Criteria Assessment Protocol (CAP) Workgroup Meeting

Monday, July 14, 2025
1:30 - 3:30 PM

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Meeting Materials
This meeting was recorded for internal use to assure the accuracy of meeting notes.

Decisions Needed: The Workgroup needs to establish a clear understanding of when DO assessment results will be made available to the States and which years of data are to be included. CAP WG members should attend to prepare for the extended August CAP WG meeting hosted by the team from a GIT Funded Project on sampling design.

ACTION ITEMS

- Include a review of the Water Quality Standards Indicator during a later meeting.
- To prepare for the August CAP WG Meeting on GIT Funded Project segmentation selection, develop priority segments for your jurisdiction that you would like to be included in the project, with your reasoning on why those segments were selected.
- Also, invite any members of your team that can speak about site selection or bring insights from the field to the August CAP WG Meeting.
- Consider the two options presented for incorporating the pycnocline into the 4-d interpolator. CAP WG Leadership will schedule a meeting in August to discuss and make a decision.
- Review the draft documents from the final agenda item and note any feedback. This discussion will continue throughout the Watershed Agreement revision process.

MINUTES

1:30 PM **Welcome, Introductions & Announcements –** *Peter Tango (USGS), Chair*

Upcoming Conferences, Meetings, Workshops and Webinars:

- 2025 Capital Area Natural Resource Management Symposium – August 22, 2025, Washington, D.C.
- Chesapeake Watershed Forum – November 7-9, 2025, Shepherdstown, West Virginia.
- Coastal and Estuarine Research Federation Conference – November 9-13, 2025, Richmond, Virginia.

Summary: Peter Tango took a minute to introduce the upcoming conferences and today's agenda. Matt Stover from MDE shared that the Maryland Monitoring Conference is on Thursday, November 20th. Also, Amanda Shaver from VA DEQ shared that the Virginia Water Monitoring Council Conference is taking place on September 30, 2025.

- ***Comment from chat:*** Breck Sullivan: Thank you for sharing! We will make sure to not plan a STAR meeting on the same day as the MD Monitoring Conference because we always want to attend!

1:35 PM **Availability of the Bay Dissolved Oxygen (DO) Assessment Results –** *Matt Stover (MDE), Becky Monahan (MDE), and Workgroup*

Description: *MDE will lead a discussion on State needs for receiving the Dissolved Oxygen (DO) assessment results for the Integrated Report as well as discussing the intersection with the information presented on the Chesapeake Progress website and any other reporting mechanisms for this information*.

Summary: Matt introduced a discussion on how DO assessments are used by different states and organizations.

Q: *Matt Stover:* To my understanding, data collected by Virginia and Maryland is fed into Duet. Independently, there is data collected by NGOs that are in the Chesapeake Data Explorer. This data eventually joins the state data in Duet to create the "stoplight chart," which MDE uses for their Integrated Reports (IR). It seems like the Bay Program uses that data in a different way and displays it on the Chesapeake Progress website. Peter, what is the difference between the indicators and the Chesapeake Progress website?

- ***A:*** *Peter Tango:* Chesapeake Progress has our annual update using DO, SAV, water clarity, and chlorophyll data to put together an estimate of attainment of standards across all designated uses and seasons. DO makes up one piece of that. It takes having those four pieces together, which come in a different times. Chesapeake Progress is where we present the full indicator.
- ***Q:*** *Matt Stover:* When you say "full indicator" is that just the water quality indicator?
- ***A:*** *Peter Tango:* Yes, the multimeric water quality standards indicator.

Q: *Matt Stover:* The stoplight chart that I am referencing is that chart with the segments on the left side and the DO criteria across the top. Virginia, do you calculate that yourself? Do you use the 3-d interpolator estimates from that?

- ***A:*** *Amanda Shaver:* Yes. Tish and Joe have been able to recreate a version of the 3-d interpolator and get it running. We do all of the data pools we need to and then use the 3-d interpolator and assessment scripts to produce results for the IR. That's been the process for the last two cycles.
- ***Q:*** *Matt Stover:* That is done in house?
- ***A:*** *Amanda Shaver:* Yes.

- ***Q:*** *Matt Stover:* What is your timeline for that?
- ***A:*** *Amanda Shaver:* The assessment is still a coordinated effort with the offices across the state. Our goal is to get all of our data pulled and all of the scripts that are used to assess Bay designated uses by May-ish. This way the three regions that we have that assess Bay waters can incorporate that information into their assessment unit level information that goes into our database and gets uploaded to EPA's attains database.
- ***Q:*** *Matt Stover:* For this 2026 IR, you will be assessing 2022 to 2024 data?
- ***A:*** *Amanda Shaver:* For DO, yes.
- ***Q:*** *Matt Stover:* This would happen in May of 2026?
- ***A:*** *Amanda Shaver:* 2025.
- ***Q:*** *Matt Stover:* So, you've done this already?
- ***A:*** *Amanda Shaver:* Yes, and we have also already done the SAV. It's slightly different. Similarly to the benthic and other biological parameters, we use a five-year assessment window. For the 2026 IR, we are looking at 2019 through 2023.

Q: *Peter Tango:* Amanda, when you do the SAV on 2019 to 2023, do you use the best three years out of five? To my understanding of the protocols, it says three-year windows but also says best out of five.

- ***A:*** *Amanda Shaver:* Yes, we look at the most recent three years that were monitored. I'm pretty sure every segment has data at some point in the last three years. Although we use the five-year window and lump it with the other biological parameters, for the SAV we use the most recent data.
- ***Comment:*** *Tish Robertson:* We do have a provision that says if we don't have the three most recent years, then we can look at a previous three-year period. Although, I don't think we've ever used that.
- ***Q:*** *Matt Stover:* It's kind of like an insurance policy in case the SAV data doesn't come?
- ***A:*** *Tish Robertson:* Yes, exactly like that. It gives us a chance to do an assessment of the information that we have available.
- ***Comment:*** *Peter Tango:* If you remember, in 2018, they had difficulties getting 10% of the survey lines done because of weather challenges. I don't recall which segments they were unable to get, but they were able to backtrack and use satellite data to fill the gaps.

Q: *Becky Monahan:* What are the four pieces that go into the Chesapeake Bay Program (CBP) indicator?

- ***A:*** *Peter Tango:* The DO results, the SAV results, the chlorophyll in the James and DC, and segments. Water clarity is on the dataflow segments that can be assessed that may show that a segment is in attainment. For example, if there is not

insufficient SAV, but there's sufficient water clarity. Those results come in afterwards. Mark Trice has done that for years on the Maryland side. It complements the SAV data, so it's a few segments, not a complete survey of all segments.

Q: *Matt Stover:* Virginia, you've been using that same timeline for the last two cycles, or was it back further than that?

- ***A:*** *Amanda Shaver:* That is what we have been doing the last two cycles. Last cycle, we were able to get a draft out in April of the even numbered year.

Q: *Peter Tango:* When would Maryland's next draft be out?

- ***A:*** *Becky Monahan:* We are trying to get a draft out this fall, the fall of 2025, in preparation to submit by April 2026. We are supposed to submit it by April 1st, but that doesn't always happen. We try our hardest. We are trying to come out with a draft by fall/winter of this year, to have it reviewed by our directors and be open to public comment.
- ***Comment:*** *Peter Tango:* If you've looked on Chesapeake Progress, there's about 30 questions of metadata information and it summarizes updates from the previous indicator, if there has been any changes in methods and what the details of sub elements within the indicator. There is a lot of extra detailed information behind the one number on the chart. It takes time for the data to come in, to get the summary, to get the metadata together, and then to review. It takes until summertime to get the full indicator out on Chesapeake Progress. For this discussion here, you've pointed out the timing of having DO results to support you in the fall, then that would fit into your timetable better. I will find out more from folks at CBP to see if there is any challenge with that. Here, the data gets processed by our team. The DO results are the first to come out. We should be able to share that when it's ready and not hold onto that until the following summer.
- ***Q:*** *Becky Monahan:* Is that through 2023 or 2024?
- ***A:*** *Peter Tango:* I think we discussed that being through 2024, so that we're not in 2026 summer, which would be the next indicator update.
- ***Comment:*** *Becky Monahan:* That would be great if you are able to get us the DO results. Like Matt said, we don't need the whole indicator and all of the metadata. To be honest, I didn't know all of that existed, so I should probably go back and look through that now, but we typically split it out ourselves. Mark gives us the water clarity which we report on. We have SAV, which we separately report on and so the portion that we need from the Bay Program is just dissolved oxygen.
- ***Response:*** *Peter Tango:* From today's discussions and those we had during the Monitoring Team meeting, it seems that we should be able to get this done by November.

- ***Response:*** *Becky Monahan:* That would be fantastic because then we can get onto the same timeline as Viriginia, which would be easier for cycles moving forward.
- ***Response:*** *Peter Tango:* I will just need to get the stamp of approval from the folks above me.
- ***Response:*** *Becky Monahan:* Thank you. If you could keep us in the loop either way, that would be really helpful for IR planning.
- ***Response:*** *Peter Tango:* Sounds good.

Comment: *Becky Monahan:* At some point, I'd like to understand the indicators that you report on better. I'm confused on how you report on meeting water quality standards when we haven't been able to access all DO criteria.

- ***Response:*** *Peter Tango:* There is a word that we put everywhere, which is estimated. It's an estimate based on a series of relationships that were built out of work that is done over time to fill gaps in the data. There are about 500+ decisions that are made as estimates based on relationships that go back as far as 2004 with work that Marci Olsen did. Those methods were published in the late 2010s. These results are not official; it is all about estimating.
- ***Response:*** *Becky Monahan:* I'd like to look more into that because if we can report on that too, it might be helpful. Right now, we are only able to say that we are not able to assess all criteria, which has been a disconnect for our readers. They are seeing the CBP is reporting on DO and DO trends and we are not. Trying to explain those different pieces could be helpful. I will look into that and might have more questions at a future CAP meeting.
- ***Comment from chat:*** *Breck Sullivan:* Great connection Becky!
- ***Response from chat:*** Becky Monahan: Thanks, Breck! Do you happen to have the direct link for where you guys post the indicator? I definitely need to do more research on it and might want to explain the difference in our IR.
- ***Response from chat:*** Breck Sullivan: You can then download the data and methods document under the graph! https://www.chesapeakeprogress.com/clean-water/water-quality
- ***Comment from chat:*** *Becky Monahan:* As part of this report, or even the DO assessments, it'd be really helpful to know which community science groups, or other groups like MDE, and their specific stations that are included in the interpolator outputs and chlorophyll-a. Because if a MD community group sends data, I need to assess all of it, so I need to know what was already included in your assessments and what I need to assess separately. Happy to have a side discussion on this another time.
- ***Response from chat:*** *Breck Sullivan:* If the indicator is put on a future CAP agenda, we could add this to the discussion, but if not, yes, let's do a side convo!

1:50 PM **Overview of Project *"Scope #7: Hypoxia Collaborative: Sampling Strategy and Design for Chesapeake Bay Habitat Assessment"* –** *Peter Tango (USGS)*

Description: *Peter Tango will give an overview of the GIT Funded Project "Scope #7: Hypoxia Collaborative: Sampling Strategy and Design for Chesapeake Bay Habitat Assessment" provided by the EPA to the University of Maryland Center for Environmental Science (UMCES). This presentation will prepare CAP WG members for the required planning meeting with UMCES taking place August 11, 2025.*

Summary: Peter Tango let the group know that we have been selected for a GIT Funded project to support the sampling strategy and design for the Bay habitat assessment. This presentation gives an overview of the project to help prepare the workgroup. The purpose of this project is to inform a thorough monitoring of the Bay with limited resources.

The first stage of the project was to host a kick-off meeting, which Peter and the team had with their awardees, Don Liang, Jeremy Testa and Laura Harris from UMCES. They are planning, along with Peter, for the August 11th meeting with the CAP WG, which will be the beginning of the segment selections. These starter segments should be interests of the community. Part of the project is also to create a protocol to understand how to best perform segmentation design. These initial segments are meant to inform the process, so any segments that are left out will still benefit from the project. Learnings will be used in designs for all 92 segments or for providing guidance when those decisions come up.

Peter emphasized how this project will benefit many of the focuses in Bay restoration and that the Hypoxia Collaborative has been thinking about the placement of these arrays for a while.

Next, Peter went through the phases listed in the scope of the project. In Phase 2 of the project, the team is meeting with CAP WG. This meeting will take place on Monday August 11th from 1pm-5pm, in place of our monthly CAP WG meeting. More information can be found on the Chesapeake Bay Program calendar webpage. For the other steps of Phase 2, Dong, Jeremy, and Laura have existing experience in this, so they will be sharing those findings. For Phase 3, the 10 segments will be finalized and there will be an all-day meeting with CAP WG, BORG, and Hypoxia Collaborative. They are looking to finish the project by October 2026.

Matt and company have been thinking about some segments to focus on, and Peter thinks the group should also look at the list created by the Hypoxia Collaborative. They are looking forward to continuing to talk about this and getting some insight from the researchers.

2:05 PM **Initial Insights and Discussion on Segment Selection –** *All*

Description: *To begin this discussion, representatives from MDE and VA DEQ will be sharing their initial insights into potential criteria for selecting priority segments. This will be followed by an open discussion on segment selection criteria in preparation for the August meeting.*

Discussion

Comment: *Peter Tango:* You can see in my presentation, the array distributions were produced and distributed by NOAA and the Hypoxia Collaborative. You've already seen data from the Main Bay, the east and west side of CB4. There was work done in the Lower Potomac and Lower Choptank. The Lower Potomac was still a priority, and the Lower Rappahannock had a desire for two sites. Folks were encouraging us to continue something like the CB4 sites on the east shore as a reference, due to the importance of having that continuous time series at a consistent location. That was important for the modelers to continue benefitting from the calibration and verification work of a continuous site. The Lower Potomac was very important to the fisheries folks, modelers, and researchers to see the data with the habitat and fish migration taking place there. This was especially important for understanding the oxygen dynamics. This was similar for the Lower Rappahannock. The Lower Choptank was important because there was some similar work happening there, and it is an accessible site. Those were some of the foundations highlighted by the Hypoxia Collaborative, which leaves us other segments to build off of or consider.

Q: *Becky Monahan:* These arrays that have already been placed, what are you doing with that data right now? It can't go into the current interpolator, right? Because it was assessed separately. Has that data been assessed separately? Is it planned to go into the 4-d interpolator? I'm curious what the results were of those segments that you've already seen.

- ***A:*** *Peter Tango:* It has informed some of our understanding of how similar the behaviors were to other analyses. It's being used in the interpolator development right now. It's playing an important role in framing the new interpolator. I can't speak completely to other uses. In terms of getting an understanding of dynamics that are happening in the water column, the data is being used to make that better than it was in our existing interpolator. We have new insights on the pycnocline that weren't possible before.
- ***Comment:*** *Rebecca Murphy:* I believe the Virginia Institute for Marine Sciences (VIMS) team has been using the data for their live forcasting model that they use. For the 4-d interpolator, we have been using the vertical array data to inform the high frequency variability at depth and the variable cycles in DO. You do bring up a good point; I believe it is not being used in the current interpolator. This is the first few years, so the NOAA team has been working through challenges with the

sensors. If we go a few more years before the 4-d interpolator is used, it's worthwhile to consider if some of the data can be pulled out and used for the interpolations. The data that is used in the interpolations is being pulled out and submitted to the DataHub and I don't believe that the array data is being put into the DataHub. It could be pulled out for the 3-d interpolator and be used, but that isn't being done right now.

- ***Comment:*** *Peter Tango:* There is a living resource assessment project going on right now. They are using all available data to inform that project, as well. This is one of the things they are going to look at. I think it might be limited because they want information across many more segments.

Comment: *Tish Robertson:* We had an internal meeting about what we would prioritize for segments for enhanced monitoring. One thing we'd like to prioritize is designated uses and covering as many of them as possible. We have segments like the lower Rappahannock where we have all five designated uses. It makes sense to me to prioritize that since you are able to look at all criteria. Our prioritization scheme would be based on our coverage of water quality standards. We would also want to look at thinking about attainment. If it's marginally impaired or marginally not impaired, they may be value in collecting additional data sets there to get more confidence in the assessment. Those are the two things we are looking at.

- ***Q:*** *Peter Tango:* That's great, Tish. How many segments do we have five designated uses for?
    - ***A:*** *Tish Robertson:* I don't know. I know Rap MH and Potomac MH are similar, but I don't know if we have other ones like that.
- ***Comment:*** *Matt Stover:* If we start considering variable pycnoclines, we could add to that list potentially.

Comment: *Peter Tango:* Matt, I am reading your list of factors for segment selection. You have number of designated uses, whether it's main stem, tributary, eastern shore, or western shore, representation of salinity regime, and size. Those are certainly elements to factor into our decisions. One challenge is the if they're in shallow water and not representing two many designated uses, we maybe be able to cover them with less infrastructure, but still the data densities we're looking for.

Q: *Matt Stover:* This initial effort is to look at which segments we would like the funding partners to use for their model development, not necessarily the ones that we're going to place monitoring assets, right?

- ***A:*** *Peter Tango:* Yes, correct.
- ***Comment:*** *Matt Stover:* When we were talking about it internally, we were like "what step are we on?" I think we want to provide them with segments that are broadly applicable to all of the Bay segments. It seems like we should be choosing

segments that are most different so that their model can be effective at choosing stations from all the different kind of parameters. We should have some with a lot of designated uses and complex bathymetry, others to represent our smaller tributaries, and everything in between. We haven't picked specific segments yet, but we did mention Fishing Bay. That was one that we hammered with monitors, so it might be beneficial to see if we over monitored that and ground truth the model there because we have so much data.

- ***Comment:*** *Peter Tango:* Great thinking. Given the data availability and that it is a unique experimental site, a segment like that would be informative to include. It is important to consider that even though we want to do 10 segments, right now we have only been able to do three segments at a time. I don't know if that will change, but we will need to talk about how many segments we can do in an assessment period in relation to the equipment we have available. If we can't do all of them in the first few years, we will have this list to reference and guide what we do moving forward. Also, when the protocol comes out, we may need to have another workshop-like conversation using the protocol to select priority segments. These 10 segments will set us up for core work over the next 5-10 years.
- ***Comment:*** *Matt Stover:* We have been thinking about where we want to go once this methodology is developed and to be clear, we don't want to go back to Fishing Bay.

Q: *Matt Stover:* Where are the existing 11 arrays placed?

- ***A:*** *Peter Tango:* Because of this year's site restrictions, they are in the Lower Choptank and CB4 on the Eastern Shore. There was desire to go back to the Potomac but due to resources allocation, they became constrained to a local area.
- ***Q:*** *Matt Stover:* Do they have three years of monitoring there, or are they planning to monitor some more to finish the three-year window, or were they just testing arrays and seeing how things went?
- ***A:*** *Peter Tango:* A lot of what has happened so far is working out kinks. We also wanted to get the best data we could in places people were interested in and start to build that data set. It was also to understand maintenance cost and effort. This was to help set the guidance for what we would need when going out to do a three-year assessment. Thus far it's been more pilot directed. They want it to be in places that could fulfill the three-year monitoring eventually, as well.
- ***Comment:*** *Matt Stover:* So it sounds like it's not a blank canvas, but it's also not completely painted.
- ***Response:*** *Peter Tango:* Sure. I think we're settling in to knowing what it takes and knowing what we have. In a future discussion, I think it will be interesting to get an insight from Rebecca into how the two-meter resolution works and whether that is sufficient with the interpolator operation. Gary Shenk suggested in the beginning that if we had one array with meter resolution, that would be important as a

reference. We haven't gone down that path yet or talked with our NOAA colleagues, but that offers something to think about with design and investment in information.
- ***Comment from chat:*** *Rebecca Murphy:* Having at least deep water, but also deep channel, DUs would be priority segments for the 4d purposes! Useful to have a least 5 depths to be able to compute the pycnocline too.

Q: *Tom Parham:* I'm still trying to understand the purpose of the project. I know we will be providing them with 10ish segments, but the goal of the project will be for us to pick any segment, and they will say what the optimal monitoring there would be. Initially, they will look at the segments but ultimately, they will build a tool that can be used with any segment. Is that correct?

- ***A:*** *Peter Tango:* That is correct, Tom. What I have learned from conversations with you all is that when you sit down to look at a segment, there are limitations to where you can and want to put these monitors. Hopefully, in this meeting, we will get a better understanding of the limitations and adjustments that you all make during site selection.
- ***Q:*** *Tom Parham:* Thanks, Peter. So, will we help them with those constraints?
- ***A:*** *Peter Tango:* Yes. Please think about that in terms of who you would like from your respective agencies at the meeting to inform the team of what they are using as a decision framework to place materials.

Q from chat: Matt Stover: Question for the group: how many sensors do these arrays have along their vertical depth?

- ***A:*** *Peter Tango:* For the deepest waters, to about 22 meters, it should be at 3m, 5m, 7m, 11m, and 17m. You are trying to get above and below the pycnocline in waters that have that. For the deepest sites, we're looking at five sensors.
- ***Comment:*** *Matt Stover:* If we have a limited number of sensors, we should think twice about putting them in segments that don't have a lot of depth or multiple designated uses.

2:30 PM **How do we assess the pycnocline? –** *Tish Robertson (VA DEQ) and Rebecca Murphy (UMCES)*

Description: *To follow the 4-d interpolator presentation and discussions from the June 2025 CAP WG meeting, Tish Robertson and Rebecca Murphy will be presenting options for assessing the changing pycnocline in the 4-d interpolator.*

Summary: Tish presented a proposal for handling pycnoclines with the 4-d interpolator. Pycnoclines have been an ongoing conversation with the 4-d interpolator at the CAP WG and BORG meetings. This is because the 4-d interpolator team has been trying to figure out how to best represent a constantly changing pycnocline in the interpolator. Tish explained how the three designated uses are important in delineating in the vertical extent. Tish also

mentioned that the map of designated uses is not exactly accurate anymore, but it shows the general idea. During the summer, shaded segments with a pycnocline present use the position of the pycnocline to determine the designated use and assessed criteria. In this presentation, Tish will be focusing on Deep Water designated segments.

Tish reviewed the current procedure for the pycnocline boundary determination. Then, Tish showed this process in the current 3-d interpolator. The top of these charts is the surface of the water, and the bottom is the sediment. Whether something is above or below the pycnocline determines the criteria.

Tish explained how the newfound knowledge of the frequent fluctuation of the pycnocline will heavily impact the 4-d interpolator due to the frequency of the model.

There were two options that Tish has explored to help model the pycnocline. She noted that these ideas are coming from a water quality standards scientist that prioritizes the incorporation of criteria.

The first option is to use an average pycnocline over a certain period, similar to how the current 3-d interpolator works. For this option, she explores using only data with stratification (a pycnocline present) into the average or including data with no stratification. This would be variable to the Chesapeake Bay Program's assessment code. While VA DEQ calls for the first example (only using data with stratification), she would prefer to include the data without stratification.

The second option would be to assign designated uses hourly based on the pycnocline. Then, the grid cells would be averaged over a certain segment or time. Next, she shows a few examples of how this option works. This option used the temporal frequency with a certain cut-off. The example cut off was 50% of the time. In this example, all of the cells are open water more than 50% of the time, so then the open water criteria would be calculated only using the data from when the grid cells were above the pycnocline. For the next example (days 8-14), two of the grid cells were open water less than 50% of the time, therefore they wouldn't be assessed in the mean criteria. They could be used for the open water instantaneous minimum.

Tish prefers option two because it wouldn't exclude as much data. The only downside would be more computationally intensive, but Elgin and John have mentioned they'd be able to handle it. The second option would minimize classification errors.

Q: *Melinda Cutler:* I have a clarification question from slide 25. For option two, there is the green on the bottom left which is saying that we will be assessing that for open water because of the frequency. Does that mean that for days 8, 9, and 10, we are still pulling data even though that data was below the pycnocline?

- ***A:*** *Tish Robertson:* That's a great question. On days 8, 9, and 10, we would not use those data for assessing the open water seven day mean because those hourly DO estimates would be classified as deep water. We would only be assessing values above the pycnocline.
- ***Response:*** *Melinda Cutler:* With option two, there would be the additional filter that they data needs to be above the pycnocline, correct?
- ***Response:*** *Tish Robertson:* Yes, exactly. That's the advantage of option two. Option one wouldn't be that refined.

Comment: *Richard Tian:* This has left some water not assessed, which I don't think would be good. I think we should assess everywhere. Assuming there is a wind event which would increase the vertical mixing and bring higher DO water to a deeper layer. That's a good thing because it would supply higher DO water to the deeper layer, but we don't see that in the assessment. We don't see that signal and when we do, we see the opposite. Instead of improvement, we see degradation. This is because the vertical mixing extends the pycnocline downward. Originally, the deeper layer was assessed with the deeper water criteria of 3, but now it's assessed with 5. What your figure shows, we never see in our assessment results. After mixing, the water column would be between the original surface water and the deeper layer. If it were to fall below 5, it would not be attained. This is way there is probably a degradation signal, not an improvement. I am asking about the mean. Also, for the designated use, I thought it was intelligent to protect living spaces, like deeper water. Those living organisms in the deeper waters don't move with the pycnocline. Also, another question is why do we bother with the pycnocline? Shouldn't we fix the boundary between deeper water and deeper channel based on the distribution of living resources we are trying to protect?

- ***Response:*** *Tish Robertson:* Are you saying that we should have the horizontal usage line up with the bottom bathymetry?
- ***Response:*** *Richard Tian:* Yeah. We could do the depths of the organisms we are trying to protect. We could define and delineate where that would be and then use the pycnocline. I think the 4-d shows that there is so much variability. On a short timeline, it goes from open water to deep water. That's just a thought. I don't think we could get an easy answer here.
- ***Response:*** *Rebecca Murphy:* You mentioned that you were concerned that some water wouldn't be assessed with this approach. In option two, a cell that doesn't meet that criteria would meet some other criteria, for example, instantaneous or deep water. I don't think we would have large sections of grid cells that didn't meet any of the criteria.
- ***Response:*** *Richard Tian:* I understand you, Rebecca. They would be assessed for some other designated use. For each duration, all of them should cover the entire water column. We can talk about this offline.

- ***Comment:*** *Peter Tango:* Your work is suggesting that the pycnoclines are getting stronger as the water is warming. We do see the turnover in strong storms, but stratification resets quickly. It'd be good to know the frequency in which that instability happens.
- ***Q:*** *Tish Robertson:* Richard, it sounded like you were saying that you could have hypoxic waters form the bottom moving into the surface water. Is that the case where you were saying there is degradation?
- ***A:*** *Richard Tian:* What I am saying is that the mixed water DO would be decreasing. The average DO from the mixing would decrease.

Q: *Leah Ettema:* Are there segments where the deep-water use disappears for a whole year? Do we always have the deep water in all of the segments?

- ***A:*** *Tish Robertson:* I don't think we've ever seen that, but it might be because we don't have the monitoring. Virginia's Potomac MH segment, where we have deep channel and deep water, doesn't have a Bay Program station in the embayment. If we don't go out there for another reason, we might not be able to capture the deep channel, but that doesn't mean it wasn't there. It just means we don't have the ability to do the computation of the pycnocline. I don't think there are any segments where we would not expect to see some stratification throughout the year.
- ***Response:*** *Rebecca Murphy:* Looking through the criteria documents, I know these designated uses were selected with a lot of analysis 20 some years ago. There has also been some updated analysis that showed these were usually stable pycnocline regions. It's not expected that there would be a year that it wouldn't exist because of the circulation patterns of the Bay.

Q: *Tish Robertson:* It sounds like Rebecca, Elgin, and John are in support of option two, but does this group need to make a decision? How can we have this as part of our decision making? Do we need to do more exploration before making a decision?

- ***A:*** *Peter Tango:* If we believe this is the best option and folks want to come back for a vote, we could do it that way.
- ***Comment:*** *Richard Tian:* I think we should apply both options and then see the difference and think about the reality.
- ***Response:*** *Tish Robertson:* I am in favor of that.

Q: *Peter Tango:* Rebecca, how soon would this need to be programmed into the development?

- ***A:*** *Jon Harcum:* Given where things are, I think the group could think about it for a month, come back and make a proposal to go forward with. I have plenty of things to do between now and then.

Action Item: Consider the two options presented for incorporating the pycnocline into the 4-d interpolator. We will carve out time in an upcoming meeting to discuss and make a decision.

Comment: *Peter Tango:* If people want to get together for a 30-minute meeting to discuss this, we could set something up. August is our big meeting regarding the GIT Funded Project, but we can try to figure something out to get that information to Elgin, Jon, and Rebecca. Maybe we could come back to this for a quick chat before that meeting.

Q from chat: *Leah Ettema:* Is there a definition of pycnocline that would apply absent of data to classify it?

- ***Q:*** *Leah Ettema:* That is a follow-up from my previous question. Since the deep water use applies to specific segments, if we don't actually have data to define where it is, what do we do? Is there a way to define it when we don't have the data we need to?
- ***Comment:*** *Tish Robertson:* Like we don't have the salinity or temperature data?
- ***Response:*** *Leah Ettema:* Yeah.
- ***A:*** *Tish Robertson:* Back in the day, we found this was an error. What the assessment code used to do was if we didn't have a pycnocline, it would input a placeholder that was a historical pycnocline depth for that sampling event, but we didn't like that option. We took that out so it would always be the observed pycnocline. We didn't like that because you are making a water quality standard decision based on the pycnocline, so if you are using an placeholder you could be assessing the incorrect criteria. If we don't have the data, we wouldn't want to do the assessment.
- ***Comment:*** *Peter Tango:* The reason we went to the dynamic pycnocline was that the fixed pycnocline were giving results that didn't fit the assessment properly.
- ***Comment:*** *Richard Tian:* We did it from 1995 to the present. It's never happened where there was no data where there was deeper water and a deeper channel.
- ***Response:*** *Leah Ettema:* That makes a lot of sense that if we don't know the criteria, we don't assess during that time.

3:10 PM **Intersection of Beyond 2025 Timeline and the CAP WG Scope & Purpose and Project Timeline –** *Peter Tango (USGS) and Amanda Shaver (VA DEQ)*

Description: *The CAP WG leadership has decided to align our changes to the CAP WG Scope & Purpose and Project Timeline with the Beyond 2025 process and changing Watershed Agreement. In this presentation, Peter Tango will review the Beyond 2025 timeline, while Amanda Shaver shares preliminary ideas for the CAP WG. They will explore the intersection of these two events to align CAP WG priorities with the updated Watershed Agreement.*

Summary: In this presentation, Peter reviewed the revised Watershed Agreement process, specifically focused on the Water Quality Standards Attainment and Monitoring Outcome, which is STAR's outcome. They are currently in the public feedback phase. Anyone can provide feedback until the September 1st deadline and information can be found on the Chesapeake Bay Program website. After the public feedback phase, there will be review and revisions by CBPO teams, the Management Board, and Principal Staff Committee. Then, the final Agreement will be brought to the Executive Council in December.

Peter mentioned that within the WQSAM Outcome there is a target that relates to the CAP WG. This is that they will have protocols in place by end of 2027/beginning of 2028. This gives the workgroup and STAR about two years.

Amanda Shaver also mentioned some resources she shared that are posted on the meeting webpage. These include an update to the CAP WG website, a draft timeline, and a draft charter/purpose. These are all initial proposals, but members can take a look at them and reach out to Amanda with questions. Without knowing the public feedback from the Agreement, there is still room for updating, especially with potential changes in outcome language or workgroup structure. Peter emphasized that this is something we will need to come back to once the Agreement is finalized.

3:30 PM Adjourn