

**PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
AMERICAN EEL MANAGEMENT BOARD**

**The Westin Crystal City
Arlington, Virginia
Hybrid Meeting**

August 1, 2023

Approved October 19, 2023

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1. **Approval of agenda** by consent (Page 1).
2. **Approval of Proceedings of February 1, 2023** by consent (Page 1).
3. **Move to accept the 2023 Benchmark Stock Assessment and Peer Review Report for management use.** (Page 12). Motion by Shanna Madsen; second by Rick Jacobson. Motion approved by Board consent (Page 12).
4. **Main Motion**
Move to form a Plan Development Team to draft an addendum to consider using *I_{TARGET}* to recommend various catch caps, using the supplemental report as presented today as a starting point (Page 12). Motion by Shanna Madsen; second by John Maniscalco. Motion amended.

Motion to Amend
Move to amend to add “but not use *I_{TARGET}* to set biological reference points or stock status” after catch caps. Motion made by Lynn Fegley; second by John Clark (Page 13). Motion passes (16 in favor, 2 opposed) (Page 15).

Main Motion as Amended
Move to form a Plan Development Team to draft an addendum to consider using *I_{TARGET}* to recommend various catch caps, but not use *I_{TARGET}* to set biological reference points or stock status, using the supplemental report as presented today as a starting point. Motion approved by Board consent (Page 15).
5. **Move to initiate an addendum to address the Maine glass eel quota** (Page 18). Motion by Megan Ware; second by Dan McKiernan. Motion approved by Board consent (Page 19).
6. **Move to approve the Maine Aquaculture Plan for 2024** (Page 22). Motion by Megan Ware; second by John Clark. Motion approved by Board consent (Page 22).
7. **Move to adjourn** by consent (Page 22).

ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)	John Clark, DE (AA)
Rep. Allison Hepler, ME (LA)	Roy Miller, DE (GA)
Cheri Patterson, NH (AA)	Lynn Fegley, MD (AA, Acting)
Doug Grout, NH (GA)	Russell Dize, MD (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)	Dave Sikorski, MD, proxy for Del. Stein (LA)
Dan McKiernan, MA (AA)	Shanna Madsen, VA, proxy for J. Green (AA)
Raymond Kane, MA (GA)	Lewis Gillingham, VA, proxy for B. Plumlee (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)	Chris Batsavage, NC, proxy for K. Rawls (AA)
Phil Edwards, RI, proxy for J. McNamee (AA)	Jerry Mannen, NC (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)	Chad Thomas, NC, proxy for Rep. Wray (LA)
Justin Davis, CT (AA)	Ross Self, SC, proxy for M. Bell (AA)
Bill Hyatt, CT (GA)	Malcolm Rhodes, SC (GA)
Rep. Joseph P. Gresko, CT (LA)	Ben Dyar, SC, proxy for Sen. Cromer (LA)
John Maniscalclo, NY, proxy for B. Seggos (AA)	Doug Haymans, GA (AA)
Emerson Hasbrouck, NY (GA)	Spud Woodward, GA (GA)
Heather Corbett, NJ, proxy for J. Cimino (AA)	Erika Burgess, FL, proxy for J. McCawley (AA)
Jeff Kaelin, NJ (GA)	Gary Jennings, FL (GA)
Adam Nowalsky, NJ, proxy for Sen. Gopal (LA)	Dan Ryan, DC, proxy for R. Cloyd
Tim Schaeffer, PA (AA)	Ingrid Braun, PRFC, proxy for M. Gary
Kris Kuhn, PA, proxy for Rep. Kulik (LA)	Chris Wright, NMFS
Loren Lustig, PA (GA)	Rick Jacobson, US FWS

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

Ex-Officio Members

Danielle Carty, Technical Committee Chair	Kurt Blanchard, Law Enforcement Committee Rep.
Sheila Eyler, Stk. Assmnt. Subcommittee Chair	

Staff

Bob Beal	Tracy Bauer	Jainita Patel
Toni Kerns	Chris Jacobs	Heather Power
Madeline Musante	Caitlin Starks	Pat Campfield
Tina Berger	Alex Dijohnson	Chelsea Tuohy
Jeff Kipp	Katie Drew	

Guests

Debra Abercrombie, US FWS	Alan Bianchi, NC DMF	Matthew Cieri, ME DMR
Max Appelman, NMFS	Jason Boucher, NOAA	Joe Cimino, NJ (AA)
Robert Atwood, NH F&G	Rob Bourdon, NOAA	Casey Clark, ME DMR
Pat Augustine	Jeffrey Brust, NJ DFW	Haley Clinton
Meredith Bartron	Scot Calitri, NH	Allison Colden, CBF
Rob Beal, ME Marine Patrol	Nicole Caudell, MD DNR	Margaret Conroy, DR DFW
Mel Bell, SCDNR (AA)	Brad Chase, MA DMF	Caitlin Craig, NYS DEC
Jessica Best, NYS DEC	Benson Chiles, Chiles Consulting	Russell Dize

Proceedings of the American Eel Management Board – August 2023

Steve Doctor, MD DNR
Wes Eakin, NYS DEC
Tony Friedrich, ASGA
Angela Giuliano, MD DNR
Brendan Harrison
Jaclyn Higgins
Kyle Hoffman, SC DNR
Stephen Jackson, US FWS
James Jewkes
Yan Jiao, Virginia Tech
Blaik Keppler, SC DNR
Robert LaFrance
William Lucey, Save the Sound
Jerry Mannen Jr.
Todd Mathes, NC DMF
Genine McClair
Chris McDonough, SC DNR

Joshua McGilly, VMRC
Robert McGinness
Steve Meyers
Steve Minkkinen, US FWS
Brian Neilan, NJ DEP
Doug Nemeth, US FWS
Jeff Nichols, ME DMR
Marina Owens, FL FWC
Ian Park, DE DFW
Nicole Pitts
Bill Post, SC DNR
Will Poston, ASGA
Max Provencher, META
Jill Ramsey, VMRC
Kathy Rawls, NC (AA)
Kirby Rootes-Murdy, USGS
Christopher Scott, NYS DEC

Somers Smott, VMRC
Renee St. Amand, CT DEEP
Lauren Staples
Elizabeth Streifeneder, NYS DEC
Kevin Sullivan
John Sweka, US FWS
Beth Versak, MD DNR
Keith Whiteford, MD DNR
Patrick Whittle, Associated Press
Taylor Woods, USGS
Emerald Wright, NH F&G
Darrell Young, ME Elver
Fishermen Assoc.
Jordan Zimmerman, DE DFW
Erik Zlokovitz, MD DNR
Renee Zobel, NH F&G

The American Eel Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia, via hybrid meeting, in-person and webinar; Tuesday, August 1, 2023, and was called to order at 10:15 a.m. by Chair Phillip A. Edwards III.

CALL TO ORDER

CHAIR PHILIP A. EDWARDS III: Good morning, everyone. I would like to welcome everyone to the American Eel Management Board. I would like to call this meeting to order. My name is Phil Edwards; I am the Rhode Island Administrative Proxy. We meet today as Caitlin Starks and Dr. Kristen Anstead with the Commission, and Dr. Sheila Eyler, the Stock Assessment Chair.

APPROVAL OF AGENDA

CHAIR EDWARDS: I would like to start with the approval of the agenda. Are there any proposed modifications, please raise your hands? Seeing none; the Board approves by consent.

APPROVAL OF PROCEEDINGS

CHAIR EDWARDS: Moving on to the approval of the proceedings from the February, 2023, which was in your materials. Are there any corrections or edits? Seeing none; approved by consent.

PUBLIC COMMENT

CHAIR EDWARDS: Next up is public comment. Are there any public comments on anything that is not on the agenda?

CONSIDER STOCK ASSESSMENT SUBCOMMITTEE REPORT ON ALTERNATIVE ANALYSIS OF INDEX METHODS FOR SETTING MANAGEMENT MEASURES

CHAIR EDWARDS: Okay, moving on to Item four. Next on the agenda, Consider the Stock

Assessment Subcommittee Report on Alternative Analysis of Index Methods for Setting Management Measures. We're going to start with a presentation of the Stock Assessment Subcommittee Report by Dr. Sheila Eyler.

PRESENTATION OF STOCK ASSESSMENT SUBCOMMITTEE REPORT

DR. SHEILA EYLER: As a background for the presentation, I will be providing some information on additional analysis and information on the items identified either by the Peer Review Panel or by the American Eel Board at the February meeting. As a reminder, the Peer Review found the assessment addressed the terms of reference, but recommended that additional work be done to test the robustness of *ITARGET* for setting catch limits.

The Peer Review suggested using management strategy evaluation or MSE for further evaluation of *ITARGET* for eels, before using this as a management approach. The SAS previously stated that the MSE approach would not be productive for eels, as we do not have much of the data needed for life history parameters across the range.

However, the SAS did some additional sensitivity testing around the MARSS Yellow Eel Index, and reference periods, which will be discussed in this presentation. Regarding stock status, there was a discrepancy between the Peer Review and the SAS, and that will be addressed in this presentation. At the February meeting, the Board expressed concern over the potential influence of specific surveys, particularly the Hudson River Surveys, on the overall trends of the coastwide yellow eel index. The SAS conducted some additional sensitivity testing around the individual surveys to address this concern.

The SAS also considered different configurations for the reference period, the multiplier and the thresholds used in *ITARGET*. Finally, additional information on the usefulness of habitat models will be presented. As a reminder, the MARSS Index is a coastwide index of yellow eel abundance that is derived from 14 different fishery independent

yellow eel surveys ranging from New Hampshire to South Carolina.

Sensitivity testing evaluated the influence of uncertainty around the individual surveys on the coastwide MARSS Yellow Eel Index and in turn, influenced recommended harvest in *I_{TARGET}*. These MARSS simulations were conducted by randomly drawing a value for each fishery independent survey for each year that the survey was conducted from a normal distribution for that survey.

After the simulated MARSS Index was developed, *I_{TARGET}* was rerun. The top graph here shows the base MARSS Yellow Eel Index from the 2023 assessment report, and the bottom graph shows 500 different simulations of the MARSS Index. The takeaway here is that the trends in the simulations of the MARSS Index was similar to the index used in the assessment, indicating that the MARSS Index in the assessment is robust to uncertainty, and individual point estimates of abundance from the surveys included in the MARSS Model.

This figure shows the 500 MARSS simulation runs of recommended catch of American eels using *I_{TARGET}*, and comparing that to the actual observed landings in the solid red line. The simulation show that actual landings were higher than recommended catch for the entire time series, excluding the low catch year of 2020.

In conclusion, resampling the indices around the respective uncertainties resulted in index trends similar to what was presented in the 2023 assessment report. Recommended catch was also similar between the base and simulated MARSS runs. Ultimately the trends in coastwide yellow eel populations are robust to uncertainty around individual point estimates of relative abundance for fishery independent surveys.

Moving on to additional sensitivity testing. Around the influence of single surveys on the coastwide yellow eel index. This was done to address a Board question about how much the Hudson River Surveys may be influencing the coastwide yellow eel index. Testing involved omitting single surveys out of the MARSS Model Index, as well as omitting groups of surveys, including entire regions, and another run that retained the longest time period per region for a single series.

Regions are depicted here in the figure on the right-hand side that were identified in the 2012 stock assessment. This is the first set of figures in the Leave- One-Out Sensitivity Analysis. The upper left panel in the blue box shows the base MARSS Model Abundance Index with all 14 yellow eel surveys, and that came from the 2023 assessment report. Other panels indicate which survey was omitted from the model fit. Indices have been scaled to a maximum of one to facilitate comparisons. Note that the slide with the blue arrow shows the run where all three Hudson River Surveys were removed, and shows the most drastic change in the index of the Leave-One-Out attempts.

Here are the remaining indices of the Leave-One-Out Sensitivity Analysis. The takeaway here is that the trends for the Leave-One-Out Analysis are similar for nearly all indices, suggesting that no single survey is driving the MARSS output for the coastwide index. An additional run was conducted for the MARSS Index, using the longest time series of surveys for the six geographic regions along the Atlantic Coast.

Instead of doing the 14 surveys coastwide, we had 6 surveys, and those geographic regions were defined in the 2012 assessment report. Again, the results are similar to the base MARSS Index in the 2023 assessment report, with a high abundance in the 1970s and 1980s, with a decline lower abundance in recent years.

In summary, although the MARSS Index is influenced by which surveys are included, and the length of time of those series, removing a single survey had little effect on the MARSS model output.

Note that the Hudson River Surveys are three of the four oldest surveys in the time series of the assessment, so they will drive early population trends.

Because the Hudson River is a large geography within the coast wide range of eels, the surveys from this system should not be discounted in consideration of the assessment of the stock. Also, within the surveys conducted in the Hudson, it's important to note that individual survey trends track each other in the early years, suggesting that observed trends in the early part of the time series were not a fact of observation error in a single survey.

In summary, the MARSS Index is robust to the influence of a single survey, and appears to be an adequate index of coastwide abundance of yellow eel. Moving on to the regime shift analysis. We did some sensitivity testing here, looking at the effect of a single index on the selection of a reference period for use in *ITARGET*.

The indices from the Leave-One-Out Assessment that we just talked about were evaluated to identify the change points in the time series, using the same method that we used in the 2023 assessment. The SAS conducted 18 sensitivity runs, a total of 13 of those runs resulted in the same regime as that presented in the assessment report. They are only different by one year.

Note that the high abundance regimes are shown in green, and the lower abundance regimes range from orange to dark red. In three runs the sensitivity testing resulted in regimes that were different by the base by more than one year around the original cutoff points. Though these runs still had a pattern of a high regime in the beginning of the time series, a lower regime in the middle and the lowest regime through the terminal year.

When all the Hudson River indices are dropped, the time series was shorter, starting in 1980 instead of 1974, and without the Hudson River

indices, the regimes flip, with a 1980 to 1994 being a low regime, and 1995 to 2020 being a high regime. Note that there was only one survey in place from 1980 to 1989 of the low regimes, which was the Delaware River Trawl Survey, and that is the next oldest survey in the time series besides the Hudson River Surveys. When you drop the Hudson River Surveys, it results in a single survey from another area driving the early years of the regime.

Finally, when the MARSS Index was used only on the longest time series of the longest surveys from each region, the results indicate four regimes. Like many of the other sensitivity runs, the first regime in the beginning of the time series is high, followed by a low regime, and then an even lower regime, but then the last regime increases slightly, but is considered low.

In conclusion, since omitting a single survey had little effect on the general coastwide pattern of the MARSS Index for yellow eel, the resulting identified regimes did not differ much from the 2023 assessment. As with the MARSS Index, omitting more than one survey, which is removing all the Hudson River surveys had a greater influence on the identified regimes.

The SAS does not recommend removing any of the current 14 yellow eel surveys from the MARSS model. Moving on to *ITARGET* configurations. The Board tasked the SAS to conduct some sensitivity testing around the reference period, the multiplier, and threshold values used in *ITARGET* to provide information on how those values may influence harvest recommendations.

As a reminder, the inputs for the *ITARGET* model are catch, and the MARSS Yellow Eel Index. For the model you need to specify the reference period, the multiplier, and the threshold values. I'll go through each of these sensitivities on the next slides. The reference period should represent a period of stable or desirable period of abundance in the available time series.

In the assessment report, *I_{TARGET}* used a reference period of 1974 to 1987. It was a period of high abundance, based on the results of the regime shift analysis, and was further supported by the sensitivity testing around the regime shift analysis. The base run from the 2023 assessment report is shown here in red in the red dash line.

The SAS and the Peer Review Panel both agree that using a high regime as a reference period is appropriate, although the Board had requested sensitivity runs that explored other options. The SAS evaluated different reference period and range of values from 1 to 1.5 for the multiplier in the sensitivity runs, and that is indicated in this graph.

A second reference period was selected from 1988 to 1999, and that was used to eliminate the influence of early years of the Hudson River Indices, and to represent a time when more coastwide surveys were in operation. Since 1988 to 1999 is a low regime, the SAS believes that setting the multiplier, which sets the desired stock abundance to 1.5 instead of 1.25 would be appropriate. The results are in the gray line here.

Note that using a more recent reference period with a 1.5 multiplier provides nearly the same harvest recommendation as the original reference period with a 1.25 multiplier, which again is that red dash line. The graph here also shows using the most recent reference period with a 1.25 multiplier in the orange line, and a 1.0 multiplier in the blue line. Those are less conservative than those that are shown in the gray line. Based on the change in the reference period in the multipliers, the recommended catch in 2020 would range from nearly 200,000 pounds to nearly 450,000 pounds. The SAS continues to recommend that the reference period should be set at the high regime of 1974 to 1987, since that is the period of highest abundance in the time series that we have.

The SAS evaluated different multipliers to set the biomass target to range from 1 to 1.5, using the 1974 to 1987 reference period identified in the assessment. Note that vetting the multiplier to 1.5 is more conservative, while setting it to 1.0 would be less conservative. The SAS used the value of 1.25, since the reference period covers the time when the carrying capacity of the stock had declined due to habitat loss.

However, this was balanced by the knowledge that fishing and exploitation had depleted the stock well before the reference period was established. Both multipliers 1.0 and 1.5 were included as sensitivity runs in the assessment, and are expanded here to show increments of 0.1. Depending on the multiplier used, and using the base threshold of 0.8, the recommended catch in 2020 varied from 140,000 to 316,000 pounds.

The SAS reiterates that that choice of 1.25 as a multiplier for *I_{TARGET}* was justified, and was supported by the Peer Review Panel. The SAS explored threshold values ranging from 0.5 to 0.8 in 0.1 intervals, 0.5 was selected as the minimum, since the overfished threshold of half of the target is appropriate in many fisheries, and 0.8 was selected as the maximum, as that was the value used by the Northeast Fishery Science Center Report from 2020.

In varying the thresholds but retaining the multiplier of 1.25 in the reference period of 1974 to 1987, which is consistent with the assessment report. The recommended catch for 2020 would have varied from 200 to 2,518 pounds. Included in the supplemental report provided to the Board before this meeting is a table with a range of reference periods, multipliers and thresholds, and subsequent recommended catch that were evaluated by the SAS.

Of the three values to be specified using the *I_{TARGET}* method which are the reference period, the multiplier and the threshold, the SAS suggested the threshold should be set by the Board, through a PDT to reflect the goals of the fishery, where 0.8 would be a more conservative number, and 0.5

would be less conservative, although still remaining consistent with how other fisheries are managed.

There was a specific question from the February Board meeting, asking if *I_{TARGET}* can be used to make predictions on abundance increases in response to harvest reductions of the eel stock. The *I_{TARGET}* method cannot forecast abundance under different harvest scenarios, because the model is a data limited tool, and does not include population parameters such as growth, mortality, and recruitment.

Another matter to bring to your attention today was that in April, 2023, it was noted that an electrofishing survey from South Carolina was omitted from the assessment. The data was submitted in a timely manner from South Carolina, but accidentally deleted from the data files, and the omission was not noted until earlier this year, after the assessment was completed. The yellow eel survey from South Carolina was conducted from 2001 to present, and met the requirements for surveys to be included in the assessment. The SAS considered both including the new South Carolina electrofishing survey as an additional survey, or replacing the existing South Carolina survey with the electrofishing survey, and reran the MARSS Index, the regime shift analysis and *I_{TARGET}*, to see if the index would change the result of the assessment.

Both replacing and adding the new survey influenced little change to the reference period. It would have only changed by one year, and it would result in a slight reduction in the 2020 recommended harvest. The SAS and Technical Committee recommend that if *I_{TARGET}* is used moving forward, that the South Carolina electrofishing survey be included as an index of relative abundance, and incorporated into the MARS Index for coastwide eel abundance.

At the February Board meeting there was a specific question about how habitat models

could help in future assessments. At this time there are data limitations that restrict development of a coastwide habitat model. Although new datasets are becoming available, both for geospatial predictors and also inland fishery data.

One potential use could be to produce an egg-per-recruit model to link a statement of inland silver eels past dams to estimate reproductive output. Moving on to the question about stock status. In the 2023 assessment report the SAS determined the stock was overfished and overfishing was likely occurring.

The Peer Review Panel disagreed, stating that the status should be depleted. After further review of the ASMFC stock status definitions, the SAS agreed with the depleted status as recommended by the Peer Review. Further, the SAS notes that each stock assessment indicates a lower and lower coastwide abundance across multiple analyses.

Although the depletion may be due to many factors, fishing is likely having an effect, and should be decreased. If *I_{TARGET}* is adopted for management use, overfished and overfishing statuses could be determined in the future. Finally, the Peer Review recommended that the SAS conduct a simulation approach using MSE techniques.

The SAS previously argued that the MSE approach is not possible at this time, because it requires knowledge of important population parameters that we simply don't have for eels. If we had those data, we would not need to use an index-based approach such as *I_{TARGET}*. *I_{TARGET}* and index-based models were simulation tested for other species with various life history strategies through their development.

Although eels are different than some of the other species evaluated, the eel's life history strategies that make them different from other species also make their plausible simulation more challenging. In the end, building the simulation and testing parameters would take significant time and analysis, and should be considered as a long-term research and modeling need for future.

In summary, the simulated MARSS model fits were similar to fits of the 2023 stock assessment report, omitting a single survey from the MARSS index has little effect on the general coastwide abundance pattern regimes identified, or reference periods for *I_{TARGET}*. Omitting all three Hudson River Surveys, which is not recommended by the SAS, shortens the time period and results in the largest change to the MARSS index and identified regime. Changing the threshold value in *I_{TARGET}* results in recommended catches from over 202,000 to 518,000 pounds. The choice of configuration should be determined by a Plan Development Team through a management document, to reflect the goals of the fishery.

The SAS does not recommend changing the multiplier or the reference period, only the threshold. Population projections are not possible using the index-based methods such as *I_{TARGET}*. Data limitations restrict the development of a coastwide habitat model, but future modeling advances may help in this effort, and MSE could be considered during the next benchmark.

But in the meantime, the *I_{TARGET}* can be used as a tool for management, because it was designed for when traditional assessment models fail. The SAS agrees with the Peer Review that the American eel stock is depleted, and that the coastwide catch should be decreased. If reference points are established through *I_{TARGET}*, overfishing and overfished statuses could be determined in the future. That concludes my presentation, Mr. Chair.

CHAIR EDWARDS: Great, thank you, Sheila, for the update, and thank you to all the SAS members for working on this. I would like to open it up to questions for Sheila. John Clark.

MR. JOHN CLARK: Thank you for the excellent presentation, Sheila. I have a lot of questions. But just to start with, I was just curious whether it was possible to separate out surveys that

were more based in fresh water from those that were based in estuarine waters. I noticed when the regime shift, when you just used the Delaware, which was the second longest survey, and it's exclusively an estuarine survey.

You don't see the same drop that you saw when the Hudson is involved there. I was wondering how much of the Hudson is in what would be considered fully fresh water. We've been seeing this for years, where there seems to be a disconnect between what we see with yellow eels in the estuaries, and what we see in fresh water. I mean a lot of the impetus to start looking at eels was due to the collapse of the Lake Ontario fisheries, which obviously is for several reasons.

But we've seen that in a lot of freshwater areas, the further upstream you go the less we see eels. Yet, I just was looking recently, I guess it was the 2018 assessment update of the Chesapeake. It showed their yellow eel indices were actually significantly increasing. Are you able to tease anything like that out from all these different surveys you have?

DR. EYLER: John, we didn't look specifically at that question. I don't know that there are any specifically fresh water surveys in the assessment, estuarine mostly, I think. But we would have to double check that for sure. But we did not separate any surveys out being more upstream versus less.

MR. CLARK: If I could just follow up briefly. Are you able to tell, like for example the Hudson obviously is a long river, or are these surveys going from the mouth all the way to Albany, for example, or was this more concentrated in a certain area?

DR. EYLER: Yes, John, I don't know off the top of my head, but the maps are in the stock assessment report, so we could get that information from there.

CHAIR EDWARDS: Lynn Fegley.

MS. LYNN FEGLEY: Thank you, Shiela and Kristen, again for all your work on this. I just have a lot of questions. But this question is really about the management process that this tool would lead us

to. I'm trying to understand, if we're setting a catch target based on 2020. In the report, right, the recommended 2020 catch level ranges from X to Y.

But the recommended catches vary with the index. My question is, how are we choosing where in time we're setting that recommended catch, and because the threshold is based on the index, how are we going to know when the index has dropped below that threshold, and then we might have to reduce catches further?

I guess really the short question is, if we're going to approach this and use this in management, how often are we running this index, to see where we are, and how are we going to avoid winding up in a situation where we run the index, and we are below whatever threshold we choose.

Then suddenly we have to turn around and make more significant management, or the reverse, which is kind of what I would like to see. How can we offer the fisheries the ability to expand in a timely way, if the index shows that they are able to expand. I'm really interested in what your vision is of how this management process might play out.

DR. KRISTEN ANSTEAD: I'm going to take that one and it's a really good question, and it's something we've talked about as a SAS, and sort of struggled with a little bit. We think that really needs to be a conversation with the PDT as well, like what is reasonable. But some additional information, the index that we're using to kind of determine that catch is a three-year-running average, so it's not just the last data point.

I think there could be some sort of conversation with the PDT about stability for the fishery, as well as keeping on top of this, and what sort of time step makes sense, because if we do it annually, as you probably suspect, you would be bouncing around a lot. Maybe there is some sort of conversation that happens by doing it

every three years, and then you're also using a three-year average. But I think that's something we would have to talk about, and it's a good question, but it would have to be discussed further.

MS. FEGLEY: Yes, thank you. Just the three-year average. The three-year average is the index value not the recommended catch value, right? One potential would be to recommend a catch value as a three-year average, is that sort of on the table?

DR. ANSTEAD: It recommends a point average, but maybe that's something the PDT could look into. Like how would the recommendation change if we were taking some sort of average for the catch. Certainly, you would want to look at this more than every decade, because as you said, what if the indices do pick up? That would change management advice. Maybe there is some rounding regime that we come up with that if the recommended catch is below this level, we round up to the nearest hundred thousand, or something like that. Maybe there is something we can work out with management that makes sense and provides some stability, with also checking in on trends.

CHAIR EDWARDS: Are there any other questions? Emerson Hasbrouck.

MR. EMERSON C. HASBROUCK: Thank you, Shiela, for your presentation. Maybe you addressed this and I just missed it. Since we can't determine overfishing or overfished status, and the recommendation is that the stock is depleted, and if we implement a reduction in catch, do we know what effect that is going to have on the resource?

You know if we reduce catch by some amount, is there going to be a positive response in the resource, or are there other things that are complicating a possible rebuilding of the eel resource? You know I'm just wondering if we're getting into a situation similar to what we have with stuff in New England, winter flounder and weakfish, where there are other factors at work here, in terms of reducing biomass, and reducing fishing mortality may not have much if any impact at all.

DR. EYLER: Thank you for that question. I think when you revert to a depleted status, that leaves the door open to the fact that the population may be influenced by other factors besides fishing, so we have mortality in other sources, hydroelectric dams, for example, are one of those. With the assessment we're not able to tease out which is a significant source and which isn't.

We can't tell you what exactly is driving the population change, if it is all fishery or partly fishery or a myriad of other things. I guess the answer is no, and based on the *ITARGET* method especially, we cannot tell you that if you implement some level of reduction in harvest that that will result in some change to the abundance of the population, we just aren't able to do that with the rules that we have available to us.

CHAIR EDWARDS: Bill Hyatt.

MR. WILLIAM HYATT: Yes, I just want to make sure that I'm understanding this correctly, because a lot of this is new to me. The highest recommended harvest coming out of this, am I correct that that is 518,000 and some odd pounds? Am I also correct that the harvest that is taking place, the three-year averages, I believe you're talking about, even with 2020, are well above that. Could you repeat those numbers if you would?

DR. ANSTEAD: Currently the coastwide cap is 916. You are correct that of the sensitivity runs we did, the highest recommended catch of those is in the 500 range. There are other sensitivities that could be run, depending on the management goals that could be discussed by the PDT that would result in higher catch.

For example, if you want to take the lowest regime as your reference period, which we don't recommend. If you want to take the most liberal threshold, the 0.5, which we think could be a reasonable decision, depending on the other decisions you make, and take the lowest

multiplier, which we also don't recommend, because it is not conservative. But if you made all those decisions, you would probably end up with something in the 700 range. There are other decisions that could be discussed by the PDT that would result in higher catch from this tool. They are not recommended to us by the SAS or the TC, but they could still be discussed and presented.

With that said, the catch has been declining well below the coastwide cap in recent years. There is some indication that could be market. There is also COVID influence, and our terminal year of the assessment is 2020. We haven't had time to add kind of the subsequent years. Although I believe it started to pick up a little bit in 2021 to maybe the 400 range. Is that helpful?

CHAIR EDWARDS: Lynn.

MS. FEGLEY: I appreciate a second bite at the apple. I want to be really careful here to Emerson's point, because there is conversation in the peer review about how it is not clear, that changes in fishing mortality are going to address the situation. We cannot tell our public that whatever level we choose the cap to be at is going to actually help ensure that we reach the goal that we choose.

I think that is a super critical point, because in my mind when you implement fisheries management, you want to do something that is going to help. We've had several, there are some conflicting statements about whether fishing is the cause of this or it could be other things. I think we all know that there is a lot of impacts to eels.

I say all that, because we want to be extremely careful, and I also, for full transparency, I come from a state with a large eel harvest. This is an incredibly important fishery to us. Personally, I would like to see you guys run the 0.5 threshold at that median reference period, because if you aim for the reference period that is the next one up, what we're aiming for is an index that is 1.25 the abundance level of what it was then, and that is a really good step.

If we can get there to start with, rather than trying to get all the way to that top regime, which by the way, when you look at the harvest time series, I feel it is back before that the harvest was quite a bit lower. That is not the index, that is the harvest. But that high regime does represent sort of a fight in what the harvest is doing, so it is not clear.

I worry about aiming for something too high. I really would like to see those higher harvest recommendations, because even if they are higher than the harvest that we have, they still may be lower than the cap. I think we need to be really clear that our goal here, or at least my goal the state of Maryland's goal, would be to provide a guardrail on this thing if the market returns. This is a market issue in Maryland that we're seeing. Right now, this is 100 percent clearly a market issue.

We drive the eel harvest; we have no market. If there is something worldwide that occurs, or the market resurges and there is a gold rush for eels, I would like some boundaries on that. But I don't want to see us shutting down a fishery, an economic opportunity, especially these days, when we can't even say that it is going to be helpful. I really would, just for the record, like to see that run of the 0.5 threshold on that middle 1988 to 1999, I think timeframe. I think that's what it was, 1988 to 1999, yes, thank you.

DR. EYLER: I can appreciate the concern of management from the state. Is it possible to bring the fourth slide in that presentation again? I just want to say from the Assessment Committee's perspective. I just want to remind folks of where we're at with the trend that we see in the yellow eel index.

This index is a yellow eel index based on fishery independent surveys, so this has nothing to do with any commercial fisheries in the states. This is what the SAS has considered in assessing the stock. We're looking at the top page here. What you see, the trends in the population are

that it was high in the past, that high regime that we're talking about.

But it has been on a steady decline, and continues decline in recent years. Our 2012 stock assessment was the last benchmark that we did, and now we have the 2023 stock assessment benchmark. In that time the stock has declined, even though we've got this cap on the fishery during that time period.

From the stock assessment perspective, something is going on with the population that is causing this continued decline, whether it's fisheries or not we can't tell you that for sure. It would be up to a Plan Development Team if you wanted to evaluate some of those other management strategies using *ITARGET*. But this is what we're seeing with the stock.

CHAIR EDWARDS: Shanna Madsen.

MS. SHANNA MADSEN: Thank you, Dr. Anstead and Eyler for your report. It is incredibly easy to read, but very thorough. I think you guys just did a really excellent job here, so I do want to take a second to say thank you for really following up on all of the things that we asked you for last time in such a thorough manner. My question is kind of concerning the section that you wrote on stock status, so Section 9.

I was a little, I guess maybe confused, and was hoping you guys could kind of walk me through this. In the beginning of Section 9, you talk about how when we set stock status, kind of without our usual assessment methods, having an actual model that is able to run estimates of reference points. We're kind of unable to set a stock status, which is kind of where we're at right now with eel. We're in this depleted zone.

We're not quite sure, because we don't have reference points to say whether we're overfished or overfishing is occurring. But then later, when you talk about the justification for why the stocks felt the need to maybe say that we were either overfished or overfishing, that potentially if we move forward with the *ITARGET* methodology, that

reference points could be established using *I_{TARGET}*, and be able to give us a stock status. How does that work exactly, just because it was kind of unclear to me how that model would be able to produce those things?

DR. ANSTEAD: That's a good question, and it is certainly something we talked about with the Peer Review Panel, because you all may recall that's how we determined our overfished, likely overfishing in the stock assessment, and the Peer Review Panel did not agree with us, and put us back to depleted. By using *I_{TARGET}* we could consider that target and threshold as more traditional reference points. It would be a little unusual, and I'm not sure that that has been done before on this type of method.

You know when the SAS really went back, we've reviewed those definitions of how we find these stock statuses, and ultimately agreed with the peer review panel. But we did leave that door open with, if we wanted to think about this more thoroughly, and if we wanted a stock status for eel, maybe we could try to make this tool work for that.

With that said, depleted is a stock status, it's just not one that has a clear management response, which is why we also provided two sections with how the Commission in the past has responded to overfished and overfishing, and some examples of management responses. Then we also provided a section on how the Commission has typically responded to depleted status, to try to kind of help showing that conversation a little more. Does that answer your question?

MS. MADSEN: Yes, it does, so just a quick follow up. That would mean that threshold level that the SAS is recommending, that the Board is sort of able to determine within *I_{TARGET}*, would then be the one that we would be using to determine overfished, overfishing? Like where does that kind of plug in there?

DR. ANSTEAD: Yes, we would be using the target and threshold to determine stock status, which is what we tried to do, and the Peer Review was not totally comfortable with it, but primarily because the concerns that you all have expressed around this table. Is it fishing, and what will that get us? Again, that is a challenge for this species. If we stop fishing or cut back on fishing, we don't know what that response will be, because we don't have a stock assessment model.

CHAIR EDWARDS: Okay, we're going to take an online question, Russell Dize.

MR. RUSSELL DIZE: What I don't understand, I know the fishermen here in our area in the middle part of the Bay in Maryland, is that we're saying depleted, but in the last five years our eel fishermen, traps are in the yard. They are setting up on land, because the oversea market has dried up. The bait industry doesn't use eel anymore in this area.

They haven't been catching any eels. When you tell our fishermen that they are depleted, they say, well look, we haven't caught eels here for five years in the middle part of the Bay. What is going on? How can it be depleted? Now, I understand we're talking about coastwide. But it's hard to tell fishermen they can't sell the eel, because there is no market for it, that it's a depleted industry.

DR. EYLER: Well, the depleted definition comes from these indexes that we use that are not related to fisheries. The surveys that the states complete that are not related to actual fishing that is happening. The surveys that the states are doing are showing declines in many places. In Maryland, the index is going up. This has tracked over the index we used, but in other places it is still declining. Again, we can't say that it's fishing or not fishing on that.

MR. DIZE: I understand what you're saying, but it's hard to tell a fisherman that it's a depleted resource, when they see lots of eels but they can't catch them. That is the problem we have here.

DR. EYLER: No, I understand that. One thing I would like to say, with respect to the life cycle of eels. Implementing a management change, so harvest has been reduced only for a couple of years. But with the life cycle of eel, and some places in its range take 20 years or more to reach maturity. The time that you're going to see the effect of some of those management changes might be a decade or more.

The fact that the fishery has only been reduced for a couple of years, that is really not long enough for us to see a change in the abundance of fish in the surveys that we're conducting. That may be another reason that we're still in this depleted status. That is also a long-term consideration. We're not looking at just the last couple of years, but we're looking over the long term of the stock in the surveys that we have.

MR. DIZE: Okay, thank you, I appreciate it.

CHAIR EDWARDS: John Clark.

MR. CLARK: Thank you for the second opportunity here. First, I would just like to say, in the estuaries it is rare to see an eel that is over 6 or 7 years old. They definitely reproduce at a much younger age. Our cap right now is an empirical coastal cap. With this high target it is still going to be judgment of the Board, correct?

I mean we're pretty much going to set these numbers where we want, and yet now we'll have these de facto overfishing status points. But I just don't really see that this is really that much of a difference from what we've been doing, because one way or the other it is going to be up to the Board to just decide what is an acceptable catch level, correct? I mean we can set the multiplier at a level where we would actually end up with a coastal cap similar to where we are now, correct?

DR. ANSTEAD: Yes, you could. The Board has asked us through the last several assessment cycles to come up with a quantitative tool to set this, versus the average landings from 1990 to

whatever it was that made the last cap. What is a quantitative tool we could use to set a cap, based on abundance in landings? We've done our best and this is the tool we have. Of course, as you know, we tried to come up with a model and we could not. I think it's an improvement over historical average, and it gives you some flexibility to respond to abundance in catch, but your point is taken.

MR. CLARK: Thanks, Kristen, yes, it's still a difficult situation, because I know every time eel comes up for assessment, we just have five more years of the insufficient data to truly assess it. Really the main problem I have with *I_{TARGET}* is it makes it seem like we have something that is more than just judgment that we're using to set these levels of the cap.

CHAIR EDWARDS: Kris Kuhn.

MR. KRIS KUHN: Thank you, Sheila, for an informative presentation. It was mentioned that habitat-based modeling has been showing promise in New Zealand and Europe, but however, data limitation here are preventing advancing that right now. What data would be needed and what would a timeline be to advance that as a tool for management?

DR. EYLER: That's a great question. I think one of the biggest shortcomings in the habitat modeling is we have a pretty good handle on the environmental parameters for different systems, but what we're missing is the eel data, especially inland eel data. Most states have next to none. As we've been pushing a bit with the assessment, we found quite a bit in the Delaware and Chesapeake Bay ranges. There is a fair amount of inland eel data.

Not so much for the other geographies on the coast, and we're talking about a panmictic population. We really have to have a better understanding geographically where these fish are. Recently I came across some additional data from Maine that we were not aware was available at the time of the assessment that may have helped with that, but we're still having some pretty big holes in the geography, as far as eel data goes.

Having some inland eel data surveys would be very helpful. Having some silver eel data surveys would be helpful, if they be run counts coming downstream at dams or whatever those are, we are really lacking in some of those pieces of data to really do a habitat model, or really even help with the assessment moving forward, even if it's not the habitat model.

CHAIR EDWARDS: Are there any other questions?

CONSIDER ACCEPTANCE OF 2023 BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT FOR MANAGEMENT USE

CHAIR EDWARDS: Next on the agenda items to Consider the Acceptance of the 2023 Benchmark Stock Assessment and Peer Review Report for Management Use. Then Consider Management Response if Necessary. Shanna Madsen.

CONSIDER MANAGEMENT RESPONSE

MS. MADSEN: I actually have a couple of motions prepared, but I want to dispense with this one first. But to let the Board know my intent, **the first motion that I want to make is to accept the 2023 Benchmark Stock Assessment and Peer Review Report for management use.** Following this discussion, I will be making another motion regarding the use of *ITARGET* to set catch caps. I will discuss that further at that time. But I wanted to dispense with this motion before that one.

CHAIR EDWARDS: Rick Jacobson.

MR. RICK JACOBSON: I'll offer a second to the motion.

CHAIR EDWARDS: I'm going to read this. **Move to accept the 2023 Benchmark Stock Assessment and Peer Review Report for management use.** Do we have any comments from the maker of the motion? Any other questions or comments? Lynn.

MS. FEGLEY: This might be a question for Shanna. I think from the state of Maryland, while we would support using *ITARGET* for management use, we would not support using it to create reference points to determine stock status. Is that this motion or the next motion?

MS. MADSEN: That's the next motion. Yes, this one is just to dispense with making sure that the Stock Assessment and Peer Review Report can move forward for management, and then the next one we can kind of have a discussion for perfecting that *ITARGET* use.

CHAIR EDWARDS: Any other questions or comments? John Maniscalco.

MR. JOHN MANISCALCO: Does this motion also accept the stock being depleted and that overfishing is likely occurring?

MS. MADSEN: I think that at this point it would match what the Peer Review Report says, and what we have in front of us today, which is that the SAS is also recommending what the Peer Review Report said, which is that the stock is depleted.

CHAIR EDWARDS: Okay, are there any other questions? **Is there any opposition to this motion? Seeing none; the motion is approved by Board consent.** Is there another motion?

MS. MADSEN: Yes, Mr. Chair. This one is definitely one that I think will need to be perfected by my colleagues. I just want to get something kind of on the board to start with. **The motion that I would like to make is to form a PDT to draft an addendum to consider using *ITARGET* to recommend various catch caps, using the supplemental report that we were given today as presented today as the starting point.** If I get a second, I will speak to it.

CHAIR EDWARDS: Is there a second? John Maniscalco. Would you like to speak for the motion?

MS. MADSEN: I would, thank you very much, Mr. Chair. I really appreciate a lot of the conversation that we've had around the table today. I think we spent a lot of time back in, I guess it was February also, discussing this. I think that the report that the Stock Assessment Subcommittee has provided us is incredibly clear.

At this point, Virginia is probably, I feel for my state next to me in Maryland. Virginia is probably the second highest harvester of yellow eels. However, after three stock assessments saying that this stock is depleted, and then getting to a point where our staff is so uncomfortable with giving us a depleted status that they are considering trying to determine how the stock might be overfished or overfishing is occurring, is really flagging to us at this point, that we need to take some action.

I feel incredibly uncomfortable not using the method that they presented us today to move forward. I know there might be some imperfections to how we utilize that method. I know that a PDT will come back with various recommended catch caps. We'll have to debate what we think is appropriate then.

But today, I believe that our SAS is essentially crying out to us to signal that we need to do something other than status quo. Although I recognize that there is a lot of other things impacting the stock, other than fishing. As fisheries managers we only really have that one lever to pull here. I don't want to kick a stock while it's down, so this is my motion, and happy to hear from my colleagues as to any imperfections that they might have to that.

CHAIR EDWARDS: Lynn Fegley.

MS. FEGLEY: If I might, **I would like to offer an amendment to this motion, and I think that it would just be adding the word, so the motion would read, move to form a PDT to draft an addendum to consider using *I_{TARGET}* to recommend various catch caps, and then add, but not use *I_{TARGET}* to set biological reference**

points or determine stock status. I think the amendment would be to specify that we're not using *I_{TARGET}* to set stock status, and if I can get a second, I'll clarify why I would like to see that in there.

CHAIR EDWARDS: John Clark. Any discussion on the amended motion?

MS. FEGLEY: Yes, thank you, Mr. Chair, if I could just provide some rationale for that quickly. Again, it's really not new information, but I think that it is really important that we make a clear distinction, for the sake of our public, and certainly for our harvesters that we are not entirely clear all of the sources of mortality that are contributing to the dilemma of eels.

I firmly believe that when you add the word overfishing and overfished, it seems to say that there is one way to fix this, and that just is not the case here. I really appreciate the sections in the report that speak to how the Commission responds to a depleted situation versus an overfished situation. But I do think that it is incumbent upon us to recognize the uncertainty in the effectiveness of our effort, and that depleted is a better more accurate way to go.

CHAIR EDWARDS: John Clark.

MR. CLARK: As the seconder, I agree with everything Lynn said. As I brought up before, I think we're still looking at basically an empirical method, and I don't want to use that to set a stock status here, when we really don't know what are the reasons for the reductions we're seeing.

CHAIR EDWARDS: Shanna.

MS. MADSEN: This is the perfection that I was expecting, and I do agree with it at this point. I think it is important to signal that we're not entirely sure of what we're doing here. But I did want to say, the reason that I appreciate the fact that the staff did try so hard to make an overfished or an overfishing status, really was to try to get us to do something.

I really appreciate the fact that this amendment is being made, and hope that it moves forward with the rest of the motion, because the rest of the motion to me is the most important part here, signaling that we are ready to actually do something.

CHAIR EDWARDS: Any further questions on the amended motion? John.

MR. MANISCALCO: I would actually just ask Kristen if she could briefly explain how *ITARGET* would be used to set a reference point.

DR. ANSTEAD: During our first go at the stock assessment that went to peer review, we used *ITARGET* and kind of the target and threshold values that it has. We used those to determine that it was overfished. It was below its threshold, and that overfishing was likely occurring. It was a little fuzzy, as far as using those to do that.

It is a time series it is not a model. We interpreted it that way and made an argument for it. That specifically was challenged by the Peer Review Panel, who put us back to depleted. You all had tasked us with kind of reconsidering that. We did concede maybe depleted is more appropriate for this fishery.

I suppose we kept that bullet in our conclusions, in case there was interest in kind of pushing that, because having overfished or overfishing or one or the other, there is usually a more clear path forward for how to respond, where as noted around the table that it is not clear how to respond to depleted.

Because there are other contributing factors, fishing could be one of them, and so I don't have a very good answer for you. But we left it open in case there was interest, but it doesn't sound like there is. But we've still provided a tool to move forward, to come up with a more quantitative way to set a catch limit.

CHAIR EDWARDS: Any further comments? Justin Davis.

DR. JUSTIN DAVIS: I'm just curious, what is the benefit of using *ITARGET* to recommend various catch caps versus just creating an assortment of empirical catch caps, and choosing which one the Board likes the best. I mean what sort of inference are we getting from using *ITARGET* that we wouldn't get from just sort of selecting a set of empirical catch caps?

DR. ANSTEAD: I think it would provide a way to set the catch limit based on what you have been catching, and what the abundance index says. If the abundance index goes up, the three-year-running average, it could potentially recommend that the harvest is more. If it continues to go down, it would continue to take Hudson harvest. You are using some of the data you actually have versus taking a time period of catch and averaging it, which you are still welcome to do.

Maybe you want that to be part of the PDT task, I don't know. But I think that you're using more information by having the time series. You know that is one reason why we looked at the Northeast Fishery Science Center paper, for when your model fails here are some other methods for setting catch that use the data that you have. I think there is a benefit to using a more quantitative method, but you certainly have other options.

CHAIR EDWARDS: Any other questions? I would like to read the amended motion. Move to amend to add, but not use *ITARGET* to set biological reference points or stock status after catch caps. Does anybody oppose this amendment? Okay, we're going to do a vote. Does anybody need a time to caucus on this? **All those in favor for the amended motion. All those opposed, abstentions, and null votes. The amended motion passes 16 to 2.** Now I would like to ask for discussion on the amended motion. John Clark.

MR. CLARK: More just a process question. Does this, going to a new draft addendum, the addendum we're working under now has specific measures that have to be put in place if the cap is exceeded. Will we be looking at a whole new write up of that section, or are we just carrying that over?

MS. CAITLIN STARKS: That would be up to the Board, John. The Board could provide guidance to the PDT on whether you would like to consider different ways to react here if there is an overage. But I think that it would be necessary to talk about it, and to consider potentially looking into how the overall quota is allocated amongst the states. If it's closer to the actual catch that has been occurring, then the Board may want to discuss that as well.

MR. CLARK: But we wouldn't have to put that in a motion, this could just be directions to the PDT. Okay, thank you.

CHAIR EDWARDS: Any other comments or questions? I'll read the full amended motion. **Move to form a PDT to draft an addendum to consider using *I_{TARGET}* to recommend various catch caps, but not use *I_{TARGET}* to set biological reference points or stock status after catch caps, using the supplemental report as presented today as a starting point.** Okay, is there any opposition to this motion? **Okay, seeing none; the motion is approved by Board consent.** Would anybody like to address this item, or we'll move on to Item 5? Lynn.

MS. FEGLEY: I just want to, and I don't know that this needs to be a motion, but I just wanted to ensure for the sake of a full and robust discussion on this addendum, that we have the option on catch caps that include status quo, which I think is standard, and also those higher harvest advice values, so that we can see where they fall relative to the cap. Specifically, I mean running these intermediate reference periods, 1988 to 1999, with a 0.5 threshold. I just wanted to repeat that. I think it's on the record, but thank you for your forbearance.

CHAIR EDWARDS: John Clark.

MR. CLARK: Just again, at this point do you need instructions, Caitlin, for the PDT to pretty much consider the management response that we already have in the current addendum, and

add anything else, or just if we leave it be is that pretty much up to the PDT?

MS. STARKS: It is certainly helpful to have clear guidance, if that is something you all would like the PDT to talk about.

MR. CLARK: In that case I'll just say that the response that we had in the current addendum, I think is a good starting point. I would just like to see that kept.

CHAIR EDWARDS: Any other questions? Rob Beal.

MR. ROBERT BEAL: Yes, I'm just curious as to what the anticipated expected timeframe on this is or might be.

MS. STARKS: Our typical addendum process can take anywhere from six months to years, in my experience with lobster. It really depends on the complexity of the options that are being considered. I believe our first step would be to form the PDT, to meet and discuss some potential options, and bring a draft addendum back to the Board.

We could potentially do that as soon as the annual meeting, but if there are inputs that the Board would like to add, beyond what we talked about today, then that timeline could extend to considering a final action in the spring or later, so it really depends.

CHAIR EDWARDS: Rick.

MR. RICK BELLAVANCE: I just wanted to take a moment to acknowledge the fine work of the Stock Assessment Subcommittee, and thank them for their diligence in this. I know it was a big lift. We all appreciate the work they did.

CHAIR EDWARDS: Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Back to the timing question. I think initiating an addendum today is not going to be able to affect the '24 fishery, so you've kind of got that cushion where

you want to probably get something approved, maybe a year from now, to have states time to implement it and implement it through the '25 fisheries. You know I think hurrying really fast and getting something approved in real early '24, probably doesn't buy you much. It's still going to affect the '25 fisheries. We've got a little bit of time for the PDT to work on it.

REVIEW MAINE GLASS EEL QUOTA PROVISION OF ADDENDUM V

CHAIR EDWARDS: Okay, if there aren't any further question, we'll move on to Item 5. Review the Maine Glass Eel Quota Provision of Addendum V, with Caitlin Starks.

MS. STARKS: I have a very quick presentation to talk about this issue. The context on this is that Addendum V to the Eel FMP established a quota that is specific to Maine's glass eel fishery, and that quota is 9,688 pounds. That was based on Maine's landings in 2014 of glass eels. In Addendum V it establishes that the quota level would be set for three years, so it started in 2019 and went to 2021, and then after that point it could be revisited by the Board before Year 4, which was 2022.

Addendum V also states that if the Board decided to maintain the glass eel quota at the same level, then it could be extended for an additional three years without requiring a new addendum. But that means the quota could only be extended through 2024. In 2021 the Board did decide to extend this quota through 2024, but for 2025 and onward, Maine's glass eel quota has to be established via a new addendum.

For that reason, this issue is just being flagged for the Board to consider now, so that we can have something in place in time for the 2025 fishing year. In the event that just occurred with the other addendum initiated, the Board could consider adding this to that addendum, or initiating a separate addendum. I can take any questions.

CHAIR EDWARDS: Thank you, Caitlin, for the update. Are there any questions for Caitlin? Emerson.

MR. HASBROUCK: I'm just wondering a little bit on history here. How is it that Maine was the only state that ended up with a glass eel fishery, and what are some of the reasons that we should consider continuing that?

MS. STARKS: I'm going to defer to Toni, who has had more time on this species.

MS. TONI KERNS: I believe it was even potentially the original FMP which stated that all states had to maintain their current levels of fishing, and that included the glass eel fisheries. Then that continued again as we went through the management documents, and some states dropped their glass eel fisheries over time if they had existing ones, probably back in the early '80s, or in between the '80s and '90s.

Through those states dropping their glass eel fisheries, and the FMP being revised and it restating that you couldn't have a glass eel fishery unless you had one at the time at that document, those states glass eel fisheries were, I guess weaned out of the system, you may say. There is, Emerson, a small glass eel fishery with that in South Carolina, but it is an insignificant amount of fish that are being harvested. That's kind of how it occurred.

CHAIR EDWARDS: Thank you, Toni, any further questions for Caitlin? Lynn.

MS. FEGLEY: Caitlin, is there an easier way, is there a way that you would prefer that this be in the same addendum with the other, or is there a preferred method for you, for staff?

MS. STARKS: Thanks for that question. It's a little tricky in that this has a limited timeline. Maine can not have a glass eel fishery in 2025 if they don't have a new addendum to establish their quota. It is something that needs to be dispensed with before 2025, and the other addendum, if it ends up being a longer process could potentially delay that. We

could put these two items together now, and then if we are seeing that the addendum for the yellow eels is taking longer than expected, then we could split.

MS. FEGLEY: One of the reasons I ask that is, you know the irony is a little rich, you know just that we're talking about the issues with the yellow eel, but then we're also talking about what we're going to do with the glass eel quota. I guess it sounds to me like they may be better separated. But I think again, that is sort of a communication piece here, where yellow eel is troubled, glass eels are not.

CHAIR EDWARDS: Emerson.

MR. HASBROUCK: Thank you, Mr. Chairman, for a second opportunity. Yes, I have to agree with Lynn. We may be going forward here with either one addendum, is that where we are? We may be going forth with one addendum here that at the same time is considering a reduction in harvest for yellow eels, yet it's contemplating to continue harvest for the continuation of the glass eel harvest, or we may end up with two different documents that are going forward at the same time that are doing just that. Contemplating a reduction in the yellow eel harvest but allowing a glass eel fishery to continue at the level it has been continuing. A bit of a dichotomy. I'm having a little trouble accepting that.

CHAIR EDWARDS: Megan.

MS. MEGAN WARE: I think the goal today is to initiate an action to consider what the elver quota is 2025 and beyond, and so I have a motion prepared to do that whenever the Board Chair is ready. Obviously, we have a coastwide stock assessment that is not giving us great advice, or I should say, let me rephrase that.

We have a coastwide stock assessment that is not showing great stock status for the stock. We don't have any quota advice coming from

status reference for the elver fishery prepared for us. This fishery is incredibly important to Maine. I don't think I need to over emphasize that. As we'll talk about in the next agenda item.

I would juxtapose what we see in the coastwide assessment with what we're seeing in Maine, which is ICPUEs, old quota utilization, and a young-of-year index that is one of the few that has a positive trend coastwide, and over the last few years has just markedly increased. We'll look at that I think next, but it's a tricky situation trying to balance what we see coastwide versus, I think a pretty different experience we're having in Maine.

There is interest from the industry in increasing the elver quota, I don't think VMR is here advocating for that today, given what we're seeing in the assessment. But our goal today is to initiate an addendum for that elver quota. I think to the timing, we do have a bit of a time limitation on the elver quota, so if we need to split off the addendum we can. But we can see how it's going as we move forward. But again, today is initiating that conversation.

CHAIR EDWARDS: Dan McKiernan.

MR. DANIEL MCKIERNAN: Yes, I would be in favor of separating these two into separate addendums, especially since the one Megan is talking about it more time sensitive. It is conceivable that we could have near status quo, in the first addendum we talked about, so I would be in favor of making them separate.

I would be interested, maybe if the PDT could look at whether the Maine drainages, for which there is a glass eel fishery, might be having an effect on the overall trends in yellow eels. Maybe Kristen you could comment. Are there any Maine drainages in that multisystem index of yellow eels?

DR. ANSTEAD: We don't have a Maine yellow eel index, but one of the requirements of Maine keeping their glass eel quota, is that they do a life-cycle study, and so we will have one. They have been collecting data for that. In a large system we

have seen it, it's just not long enough to put in the stock assessment yet.

MR. McKIERNAN: In light of all the work that Maine has done to open up new habitat, I think it is appropriate to keep it separate.

CHAIR EDWARDS: John Clark.

MR. CLARK: Just if we do start a new addendum about the glass eels, of course one of the reasons we've always decided to allow glass eel fishery is because the thought that a very extremely small portion of them actually will make it to yellow and then silver eel. But will this addendum keep the same guidelines or create new guidelines, if other states decided that they wanted to get into the glass eel fishery?

From what I understand, the demand for glass eels just keeps increasing, and we saw the mess they had up in Canada. Not saying that we want to do that, but the demand will be there. That creates a pressure for poaching. You know we have just the sight that we use for our young-of-the-year survey. There have been days where just with one four-foot fyke net we probably caught enough eels to buy a new truck. I mean it's just crazy. Just curious.

MS. STARKS: Just to offer some background context. I believe that the FMP says that any state or jurisdiction can request allowances for commercial harvest of glass eel, based on stock enhancement programs that were done after January 1, 2011. That proposal would have to get reviewed and approved by the Technical Committee and the Board. I believe if any other state wanted to implement a glass eel fishery, they would need to go through that process, unless that has changed in a future addendum.

CHAIR EDWARDS: Okay, are there any other questions? Would someone be willing to put forward a motion? Megan Ware.

MS. WARE: Move to initiate an addendum to address the Maine glass eel quota.

CHAIR EDWARDS: Dan.

MR. McKIERNAN: Second.

CHAIR EDWARDS: Okay, would the makers like to discuss around this motion?

MS. WARE: I think we've had a lot of discussion. At this point we don't have a quota for 2025 and beyond, so we need to have that discussion.

CHAIR EDWARDS: Malcolm Rhodes.

DR. MALCOLM RHODES: Just for information, South Carolina we've talked about before, we allow ten harvesters. It used to be in a one-mile section, one river. It's mainly kind of a CPUE as much as anything. We still have ten harvesters, and I think we're all set. About five of them went out. Do we need to get a new quota? I mean our harvest was 150 pounds.

MR. MEL BELL: We don't work under a quota we work under the cap.

DR. RHODES: We're just under the cap, okay.

MR. BELL: We're under the trigger.

DR. RHODES: That is why I wanted to double check.

MR. DIZE: Our fishery is managed under that 750-pound trigger that would lead to a full life cycle survey requirement, so we maintain it below that level.

CHAIR EDWARDS: Any other questions or comments? Okay, I'll read the motion. **Move to initiate an addendum to address the Maine glass eel quota. Is there any opposition to this motion? Seeing none; the motion approved by Board consent.**

REVIEW MAINE LIFE CYCLE SURVEY REPORT

CHAIR EDWARDS: We're going to move on to Agenda Item Number 6, Review the Maine Life Cycle Report by Danielle Carty, the TC Chair.

MS. DANIELLE CARTY: My name is Danielle Carty, Fisheries Biologist for the South Carolina Department of Natural Resources, and appointed American Eel TC chair. I'll be giving an update on Maine's Life Cycle Study. This study was led by and this presentation prepared by Jason Bartlett and Casey Clark, marine scientists with Maine's Department of Marine Resources.

Casey will be available at the end of this presentation to answer any outstanding questions that you all may have. Maine's studies all occur in the West Harbor Pond. Their glass eel study was initiated in 2001 per ASMFCs requirements for Young-of-Year study. Their yellow eels' studies initiated in 2018, as well as their silver eel study initiated in 2018.

Sampling for yellow eels occurs through pot fishing, and sampling for silver eels occurs through fyke nets, to collect out migrating silver eels. Their glass eel study begins at approximately the same time the commercial season opens, around March 24, and it continues through June. There are two vertical ramps attached to the dam at the outlet of West Harbor Pond.

Fresh water is supplied to the ramps from early flood tide through late ebb tide. Eels ascend the ramp while the water is flowing, and drop in the boxes secured in the pond. Glass eels are separated from elvers. They are counted or weighed, and they are released back into the pond. The number caught varies from year to year, 2022 resulted in the largest catch since the study began.

Over the course of sampling season 60 fish subsamples are taken for individual measurements, and pigment code

determination. As you can see in the graph on the right, this depicts data from 2022, and their average individual ranks and weights tend to decrease as the season progresses. That is just giving you a look at their length vs weight. Here you have their number of glass eels caught by year from 2001 to 2023. You can see that huge increase in 2022. It does dip back down in 2023, but it's still around one of the highest catch years that they've had in 2023. Their yellow eel sampling, here is a little Google Earth image, give you a look at West Harbor Pond and where their 24 pots are. Sampling with these baited eel pots begins in July, and continues through September. These 24 pots are deployed every other week for five cycles, and at set locations around the pond.

They are checked after 24 hours, rebaited and deployed again for another 24 hours. Each time the pots are checked, all the eels are removed. They are measured for length and weight. They are scanned for a PIT tag. If they do not have an existing one, they are tagged with a new PIT tag and subsequently released.

To date, 1,019 yellow eels have been tagged, and many have been recaptured at least once. For silver eel sampling a fyke net is set at the outlet of West Harbor Pond. This starts in September, to catch out-migrating silver eels, and sampling continues until December, or when no more silver eels are caught.

All the eels are removed from the trap, and again scanned for PIT tags. A subsample of length and weight measurements are taken. We are told that rain events tend to trigger those silver eels to migrate, and to date 5,888 silver eels have been captured. This graph depicts the number of silver eels caught from 2018, when the study was initiated, to 2022. Of course, this year's silver eel studies are ongoing.

You can see that they had a large increase in 2021 for silver eels caught, and then it did dip back down in 2022. I do recall Casey saying that in 2021 they captured a good number of eels that were still transitioning, yellow to silver, and when they

recaptured them again recently, they were actually still in their transition stage.

This is just a quick overview of any additional sampling methods that they all have. They are doing some aging of otoliths. These otoliths are sectioned, polished and stained to count the annuli. The average ages of silver eels leaving West Harbor Pond are 8 years for males and 14 years for females.

The average length of silver eels leaving West Harbor Pond are 297 millimeters for males and 443 millimeters for females. They have also tested for the swim bladder parasite, the invasive eel parasite *Anguillacolooides Crassus* is present in eels living in West Harbor Pond, and over 50 percent of the eels sampled are unfortunately infected with this parasite. Next slide is opening up to any additional questions, and I will pass that to Casey to answer anything you may have.

CHAIR EDWARDS: Thank you for the great presentation. Are there any questions? Megan.

MS. WARE: I just wanted to comment, kind of in reference to my comment on our previous agenda item. If we go back to that young-of-year abundance index. I believe the last year in the assessment, I was just looking it up, was 2019 from that index. Folks can take a look at what we've seen since then. At that time 2017 was our highest value, so 2020, 2022, 2023 have all been higher than that highest value we had in the assessment.

CHAIR EDWARDS: John Clark.

MR. J. CLARK: Thank you for the presentation. Just curious for the yellow eels. Did you see any territoriality in terms of certain eels showing up in the same pots, because from what I understood like down in our part of the country, where the eels are in ponds. A lot of times they seem to be fairly territorial.

MR. CASEY CLARK: Yes, thank you for that question. We've seen a little bit of certain eels getting caught a few more times than other eels, meaning that you know we sort of call them trap happy to some degree. But nothing that would sort of be to the point where we would want to remove those from the population estimate or something like that.

We certainly haven't seen too much of that sort of recapture that maybe you were seeing there. I think maybe some of that has to do with just having as many pots as we have out, and as many eels that are tagged, that we do generally just sort of see a lot of recaptures of the old around the pond.

CHAIR EDWARDS: Any other questions? John Maniscalco.

MR. MANISCALCO: Megan or whoever else could provide some info. But I'm just wondering how West Harbor Pond compares with kind of the spatial extent of the glass eel fishery in Maine.

MS. WARE: I can try, and Casey can fill in. West Harbor Pond is in Boothbay, so Mid-coast Maine. The glass eel fishery spans the coast, so in the middle, I would say. Casey, I don't know if you want to say anything more about that specific habitat or anything that you've noticed.

MR. C. CLARK: No, I think you hit it on the head there. It is very representative of a coastal population, and the access to the ocean and sort of not having any barriers of passage into that pond is very similar to a lot of places where we see glass eel harvest around the state.

CHAIR EDWARDS: Thank you, any further questions?

CONSIDER APPROVAL OF 2024 MAINE AQUACULTURE PROPOSAL

CHAIR EDWARDS: Okay, we'll move on to Agenda Item Number 7. Consider Approval of the 2024 Maine Aquaculture Proposal. Caitlin Starks.

MS. STARKS: For this year we only have the one aquaculture proposal from Maine, so I will go over that quickly, and the Technical Committee's comments, and then take any questions. The aquaculture provision is established by Addendum IV, and maintained in Addendum V, and it allows states and jurisdictions to develop plans for aquaculture purposes.

Under an approved aquaculture plan, state or jurisdiction can harvest a maximum of 200 pounds of glass eel annually from within their waters for use in a domestic aquaculture facility. But the state has to show that the harvest will occur from a watershed that minimally contributes to the spawning stock of American eel, and those aquaculture request must include the pounds that are requested.

Location of harvest and dates of harvest, prior approval of any applicable permits, and descriptions of the aquaculture facilities, including capacity and husbandry methods, as well as description of markets that the eels will be distributed to, what the monitoring programs will be, and that they have adequate enforcement capabilities and the penalties that would occur for violations. For 2024, Maine has requested 200 pounds of glass eel for aquaculture. They have been granted aquaculture quota since 2019, and that quota has been put towards the company American Unagi, and American Unagi contracts with commercial eel fishermen in Maine. In 2023 the fishery was similar to 2022, 200 pounds were harvested in both of those years.

The same watersheds were fished as 2022, with the addition of three new locations. The proposal also noted that the catch per unit effort in 2022 and 2023 was higher than in previous years. For 2024, there is no change from Maine's request from last year. They are requesting the same amount of harvest and the same location, same facility, and the same monitoring programs and law enforcement program. The TC did not have any concerns

with the 2024 proposal and they recommended approval by the Board. With that I can take any questions.

CHAIR EDWARDS: John Clark.

MR. J. CLARK: Seeing that American Unagi wanted the full 200 pounds for the past couple years, is that the full extent of their stocking, or are they actually using more than 200 pounds? Are they growing that much that they need that much glass eels?

CHAIR EDWARDS: Megan.

MS. WARE: Yes, thanks for the question. I think this is kind of an example of a success story here, where Sara has been really great and responsible at using the quota. She started more as, you know pilot concept, but she now has a full facility in Mid-coast Maine. She is using that full 200 pounds. I think the fact that she had the opportunity to use 200 pounds in the beginning and did not, really speaks to how responsible she has been about using this resource responsibly and respectfully, and shown some restraint.

MR. J. CLARK: Does she have to buy extra?

MS. WARE: She also buys, that is correct.

CHAIR EDWARDS: Any other questions for Caitlin or Megan?

MS. STARKS: The action on this item would just be for the Board to consider approval of Maine's aquaculture proposal for 2024.

CHAIR EDWARDS: Megan.

MS. WARE: If there is no other discussion, I am happy to make that motion. **Move to approve the Maine Aquaculture Plan for 2024.**

CHAIR EDWARDS: John. Would the maker or seconder like any further discussion?

MS. WARE: I think I said what is needed.

CHAIR EDWARDS: Any comments or discussion on the motion? **Any opposition to the motion? Seeing none; the motion is approved by Board consent.**

OTHER BUSINESS

CHAIR EDWARDS: Moving on to the last agenda item, Other Business. Is there any other business to come before this Board? Dan.

MR. McKIERNAN: Just a question. How will the PDT be formed?

MS. STARKS: We will send an e-mail to the Board after this meeting to request nominations.

MR. McKIERNAN: Thank you.

ADJOURNMENT

CHAIR EDWARDS: Any other questions? Seeing none; could I have a motion to adjourn this meeting? Raymond, a second? John Clark. Thank you everyone.

(Whereupon the meeting adjourned at 11:53 p.m. on Tuesday, August 1, 2023)