at its threshold and herring at its target?

DR. CIERI: I think that is something that we can discuss as a Work Group. We can certainly put some in there for things that are lower than the herring threshold. I do want to reiterate that for those that aren't really familiar with the Atlantic herring FMP in Amendment 8. Herring F goes fairly quickly to zero, the further below the threshold that they get.

The fishing actually comes to pretty much a grinding halt not much further past the F threshold, according to Amendment 8. I think I wouldn't want to see sort of an analysis that was too much below the threshold, but it is something that we can do. If that is something that the Board would like to task us with.

DR. COLDEN: Okay, do you mean that the F comes to a halt when biomass dips below the B threshold, or are you referring to the F threshold?

DR. CIERI: No, the B threshold. It linearly declines to 0, as you move further and further below B threshold.

DR. COLDEN. Okay, and the other question I was hoping you could talk through or clarify a little bit is going back to the risk probabilities that were

projected for each of the scenarios. Yes, if you could pull those up, I think that would be helpful. For the example ERP at the beginning, when you were reviewing the results you showed that the 2017 F rate was very close to the ERP target F. I'm just trying to reconcile that with the example ERP probability of exceeding ERP target of 60 to 70 percent, so could you talk through that a little bit?

DR. CIERI: Yes, certainly. As you guys might remember from the single-species assessment, menhaden are projected to go down slightly, you know from 2009 through 2021. This just sort of reflects that, that this particular quota at 216,000 metric tons sort of gives you a probability here in 60, 71, and 66.

I think it's important to understand that for the ERP example that it was assumed that striped bass would be at its B target, and we all know that is not really the case, it's probably closer to its B threshold. But if striped bass were at its B target, this is the probability that you would get if striped bass was at its target. I don't know if Katie wants to sort of chime in, if there is something that she would like to say as well.

DR. KATIE DREW: Yes, thanks Matt. I just wanted to also add to that that the F of 0.16 that is approximately the ERP target, is the F from 2017, where we had a lower TAC. The 216,000 metric tons does represent a slight increase from where we were in 2017, and so that also contributes a little bit to like the higher probabilities of exceeding the ERP target in this scenario, compared to sort of where we were in 2017.

CHAIRMAN WOODWARD: All right, Toni, who is up next, and who is on deck?

MS. KERNS: We have Justin Davis with Nichola Meserve on deck.

CHAIRMAN WOODWARD: Justin, go ahead.

DR. DAVIS: I'll just start off by thanking the Working Group for continuing to produce this really great work, I just continue to find it really interesting. You know it really demonstrates that this ecosystem approach is sort of performing as advertised, as it is presenting a way of making sort of quantitative decisions, you know tradeoffs, evaluating tradeoffs around management decisions for multiple species.

I've got a question about a way that I'm sort of interpreting Scenarios 2 and 4, relative to Scenario 1 that I would like to see if Matt agrees with.

I think one of the motivations for this Board asking for these additional scenarios was that the Scenario 1, presented back at the winter meeting assumed status quo F for bluefish and herring, when we knew that this Commission and some of our federal partners had taken actions to relax F for those species to decrease F. I remember at the winter meeting kind of asking a question about, well what does it mean if we set an ERP that assumes status quo F, but we know that we're making an attempt to reduce F?

Does that mean we're setting the ERP too conservatively, or not conservative enough? My interpretation looking at what is presented here in Scenarios 2 and 4 is that you could look at Scenario 1 as essentially a very conservative approach to setting the reference point, given the uncertainty about the success of the management initiatives to reduce F on bluefish and herring, and initiate rebuilding.

Both Scenarios 2 and 4 suggest that were we to successfully rebuild bluefish and herring, and I think this is primarily due to herring. That sort of in retrospect we could have fished menhaden less conservatively, but that if we do not have success in rebuilding herring and bluefish that essentially Scenario 1 reflects an appropriate fishing mortality for menhaden.

If we essentially have very little success in the near term in rebuilding those species, we will at least be fishing menhaden conservatively enough to achieve our management goals for striped bass. Does that sort of match with your understanding, or is that a realistic way to interpret these results?

DR. CIERI: I think it's an appropriate way of interpreting some of the results. I think the ERP that we gave as an example is one in which it incorporates the current status of Atlantic herring, bluefish, spiny dogfish, and weakfish. That is a pretty safe bet. Again, I would sort of go back to what I said earlier. Long term I think the goal is to have Atlantic herring and bluefish rebuilt, as part of the federal management process. But having said that I believe you are correct.

CHAIRMAN WOODWARD: All right thank you Justin, and Nichola you're up, and who's on deck?

MS. KERNS: Emerson Hasbrouck.

CHAIRMAN WOODWARD: Ten-four, go ahead, Nichola.

MS. MESERVE: Thank you, Mr. Chairman and to Matt as well and the ERP for doing these additional analyses for us, which I agree with everyone it helps us get a better idea for how the example ERP is per it has the potential to perform. I have a bit of a question about the timeline. The assessment with ERPs is obviously met with a great deal of anticipation from the managers and the public alike, in terms of when we could implement an ERP.

We're looking at potentially another delay in adopting an ERP with some additional tasking to the Work Group, which looks very worthy to me. However, I wanted to check that we still have the potential for a timeline where the Board could be adopting an ERP, such that it could be used to set a TAC in 2021. That is my first question. Then the second part would be whether the ERP Work Group expects if their task would be additional analyses, if they expect to be in a position of reaffirming its recommendation of the example ERP, or potentially changing that to some other recommendation.

DR. CIERI: I'm going to let Max or staff actually handle the first one, as far as timeline.

MR. APPELMAN: Yes, thanks Matt. Nichola, I would say that definitely there is an opportunity for the Board to set a TAC for 2021 with new ERPs. That timeline is not impacted here. You want to start thinking about moving down that road soon. Of course, if you wait until October for example, that might present some challenges. But as we stand right now that timeline is not impacted.

DR. CIERI: For the second one. Under our next steps, I think we can have some of that analysis, for I think all of it frankly, done by the August meeting, provided Dave doesn't kill me. But having said that we've already had discussions around some of these over e-mails, and some preliminary runs have been done, which we have to bring back to the group. I do think that we can have some of these explored by the August meeting.

MS. MESERVE: Maybe I'm asking you to look into your crystal ball a little bit here, but do you expect that those additional analyses will lead you to a position where you have a recommended ERP, whether it be the initial one or some iteration of it?

DR. CIERI: I'm not quite sure we will ever recommend something. We will present you the information and allow you to make your own choices, as always.

MS. MESREVE: All right that's fair, thank you Matt. If I could just follow up. I would say that I think the Work Group has done a great job here again. They are basically asking us to recommend, to task them with some additional analysis that is going to help us take the work that they make, and select an ERP to move forward with. It's my hope that the Board will task the ERP Work Group with the three specific analyses that are in the memo, and have been presented in presentation today, and report back on that work at the August meeting.

CHAIRMAN WOODWARD: We'll address those next steps once we handle all the questions. Emerson, you're up, who is on deck?

MS. KERNS: We have John McMurray and then Cheri Patterson after Emerson.

CHAIRMAN WOODWARD: All right, go ahead, Emerson.

MR. HASBROUCK: Thank you Matt for your presentation, and thanks to the Working Group as well for all the work that they've put in this. Matt, in your presentation you had mentioned that the relationship between Atlantic Herring and striped bass is very strong. That the relationship between striped bass and menhaden seems to be influenced by Atlantic herring.

That adding in alternative prey species may also result in a higher F for menhaden (fade) point. To me as a biologist that just means what we kind of know with striped bass anyhow.

That they are very opportunistic feeders, and they are going to kind of prey on whatever is in abundance and whatever is easy for them to prey on. I'm wondering then why you think that the model may be influencing herring dependence with striped bass, rather than just actual biology. That is my question, thank you.

DR. CIERI: When we went through and we looked at this we were a little bit surprised. The diet data doesn't seem to line up with this level of dependence between striped bass and Atlantic herring, as you're well aware of. While a good chunk of striped bass is in the Gulf of Maine, exposed to Atlantic herring in the summertime, and as well as much of the population in the winter, on the winter-feeding ground.

There wasn't as much diet data to back up the relationship between striped bass and Atlantic herring, as there is for striped bass and menhaden. I think this is something that we really need to look at. We believe that there is probably a seasonal component that is probably really important that we want to explore further.

But let's be frank. The overlap between striped bass and menhaden is a lot stronger than the overlap between striped bass and Atlantic herring. While we do think it's important, we think that this looks like it might be a little bit more important than we had initially seen from the diet data, and so we want to explore it.

CHAIRMAN WOODWARD: Is that good, Emerson? Do you need any follow up?

MR. HASBROUCK: The only follow up I might have, is I'm not sure what the diet data is that Matt is referring to, and where those samples were collected. Are they distributed pretty evenly up and down the coast, or were they taken primarily in those areas where striped bass and menhaden overlap?

DR. CIERI: A little bit of both. But I will sort of point out that one of our biggest contributors of diet for striped bass is, at least one study done by Gary Nelson, who works out of Mass DMF, who documented a lot of herring and menhaden in the diet of striped bass in the Gulf of Maine. The other is the Northeast Fishery Science Center Bottom Trawl Survey, which also takes a lot of guts, as well as the fins biomass survey.

There is a lot of information that goes into this model. Within the stock assessment you can take a look at the whole suite of information that we've brought into this. After a very large and lengthy comprehensive look at almost all the diet studies that have happened on the U.S. East Coast for the last 30 years. We felt that there wasn't as much data to back up that sort of very strong relationship between Atlantic herring and striped bass, as there would be for menhaden.

MR. HASBROUCK: One follow up, please.

CHAIRMAN WOODWARD: Go ahead.

MR. HASBROUCK: Could it be then that in the model that Atlantic herring presents itself possibly as a proxy, in a way, or some of these other alternative prey species that are not included in the model?

DR. CIERI: No, I don't think that is really the case. We really did isolate, if you go through the assessment report, we isolated the major components of the ecosystem, and we even had a broader ecosystem model, the full model, which sort of gave the information that we needed to sort of hone down this information. No, I don't think that the model is forcing striped bass consumption on herring, as a result of not including other aspects of the ecosystem.

CHAIRMAN WOODWARD: John McMurray.

MR. McMURRAY: I might be getting ahead of the conversation here, but everything that has been said up to now bides that we are planning on just to keep tinkering with inputs. The questions have all been technical, and frankly a little difficult to follow. My question, is the working group planning on producing a simplified summary decision document with three or four options that the non-science folks and the public might actually be able to understand?

You know, we've worked on this an awful long time, and I think the expectation is to make a decision in August. Yes, I mean it would be useful to have something like that a week or two in advance of the August meeting, and I'm just wondering if that is the game plan moving forward.

DR. CIERI: I'll defer to Max or Katie.

MR. APPELMAN: I was going to say maybe Katie should jump in and answer this one.

DR DREW: Yes, I think that is definitely the goal of what we would want to do. We want to make sure that when we come to August, people feel kind of comfortable understanding the performance of this model, and the potential ERP options. We're not necessarily recommending, oh this is the right option, because obviously it depends on kind of how the Board wants to assess risk and manage risk.

For example, that threshold scenario says that you have to forego menhaden yield, in order to keep striped bass at its target or its threshold, when herring or alternative prey species are at their threshold. As opposed to the situation where herring is at its target. As opposed to the situation where herring and other species are kind of continue at their status quo level.

What we want to provide is sort of a range of different, these are sort of the different effects that you get in different ecosystem considerations, and different management scenarios, and it's up to the Board to decide how risk averse they want to be, or how conservative or not conservative they want to be with menhaden.

But the goal is definitely to kind of provide the range and understand the limits in the sensitivity of the reference points, so you can understand here is how the example ERP performs under this set of assumptions compared to some of these other assumptions. Then the Board can decide what the most reasonable ecosystem is to try to manage, either in the short-term or in the long- term. Our goal is definitely to provide as accessible a document as possible to the Board and to the stakeholders, to help understand this tool. There are certain decisions that we can't make for you, like how risky you want to be, or how conservative you want to be with menhaden. But we can help you understand.

If you want to be more conservative, here is the reference point that you're looking at, and how does that relate to a less risky alternative or a more risky alternative. For sure, when we come to the Board in August, we can show you all of this information. But I think you guys then have to be in a place where you are ready to make a decision, or ready to understand how risky or how conservative you want to be.

MR. McMURRAY: Mr. Chair, can I ask a follow up question?

CHAIRMAN WOODWARD: Go ahead.

MR. McMURRAY: Just to be clear. The intent is to provide those options in advance of your August meeting so that Commissioners can make a decision in

August, because I think that is what the public is expecting, and I think we have to be clear about that goal now.

DR. DREW: Yes. Our intent is to complete all of the work that we have suggested. We have identified certain areas that we feel are uncertainties that we want to really flesh out from a technical standpoint, so that we can be confident in the information we're giving you in August. You know obviously I don't think we can control the Commissioner's concerns or uncertainties, or things like that. If people come to the Board and say, oh I want to see more work, oh I want to see more work.

That is a Board decision, and certainly you guys can have that discussion. But our intent is to provide as structured and as accessible a document as possible before the August Board meeting, with materials or supplemental materials, so that you can see everything that we've sort of recommended to be explored laid out for you, and understand the range and the sensitivity of these reference points, and understand sort of some of your options or considerations for levels of risk or uncertainty, and then can make that decision if you the managers feel that you're ready to go forward at that point.

MR. McMURRAY: That is useful, thank you.

CHAIRMAN WOODWARD: I'm going to speak to this later, but since it has sort of come up, I'll go ahead and address it now. It is certainly my intent as your Chair, to bring us to the decision point in August, whether that is an in-person meeting or a webinar meeting, which none of us know at this point.

Yes, at some point we have a motion in limbo that has been postponed that has got to be addressed, and we've got to move this forward. It is certainly my intent to get us across the finish line, and to do whatever is necessary as preparatory work, so that whenever we do have that August meeting, and whatever format it is, everybody is at a point where they can make a decision. Okay, Cheri you are up. Is there anybody else in the queue?

MS. KERNS: Then we have Roy Miller and Justin Davis does have his hand up. I think it's a new question.

CHAIRMAN WOODWARD: Well I certainly don't want to stymie questions, but we are already 17 minutes over time, and I don't want to cut into anybody's lunches, so we'll do the best we can. But I'll just ask everybody to keep your questions succinct and on point, so you said Roy and then who else?

MS. KERNS: Then Justin after Cheri, but I also wanted to let you know that there are two members of the public that have either raised their hands or sent in questions.

CHAIRMAN WOODWARD: Okay, very good. Okay Cheri, you're on.

MS. PATTERSON: Thank you, Matt. Every time I get more information, I glean more information from your presentations, and I really do appreciate all this hard work that you and the Work Group have done. Can you go to the last slide, please? Mr. Chair, I would like to entertain a motion when you feel that it's ready. I understand that you have additional questions, potential technical questions beyond me, and then if you care to come back, I can make a motion.

CHAIRMAN WOODWARD: Yes, I'll tell you what. If you'll just hold back and let's see what else we've got, but I'll certainly get back to you on that. Okay Roy, you're up.

MR. MILLER: Just very quickly. This strong relationship between Atlantic herring and striped bass, Matt, being higher than expected. I wonder. I'm assuming that we're referring to female striped bass biomass primarily, rather than total striped bass biomass, or I may have that wrong. Is it total striped bass biomass, are the males included?

DR. CIERI: Yes, the males are included.

MR. MILLER: Okay. Well, I'm wondering if we're getting a misleading picture. Knowing that Atlantic herring are not terribly abundant in Delaware Bay and in Chesapeake Bay, and male striped bass, because of their delayed migrational habits, are much more dependent on Atlantic menhaden than they would be on Atlantic herring.

I wondered if that was the reason that this strong relationship between herring and striped bass might throw us off track a little bit. We should look at that, since in the producer area portions of the range of striped bass we're basically talking about menhaden, and not Atlantic herring. Thank you.

DR. CIERI: I think it's important to note that the EwE model, the NWACS model, doesn't really have the ability to do spatial resolution. We can probably do something looking at some temporal resolution, although that is something that we've only discussed as recently as a Work Group. The frame to look at for the NWACS model is coastwide across the entire year. Drilling into anything more specific, either by particular sexes or in particular areas, it is just not possible with this type of a modeling approach.

CHAIRMAN WOODWARD: All right, Justin.

DR. DAVIS: I have a bit of a process question that it is possible Cheri is going to address this with her motion. But at the last meeting the motion to postpone was sort of until a certain time, and the motion said that we were postponing until the Working Group came back with the result of the analyses that they presented today.

I'm just wondering if this Board needs to take some affirmative action to postpone the postponed motion again until August, or if we can just at least do that via sort of Board consent, and get it in the record, even though we don't have a button here for nodding your head. We can't just look around the room and see if that is the consent of the Board. But I'm just wondering if we need to get it in the record that we're postponing that motion again.

CHAIRMAN WOODWARD: Good question. Max, do you think we need to go on record as saying the motion continues in postponement?

MR. APPELMAN: I'm going to look to Toni or Bob on this one, but my initial reaction is that we don't need any motion here, that it was a Commission leadership decision to make this particular Board meeting informational only. But, I again defer to Toni or Bob to chime in or correct me.

MS. KERNS: I think that because the Work Group still had uncertainties with the analyses that they presented. I would say that the information being presented is still continued, and that until we have the additional work from them, we consider the motion postponed. But if you want to put it on record, Spud, you could say that or what I have said is on record.

CHAIRMAN WOODWARD: Yes, I think her explanation is whatever Max said, but I appreciate you bringing it up, Justin. We'll make sure we don't get ourselves crossways. Okay, any other questions? If not, I'm going to go to Cheri. Is anybody else in the queue, Toni?

MS. KERNS: Right now, we just have members of the public that are in the queue.

CHAIRMAN WOODWARD: All right, Cheri, I'm back to you.

MS. PATTERSON: I would like to make a motion that the Board task the ERP Work Group to continue with analyses to address the listed recommendation scenarios before the August Board meeting.

CHAIRMAN WOODWARD: Very good, do I have a second. If so, just raise your hand so you can be identified by Toni.

MS. KERNS: We have Nichola Meserve with her hand up as a second.

CHAIRMAN WOODWARD: Okay.

MS. PATTERSON: Task the ERP Work Group to continue with analyses to address the listed recommended scenarios before the August Board meeting.

MS. KERNS: Spud, while Maya gets these. Because this is a TC tasking, you could try to see if anybody disagrees if you would like to, instead of calling the roll. Commissioners could raise their hands by disagreeing, I guess. We don't always do tasking.

CHAIRMAN WOODWARD: All right. Is this your motion, Cheri, is this accurately portrayed?

MS. PATTERSON: No, that is fine with me, thank you.

CHAIRMAN WOODWARD: All right, so we have a motion before us to task the ERP Work Group to continue with analysis to address the listed recommended scenarios before the August Board meeting. Is there any opposition to the motion as presented? If so, raise your hand. I don't see any raised hands, and we will consider it is supported unanimously. We will move on.

MS. KERNS: Spud, really quick. Justin Davis, you do have your hand raised. I don't know if it is left over from before. Okay, he took it down, so I think it was just leftover.

CHAIRMAN WOODWARD: Very good, all right motion passes unanimously. All right thank you Matt, thank you Katie. We appreciate the questions from everybody.

OTHER BUSINESS

HYDROACOUSTIC SURVEY TASKING

CHAIRMAN WOODWARD: All right we're going to move on to other business. Joe, you've got an item you want to bring before the Board?

MR. CIMINO: Yes, thank you Mr. Chair, and thanks to Matt and the ERP for all the work they've done, as well as the SAS and TC to date, getting us all this important information. Those of us that have been dealing with menhaden for a while know that past peer reviews, plural not just the most recent, have pointed out that despite the volumes of surveys used and reviewed for our assessments. You know we still lack a survey designed to target menhaden.

Both the peer reviews and the CIEs have pointed out that there needs to be a sampling of larger, older fish that are sampled across the range. There is a Saltonstall-Kennedy Grant that is a proposal that is out there right now that does intend to do that to some extent. It's a hydroacoustic survey, with principal investigators from the Chesapeake Bay Lab of University of Maryland, as well as co PIs from VIMS and Normandale.

Industry collaborators from Cape May New Jersey, since this is a Mid-Atlantic survey design, with industries assistance and federal partners from National Marine Fisheries Service at the Beaufort Lab, Northeast Fisheries Science Center, state partners with New Jersey's Marine Fisheries Association.

This hydroacoustic survey is a chance to get field confirmation of overwintering adult menhaden in the Mid-Atlantic region, which could shed some light on the existence of spawner biomass in the offshore wintering areas. It is an important component of our needs for the assessment. I believe that the Board would benefit greatly if the TC was able to review, well the survey methodology both from the proposal, as well as from the peer review article put out by Drs. Liang, Nesslage, and Wilberg from Chesapeake Bay Lab that we can provide for the Technical Committee. I would hope, I have personally three specific asks for the TC. That they would do a review of the survey design to assess the magnitude of the overwintering menhaden biomass off the coast of New Jersey, to gather biological samples on older fish in the northern portion of the range, and also reviewing it and providing information. If it's a decent index of relative abundance in the region, if this survey was able to be conducted long term. I just wanted to put that out there for Board consideration as a task to the TC.

CHAIRMAN WOODWARD: All right thank you, Joe. Does anybody have any questions for Joe on this, since it is a tasking recommendation, we do not have to submit it in the form of a motion, unless there is some great concern about this. If so, raise your hand, if you have questions.

MS. KERNS: I don't see anybody with their hand raised, except for a member of the public, but that person has had their hand raised for a while, so I think it was on other issues.

CHAIRMAN WOODWARD: We'll get the public comment in just a second. Seeing no concerns or opposition to that then Joe, we will certainly get your recommendation to the Technical Committee.

MR. CIMINO: Many thanks.

CHAIRMAN WOODWARD: All right, well we are 30 minutes past our cut off time. We've got another Board meeting coming up shortly. Folks need to have lunch. We have two people in the queue for public comment. I will accept that public comment, but we're going to need to keep it brief, so three minutes for public comment. Toni, if you will just kind of help me keep up with that please. Who have we got up for public comment?

MS. KERNS: Will do. Steve Bowman did just raise his hand, so before we go to the public, do you want to go to Steve?

CHAIRMAN WOODWARD: All right, Steve.

MR. BOWMAN: Good afternoon, Mr. Chairman. I'll be very, very brief. I just want to take this opportunity on the behalf of the Commonwealth of Virginia. You all may know, and most people do know, but I just wanted to get it on the record that we appreciate the patience of the Commission through the past almost two years, as we have dealt with the compliance issue with the Commonwealth of Virginia.

I'm just pleased to report to this Board. If you did not know that the General Assembly of the Commonwealth of Virginia transferred control of the menhaden fishery from the General Assembly to the Marine Resources Commission. At its April 28th meeting, the Marine Resources Commission unanimously adopted a regulation that has Virginia adopt the amended cap as it relates to menhaden.

I just wanted to thank everyone involved, the Commission for their patience during the time of patience, the Commission for their resolve, because if it were not for the resolve of the Commission to move forward, I believe with the last motion that took Virginia out of compliance, we would not have been in as strong a position as we were, as we move forward to attempt to have control moved to VMRC. On top of that. After that occurred, I would like to thank the stakeholders that were involved, recreational fishery and industry, and the Northam administration, Governor Northam and Secretary Strickler, and all who worked very, very diligently to get us where we are today.

I think that removes one less element of conflict that we will have to deal with as we move forward to manage this fishery in a productive manner. I just wanted to get that on the record, and thank you all very, very much for your patience, your resolve, and your assistance. I know we're going to be moving in the right direction, so thank you very much, Mr. Chairman.

CHAIRMAN WOODWARD: Thank you Steve, and kudos to you and your team for your persistence in trying to get this situation resolved. I think we're all much happier now of where we are versus where we were. As you said, it's one less point of conflict for us to deal with as we try to move menhaden management forward. With that public comment, Toni. What have we got?

MS. KERNS: We'll start with Jim Uphoff, Jim I'm unmuting you.

MR. JAMES H. UPHOFF, JR.: Oh, I'm sorry that was just a mistake, I was pushing the wrong button. My apology.

MS. KERNS: Tom Lilly, Tom you are not connected, so I won't be able to unmute you. Tom, you should have received an audio pin from the webinar, so if you could enter that on the phone, do the pound, then the three-digit key, and then the pound that should let you be unmuted.

CHAIRMAN WOODWARD: Everyone should have received the written comment from Mr. Lilly, so we do have that.

MS. BERGER: Tom, in order for you to speak you have to enter an audio pin of 688#.

MS. KERNS: He still hasn't entered it yet, Spud.

CHAIRMAN WOODWARD: All right well in the interest of moving on, we've got ACCSP at one o'clock, so we're already impinging on people's flex time. Instead we do have some written comments from Mr. Lilly, I'm sure his verbal comments would be basically kind of similar to those. Sorry about that Mr. Lilly. We're in a whole new world here, and it comes with some technical difficulties.

ADJOURNMENT

CHAIRMAN WOODWARD: Is there any other business to come before the Atlantic Menhaden Management Board?

MS. KERNS: No hands are raised, Spud.

CHAIRMAN WOODWARD: All right very good, thank you all for your patience, for making this all work, and we're all optimistic that this is a temporary situation. Hopefully we can be back face-to-face for our next meeting, but if not, we will keep things moving, and as always, I'm available if you have questions and comments, things that will help me in my job as Chairman. Don't' hesitate to let me know, and with that we will stand adjourned.

(Whereupon the meeting adjourned at 12:15 p.m. on May 5, 2020)

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

July 15, 2020

To: **Atlantic Menhaden Management Board**

From: **Ecological Reference Point Work Group and Atlantic Menhaden Technical Committee**

RE: **Recommendations for Use of the NWACS-MICE Tool to Develop Ecological Reference Points and Harvest Strategies for Atlantic Menhaden**

At the 2020 Winter Meeting, the Atlantic Menhaden Board accepted the Atlantic menhaden single-species and ecological reference point (ERP) benchmark assessments and peer review reports for management use. The ERP assessment developed a tool, the NWACS-MICE model, which can be used in conjunction with the single-species assessment model to evaluate tradeoffs and develop ERPs and harvest strategies that account for Atlantic menhaden's role as a forage fish.

The exact values and definition of the ERPs depend on ecosystem management objectives and ecosystem conditions. The assessment proposed the following ERP definitions:

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

Atlantic striped bass was the focal species for the example ERP definitions because it was the most sensitive predator fish species to Atlantic menhaden harvest in the NWACS-MICE model, so an ERP target and threshold that sustained striped bass would likely not cause additional declines for other predators in the model assuming no other major perturbations to the food web/ecosystem structure. The assessment also provided example ERPs by applying this definition to a status quo ecosystem scenario where all other ERP focal species in the model (bluefish, weakfish, spiny dogfish, and Atlantic herring) were fished at status quo (i.e., 2017) levels.

The Board tasked the ERP Work Group (ERP WG) with additional follow-up work to explore the sensitivity of the NWACS-MICE ERPs to different ecosystem scenarios and better understand the performance of the NWACS-MICE tool. This memo summarizes the results of those analyses and the recommendations of the ERP WG and Atlantic Menhaden Technical Committee (TC) for the use of the NWACS-MICE model in management.

Alternate Ecosystem Scenarios

At the 2020 Winter Meeting, the Board tasked the ERP WG with exploring alternate ecosystem scenarios to understand the sensitivity of the NWACS-MICE tool to different assumptions about ecosystem conditions before implementing it for management. The major ecosystem scenarios (i.e., assumptions

about the other ERP focal species: bluefish, weakfish, spiny dogfish, Atlantic herring) explored are listed in Table 1.

While the *B* target and *B* threshold scenarios (scenarios 2- 3) provide additional context for the example ERPs, the status quo scenario (scenario 1) more closely approximates short-term conditions for the ecosystem. Running the alternative scenarios of the NWACS-MICE model showed that the NWACS-MICE output and resulting ERPs are sensitive to the levels of Atlantic herring biomass and the strength of the relationship between striped bass and Atlantic herring (Figure 1). At the 2020 Spring Meeting, the Board tasked the ERP WG with additional work to better understand the influence of Atlantic herring on the NWACS-MICE model.

Table 1. ERP Ecosystem Scenarios

ERP Scenario	Striped Bass	Bluefish	Weakfish	Spiny Dogfish	Atlantic herring
1. Example ERPs (2017 status quo)	*F* target	2017 status quo	2017 status quo	2017 status quo	2017 status quo
2. All at *B* target	*F* target	*F* target	*F* target	*F* target	*F* target
3. All at *B* threshold	*F* target	*F* threshold	*F* threshold	*F* threshold	*F* threshold

Note that for the other ERP focal species, "*F* target" and "*F* threshold" are defined as the *F* rates within the NWACS-MICE model that let these species approximate their biomass targets and thresholds, respectively.

Influence of Atlantic herring in the NWACS-MICE model

Although Atlantic herring are an important component of striped bass diets in some regions and seasons, sensitivity analyses indicate the model is overestimating the importance of Atlantic herring on a coastwide, annual level. For example, in the sensitivity run when all species were at their biomass targets (scenario 2), the Atlantic menhaden ERP target was much higher than the example ERP value due to the increase of Atlantic herring as alternate prey (Table 2). Atlantic herring was below its biomass target in 2017, so *B* target represents an increase in biomass. With more Atlantic herring in the system, the model predicted more Atlantic menhaden could be removed through fishing and the resulting ERP target was higher. However, in evaluating the sensitivity of striped bass to Atlantic herring, it was observed that the model predicted a higher proportion of Atlantic herring in the diets of striped bass than what has been observed in coastwide diet studies.

Table 2: ERP targets and thresholds under different ecosystem scenarios, and the probability of exceeding the ERP values under the current TAC for 2019 - 2021

	Atlantic Menhaden Full *F* equivalent		Probability of exceeding ERP target			Probability of exceeding ERP threshold		
Scenario	**ERP target**	**ERP threshold**	2019	2020	2021	2019	2020	2021
1. Example ERPs	0.19	0.57	60%	71%	66%	0%	0%	0%
2. All at *B* target	0.36	*	0%	3%	6%	0%	0%	0%
3. All at *B* threshold	0.03	0.32	100%	99.5%	99.5%	0%	13%	13%
	Target	**Threshold**	**Probability of exceeding single-species target**			**Probability of exceeding single-species threshold**		
Single species BRPs	0.31	0.86	0%	0%	17%	0%	0%	0%

***** When Atlantic herring were at their biomass target and striped bass were fished at their *F* target, the ERP threshold was undefined, meaning none of the Atlantic menhaden *F* values explored pushed striped bass to their biomass threshold.

The ERP WG conducted additional sensitivity runs to explore the possibility that the NWACS-MICE model may be overestimating the importance of Atlantic herring on a coastwide, annual level. These sensitivity runs used a range of different Atlantic herring biomass levels, including status quo levels, target biomass levels, and threshold levels as in the base model configuration. Sensitivity runs also used different fixed levels of vulnerability to predators and seasonally variable levels of Atlantic herring availability to striped bass.

For the seasonal variability sensitivity runs, the magnitude of variability was based on observed diet data, with availability peaking in the summer. With seasonal variability included, the predicted levels of Atlantic herring in striped bass diets were lower than the base configuration (the peer-reviewed model without seasonality incorporated) and more in line with observed data. Varying the availability of Atlantic herring to striped bass seasonally also resulted in a significant reduction in the sensitivity of the ERPs to the level of Atlantic herring in the ecosystem. For the base model, higher levels of Atlantic herring biomass (All at *B* target) produced higher estimates of the ERP target *F* value than the status quo scenario, while lower levels of Atlantic herring biomass (Atlantic herring at *B* threshold) produced lower estimates of the ERP target *F* value (Figure 2, left). When the seasonal component was added for the striped bass and Atlantic herring relationship, the different Atlantic herring levels (All at *B* target, Atlantic herring at *B* threshold) produced ERP *F* target values that were much closer to the status quo ERP *F* target (Figure 2, right). This analysis suggests that the sensitivity to Atlantic herring biomass levels in the base model configuration of the NWACS-MICE is likely due to the lack of seasonal and spatial dynamics in the model, rather than reflecting realistic ecological dynamics.

Conclusions

The ERP WG and Menhaden TC recommend using the ERPs based on the status quo scenario (scenario 1), the original example ERPs presented in the assessment report, for the near-term management of Atlantic menhaden. The status quo scenario most closely approximates short-term conditions for the ecosystem. The example ERPs, as defined here, aim to provide enough menhaden to sustain striped bass, the most sensitive predator in these models, when striped bass are at their biomass target under these conditions.

The ERP WG conducted additional runs of the NWACS-MICE tool to explore the sensitivity of the ERPs to alternate ecosystem scenarios. While these analyses (scenarios 2-3) show a sensitivity to Atlantic herring biomass levels, follow-up analyses suggest that this sensitivity is likely due the lack of seasonal and spatial dynamics in the model, rather than reflecting realistic ecological dynamics. However, this is a source of uncertainty that the Board could consider when setting specifications, particularly given Atlantic herring are now well below their biomass target. The Board may consider applying a buffer when setting the TAC based on the ERP *F* target or choose a TAC that has a lower probability of exceeding the ERP *F* target when Atlantic herring are at low biomass. Alternatively, the Board could select a TAC that has a higher probability of exceeding the ERP *F* target when Atlantic herring stocks are high. (See also the draft Risk and Uncertainty Policy included in the meeting materials for the ISFMP Policy Board for the 2020 Summer Meeting, which provides an explicit mechanism for turning qualitative assessments of uncertainty into an adjusted probability of achieving the *F* target.)

The seasonal variability sensitivity run presented here is a preliminary step in incorporating seasonality in the NWACS-MICE tool. While the results demonstrate potential sensitivity to seasonal dynamics, the seasonal parameterization has not been fully vetted and peer-reviewed. In addition, seasonality was only applied to the Atlantic herring – striped bass relationship, and not any of the other predator – prey relationships. The ERP WG and Menhaden TC recommends thoroughly investigating seasonal dynamics within the NWACS-MICE tool during the next benchmark assessment. The use of seasonal parametrization should be fully vetted and peer-reviewed before use in providing management advice.

The ERP WG also recommends revisiting the definition of ERPs after the next benchmark assessment is complete. The NWACS-MICE tool represents significant progress in managing Atlantic menhaden to account for its role as a forage fish, but it is a tool that should continue to be refined. The Commission's ecosystem approach to Atlantic menhaden management will continue to evolve as the science evolves.

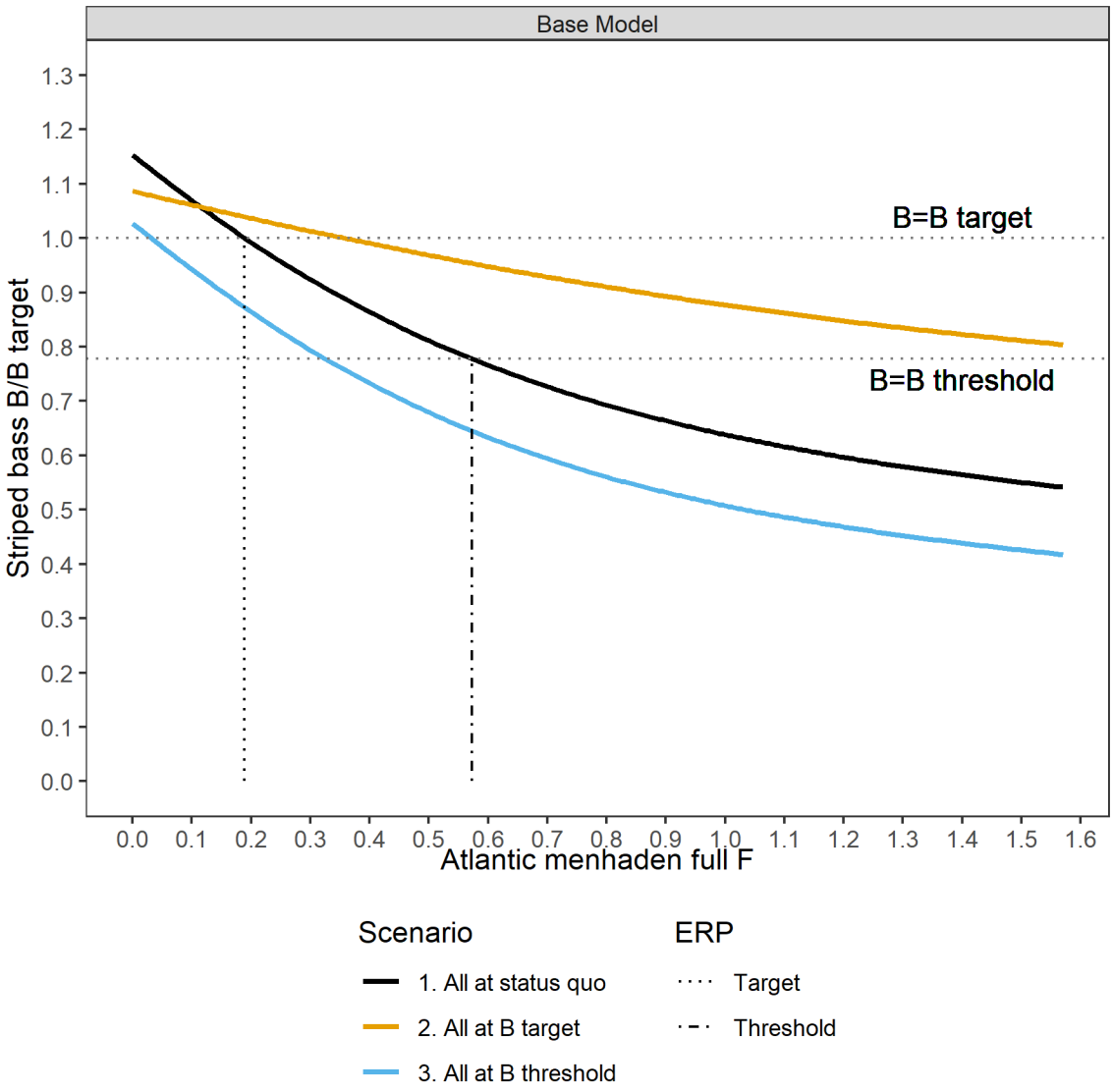


Figure 1: Striped bass biomass levels relative to their biomass target under different levels of Atlantic menhaden F for different ecosystem scenarios from the original analysis. Striped bass are fished at their F target in all scenarios. The dashed vertical lines indicated the ERP F target and threshold for the status quo scenario.

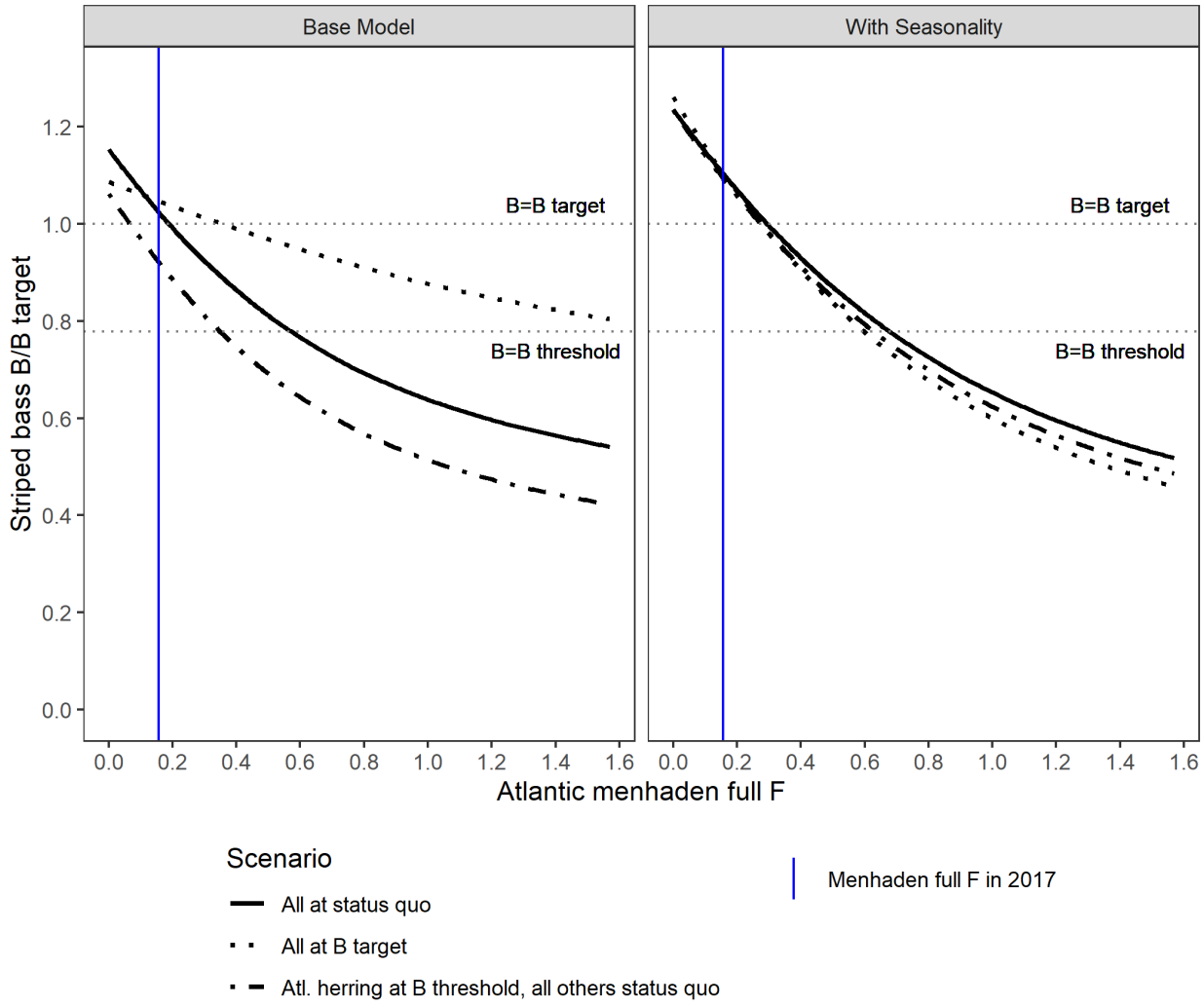


Figure 2: Striped bass biomass levels relative to their biomass target under different levels of Atlantic menhaden F for different ecosystem scenarios for the base configuration of the NWACS-MICE model (left) and the exploratory model with seasonal dynamics (right).The vertical blue line indicates the estimate of *F* from the single-species assessment model in 2017. Striped bass are fished at their F target in all scenarios.

Max Appelman

From: Capt. TJ Karbowski <tedkarbowski@yahoo.com>
Sent: Saturday, May 9, 2020 8:49 AM
To: Max Appelman
Subject: [External] Comments- Spring Meeting.

Comments- Menhaden/Striped Bass/Bluefish- Spring Meeting.

This is not that complicated.

Do what you have to with the reduction fishery because that's your only tool, but the bottom line is- There needs to be enough menhaden to sustain Striped Bass and large Bluefish. THAT IS WHAT THEY PREFER TO EAT IN MOST OF THEIR RANGE. Right now there are MILLIONS of striped bass and bluefish that have grown up over the winter, are heading north and are going to be hungry. They are going to be sucking every bunker out of the ocean that they can and there needs to be enough to sustain them. If these fish aren't healthy and viable enough for proper spawning, it's NOT us the recreational fishermen that killed them, it's YOU the regulators. These juvenile fish ARE the answer to rebuilding the striped bass and bluefish populations.

Over the past 4 or 5 years I can count on my fingers how many days each season there has been menhaden in Long Island Sound. ….and guess what? When the bunker are there, we catch mature striped bass and bluefish. I don't care what your trawl surveys or spreadsheets say. I am on the water everyday for a living for 10 hours a day, you are not. I am right.

In regards to the recent years striped bass numbers….

Find the food, find the fish.

If there's not enough menhaden, they will look for alternative food sources that alter their migration patterns, thus throwing all traditional data off; rec. harvest, trawl survey's, everything will be off. - If cars needed to fill their tanks several times a day and all gas stations were moved from their current locations to somewhere miles away from where they used to be, our traditional traffic patterns would change and we would hear on the news everyday of the absence of traffic on the highways. – Yes, it's really that simple.

P.S.- Unless you like arguing with people all day long and plan to argue with people for the rest of your career, someone needs to get some guts and take the lead to put an end to the NEW MRIP. I'm sick of wasting my time sitting on webinars for hours on end listening to people throw these ridiculous numbers around like they are credible. The NEW MRIP is NOT the best available source. Using numbers that popped into your head while tripping on LSD would be more accurate. NEW MRIP IS A FARCE. You know it, I know it, and everyone else knows it, but no one has the guts or is just too lazy to do anything about it. In the meantime, these ridiculous regulations are ruining people's lives, and the ecosystem in the process.

Have a good weekend. - TJ

Thank you,
Capt. TJ Karbowski
Rock & Roll Charters
Clinton, CT
203.314.3765
https://rockandrollcharters.com/

Kirby Rootes-Murdy

From: Phil Zalesak <flypax@md.metrocast.net>
Sent: Friday, July 3, 2020 12:33 PM
To: Spud Woodward
Cc: PHIL LANGLEY; LYNN FEGLEY; Allison Colden; Kirby Rootes-Murdy; Toni Kerns; Tina Berger; STEVEN G. BOWMAN; Patrick Geer; BILL ANDERSON; Russell Dize; Del. Dana Stein; robert.t.brown@shopcove.net; 'Bill Bonner'; Chris Goudreau; Ron Smith; PHILIP ZALESAK; MARTIN GARY; THOMAS LILLY; Robert Beal; Capt Chris Dollar; dunnsville@gmail.com; jeannie.riccio@maryland.gov
Subject: [External] Request for Public Comment on Addendum 1 to Amendment III of the Atlantic Menhaden Fishery Management Plan
Attachments: 2017-11 AtlanticMenhadenAmendment3_Nov2017.pdf; 2020-0701 Proposal to Improve the Atlantic Menhaden FMP.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

References: (a) SEDAR 69, Ecological Reference Points Stock Assessment Report, Atlantic Menhaden, January 2020

Mr. Woodward,

After soliciting ideas on how to improve the current Atlantic Menhaden Fishery Management Plan (attachment 1) from ASMFC Atlantic Menhaden Management Board members, Maryland Sport Fishery Advisory Board members, CCA-MD members, Southern Maryland Recreational Fishing Organization (SMRFO) members, charter captains, and Maryland recreational fishermen, I organized the ideas into four specific proposals. I then had the SMRFO Board of Directors evaluate the pros and cons of each proposal (attachment 2).

The Board voted unanimously on a proposal which **does not require a reallocation of the total allowable catch between the ASMFC states**. In fact, the proposal **does not reduce the Virginia allocation by one fish** (see attachment 2). But the proposal does "better equitably distribute the resource's ecological and economic benefits between all user groups" in the Chesapeake Bay. The primary user groups include those who **extract and utilize menhaden for human use**, those who **extract and utilize predators which rely on menhaden as a source of prey**, and **those whose livelihood depends on the health of the marine ecosystem."**

The recommended proposal is as follows: **Close reduction fishing for Atlantic Menhaden in the Chesapeake Bay and within the 3 nautical mile limit of the Economic Exclusive Zone**.

Current scientific studies (reference (a)) document the dependency of commercially and recreationally important predator fish on the availability of Atlantic menhaden. Further, the Maryland Department of Natural Resources, the Virginia Marine Resources Commission, and the Potomac River Fisheries Commission have documented a significant decline in the commercial harvesting of these predators, a significant decline in Maryland and Virginia commercial harvesters, a significant decline in Maryland and Virginia saltwater licenses, and a significant decline in for-hire trips in Maryland and Virginia (attachment 2). Given scientific studies and well established empirical data, there is sufficient justification for creating an addendum to the existing fishery management and putting it before the public for comment.

Addendum 1 would require a one sentence change to the current fishery management plan. Under "Chesapeake Bay Reduction Fishery Cap" the sentence would simply read "Reduction fishing is prohibited within the Chesapeake Bay and within the 3 nautical mile limit of the Economic Exclusive Zone."

I respectfully request that you put this before the public as soon as humanly possible.

Phil Zalesak
President
Southern Maryland Recreational Fishing Organization
www.smrfo.com
https://www.facebook.com/groups/598428253621775/

Finfish Advisory Committee Member
Potomac River Fisheries Commission
http://prfc.us/finfish_advisory_committee.pdf

Proposal to Improve the Atlantic Menhaden Fishery Management Plan

July 1, 2020

Phil Zalesak

President (www.smrfo.com)

Agenda

- Goals and Objectives of the Atlantic Menhaden Fishery Management Plan (November 2017)
- Current Allocation of Atlantic Menhaden by State and Region (Potomac River)
- Atlantic Menhaden Migration Pattern
- Issues with the Current Plan
- Proposals to Improve the Plan
- Recommendation

Atlantic Menhaden Fishery Management Plan

Atlantic States Marine Fisheries Commission

Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden

November 2017

Vision: Sustainably Managing Atlantic Coastal Fisheries

Goals and Objectives of Current Plan

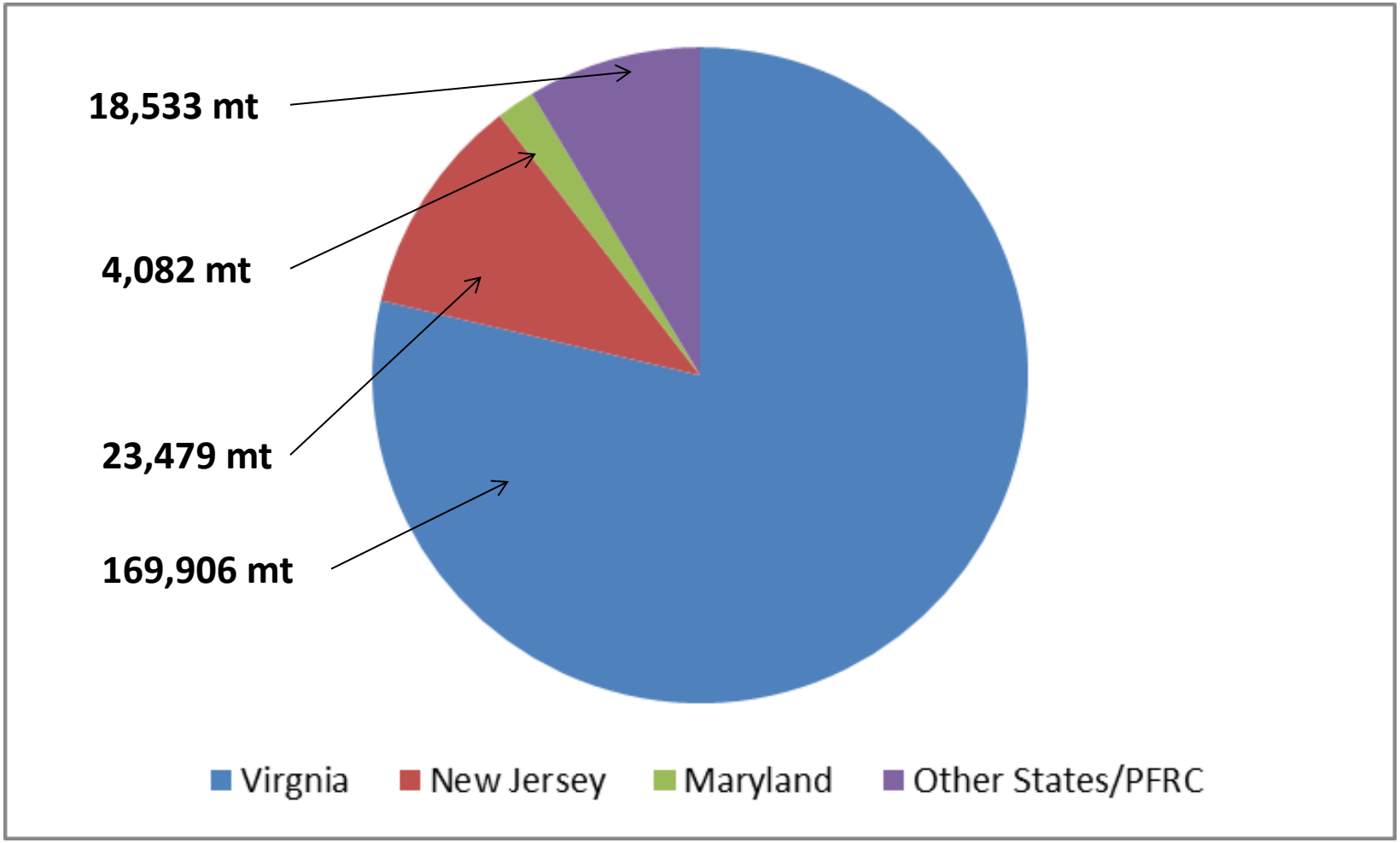
To manage the Atlantic menhaden fishery in a manner which equitably allocates the resource's ecological and economic benefits between all user groups.

The primary user groups include those who:

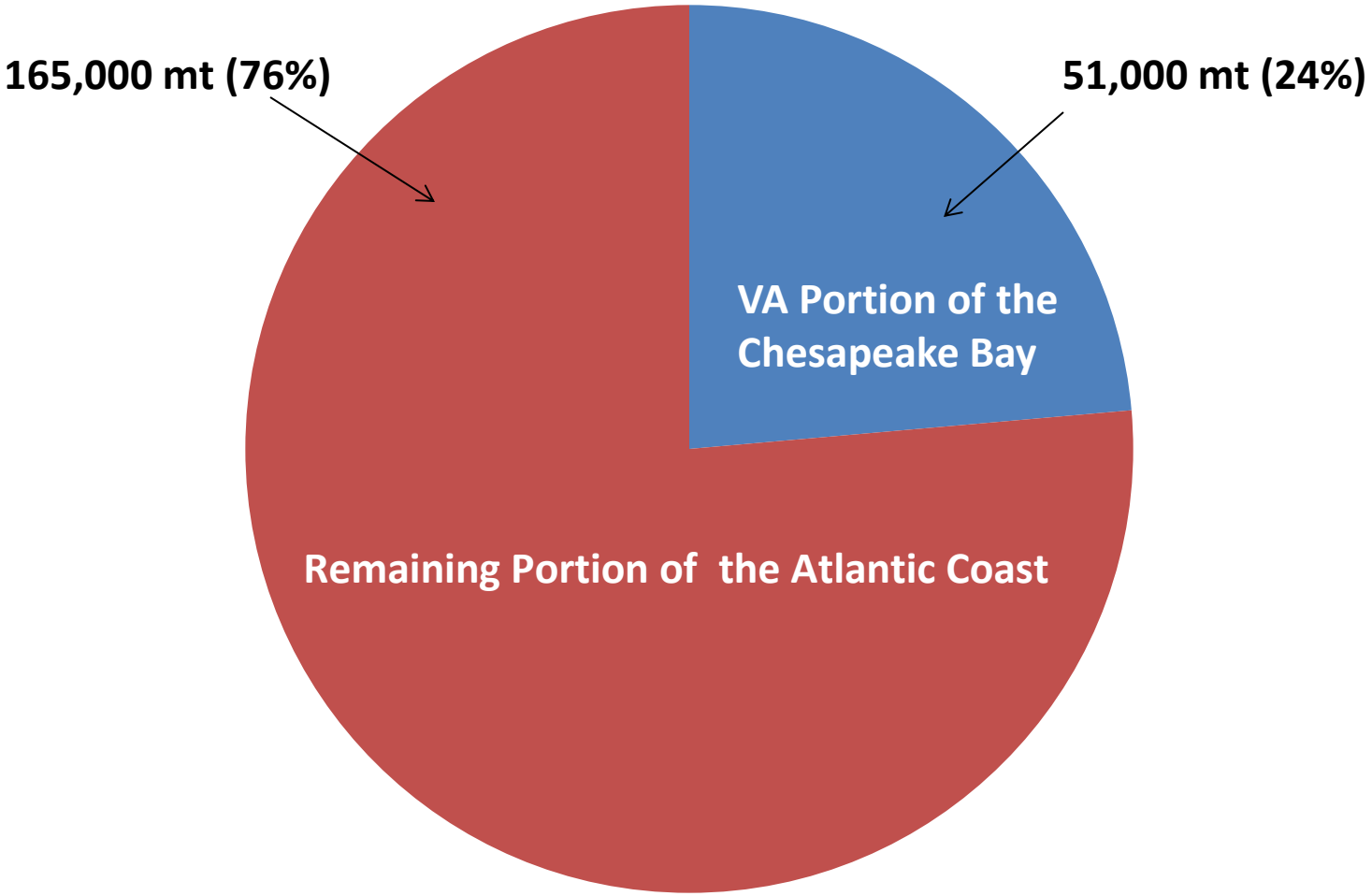
- extract and utilize menhaden for human use,
- extract and utilize predators which rely on menhaden as a source of prey, and
- whose livelihood depends on the health of the marine ecosystem.

Current Allocation

Total Allowable Catch (216,000 Metric Tons)



Chesapeake Bay Cap for Reduction Fishery (51,000 Metric Tons)



Atlantic Menhaden Migration Pattern (11/2/18)

Fisheries Research 210 (2019) 204–213

Contents lists available at ScienceDirect

Fisheries Research

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

Estimation of movement and mortality of Atlantic menhaden during 1966–1969 using a Bayesian multi-state mark-recovery model

Emily M. Liljestrand[a,*], Michael J. Wilberg[a], Amy M. Schueller[b]

[a] Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, P.O. Box 38, Solomons, MD, 20688, USA
[b] National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, 101 Pivers Island Road, Beaufort, NC, 28516, USA

ARTICLE INFO

Handled by A.E. Punt

Keywords:
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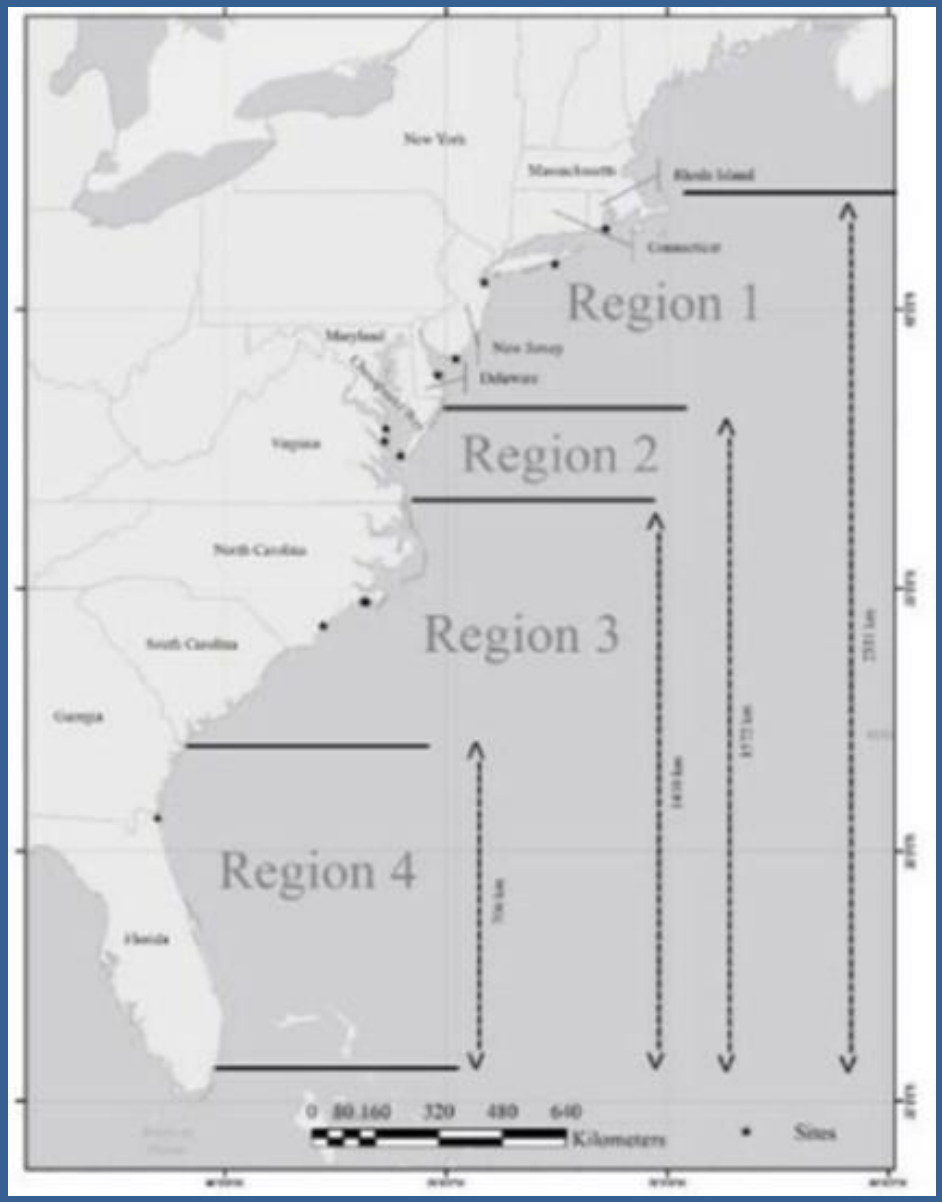
Forage Fish
Natural mortality
Fishing mortality
Brevoortia tyrannus

ABSTRACT

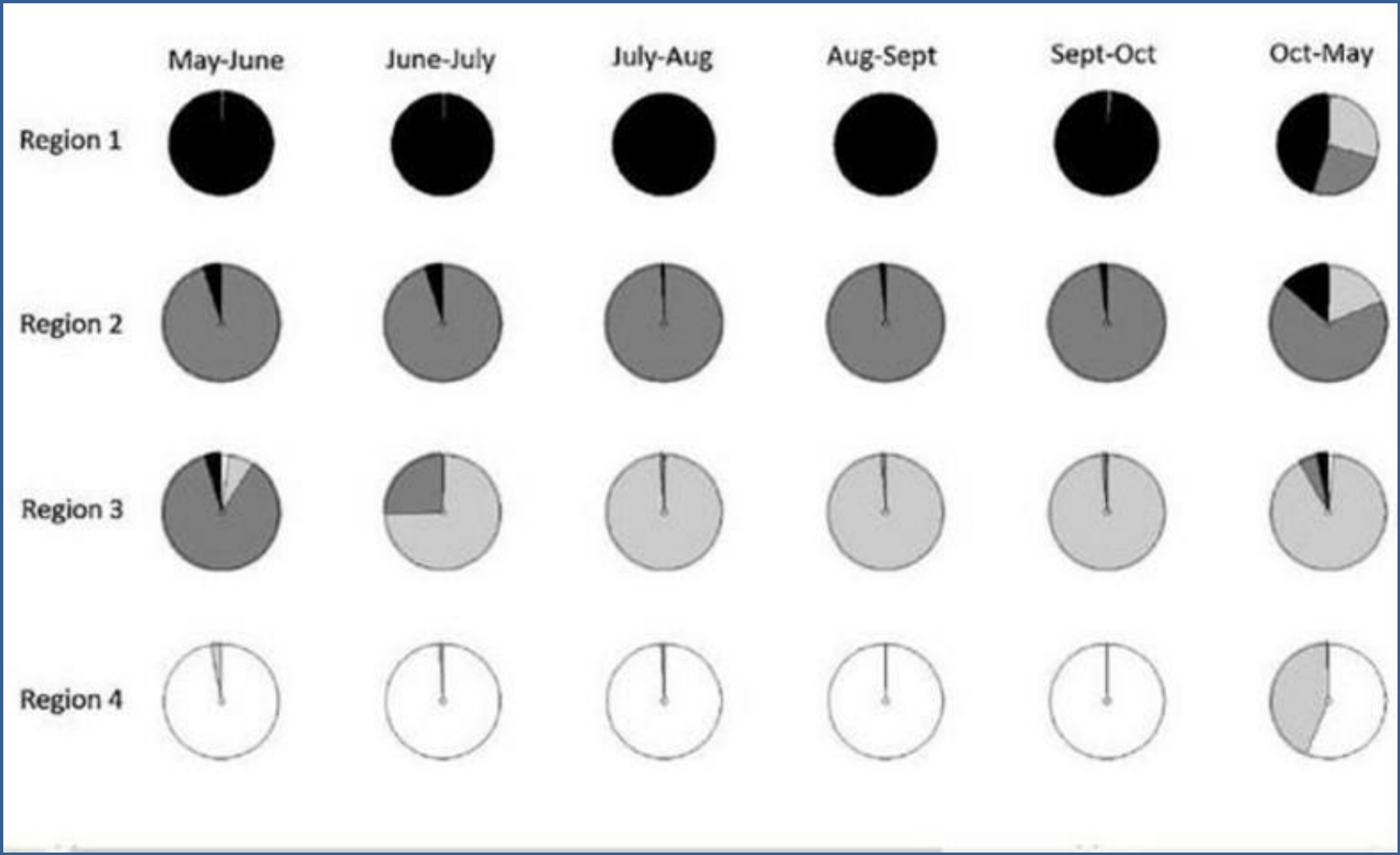
Atlantic Menhaden *Brevoortia tyrannus* is an economically and ecologically important forage fish targeted by large-scale commercial reduction and bait fisheries. In the late 1960s, the National Marine Fisheries Service conducted a mark-recovery study in which they tagged over one million adult Atlantic Menhaden. Mark-recapture models at the time did not allow for estimation of movement rates. Our objective was to reanalyze these data to simultaneously estimate natural mortality, fishing mortality, and movement probability during 1966–1969. We developed a Bayesian version of the Brownie model that incorporated fishing mortality, natural mortality, and movement among four regions of the northwest Atlantic continental shelf ecosystem at a monthly time step. The model also accounted for both tag loss and tag detection probability. During May-June, an estimated 91% of Atlantic Menhaden from North and South Carolina moved northwards. Atlantic Menhaden largely remained within the same coastal region from June to October. In the winter, an estimated 55% of the tagged sample north of the Chesapeake Bay moved southward to the Chesapeake Bay and North and South

...stantially smaller
...9–1.23 yr^{-1}, 95%
...mporally variable
...al seasonal spatial
dynamics of this stock will improve contemporary survey design and management, as these dynamics may

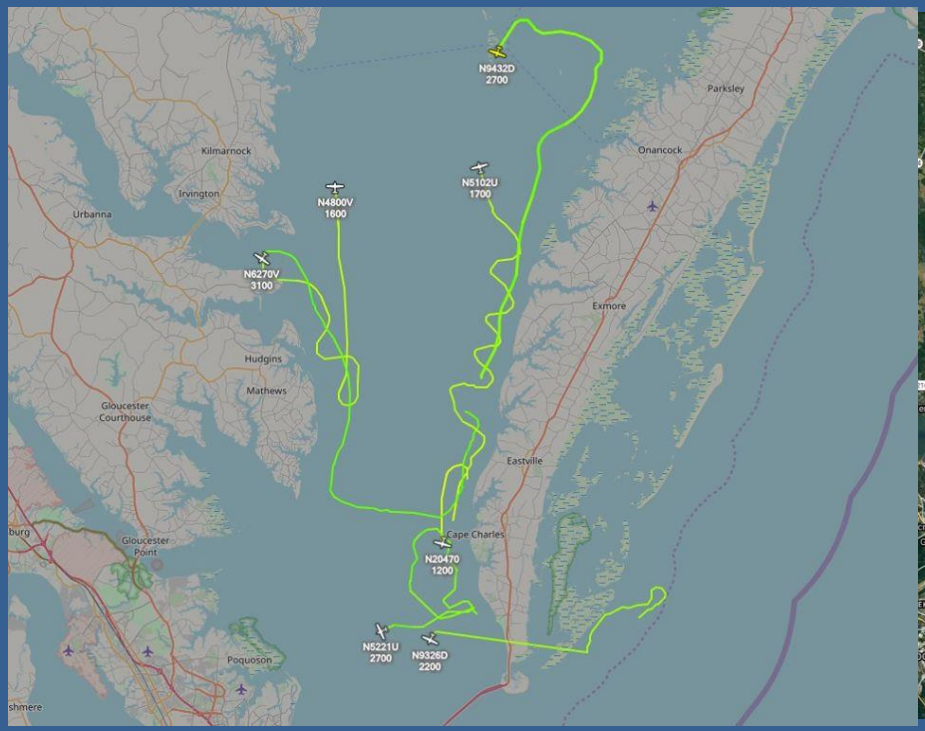
Atlantic Menhaden Migration Pattern (page 205)

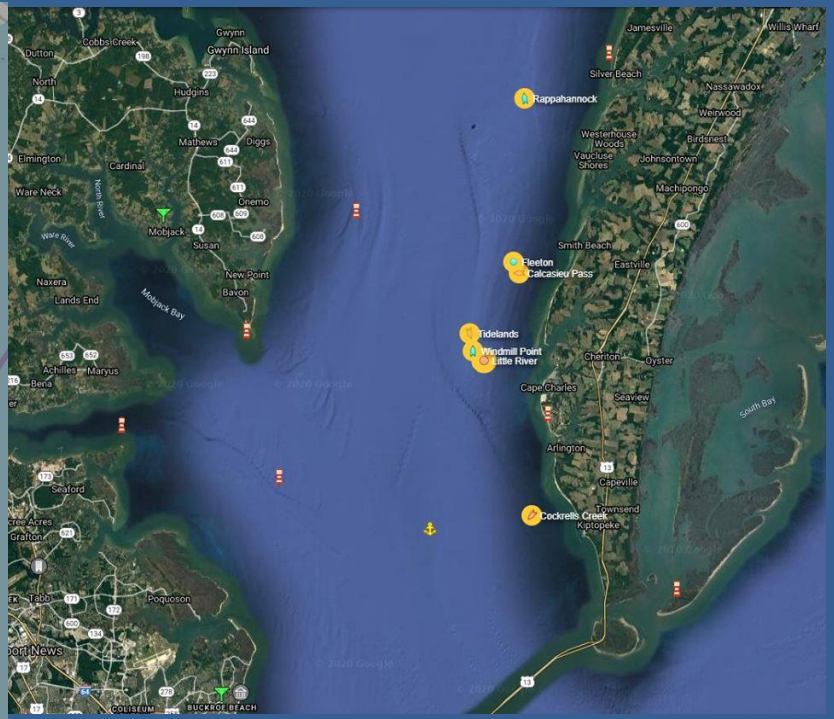


Atlantic Menhaden Migration Pattern (page 210)



Menhaden Reduction Industry Fleet (6/15/20)





Source: William Dunn, Facebook – 6/15/20

Issues

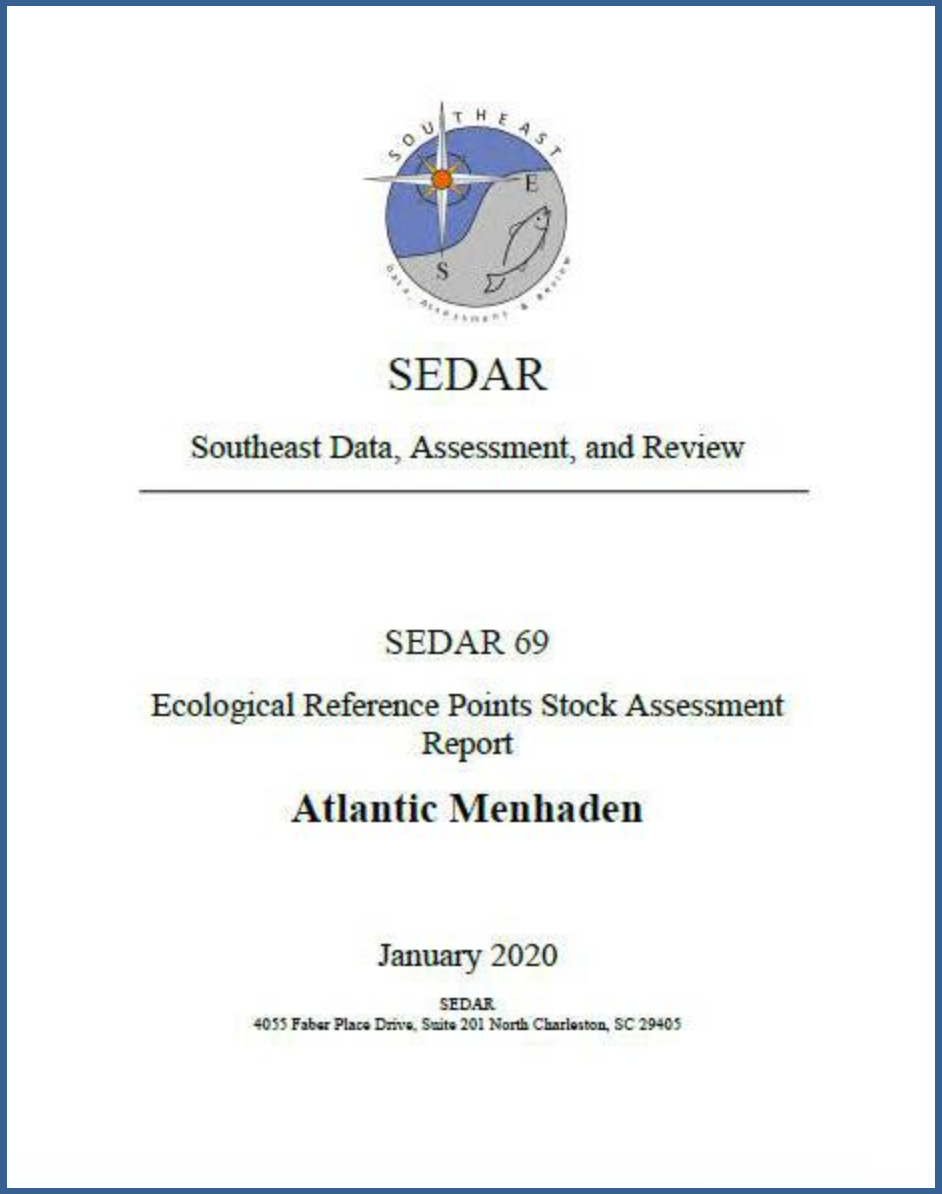
- Current Plan is in violation of its Goals and Objectives as the allocation is not based on ecological or economic principles. It is based on history.

- Current Plan does not equitably allocate the resources ecological and economic benefits to all user groups. In fact, it penalizes the non-reduction commercial industry and recreational industry in the Chesapeake Bay Region and beyond.

Data in Support of Issues

- Decline in Commercial Harvest of Predator Fish in the Chesapeake Bay and Potomac River
- Decline of Maryland and Virginia Fin Fish Harvesters
- Decline of Saltwater Fishing Licenses in Maryland and Virginia
- Decline of For-Hire Trips in Maryland and Virginia
- Decline in Economic Activity in the Chesapeake Bay Region and Beyond

Predators Sensitive to the Decline in Menhaden



SEDAR

Southeast Data, Assessment, and Review

SEDAR 69

Ecological Reference Points Stock Assessment Report

Atlantic Menhaden

January 2020

SEDAR
4055 Faber Place Drive, Suite 201 North Charleston, SC 29405

Predators Sensitive to the Decline in Menhaden

Special Report No. 83
of the

Atlantic States Marine Fisheries Commission

Working towards healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015

Atlantic Menhaden Workshop Report & Proceedings

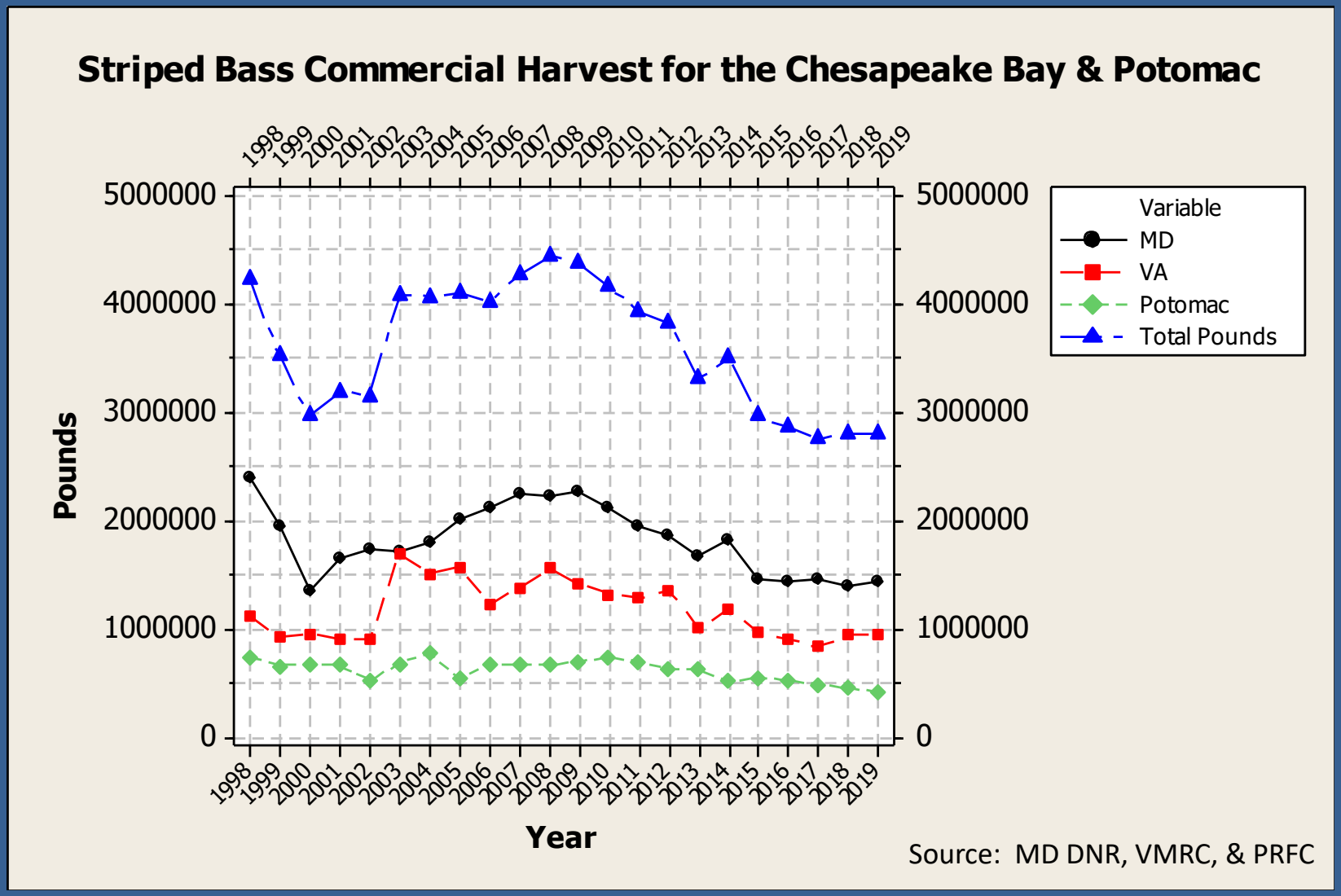
December 2004

Predators Sensitive to the Decline in Atlantic Menhaden (Key Food Source)

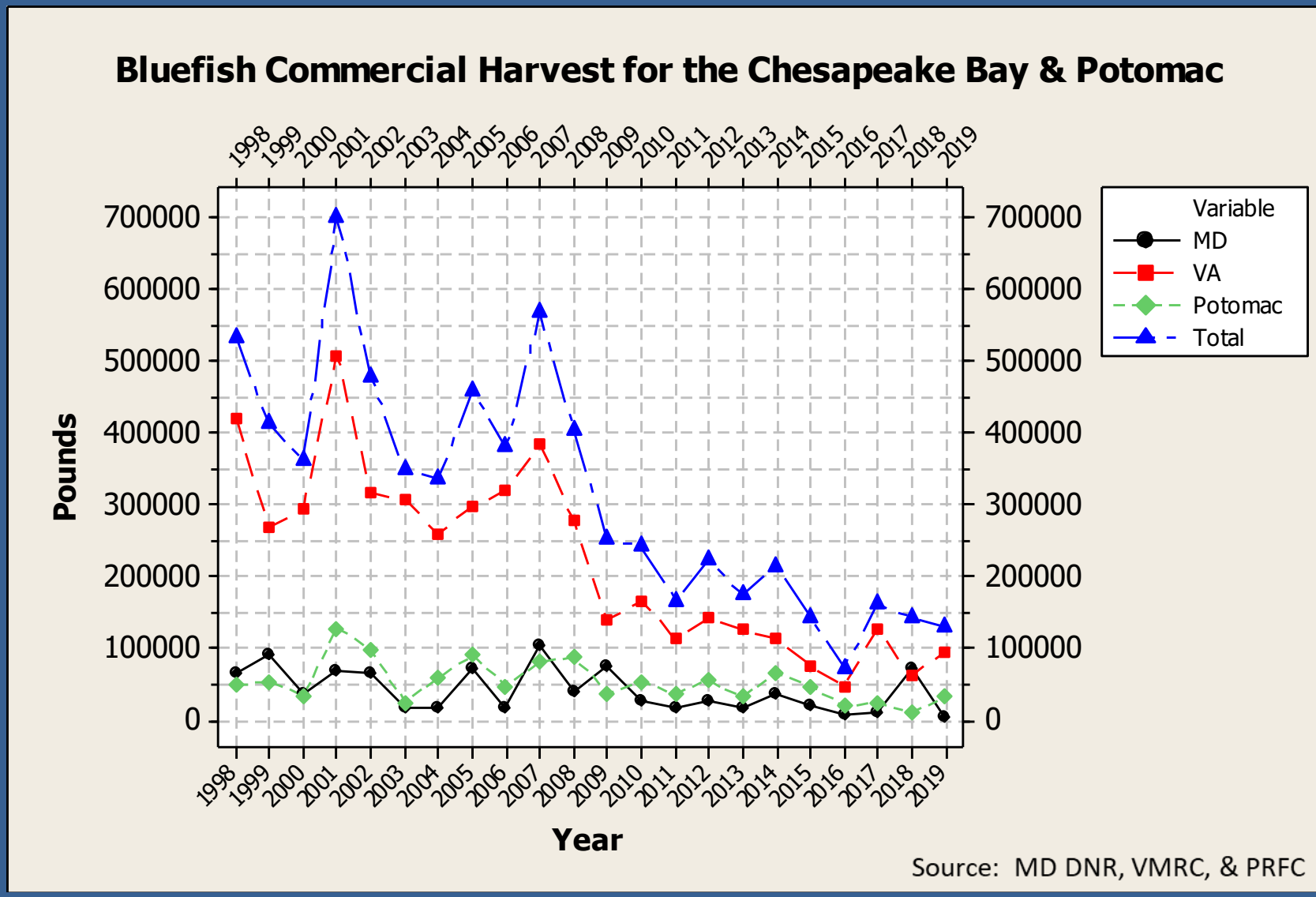
SEDAR 69 Report of 1/2020

- Striped Bass
- Bluefish
- Weakfish

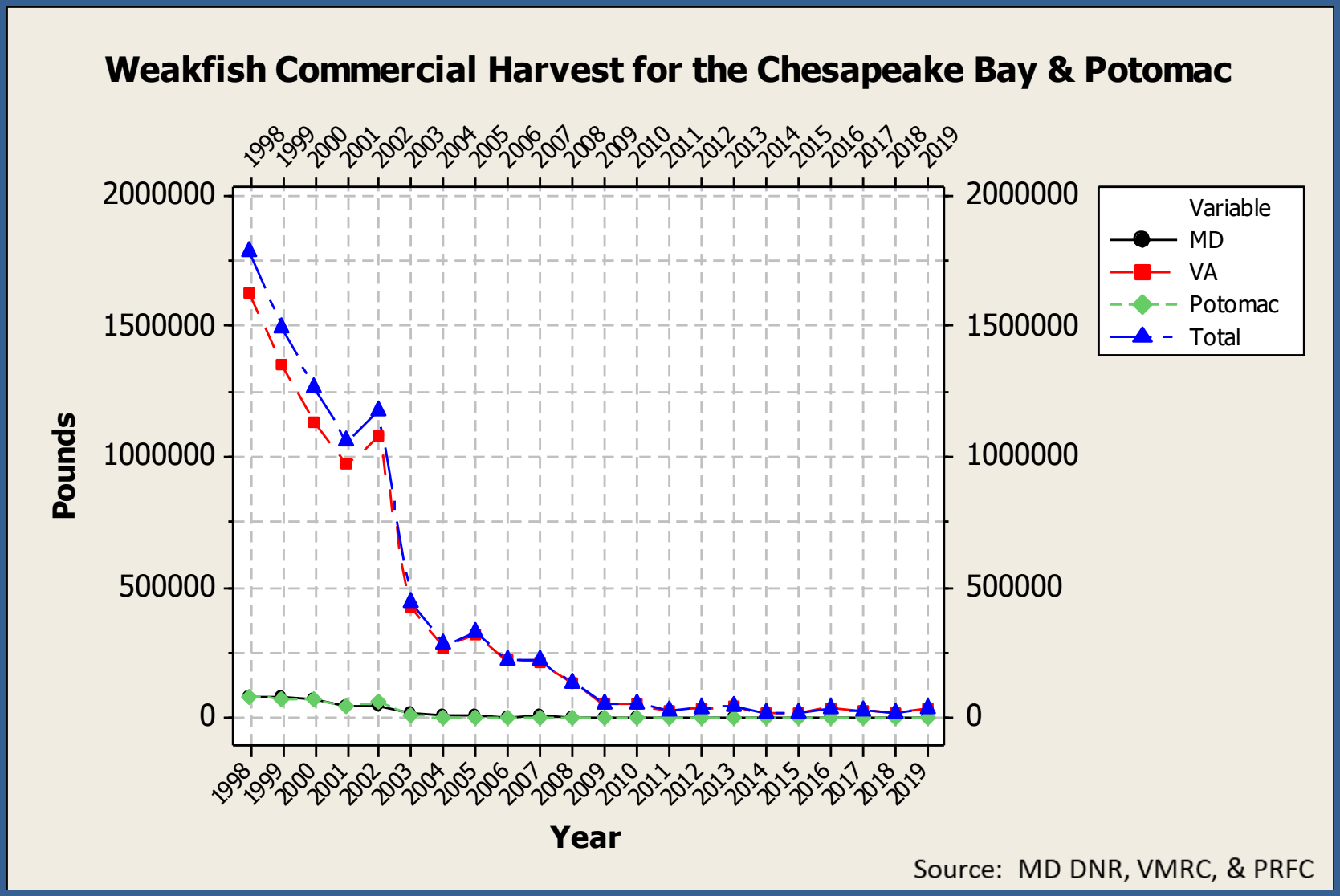
Decline of Commercial Harvest of Striped Bass



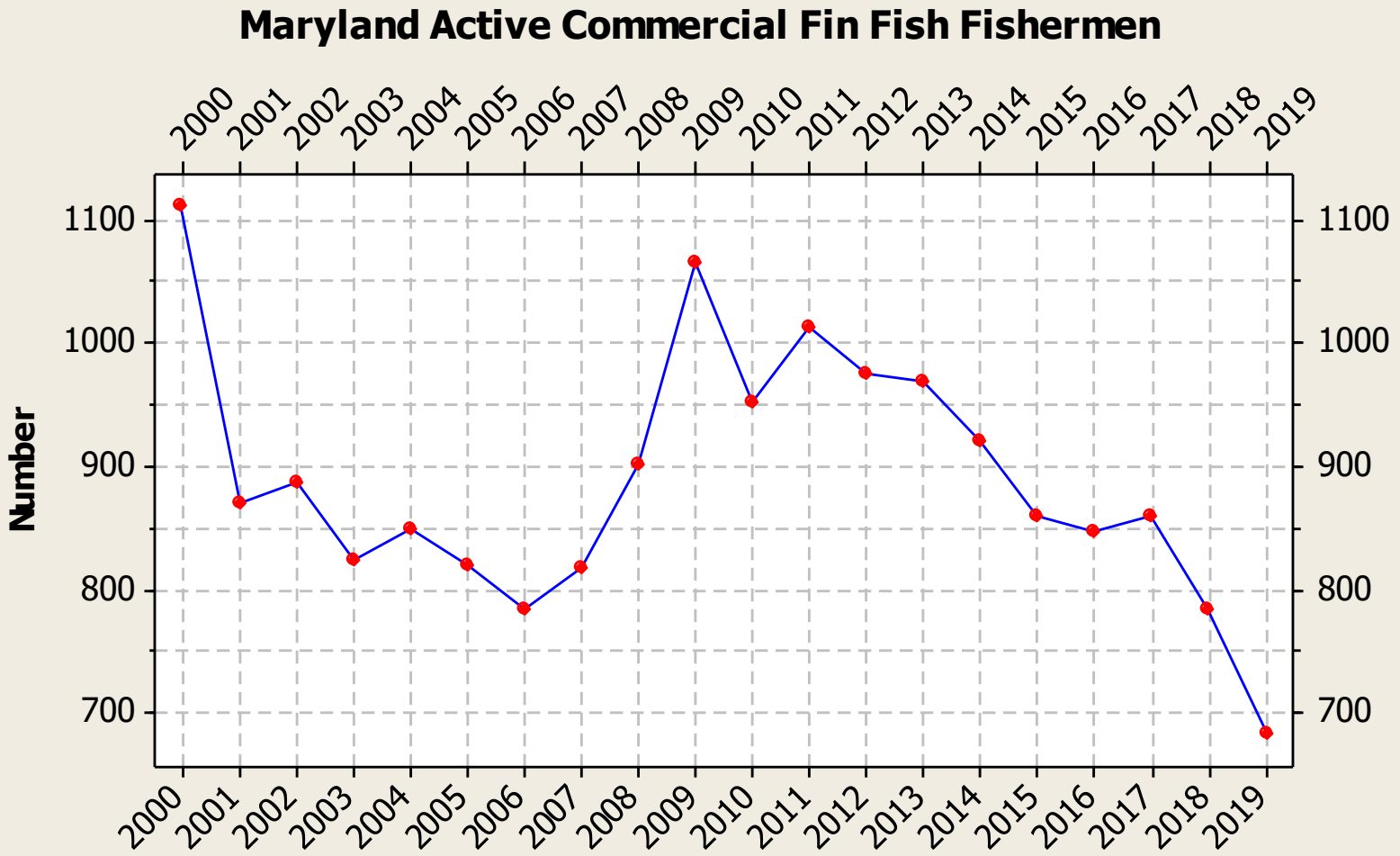
Decline of Commercial Harvest of Blue Fish



Decline in the Commercial Harvest of Weakfish

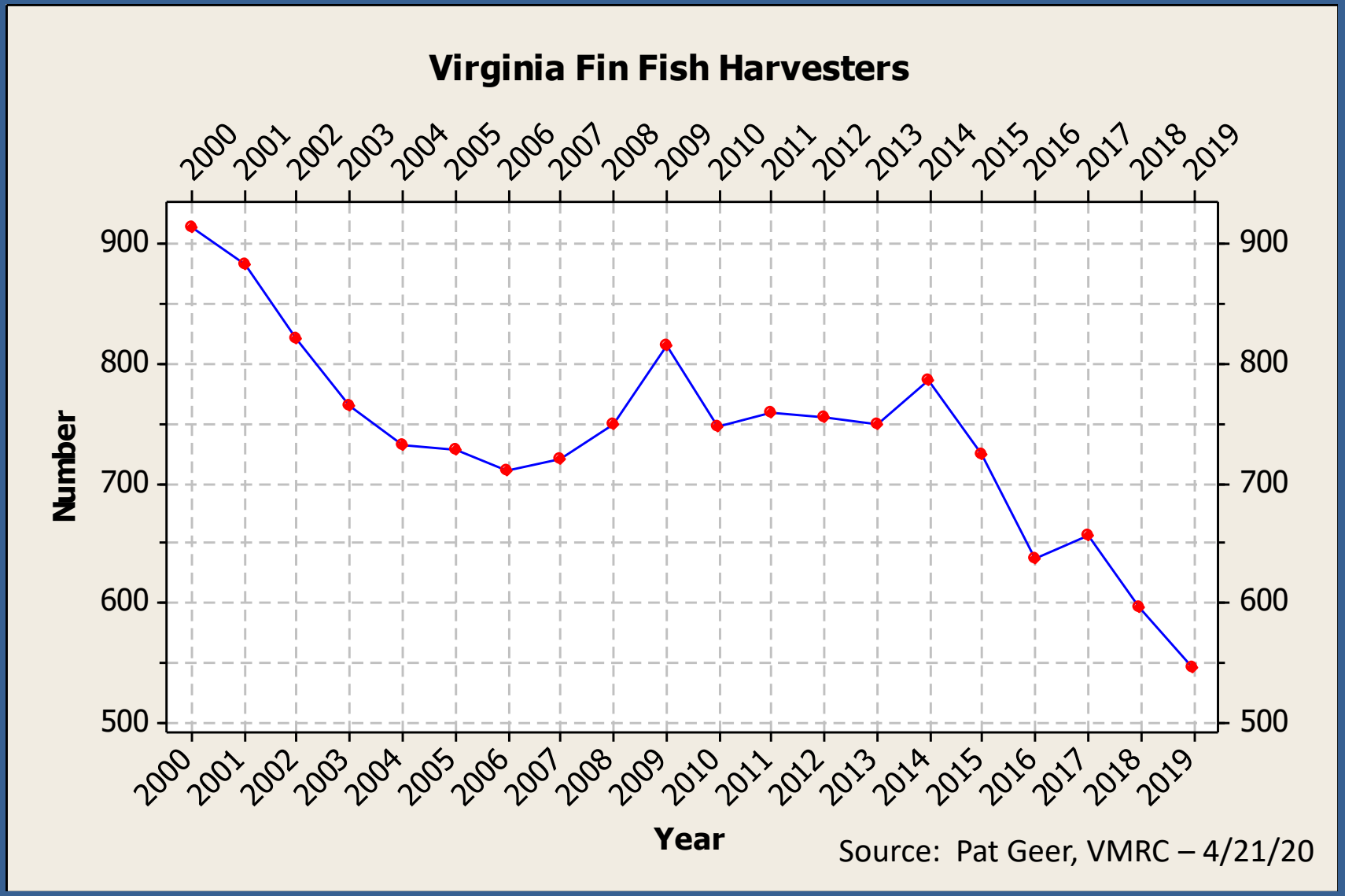


Decline in MD Active Commercial Fish Fishermen



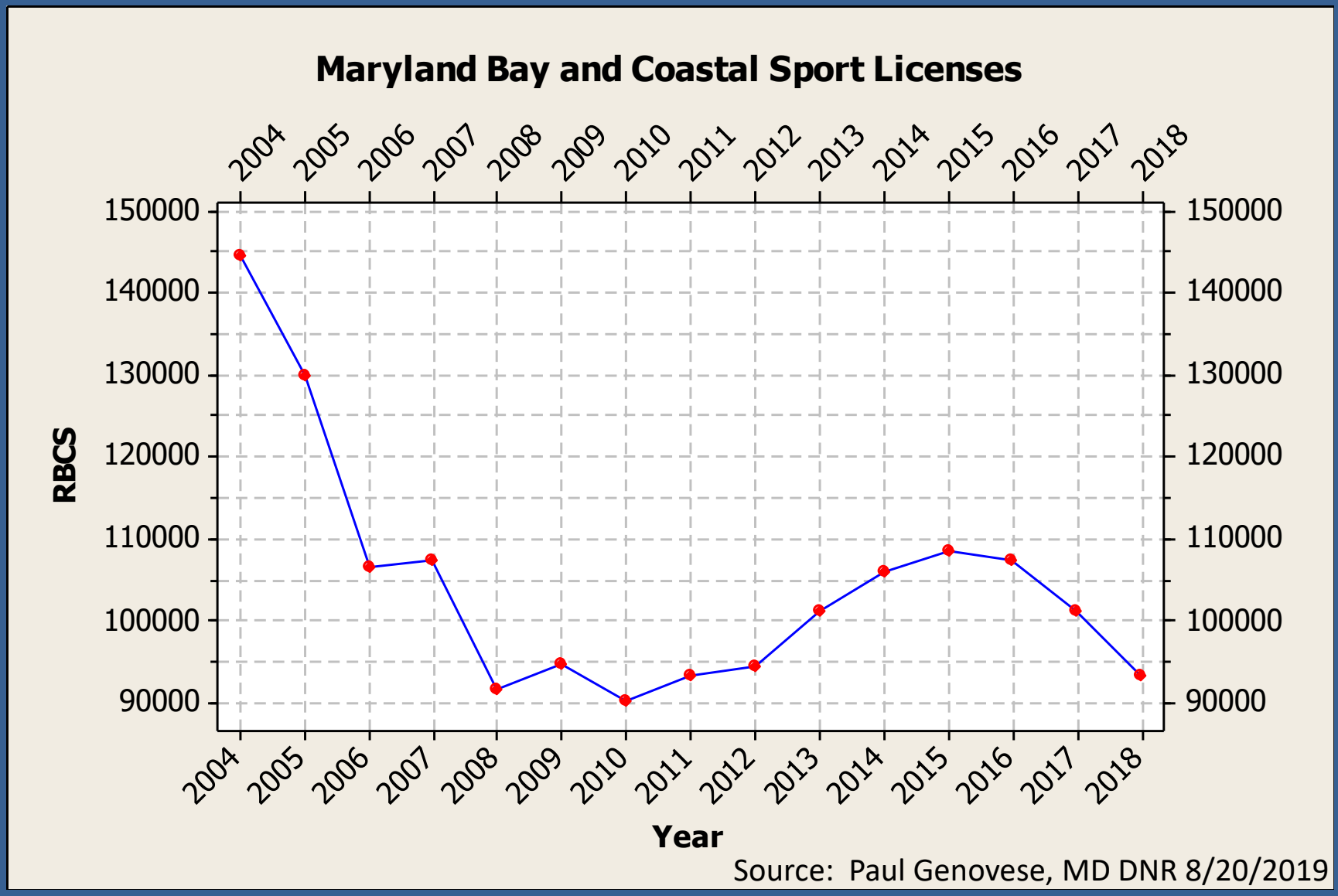
Source: Gina Hunt, MD DNR – 2/28/20

Decline in VA Fin Fish Harvesters



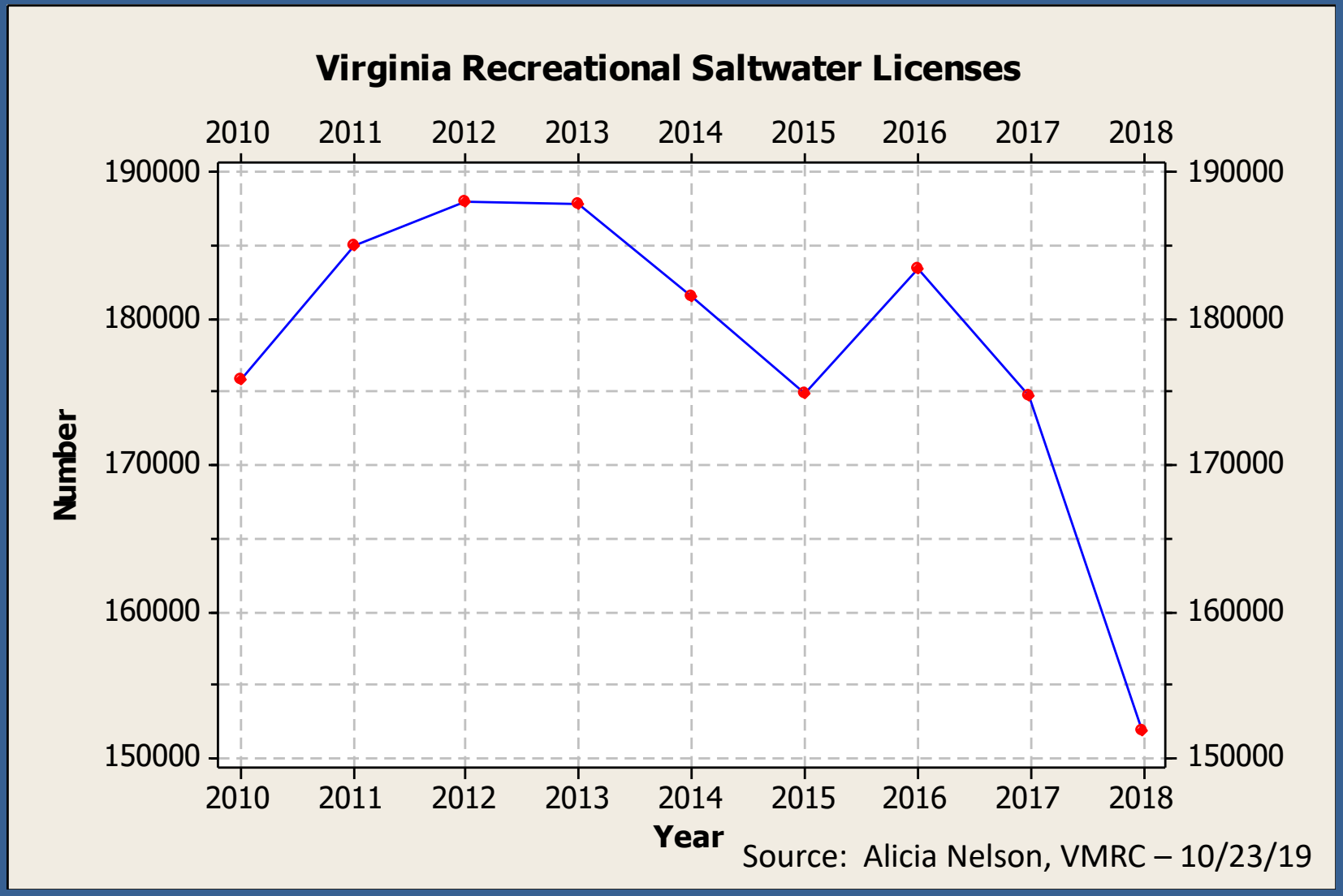
Source: Pat Geer, VMRC – 4/21/20

Decline in MD Saltwater Licenses

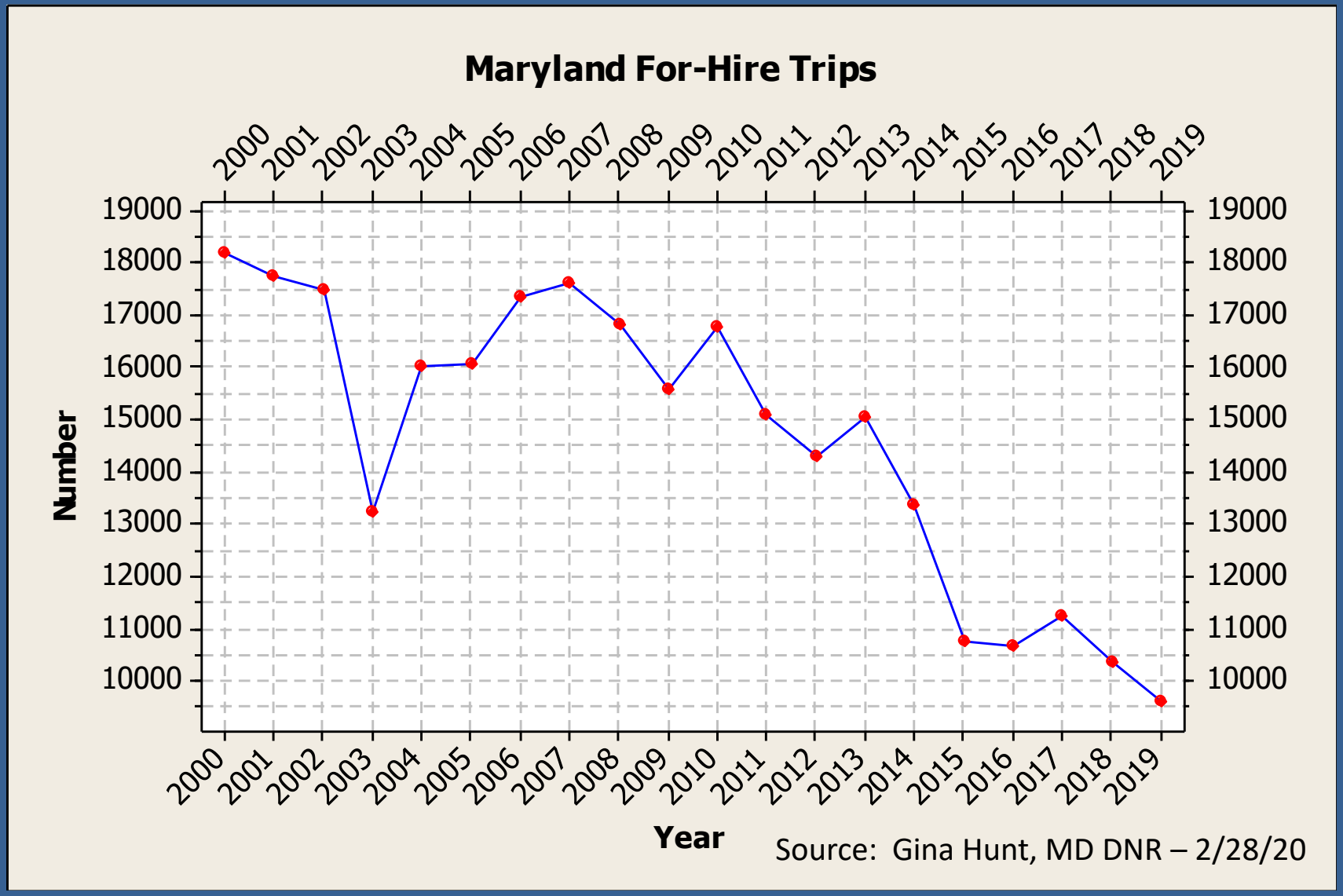


Source: Paul Genovese, MD DNR 8/20/2019

Decline in VA Saltwater Licenses

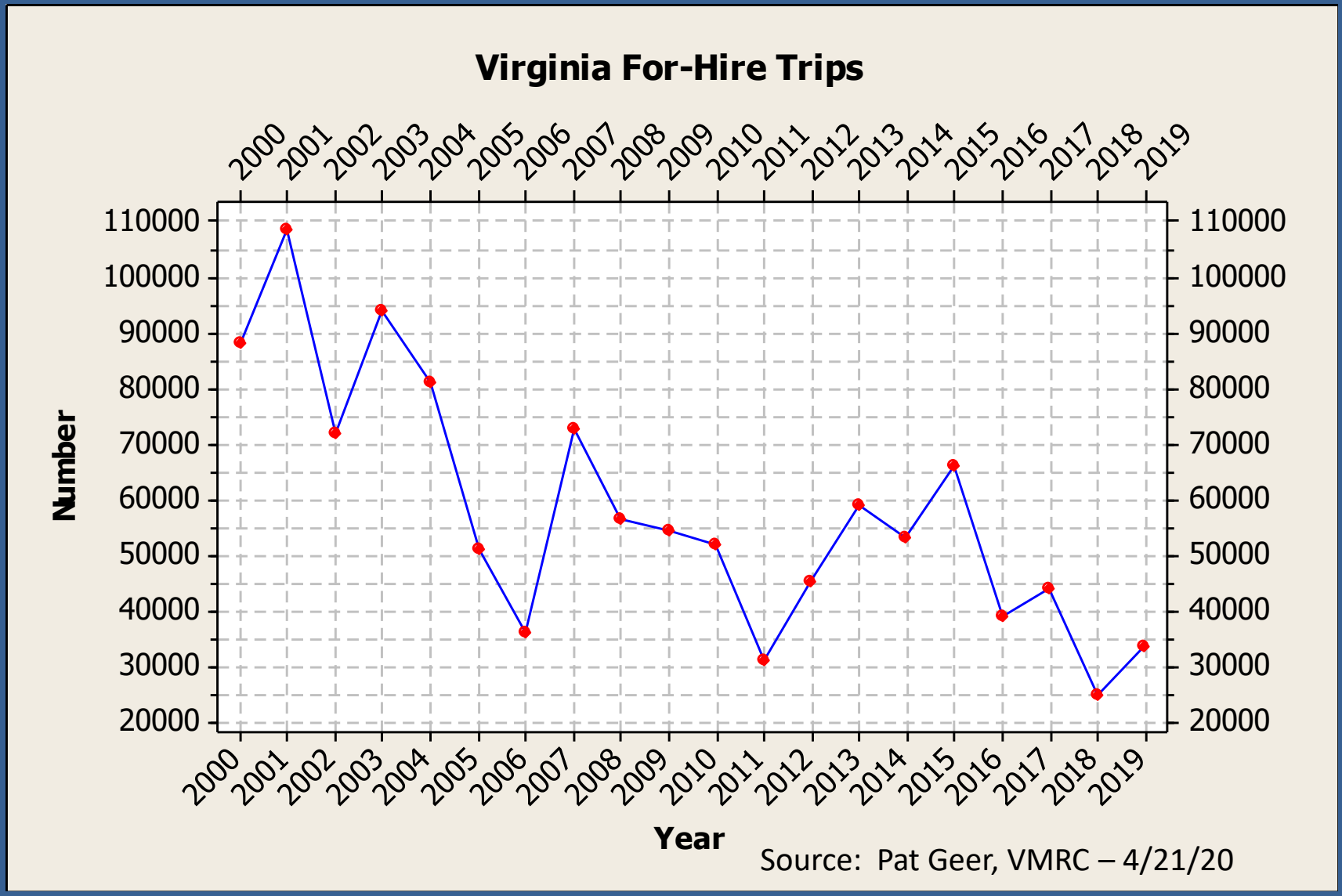


Decline in Maryland For-Hire Trips



Source: Gina Hunt, MD DNR – 2/28/20

Decline in Virginia For-Hire Trips



Source: Pat Geer, VMRC – 4/21/20

Economic Impact

Atlantic States Marine Fisheries Commission

ADDENDUM VI TO AMENDMENT 6
TO THE ATLANTIC STRIPED BASS
INTERSTATE FISHERY MANAGEMENT PLAN

Approved October 30, 2019

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Economic Impact

"The contribution of the commercial sector to the region's gross domestic product (GDP), when attempting to account for all industries involved in harvesting, processing, distributing, and retailing striped bass to consumers, was $103.2 million and supported 2,664 regional jobs. In comparison, the contribution of the recreational sector to the region's GDP was $7.7 billion and supported 104,867 jobs." – page 6

Conclusion

"The allocation of Atlantic menhaden in the current ASMFC Fishery Management Plan is an ecological and economic disaster for the Chesapeake Bay region and beyond."

Approach

Solicit Proposals from:

- ASMFC Atlantic Menhaden Management Board Members
- MD Sport Fishing Advisory Board Members
- CCA-MD Members
- Southern Maryland Recreational Fishing Organization Members
- Charter Captains
- Maryland Recreational Fishermen

Proposals

- #1: Close reduction industrial fishing for Atlantic Menhaden in the Chesapeake Bay and within the 3 nautical mile limit of the Economic Exclusive Zone

- #2: Close reduction industrial fishing in the Chesapeake Bay until July 31st of each year

- #3: Close reduction industrial fishing for all member states of the Atlantic Maritime States Marine Fisheries Commission and retain the current allocation among members

- #4: Close reduction industrial fishing for all member states of the Atlantic Maritime States Marine Fisheries Commission and redistribute allocation in an agreed upon manner.

Recommendation

Close reduction industrial fishing for Atlantic Menhaden in the Chesapeake Bay and within the 3 nautical mile limit of the Economic Exclusive Zone.

- Pros
  - Precludes overharvesting of Atlantic menhaden in the Chesapeake Bay
  - Results in no job loss in the reduction fishery industry
  - Least disruptive of all the options
- Cons
  - Adds greater effort and cost for reduction fishing

Backup

Fishery Management Plan History

08/1981 – FISHERY MANAGEMENT PLAN FOR ATLANTIC MENHADEN

- Set limit that 10% 3 year old or older (spawners) should be represented in the landings

07/2001 – AMENDMENT 1

- Concern over a real and/or perceived decline in the Atlantic menhaden population
- Does not implement specific commercial fishery management measures to control the harvest of the fishery menhaden or limit effort in the fisheries at this time

08/2004 ADDENDUM I TO AMENDMENT I

- Establishes Biological Reference Points (Spawning Stock Biomass, Fecundity, Fishing Mortality)

12/2004 Special Report No. 83

- Status of menhaden's ecological role
- Reference points implications for menhaden's ecological role
- Effects of concentrated harvest in the Chesapeake Bay
- Recommendations for a revised or new direction in fisheries management

10/2005 - ADDENDUM II TO AMENDMENT 1

- Limiting the harvest of menhaden in the Chesapeake Bay by purse seine to no more than 110,400 metric tons or 730 million fish annually in 2006 and 2007

12/2012 - AMENDMENT II

- Total Allowable Catch of 170,800 metric tons effective in 2013
- Chesapeake Bay reduction fishery limited to no more than 87,216 metric tons.
- Virginia allocation 85.32% of total allowable catch

08/2016 - AMENDMENT III

- For the 2018 and 2019 fishing years, the Board implemented a total allowable catch of 216,000 metric tons
- Virginia allocation set at 78.66%
- Chesapeake Bay reduction fishery is limited to no more than 51,000 metric tons

Proposal #2

Proposal #2: Close reduction industrial fishing in the Chesapeake Bay until July 31st of each year

- Pros
  - Allows Atlantic menhaden to enter the Chesapeake Bay in the spring without harvesting
- Cons
  - Doesn't preclude the overharvesting of Atlantic menhaden in the Chesapeake Bay for the entire year

Proposal #3

Close reduction industrial fishing for all member states of the Atlantic Maritime States Marine Fisheries Commission and retain the current allocation among members.

- Pros
  - Precludes overharvesting of Atlantic menhaden in the Chesapeake Bay
  - Precludes harvesting of 78.66% of the Total Allowable Catch of 216,000 metrics tons which results in 169,096 metric tons or 374,471,492 pounds or 772,079,442 fish left in the environment for foraging by natural predators.
- Cons
  - Ends reductions fishing operations in Virginia with associated job losses.

Proposal #4

Close reduction industrial fishing for all member states of the Atlantic Maritime States Marine Fisheries Commission and redistribute allocation in an agreed upon manner.

- Pros
  - Precludes overharvesting of Atlantic menhaden in the Chesapeake Bay
  - Better equitably distributes the ecological and economic benefits harvesting Atlantic menhaden among the states and user groups
- Cons
  - Ends reductions fishing operations in Virginia with associated job losses.
  - Multiple undefined variations of this proposal causing delay in taking action

From: Alejandro Arango
To: Comments
Subject: [External] Menhaden
Date: Friday, July 3, 2020 6:31:57 PM

This Fish's help the Ecosystem in the bay , I don't know why you guys can't think about the other species that makes the ecology going ....without menhaden it will be no other species and the water will turn bad.

I'm just feel that the fishing has decreased drastically in the last few years.

From:	paul spitzer
To:	Comments
Cc:	juphoff@dnr.state.md.us; Andre Buchheister; Michael H Academia; bdwatt@wm.edu; Jan Reese; afp7@cornell.edu; Tom O"Connell; mscheibel49@gmail.com; Ben Wurst; Kathy.Clark@dep.nj.gov
Subject:	[External] PAUL SPITZER, PhD Cornell 1980: SELECT OSPREY COLONIES AS MENHADEN ERPS
Date:	Sunday, July 12, 2020 12:45:31 PM
Attachments:	Osprey Colonies as Menhaden ERPs.docx
Importance:	High

ASMFC, Menhaden Management Committee

Dear Sirs: I have been studying East Coast ospreys for 50+ years, including famous coastal colonies in MD, NY, and CT whose current prime prey base is Menhaden.
My first decade, 1968-78, for my Cornell U. doctorate in Ecology and Evolutionary Biology and related publications, I focused on DDT effects (in Science 1978), then post-DDT population ecology (PhD Thesis 1980).
The most recent decade 2013-2018, I focused on select colonies dependent on menhaden; and simple field methodology to yield a quantitative assessment of local menhaden abundance from osprey reproductive success. Two years ago, I submitted to the ASMFC two complementary detailed "osprey-menhaden ERP" proposals: For the Ct. R. Estuary colony, CT; and the famous, now recovering (with renewed menhaden abundance) Gardiners Is., NY, colony. I have attached a short summary of this work. The full proposals are in my e-files, and can be provided at your request. The Gardiners Is. nest numbers and reproduction have roughly tracked what we know about local menhaden abundance over the last 50 years: This unique time-series, which I initiated in 1969, provides a solid, ongoing, field-testable hypothesis that this is a "Menhaden Colony".
I am copying several osprey and menhaden colleagues on this note.
Respectfully submitted, Paul R. Spitzer PhD, 31672 Old Orchard Rd., Trappe, MD 21673 tel 410-476-5163

Selected East Coast Osprey Colonies as Quantitative Biomonitors of Regional Menhaden Abundance: Proposed to the ASMFC as "Ecological Reference Points" for Long-term Menhaden Management

Paul R. Spitzer, PhD, 31672 Old Orchard Rd., Trappe, MD 21673 spitzer_paul@hotmail.com

Spitzer and colleagues have carried out 50 years of osprey field research since 1968. For the first decade, this was assessment of the profound destructive impact of DDT and dieldrin residues on reproduction and population dynamics (Spitzer *et al.* 1978, Spitzer 1980). Recovery followed, to a current state of abundance that enables precise study of food limitation, with no known contaminant effects. We have developed an array of simple, easy study techniques; plus intimate familiarity with the ecology of selected colonies where Atlantic Menhaden are the prime food fish during the eight-week nestling period and subsequent fledgling period. With adequate context, this enables annual quantitative assessment of regional menhaden abundance, using the osprey reproductive parameters "young fledged/active nest" (Y/AN) and "young fledged/successful nest" (Y/SN), or "mean brood size".

Three East Coast osprey colonies are proposed to serve this scientific function:

1) <u>High Menhaden Abundance</u>: The Connecticut River Estuary, CT, colony has been studied since the 1930's, and was reduced to one active nest at the end of the DDT/dieldrin era (Spitzer 1980). The current active nest count is about 120, which continues to rise when appropriate nest sites are available. A pre-fledging Y/SN check of the predator-proof nest platforms at the Roger Tory Peterson Wildlife Area, Great Island, Old Lyme, CT, yields consistently large broods of young, with many three-young broods. This estuary and adjacent Long Island Sound are a consistent menhaden "hotspot" and sanctuary, with ecological parameters that enable the fishes' active habitat selection, and no local harvest pressure.

2) <u>Variable Menhaden Abundance</u>: The Gardiners Island, NY, colony has supported 200-300 active nests since the historic visit of Alexander Wilson in 1803 (Wilson 1812). Spitzer first visited this colony in 1969, finding 38 nests near the end of the DDT era (Spitzer 1980). This isolated, predator-free island is surrounded by the open, tidal waters of Gardiners Bay and Block Island Sound (Atlantic Ocean). This is prime menhaden habitat--but the colony is apparently highly sensitive to variable regional abundance of these migratory fish. For much of our 50-year time-series (maintained by Michael Scheibel of TNC and NYSDEC), Y/AN and Y/SN appear to track menhaden abundance (the working hypothesis, supported by ample annual observations). Since the ASMFC limitation of harvest quotas in 2013, both Y/AN and Y/SN have been high, and this food-limited population has recovered from 20 nests to 55 nests. If current trends are maintained, we hope for increase toward historic levels. Thus Gardiners is a bellwether of menhaden management for ecosystem benefits. The owners of this private island are highly supportive of this objective.

3) <u>Mediocre Menhaden Abundance</u>: The Broad Creek colony, off the Choptank River, near St. Michaels, MD, on the eastern shore of Chesapeake Bay. Spitzer (unpublished) studied this breeding cluster in 1983-87 and 2018, finding consistent Y/AN slightly above replacement rate of ~0.8 Y/AN (Spitzer 1980): the 6-year mean is 0.95, and the range 0.72-1.17. Y/SN mean is 1.56, range 1.36-1.80, with dramatic losses due to nestling starvation and resulting brood size reduction. In three years of intense study, 1984-86, this nestling loss was 41%, 57%, and 43% . The 2018 active nest count was 39, compared to 1983-87 mean of 48 (range 46-53). (This is due to reduction of manmade predator-proof offshore nest sites—but the breeding population is considered to be stable. In the five years 1970-74, with less nest

Kirby Rootes-Murdy

From: Aaron Kornbluth <AKornbluth@pewtrusts.org>
Sent: Monday, July 13, 2020 3:55 PM
To: Comments
Cc: Kirby Rootes-Murdy
Subject: [External] Menhaden - Submission of joint letter regarding adoption of ERPs
Attachments: ASMFC Menhaden Policy Letter on ERPs - Pew WO CLF Audubon - July 13 2020.pdf

Dear Menhaden Management Board and ASMFC staff,

Attached, please find a joint letter from The Pew Charitable Trusts, Conservation Law Foundation, National Audubon Society, and Wild Oceans urging the Menhaden Management Board to adopt the example ERPs and commit to using the new ERPs to set conservative future TACs and continue improving multi-species management.

Please include this email and attached comment letter in the meeting materials.

Thank you for your continued efforts to advance the management of this key forage species.

Sincerely,

Aaron Kornbluth
Officer, Conserving Marine Life in the U.S. | The Pew Charitable Trusts
cell: 603-953-4040 | *e:* akornbluth@pewtrusts.org
Sign up to receive our monthly East Coast Ocean News

The Pew Charitable Trusts · Wild Oceans
Conservation Law Foundation · National Audubon Society
July 13, 2020

The undersigned organizations write in support of the adoption of the example Ecological Reference Points (ERPs) by the Atlantic States Marine Fisheries Commission's (Commission) Menhaden Management Board (Board) and urge you to move forward with the conservative management of menhaden. We thank you for your many years of work to get to this pivotal decision point. If adopted at your August 2020 meeting, ERPs will represent the culmination of decades of work and input by the Commission, scientists, fishing interests, conservation organizations, coastal businesses, and the public. ERPs will set new guideposts to transition from single-species to multi-species management, providing a scientifically sound mechanism to set annual total allowable catches (TACs) that explicitly manage this forage species to protect its vital role in the Atlantic coastal ecosystem. This will be a big step forward to achieving the ASMFC's goal of achieving ecosystem-based management of its fisheries and will ensure there is sufficient forage for wildlife including seabirds, marine mammals, and sea turtles, as well as commercially and recreationally caught fish species.

Adopt the Example ERPs now and manage conservatively to achieve the target. We urge you to adopt the ERP Work Group-recommended and peer-reviewed ERP target of 0.19 and threshold of 0.57. We also encourage you to commit on the record and to the public that the Board intends to conservatively manage to this new *target* reference point, defined as the maximum fishing mortality rate (F) on Atlantic menhaden that sustains striped bass at their biomass target when striped bass are fished at their F target. As striped bass and other menhaden predators, as well as numerous prey species, along the Atlantic coast continue to struggle (see Appendix), managing to the new, more protective ERP target becomes key. Doing so will serve not only to encourage recovery of these species, but can also buffer the negative impacts of swings in menhaden population abundance and recruitment at a time when the ecosystem is rapidly changing. It will have the added benefit of bolstering forage availability for predators that also rely on depleted prey like Atlantic herring (whose 2019 spawning stock biomass is estimated to be at a mere 29% of its target[1]), particularly in New England where older fish return if the population is healthy[2] and hopefully in the South Atlantic where a recovery has not yet happened.

Recent actions have paved the way for immediate ERP adoption. ERPs have been years in the making, but several key steps highlight their importance, appropriateness, and readiness:

- The Board adopted Amendment 3 to the fishery management plan in 2017 with only one dissenting vote.[3] Amendment 3 Section 4.6.2 specifies that new reference points may be adopted through adaptive management and does not require a new amendment or addendum.[4]
- Hundreds of thousands of public comments,[5] including from scientists, fishing interests, coastal businesses, and the public have urged the Board to adopt ERPs to protect menhaden, their predators, and the wider Atlantic marine ecosystem.
- Two benchmark stock assessments, including the Board's first multi-species one, enthusiastically passed peer review in Dec. 2019.[6] The peer review panel agreed that the "… Northwest Atlantic Coastal Shelf Model of Intermediate Complexity for Ecosystems (NWACS-MICE model) is best able to address the full suite of management objectives when combined with [the Beaufort Assessment Model]," and that "[it is] ready to be used to provide management advice."[7] The Board then accepted the assessments for management use.[8]
- The Department of Commerce upheld ASMFC's decision to find Virginia out of compliance,[9] effectively affirming its "… support for the Commission's interstate fisheries management

process and, in particular, [ASMFC's] efforts to manage Atlantic menhaden, an important forage species, in a precautionary manner."[10] Virginia has since come back into compliance.[11]

- At the Board's May 2020 meeting, the Board committed to adopting ERPs in August 2020.[12] The ERP Work Group has now recommended the adoption of the Example ERPs, which represent a straightforward, common-sense balance of multiple objectives for the fishery.

ERPs will be protective of menhaden, striped bass, and other predators. Numerous species of fish, mammals, and seabirds depend on menhaden for high-quality forage. While the example ERPs do not explicitly account for the needs of all of these important predators, they "… would likely not cause additional declines for other predators in the model … [because] Atlantic striped bass was the most sensitive predator fish species to Atlantic menhaden harvest."[13] The models used to generate the example ERPs can be used to add additional species, data, and objectives moving forward.

A large body of science, and many scientists, supports menhaden-specific ERP adoption. NOAA Fisheries' Ecosystem-Based Fisheries Management Road Map[14] urges state and federal managers to "Develop and monitor ecosystem-level reference points," and to "incorporate ecosystem considerations into appropriate … assessments, control rules, and management decisions." A growing list of scientific literature[15] urges fishery managers to use tools like ERPs as precautionary measures to manage forage species differently than predators. The Board considered the use of rule-of-thumb ERPs through Amendment 3, but ultimately decided to pursue the development of models and reference points specific to menhaden, its key predators, and the Atlantic coast. This is in keeping with some recent science that suggests that "… models tailored for individual species and ecosystems are needed to guide fisheries management policy."[16]

The NWACS-MICE model, working in concert with the BAM, is the right tool to use now. The ERP Work Group and stock assessment peer reviewers evaluated the performance of five multi-species models and determined that the NWACS-MICE model is the best one available to use for setting reference points that inform TACs.[17] NWACS-MICE allows the Board to "…explore both the impacts of predators on Atlantic menhaden biomass and the effects of Atlantic menhaden harvest on predator populations, [and] ... could be updated on a timeframe that works for managers." "MICE [models] are context- and question-driven and limit complexity by restricting the focus to those components of the ecosystem needed to address the main effects of the management question under consideration."[18]

Use the new ERPs to set conservative future TACs and continue improving multi-species management. Once adopted in August, the Board must use the new ERPs to set 2021 and out-year TACs. The Board confirmed in May 2020 that this is both possible and necessary. The Board, ERP Work Group, Technical Committee, Advisory Panel, and the wider public must also continue to work to improve how menhaden are managed in the context of their predators, related prey like Atlantic herring, and the ecosystem. We support the research and modeling recommendations of the ERP Work Group,[19] including:

- evaluating other models (e.g., Multi-Species Statistical Catch-At-Age, Stock Synthesis 3) for use in addition to or as a replacement for the NWACS-MICE and/or BAM models;
- incorporating additional species, both predator and prey, into multi-species models and ERP-generation, especially groups found in the model to be sensitive to menhaden abundance (e.g., nearshore piscivorous birds)
- continuing to address uncertainties related to the changing population status of stocks like Atlantic herring and striped bass;

- improving collection of diet data and monitoring of population trends for non-finfish predators (e.g., birds, marine mammals) and data-poor prey species (e.g., bay anchovies, sand eels, benthic invertebrates) to better parameterize the ecosystem models;
- conducting a management-strategy evaluation to identify harvest strategies that will maximize the likelihood of achieving the identified ecosystem management objectives;
- adding additional seasonal and spatial considerations to one or more models; and,
- continuing to review and update data and models, and model outputs, through the stock assessment process.

We greatly appreciate the work of the Board, ERP Work Group, Technical Committee, and ASMFC staff to develop and evaluate multiple multi-species models and develop first-of-their kind ERPs. With adoption of the recommended ERPs, the Board will set a national, even global precedent for how forage fish like menhaden should be managed.

Sincerely,

Aaron Kornbluth
The Pew Charitable Trusts

Pam Lyons Grommen
Wild Oceans

Erica Fuller
Conservation Law Foundation

Anna Weinstein
National Audubon Society

APPENDIX. Predators (species at left) depend on a sufficient forage base, especially menhaden, and many iconic species are in trouble. When alternative prey (species at right) are themselves in decline, healthy menhaden populations may buffer against impacts to predators.

Striped bass (assessed in 2018):
Overfished and experiencing overfishing
2017 Female SSB in 2017 was 25% below *threshold*

Atlantic herring (assessed in 2020):
Overfished, not experiencing overfishing
2019 SSB at 29% of the biomass target

Bluefish (assessed in 2019):
Overfished, no overfishing
Stock experienced overfishing in all years back to 1985

Shad (assessed in 2007):
Stocks are currently at all-time lows
and do not appear to be recovering

Weakfish (assessed in 2019):
Depleted since 2003; experiences very high levels of
total mortality preventing the stock from recovering

River herring (assessed in 2017):
Depleted coastwide at near historic lows
and total mortality remains high

Spiny dogfish (assessed in 2018):
No overfishing, Not overfished; Biomass recently
declined, requiring significant catch reductions 2019-20

Atlantic mackerel (assessed in 2017):
Overfished and experiencing overfishing
2016 SSB was estimated to be 22% of the target

Western Atlantic bluefin tuna (assessed in 2017):
No overfishing, overfished status unknown
Recent biomass is estimated at just 18% of historic levels from the 1950s

Atlantic butterfish (assessed in 2020):
No overfishing, Not overfished; Biomass has been declining steadily
because of poor recruitment and is estimated at 69% of target

Image sources: Striped bass, Atlantic herring, Bluefish, Shad, Weakfish, River herring – AMSFC.org; Butterfish, Atlantic mackerel – MAFMC.org; Bluefin tuna – Fisheries.NOAA.gov.

Data sources: Striped bass-ASMFC; Atlantic herring-NEFSC; Bluefish-ASMFC; Shad-ASMFC; Weakfish-ASMFC; River herring-ASMFC; Spiny dogfish-ASMFC; Butterfish-MAFMC; Bluefin tuna-ICCAT; Atlantic mackerel-MAFMC.

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[1] NEFSC (June 2020). Atlantic Herring 2020 Assessment Update Report. https://apps-nefsc.fisheries.noaa.gov/saw/sasi/uploads/2020_Herring_Unit_Report.pdf.
[2] SEDAR (Jan. 2020). SEDAR 69 Benchmark Stock Assessment Report: 2.2 Recruitment and Migration Patterns. http://www.asmfc.org/uploads/file/5e4c3a4bAtlMenhadenSingleSpeciesAssmt_PeerReviewReports.pdf.
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