

July 12, 2019

Dear Data Integrity Workgroup committee members:

The next meeting of the Data Integrity Workgroup (DI) of the Chesapeake Bay Program Scientific and Technical Analysis and Reporting (STAR) will be Thursday, July 18, 2019. This meeting will be held at the Chesapeake Biological Laboratory in Solomons, MD, located in the R.V. Truitt Laboratory second floor conference room. Information about the meeting is listed below.

Conference Line: 929-205-6099

Meeting ID: 322-522-573

Webinar: <https://zoom.us/j/322522573>

CBP calendar web page:

https://www.chesapeakebay.net/what/event/data_integrity_workgroup_july_2019_meeting

The meeting will be held from 10:00 AM to 3:00 PM. A draft agenda is attached. If you have any additions to the agenda, please bring them to the meeting.

Sincerely,

Bruce Michael
Cindy Johnson
DI Workgroup Co-Chairs

AGENDA
Data Integrity Work Group (DI)

Chesapeake Biological Laboratory
Truitt Bldg, Ulanowicz Room
Solomons, MD

Thursday, July 18, 2019
10:00 - 3:00

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Action Items:

- ✓ Discuss with the Criteria Assessment Protocol Workgroup about possibly including May in the time period for the dissolved oxygen criteria.
- ✓ Breck Sullivan will add contacts from Blue Water Baltimore to the DIWG mailing list and Bruce Michaels will encourage them to participate in the meetings.
- ✓ Bruce recommended Durga keep notes on her analysis of the lab's data samples when there is an issue and the reason for it.
- ✓ The OWML z-values for the USGS reference samples were very high so Bruce will reach out to them to hopefully get them more involved in the workgroup meetings and ask them how they identify themselves.
- ✓ Bruce and Mike Mallonee need to figure out a solution for why Jerry Frank cannot submit tidal mainstem blank data.
- ✓ Please send topics for the next Data Integrity meeting to Bruce Michael (bruce.michael@maryland.gov), Durga Ghosh (dghosh@chesapeakebay.net), or Breck Sullivan (bsullivan@chesapeakebay.net).

Announcements, Meetings, Conferences:

Coastal and Estuarine Research Federation Conference (CERF), November 3 – 7, 2019. Mobile, Alabama. Abstracts due May 1, 2019.

Annual Water Resources Conference (AWRA), November 3 – 7, 2019. Salt Lake, Utah. Abstracts due May 6, 2019.

Ocean Sciences Meeting, February 16 – 21, 2020. San Diego, CA.

A Community on Ecosystem Services (ACES), December 14-17, 2020. Bonita Springs, FL.

- [Maryland Water Monitoring Council](#) – December
 - Governor Hogan will provide opening remarks

[2019 Summer Hypoxia](#)

- Forecast
- June and Early July Results

Michael

In 2018, there were extremely high flow events and it continued into 2019. The USGS recorded 13 out of the 15 past months have been above high flows which contributes to higher amounts of nutrients entering the Bay. In June, UMCES and the University of Michigan put together a hypoxia forecast and this forecast based on the Susquehanna and Potomac rivers were listed for higher hypoxia. DNR and their corresponding organizations in other states go out on monitoring cruises twice a month in June, July, and August to record hypoxia. They report on the June to September time period because the CBP dissolved oxygen criteria is for that time period. However, when they looked back on the May hypoxia, there was a high amount of hypoxia so this workgroup might want to bring this up with Criterial Assessment Protocol workgroup because they are seeing the hypoxia extend over a longer time period. Hypoxia is present for more of the year due to climate change and the warming temperatures which also makes it extend to later in the year till October.

The first June cruise recorded above average hypoxia compared to the long-term average. The second June cruise is well below the long-term average. There were significant wind events before the monitoring cruise went out. The wind mixes the surface water with the bottom which pushes the deoxygenated water deeper to the bottom and probably contributed to the recording. On the third day of the cruise, they could see the hypoxia build back up in the water. The monitoring team has completed the first July cruise. At the time of the meeting, the results were not available, but they will be available on the MD DNR website. As a reference, these reports are on hypoxia which is 2 mg/l per liter of oxygen. During the June cruise, they did not see anoxia which is 0.2mg/l per liter of oxygen which is really encouraging.

Data Quality Indicators for Watershed-wide Lab Data

Ghosh

Durga worked on a self-evaluation exercise for the labs participating with the Chesapeake Bay Program to identify issues so that the labs can use the expertise and knowledge from the workgroup to solve them. She gathered data from past years collections. There have been issues in the past but identifying them as soon as possible helps to make the data more accurate, valuable, and comparable. Durga looked at data from across the watershed using QA sampling events, and she categorized them into two main events: External Quality Assessment (Blind Audit, USGS Reference Samples, Coordinated Split Sample Program) and Internal Quality Assessment (Replicates/Duplicates, Blanks). There are currently 16 labs participating, and the CBP is hoping to have all the labs contributing blind audits, USGS reference samples, and split samples. If the lab only contributes two options, they will still be accepted. The workgroup needs to reach out to Blue Water Baltimore (BWB) because they have not seen data form them. Becky Monahan has been talking with BWB, and they are currently looking for a new lab to use which will help them contribute data.

For the Blind Audits, Durga pulled together data for fall 2016, and everything is really close together which is good. For spring 2017, it is hard for Microbac to get to the concentrations the blind audits are requiring. For some data points, Microbac is in the +/- 20% which is the warning zone and some data points are in the >20% which is the fail zone.

For the USGS Reference Sample Data, Durga first gathered data for spring 2017. Everything looks good and passes with z-values equal to or less than 2. Two PADEP samples and one DCLS sample is higher than 2, but these are isolated events, so everything is okay to move forward.

Samples from fall 2017 is good along with spring 2018. For fall 2018, there were some discrepancies with ODU, but this was when they ran the wrong sample.

For the most recent 2019 results of the [USGS Reference Sample Data](#), Total Nitrogen Low Concentration looks good for all the labs except OWML and Fairfax DPW. OWML has a very high value for high concentration too. This is not a new issue for the OWML. A few labs were outside the satisfactory z-value, but only by a little bit except for OWML for Total Phosphorous low and high concentration. Three labs had samples for Ammonia + Organic. Two are little bit outside of unsatisfactory for low concentration, but within the boundaries for high concentration. The labs are doing well for ammonia low and high concentrations, nitrate low and high concentrations, orthophosphate low and high concentration. DCLS and OWML are unsatisfactory for Nitrite + Nitrate low concentration but not by much, and high concentration looks good for the labs. Most of the issues throughout the parameters are sporadic and does not raise alarm. If the workgroup continually notice labs recording numbers different from other labs, than that is when the workgroup needs to figure it out if there is something wrong with the sampling or other processes.

The Precision & Bias Completeness is split between Tidal and Non-tidal data. First, Durga displayed graphs that show the % of duplicates collected based on the criteria for how many needs to be collected for each agency, and an ideal scenario is 90 – 95%. For Tidal, all the agencies meet this criteria, and almost all of them do for Non-Tidal. Bruce plans to reach out to SRBC for the Non-Tidal duplicates data. For Tidal blanks, the mainstem ODU numbers look good. Durga is not sure if she has all the data for DNR VA. Cindy stated for tidal they collect equipment blanks when they collect duplicates but non-tidal is a little under so she will investigate it for Durga. For Non-tidal blanks, most agencies are good. The MD USGS RIM and USGS Primary data uploads are to be completed soon. For the Precision plots, Durga looked at the variability of the tidal and non-tidal data for any given sample and graphed the percentage of that data that preceded the precision limit which is 20% for soluble and 30% for particulates. In almost all cases for non-tidal, less than 15% of the data is qualified. Exceptions include ammonia data (SRBC-NY sites), TP data (WV USGS). For tidal, variability in duplicate data is within acceptable limits. VADEQ data appears to be more variable for Particulates. Cindy commented that they know one of their offices has a problem with TSS, and they have been looking into it. They think they have identified the problem as the y-splitter, so they have moved to co-locating splitting which moves the hose back and forth.

Durga will continue collecting this data for this self-evaluation and present on it once a year.

Jerry Frank mentioned that for Tidal mainstem, there is no blank data from them. He submits the station data, but when they try to submit the blank data, it will not upload. They analyze the data, but that data has never been submitted. Mike Mallonee needs to speak with Mark to see if their program can be modified.

Method/lab Change Affecting pH Trends in Virginia

Rebecca Murphy

The Tidal Trends Analysis Team at the CBP has been using Generalized Additive Models (GAMs) to look at long-term trends. To make sure these trends are accurate, they look for interventions in the data which is an approach for long-term trends with method changes that possibly caused shifts in the data. They allow for a step in the model and let the model state whether it is significant or not. Marjy Friedrichs has been looking at pH long-term trends, and she saw different changes over time in VA mainstem where VIMS sampled until the 1/1/1996 switch to ODU. Marjy was looking at the mean summer pH depth (1995 to 2004) to the mean summer pH depth (1985 to 1994) for the Susquehanna to the mouth of the Bay. The mean pH increases until it hits the state line and then there is dramatic decrease. She was wondering if this is a difference or change in methodology. These data look very different from the MD and southern VA (ODU) data, and the later northern VA data (collected by ODU). They looked into the user guide which states from ODU the parameter from June 1984 to April 1986, pH was not measured as part of the vertical profile. It also states VIMS did not measure pH as part of the vertical profile. They collected aliquots of the nutrient samples and measured pH onboard the research vessel with a pH meter which might explain what is going on with the data shift. Rebecca provides a list of questions for the workgroup to go over based on the information she provided.

Cindy Johnston commented that in 1996 where the shift occurs was a big flooding year so that could account for the differences.

Tish recommended comparing the data to a tributary station near by to see if there was a big difference. Rebecca commented she has compared it to MD and ODU stations, but they can look into a tributary comparison.

Sarah commented that the criteria for the field data is +/- 0.2 to be okay for the instruments on the post and pre calibrations, and most of the values on the graph is within +/- 0.2. However, there needs to be an even distribution and not let it be one sided.

Marjy's team will take the lead on these recommendations, but if she finds anything, it will be brought back to the workgroup at a later date.

Citizen Monitoring – Update on Tier III Field Audits

All

- MDE Final Audit Report
- Arundel Rivers Final Audit Report
 - Sarah Giordano stated they went through the audit process for the south rivers and would like to do it for the West & Rhode Riverkeepers.
 - Caroline thinks this is great idea but wants to make sure they have the capacity and resources to do it. She will set up an appointment with Sarah and Durga to discuss the QAPP.
- Potential Tier III Expansion
 - Caroline Donovan welcomes any suggestions on tidal and non-traditional monitoring program types.
 - She has been talking with Liz Chudoba about advancing some tier 2 up to tier 3.

Coordinated Split Sample Program

- February and May 2019 [Mainstem Results](#) **Mallonee**
 - Mike presented on the following parameters: CHLA (Missing data from UMCES), Ammonia, Nitrite, Nitrate + Nitrite, PC, PN, Phosphate, PP, SI, TDN, TDP, TSS, FSS. Appalachian Lab data will be added, and Mike will send out an updated presentation to the workgroup. The data looked good.
- March 2019 [Tributary Results](#) **Mallonee**
 - Mike presented on the following parameters: CHLA, DOC, Ammonia, Nitrite (VIP/OWML had different results), PC, PN, Phosphate, PP, SI, TDN, TDP, TP, TSS, FSS. Appalachian Lab data will be added, and Mike will send out an updated presentation to the workgroup. The data looked good.

Blind Audit Program Update

Frank

They have received results from all labs except for two (DOE lab and Interstate Environment Commission College of New York Staten Island) for the spring results. They both have assured that Jerry will receive the data next week. The data looks tighter than usual. He will contact anyone higher than 20% of the cohort.

Mid Bay Hypoxia Monitoring Pilot Project and Chesapeake Bay Updates

All

Chesapeake Bay Program direct water quality monitoring has been by necessity widely spaced in time and location, with monthly or bi-monthly single fixed stations separated by several kilometers. The need for continuous, real time, vertically sampled profiles of dissolved oxygen has been long recognized, and improvements in hypoxia modeling and sensor technology make it achievable. Recent results of Bever, et al. (2018) show that total Chesapeake Bay hypoxic volume can be estimated using a few analytically selected fixed continuous dissolved oxygen profiles. This week kicks off the discussion and planning for a Mid Bay hypoxia monitoring pilot project. The project is to pilot a cost effective, real-time dissolved oxygen vertical monitoring system for characterizing mainstem Chesapeake Bay hypoxia. The approach for this project is to use a lightweight, low-powered real-time inductive CTDO2 mooring with sensors at multiple vertical measurement levels.

The Phase III WIPs are almost finalized. The draft plans have been sent to the EPA for their approval. MD's just got approval from MD Bay Cabinet and was sent to the governor's office for final approval. The final plans will be up on the MDE website in August once it is approved. There will be an EC meeting on September 5th with a theme of Phase III WIPs for how to make load allocations by 2025. There is also a WIP for the Conowingo Dam which all states are committed to reach the limits. The funding comes from all the jurisdictions, but MD and PA will probably be doing much of the work because they are closet to the Susquehanna. The dam has reached its capacity. There is 6 million pounds on N that needs to be reduced from the Bay, and it still needs to be figured out how to reach this. There is an additional climate narrative to all of the WIPs which needs to be quantitative by 2021.

The Governor Hogan initiative Conowingo dredging pilot project is moving forward and a contractor was confirmed. They are reviewing sampling plans on how to take cores and want to make sure they have the best model and information collected used to target where they should dredge to get the best Bay water quality results. The project needs to be done within a year and

the coring and dredging must be done this summer. With the dredging samples, they are trying to figure out what it can be used for such as road construction or cover for landfills.

The budget for the Chesapeake Bay Program was passed by the House for \$83 million, but it still needs to get passed from the Senate.

Topics for Next DI Meeting

All

The next meeting will be held around the week of October 21st or early November.

Participants: Rebecca Murphy, Pam Higgins, Tammy Zimmerman, Becky Monahan, Cindy Johnson, Sarah, Doug Moyer, Jerry Frank, Durga Ghosh, Mike Mallonee, Bruce Michaels, Caroline Donovan, Suzanne Doughten, Cindy Davidson, Sarah Giordano, Mike Langland, Jeni Kiesman, Jaclyn Mantell, Tish Robertson, Breck Sullivan