



## Bay Oxygen Research Group (BORG) Meeting

May 18<sup>th</sup>, 2026  
12:00 PM – 1:00 PM

[Visit the meeting webpage for meeting materials and additional information.](#)

**Purpose:** This was the May monthly meeting for the Bay Oxygen Research Group (BORG). In this meeting, participants heard from Rebecca Murphy (UMCES) on the grid thinning. This is a decisional item that was explored in the [November 2025](#) and [April 2026](#) BORG meetings. Next, Rebecca shared the progress with the Fishing Bay analysis and discussed with participants about how this information could be used. Lastly, Breck Sullivan (USGS) presented the 4-d interpolator timeline.

### Minutes

#### I. Welcome, Introductions & Announcements

*Lead: Breck Sullivan (U.S. Geological Survey, USGS)*

##### Upcoming Conferences, Meetings, Workshops and Webinars

- [Choose Clean Water Conference](#) – May 18-20, 2026. Lancaster, Pennsylvania.
- [Chesapeake Community Research Symposium](#) – June 1-3, 2026. Annapolis, Maryland.
- [Restore America's Estuaries' 2026 Coastal & Estuarine Summit](#) – September 22-25, 2026. San Francisco, California.
- [Chesapeake Watershed Forum](#) – November 13-15, 2026. Shepherdstown, West Virginia. *Session proposals are currently open and due May 27. More information can be found [here](#).*

##### Announcements

1. At the April 20<sup>th</sup> BORG meeting, the development team presented on testing simulation counts. Based on discussion, the team is still testing out different approaches and will bring the topic back to a future meeting.

#### II. [Grid Thinning](#)

*Lead: Rebecca Murphy (University of Maryland Center for Environmental Sciences, UMCES)*

Rebecca began with a background on the thinning presentations in the [November 2025](#) and [April 2026](#) meetings. This included maps of each grid segment where grid resolution would potentially be thinned and a list of the development teams recommendations on whether each segment should be thinned. She also covers how the depth will change in the thinned grids, which was explained in the April meeting's presentation.

When thinned, the grid may have a shallower depth than originally. In the last meeting, there was a question about this and whether monitoring data was being lost. All data is used for the interpolator. The interpolator will not calculate results for the depths beyond the grid, but that data will be used. Rebecca shared that most segments are not monitored to the grid depth, but

extrapolated by the interpolator. She also did an extra analysis that looked at the deepest monitoring depth compared to the interpolator grid depth and found that there is only one segment where there are samples deeper than the grid. When diving into this station, she found that the deepest depths are rarely sampled and the segment is not highly stratified. Based on this, Rebecca has determined that thinning this segment won't have an impact on the results but is willing to keep the original grid if people would like.

They also did an analysis to make sure there wasn't an impact on the dissolved oxygen (DO) distribution between thinned and non-thinned grids. These pointed out the maximum difference between the two results for each station, which is visualized in the chart on slide 18.

On slide 23 and 24, Rebecca shared the development team's recommendations for which segments to thin. They are looking for agreement with the group on those choices.

### **Decisions:**

- The interpolator grid segments highlighted on slide 24 of [Rebecca's presentation](#) will be thinned.

### **Discussion Notes:**

**Q:** *Amanda Shaver:* On the list on slide 13, do any of those segments have a deep water designated use? If we did have those additional deep water uses, there would be a concern with not seeing the full profile.

- **A:** *Rebecca Murphy:* All of these are open water.

**Q:** *Amanda Shaver:* When you are talking about the difference are you measuring against the reference cumulative frequency diagram (CFD)?

- **A:** *Rebecca Murphy:* No, it would be between empirical density functions (EDFs) – one with the full grid and one with the thinned grid. We didn't go all the way to CFD for these tests. This isn't the assessment. We can assume that if these differences are very small, the grid change is not going to have much impact in the assessment.
- **Comment:** *Amanda Shaver:* In Maryland and Virginia, we have been talking about some decision rules around using the reference CFD curve. We want to make sure we discuss any decisions around that.
- **Comment:** *Elgin Perry:* With a CFD, we are plotting percent of space versus percent of time. In these graphs, we're comparing percent space by two different levels of density in the interpolation. Here we are looking at one dimension of the CFD. It's a step along the way to getting to the CFD. The time dimension is done by sampling frequency. If we don't see problems here in the space dimension, that assures us we don't have issues with the CFD.

**Comment:** *Elgin Perry:* I want to discuss the issue with the depths for the MPNOH. In the situation where we have samples that are deeper than the interpolator grid, we are never going to throw that away. We still use that data to fit the daily mean generalized additive model (GAM). It does change the role of that data if it goes beyond the interpolation grid. Then, it is acting more like a boundary condition, than a condition that's within the grid. Having boundary conditions is good. When we do the horizontal interpolations, we include data from neighboring segments to give us a boundary condition. It stabilizes the GAM as it goes towards the edge of the interpolation grid. That's what would happen in this event as well.

**Comment:** *Breck Sullivan:* It would be great if you could give a thumbs up if you are in agreement with this decision to thin these segments. *All participants were in agreement.*

### III. Fishing Bay Analysis

*Lead: Rebecca Murphy (UMCES)*

The development team has started working with the Fishing Bay data while still building parts of the 4-d approach. Rebecca listed some of her ideas for the use of this data, including showing interpolation results, mapping low DO thresholds, and using the results for criteria assessment.

Next, Rebecca presented an example of the outcome of the 4-d interpolator. She also shows an example of the draft interpolator plots compared to the Fishing Bay data. In these results, it shows that the data is falling in the center of the interpolator, which is good. It also shows what the interpolator is able to do during times of data gaps, which is continue to interpolator the daily cycles.

When showing the map on slide 13, Rebecca notes that the interpolator grid doesn't reach into the small tributaries in the segment. This was true with the 3-d interpolator grid as well because the Fishing Bay grid was not thinned. This might be something to talk about in the future.

They are able to show the spatial distribution of the oxygen interpolation based on different thresholds. The map on slide 14 shows the fraction of observations below 5mg/L, which they compared to the Fishing Bay data, which matches the interpolation results. Rebecca also quickly mentions applying this data to criteria assessment.

#### **Discussion Notes:**

**Q:** *Matt Stover:* There is a lot of monitoring in Fishing Bay. When you mentioned looking at places with lower DO, are you thinking about collecting similar amounts of data where we have more designated uses and lower DO? Is that something you can see in the near future?

- **A:** *Rebecca Murphy:* I was looking at the historical data record. We are going to be looking in depth at all of the results regardless of how much data there is. There are places we are looking at with the high frequency data from NOAA, like CB4. There are other places with continuous monitoring (common) that we'd like to look at in Virginia. No, I was thinking about looking at data we already had. I would love to have us collect more data but there are a lot of limitations with that. If anyone has suggestions of times where a common was in a segment, let me know if you'd like me to zoom in.
- **Comment:** *Matt Stover:* Fishing Bay is unique with the level of monitoring. I don't know if that would be helpful with the interpolator. It would be good to fill that in with extra measurements to ground truth those relationships.
- **Response:** *Breck Sullivan:* Hopefully the 4-d interpolator could help support that and help identify where we should be monitoring more to better articulate dissolved oxygen. It's not for the 4-d development team to decide where the monitoring goes but we could possibly point out focus areas.
- **Response:** *Matt Stover:* The 4-d interpolator will give you a value everywhere and how do we know if that value is real? That's what I'm thinking about.

**Comment (from chat):** *Peter Tango:* Lower Potomac for the year NOAA had 2 vertical arrays on year as a place to look at 3 Designated Uses in summer coupled with long term monitoring program data. That's different than most segments.

**Comment:** *Amanda Shaver:* I think at the mouth of the York, VIMS has vertical profilers. It should be in the historical data set.

- **Response (from chat): Peter Tango:** York, Amanda.
- **Response: Rebecca Murphy:** We've compiled the data back to 1990, so we can go back and look at that.

**Comment (from chat): Jon Harcum:** uidstr is just the concatenated utm x & y

**Comment: Breck Sullivan:** It seems like it would be helpful to share these visuals once we have the final results. It would be great to hear any other suggestions. Email us with any questions and we will be bringing updates to future meetings.

**Comment (from chat): Matt Stover:** Maybe once we have a chance to digest this more, we might want to talk with you more Rebecca!

**Comment (from chat): Becky Monahan:** Yes, this was really helpful to be able to visualize what the results will look like! Thank you!!!

#### IV. 4-d Interpolator Timeline

**Lead: Breck Sullivan (USGS)**

In this presentation, Breck shared the draft timeline for the 4-d interpolator, along with the Phase 7 project. Their goal is to have a fully operational tool by the end of July. They'd like to share some final results and comparisons by the end of July. Breck is going on leave August 1<sup>st</sup>, emphasizing the importance of this deadline. The documentation will be turned over in November. The Scientific Technical Advisory Committee (STAC) review will begin in November, but they are unsure how long that will be. They'd like to submit before the Phase 7 is submitted to STAC.

They would also like to work with the Criteria Assessment Protocol Workgroup (CAP WG) to discuss the use of the 4-d interpolator in criteria assessment. This is something that needs to be discussed further in the future.

##### **Discussion Notes:**

**Comment: Matt Stover:** We'd love to see a copy of interpolator documentation, even if it's a rough draft. It might help further our understanding, and we can learn as it gets refined.

- **A: Breck Sullivan:** Absolutely. I remember that comment from before. When we have something we can forward to you, we will do that, even if it's in sections. We aren't there yet since we are still in development mode and changing things, like the grid. We will be sending things and you can review it while it's being reviewed by STAC.

**Comment (from chat): Amanda Shaver:** I think we would like to have the assessment decisions decided before they move forward finalizing Phase 7 as we are looking to assess all criteria

- **Response: Matt Stover:** Maryland shares this perspective too. It would be good to have decisions made on how we're interpreting the instantaneous minimum, one-day, and seven-day. There are small decisions that make a difference when assessing data. How do we make an assessment on those higher frequency DO criteria when we haven't settled those basic assessment rules? We'd like those to be input into the 4-d interpolator.
- **Response: Amanda Shaver:** We've had a lot of discussions about meeting with the modeling team so they better understand how criteria assessment and implementation is happening with the 4-d so they can realize there is a crossover with the modeling work. We can see if there is a way to work together and get into the weeds to be sure we're all on the same page. We'd like to do it the same way.

**Q (from chat):** *Becky Monahan:* Rebecca- one initial question I have about the data- doesn't need to be answered today, just thinking about it with assessments. What if the interpolator data shows exceedances but the actual data doesn't? What would be reported then in the graphs? Because the many sampling runs create that larger variability.

- **A (from chat):** *Rebecca Murphy:* Becky - will note your question and we can discuss!

**Comment:** *Breck Sullivan:* Looking forward we will make sure to discuss the criteria methods in terms of the Phase 7 timeline and bringing in the Modeling Team to be sure they understand the criteria connection.

## V. Adjourn

**Next Meeting:** June 2026 \*Date TBD

### Attendees:

- Allison Welch, CRC
- Amanda Shaver, VA DEQ
- Andrew Keppel
- Angie Wei, UMCES
- Becky Monahan, MDE
- Breck Sullivan, USGS
- Cindy Johnson, VA DEQ
- Elgin Perry
- Guido Yactayo, MDE
- Jim Hagy, EPA
- Jon Harcum, TetraTech
- Kaylyn Gootman, EPA
- Leah Ettema, EPA
- Matt Stover, MDE
- Melinda Cutler, MDE
- Peter Tango, USGS
- Rebecca Murphy, UMCES
- Sophia Grossweiler, MDE