



Chesapeake Bay Program Hypoxia Collaborative Meeting
Friday, May 21st, 10:00 AM - 12:00 PM

Meeting Link:

<https://umces.webex.com/umces/j.php?MTID=m9602e87d6f521de0556b7f0080d2cd05>

Meeting Number: 120 886 6214

Password: CBP2021

- *Peter Tango (USGS)*
- *Breck Sullivan (CRC)*
- *Justin Shapiro (CRC/NCBO)*
- *Mark Trice (MDNR)*
- *Jeremy Testa (UMCES)*
- *Durga Ghosh (QA CBPO)*
- *Tom Parham (MDNR)*
- *Jay Lazar (NOAA NCBO)*
- *Amanda Shaver (VDEQ)*
- *Kevin Schabow (NOAA NCBO)*
- *Cindy Johnson (VDEQ)*
- *David Scheurer (NOAA NCCOS)*
- *Marjy Friedrichs (VIMS)*
- *Aaron Bever (Anchor QEA)*
- *Lee McDonell (EPA CBPO)*
- *Sean Corson (NOAA NCBO)*
- *Steven Hummel (VDEQ)*
- *Piero Mazzini (VIMS)*
- *Rebecca Murphy (UMCES)*

Action Items:

- Breck Sullivan will create a Teams page and upload the draft table of status and vulnerabilities for the vertical profilers so the group members may edit the document.
- Members will email Justin Shapiro (justing.shapiro@noaa.gov) and Breck (bsullivan@chesapeakebay.net) if they have additional contacts for the group.
- Justin will send around a poll to confirm a date/time for future meetings.
- Team will start developing the QAPP for the two NCBO vertical profilers.

- Durga Ghosh would like to come back for a more focused discussion on QA/QC once the Team starts to develop their QAPP.

Introduction (*Peter Tango (USGS) and Bruce Vogt (NOAA): 5 minutes*)

Establishing Profiler Locations (*Peter Tango, Jay Lazar, and Rebecca Murphy: 30 minutes*)

- Finalize NCBO locations of choice for summer 2021 deployment
 - Insights from CB4.3E's pilot data and historical depth sampling by MDNR at 4.1W/5.1W (Rebecca Murphy)
 - CB4.1W, CB5.1W, (pros and cons)
 - *CB5.1W presents potentially high boat traffic challenges as compared to CB4.1W*
 - *CB4.1W provides multiple arrays within a single bay segment for assessing within-segment habitat characterization*
- Propose a paradigm for sensor distribution on arrays
 - *CB4.3E is reference instrument and other deployments apply sensors at the same distribution in vertical within the allowable depth afforded by other location when using fixed-sensor arrays*
 - *This results in 10 sensors on the 4.3E instrument starting at 1m and located every 2m in depth to the bottom. Other arrays would start at 1m and have sensors every 2m to their bottom depth*
 - *Matching a reference instrument - At a minimum having that as sensor distribution (Consistency between NCBO, VIMS, MDNR, others in future)*
- Rebecca Murphy presented long-term data at possible stations. She looked at the continuous vertical DO data from the prototype deployment last summer to consider what type of data could help with the short-term water quality criteria and how to incorporate it with the 4D interpolator.
- She compared the DO data from the vertical monitoring to the long-term sampling the in the same period. She graphed all the vertical profiles of DO in June from 1985 - 2020 at the station CB4.3E from the long-term sampling which shows June 2020 is in the middle of the distribution. Looking at the quantiles of the distributions and combined long-term profiles have, it has similar variability to the 10 – min data so it captures the fluctuations of the pycnocline going up and down due to the tides, wind, and other factors. Rebecca and others have looked into how they can predict these fluctuations based on this vertical monitoring, and it is something they want to feed into the 4D interpolator.
- She did the same work at the station CB4.3C over the long-term from MD DNR to see if close stations are similar. The surface mixed layer is shallower at CB4.3E, and there is lot of variability of oxygen in the Bay depending on the location.

- Rebecca then discussed the future potential locations for vertical profilers. Consistently see CB5.1W acts like stations in the Patuxent and not like other mainstem stations.
- Comparing the vertical profiles of stations CB4.1W, CB4.1C, and CB4.1E, the three stations from 5 – 9 meters deep there are quite a few samples over the long-term that fall below the 3 mg/L criteria and even the 1 mg/L criteria.
- There are a lot fewer samples collected at CB5.1W with the low DO oxygen range, but there is a lot at the CB5.1 station.
- In summary, CB5.1W seems to be influenced by the Patuxent River, and might be limited in how much it would contribute to understanding mainstem oxygen dynamics. She also notes CB4.1W would be helpful with analyzing the vertical dynamics of low DO movement on the western side of the mainstem.
 - *Action: Decision on two stations (CB4.3E already confirmed)*

Group Comments:

- *Peter Tango (USGS): Both potential stations (CB5.1W and CB4.1W) go to 8 meters so they are not stretching the depth.*
- *Marjy Friedrichs (VIMS): I voted for 5.1W because she is interested in the southern location. The proximity to the Patuxent is a good point because if it acts as the tributary, it is not optimal.*
- *Jeremy Testa (UMCES): I originally chose CB5.1W, but now is thinking of changing my mind. CB5.1W there is a lot of boating activity, but there is open space. I was originally thinking looking at the data longitudinally going out to CB5.1W. I don't think there is enough data over there to understand the environment. I think having two stations at the same time on either side of the channel would help capture the East and the West because it will help to understand the tidal and wind effects.*
- *Jay Lazar (NOAA): The operations will be out of Annapolis. They hope to have the systems out in July. This effort is still a second pilot and will not suggest where they would go in a complete seasonal monitoring approach for the purpose of looking at models or other efforts. They are focusing on CB4.3E because of the vertical element, and the other stations offered were because those were suggested by the group. This discussion will be helpful on what they do in 2022.*
- *Tom Parham (MD DNR): Are there any depth limitations for the systems? Is there a depth with too much scoping?*
 - *Jay Lazar (NOAA): They don't know how much the current moves the systems.*
- *Marjy Friedrichs (VIMS): Why not consider CB4.3E and CB4.3W so we can measure the sloshing back and forth across the Bay?*
 - *Jeremy Testa (UMCES): I like Marjy's idea. It would be informative to do this in places where there are board shoals. CB5.1 has a really narrow shoal to the east.*
 - *Aaron Bever (Anchor QEA): I stated CB5.1W is the best from the science standpoint because it has the mainstem and tributary effect. From a logistical*

standpoint, it makes more sense to look at CB4.1W to make the permitting smoother. Instead of looking at other stations, it is best to look at the ones already provided to get the system in the water quicker. I didn't suggest CB4.3W because it is really close to the shore.

- *Peter Tango (USGS): This will not be the last time the group and others consider where to put a profiler so this information will be helpful in the future, and for now, they can focus on the options already given.*
- *Peter Tango (USGS): It seems people prefer the CB4.1 station.*
 - *Jay Lazar (NOAA): CB4.3W was not looked at because it wasn't mentioned at the last meeting. If it adds values to look at the station, they can do it.*
 - *Rebecca Murphy (UMCES): I like the idea of CB4.3W. I found the vertical profile data from last year, and it would be valuable to have the same depth profile.*
 - *Tom Parham (MD DNR): I like CB4.3W as a test site because it captures sloshing and help with the 4D interpolator.*
 - *Peter Tango (USGS): There is additional support for 4.1W or 4.3W.*
 - *Jay Lazar (NOAA): CB4.3W is a great decision and gives them more options to reach the station.*
- *Rebecca Murphy (UMCES): What is the maximum depth one of these profiles could go to?*
 - *Jay Lazar (NOAA): I need to follow up with Doug.*
- Discuss locations of potential MDNR and VIMS profilers

Group Comments:

- *Piero Mazzini (VIMS): I proposed to MARACOOS along with Malcom studies to deploy two wire walkers, and it got accepted. We are planning on doing the test deployment in 2023 and the system would go in the water for a season in 2024. They proposed systems are at CB5.1 and CB5.4, and we expect them to capture data every 2 – 4 minutes. We are expecting resolution for every meter for DO.*
- *Tom Parham (MD DNR): Due to staffing, they are not able to get one out this year, but they will put one in Fishing Bay next year. They are working with their partners with NOAA to put a profiler in Fishing Bay or an oyster reef possibly near St. Mary's.*
- *Jeremy Testa (UMCES): I am involved in a potential pilot project related to aeration in oyster culture areas. It is very early and I wasn't sure it would proceed, but it looks to have life. There would be some long-term monitoring associated with this system somewhere in a western shore tributary.*

QA/QC Guidance (Durga Ghosh: 20 minutes)

- ConMon requirements and process for approval

- Quality Assurance (QA) is mandatory for all agreements & applies to all data operations. It needs to be approved before data collection.
- The QA Program Plan (QAPP) is needed if there is collection of environmental data, if environmental data is being presented to EPA for use, if EPA funds are being used to generate data, or if using existing data for new purpose.
- Once a QAPP is developed there is an organizations internal QAPP review, and when the approval is obtained, it is sent to the Chesapeake Bay Program Office point of contact (Durga Ghosh). The QAPP is forwarded to Regional EPA QA Team for review and final approval. The timeframe for this process is around 3 months.
- VA and MD have long standing continuous monitoring programs, and vertical profiles are an extension of continuous monitoring scenarios. It should be easy to develop a QAPP for the vertical profiles based on what is already existing for continuous monitoring, but some considerations for the QAPP that may be different is depth, calibration of the instruments, data handling and management, and areas of focus.
- In the future, she hopes to have a more focused discussion with the group.

Group Comments:

- *Sean Corson (NOAA): The vertical profiler is a natural extension of continuous monitoring in VA and MD. In order to make the data relevant to the broadest extent possible, the framework laid out is the EPA framework that we would need to peruse. We haven't talked about who would implement QA/QC whose responsibility it would be and what formats it would follow. There are multiple profilers out there under different organizations. It would make sense to be under the broadest umbrella to maximize utility of the data so that would be the EPA framework described. Is that what others are thinking?*
 - *Peter Tango (USGS): There has been internal conversations to have the data most useful for a variety of situations. There might be something above EPA.*
 - *Durga Ghosh (USGS): There are certain regulations because each organization has their own that they want to follow. Sean's point is well taken because there are multiple organizations doing different things for vertical profilers, so this conversation is really important to have early. She said there is precedent for this to make it easier, but there is a lot to consider.*
- *Bruce Vogt (NOAA): It sounds like we should start QAPP for the two NCBO profilers at least. We might be able to build from Doug's if he submitted one, can't recall.*

Making Connections (Peter Tango: 15 min)

- Connections between Hypoxia Team and concurrent efforts (BORG, PSC monitoring review, etc.)

- 4D interpolation directions will help understand the value of each additional instrument for addressing spatial and temporal data needs.
 - The data from the profile along with station data will feed the 4D interpolator.
- The PSC review targets 9 months for providing recommendations on what monitoring is needed to close capacity and assessment gaps.
- As we establish a vertical profiler/ConMon network, we want to be cognizant of what the total investments needed are to establish the network at some minimum level of operation
 - Price out any additional instrument costs and any further support costs on a 5 year time horizon .
 - This 9 month review is a target timeline to chart out what we have, what might be missing and why, and what is needed in resources to close that capacity gap and maintain this network operation.
 - We don't need all the answers in 9 months. We need a good understanding and solid justification for any recommendation that asks for additional financial resources.
 - We will want the vertical profile to have its own portfolio since it is unique to the other monitoring networks.
- Linkages will likely lead us to a summit in the form of one of the STAC Advanced Monitoring workshop sessions, for example, on the issue of sampling design and program operation.

Group Comments:

- *Bruce Vogt (NOAA): The team is planning to create a report for sampling design and cost of the profilers. We will compile this information through this meeting for the report that can feed into the recommendations for the PSC. The group is pretty clear on the...the conversation about the stations highlighted that each one has a level ofMaybe we can build that into the report more about the research and science gaps. Stations could address management questions or research questions.*

Outstanding Administrative Questions *(Justin Shapiro and Breck Sullivan (CRC): 15 minutes)*

- When do we convene - sticking with monthly on Fridays?
 - Marjy Friedrichs has a conflict on Fridays from 9:30 – 10:30.
 - Justin will send around a poll to help find the best day for meeting.
- Are there other participants we should invite to the recurring meetings?
 - Members will email Justin and Breck if they have additional contacts.
- Establishing a timeline for this project (Responding to PSC request)

- Base agendas based on the PSC recommendations for the first few months.
- Revisiting our key deliverables: Cost, modeling considerations, end products

“Down the Road”: Longer Term Sampling Design Considerations (*Peter Tango: Remaining time*)

- Taking inventory of available DO sensors to supplement/flank the high resolution vertical profilers
 - *Ex. High density groupings to gain insight on local-scale water quality variability*