Data Integrity Work Group (DIWG) Virtual Meeting
Tuesday, February 28, 2023

12:00PM-3:50PM

Meeting Materials Link

This meeting was recorded for note taking purposes.

ACTIONS

- ✓ Send topics for future DIWG meetings to Durga Ghosh (dghosh@chesapeakebay.net), Cindy Johnson (cindy.johnson@deq.virginia.gov), and August Goldfischer (agoldfischer@chesapeakebay.net).
- ✓ Alexander Fries (UMCES) and Ann Foo (UMCES) discuss Chesapeake Monitoring Cooperative Tier 3 prioritization with Integrated Trends and Analysis Team (ITAT).
- ✓ Durga Ghosh (USGS) will work with DIWG and Nontidal Network Workgroup to coordinate field audits with the help of August Goldfischer (CRC) for scheduling.
- ✓ Participants in the Blind Audit program should let Jerry Frank know as soon as possible if they need extra samples to do comparison analysis for new instruments (email frank@umces.edu).
- ✓ Workgroup members who did not receive the Blind Audit FY21 final report and would like to receive it should email Jerry Frank (frank@umces.edu). Workgroup members should also reach out to Jerry if they have any colleague labs interested in joining the program.
- ✓ Members currently hiring for positions should send their position advertisements to Communications Staffer Marisa Baldine (mbaldine@chesapeakebay.net) for inclusion in the Chesapeake Bay Program's newsletter, the Bay Brief.
- ✓ All members should fill out this poll to vote on whether to have a hybrid meeting or not and to provide some brief feedback on the workgroup by **COB Friday, 3/24/23.**
- ✓ Contact Durga Ghosh (dghosh@chesapeakebay.net) and Mike Mallonee (mmallone@chesapeakebay.net) if you would like to have log-in access to the Data Upload and Evaluation Tool (DUET).
- ✓ Alex Fries (CMC) and Peter Tango (USGS) will follow up as needed to answer questions regarding use of Tier 3 nontraditional data in water quality standards assessment.

MINUTES

12:00-12:10 Introductions & Announcements **All**

All participants introduced themselves with their titles and affiliations.

Participants:

Alexandra Fries (UMCES), Amanda Shaver (VA DEQ), Ann Foo (UMCES), August Goldfischer (CRC), Becky Monahan (MDNR), Betty Neikirk (VIMS), Breck Sullivan (USGS), Carl Friedrichs (VIMS/CBNERRVA), Carol Cain (MDNR), Cindy Johnson (VADEQ), Doug Chambers (USGS), Doug Moyer (USGS), Durga Ghosh (USGS), Elgin Perry (independent statistician), Heather Wright (ODU), Ian McMullen (DNREC), Jaclyn Mantell (CBL), Jake Kilczewski (MDNR), Jay Armstrong (VA DGS), Jerry Frank (CBL), Keri Maull (DNREC), Kevin Minga (ODU), Kim Blodnikar (CBL), Kristen Heyer (MDNR), Lara Phillips (MDH),

Laura Lockard (DNREC), Lexis Carter (ODU), Liz Chudoba (Alliance for the Chesapeake Bay), Margaret Giitter (UMCES), Mark Nardi (USGS), Meighan Wisswell (VA DEQ), Michael Mueller (Fairfax County, WV), Mike Mallonee (ICPRB), Najma Khokhar (MDNR), Peter Tango (USGS), Suzanne Doughten (ODU), Tammy Zimmerman (USGS), Taylor Hughes (PA DEP), Tish Robertson (VA DEQ), Tracee Cain (DNREC), Tyler Shenk (SRBC)

12:10-12:30 Monitoring and Laboratory Analysis Updates All

Lara Phillips (MDH) provided the laboratory updates for Maryland. They are close to being fully staffed for the first time in almost two years. They're looking at a replacement for their Latchat instrument. Right now, they have a Flow Injection Analysis (FIA) instrument that they use in-house for their drinking water methods for high level nitrate and nitrite-nitrate. They'll be able to do a sample comparison analysis between the machines, but so far, they found it's working well.

Kristen Heyer (MDNR) provided the field update for Maryland. They are working on hiring and getting staff back up to previous capacity levels. They also need a replacement vessel as they've been using the University of Maryland Center for Environmental Science (UMCES) vessel for the last couple years. They've had some difficulties with instrumentation over the past couple years; however, that seems to be improving with some of the supply chain issues resolved. They are doing ok for tributary sampling. For nontidal sampling, they still have one site without access for high flow sampling due to a bridge being fixed, but that work should be completed by Memorial Day.

Tracee Cain (DNREC) provided the update for Maryland. Tracee said that the field person wasn't on the call but from Tracee's perspective things are going well. They're working on some staffing, and specifically, looking for a person to help us with PFAS analysis. They hired someone to work in the field recently. They also have a Latchat they'd like to replace as well as an Astoria flow instrument that hasn't been working out for them. They're utilizing the company SEAL Analytical and are currently in the process of getting quotes and securing new instruments from SEAL.

Tyler Shenk (SRBC) provided the update for Pennsylvania, saying that everything is going well.

Cindy Johnson (VA DEQ) provided the field update for Virginia Department of Environmental Quality, saying that their tidal and tidal sampling is going well. They had a couple of boat issues but hope to have everything back up and running soon. Additionally, they were able to replace most of their personnel that they lost due to retirement. Doug Moyer (USGS) added that Virginia USGS nontidal sampling is on target. Suzanne Doughten (ODU) provided an update from Old Dominion University, and said they finished January and February mainstem sampling fine. For the Latchat, they ordered a SEAL which is supposed to be delivered in a couple months. Once they receive the instrument, they'll do a comparison study between the new and old instruments. The Latchat is still running but they're discontinuing it hence the need for replacement. Betty Niekirk (VIMS) gave an update for Virginia Institute of Marine Science, saying they will have their continuous monitoring instruments deployed by the end of March and their first data flow cruises in April. VIMS is doing well personnel wise. They're waiting on a few pieces of

instrumentation to come in due to supply chain issues, but they have enough backups to keep going in the meantime.

Jay Armstrong (DCLS) provided an update for Virginia Division of Consolidated Laboratory Services. He said they're doing well, coming back to full staff, and adding their last open position now. They are working on validating their SEAL instrument to replace the Latchat.

Jerry Frank (CBL) provided an update for Chesapeake Biological Laboratory and said they're doing well. They had a new analyst join in early November which is having a significant impact on their ability to meet deadlines. They received a single channel SEAL analyzer for cadmium nitrate last August and are hoping to get a dual channel system for TDNP for use this spring.

Doug Chambers (USGS) provided an update for West Virginia. He said their samples go to the USGS national water quality lab, and the sediment samples go to the USGS Kentucky lab for analysis. Both labs had staffing issues that resulted in backlogs. They recently worked through these backlogs, however, and they're starting to get samples back in a normal time frame. On the field side, things are going well, and there is a crew out sampling today.

12:30-12:50 Blind Audits **Jerry Frank**

Jerry Frank (CBL) said he received results for the fall samples from nearly everyone. The spring round of samples will go out in the first week of April. For those who don't do the full suite, if you'd like to, let Jerry know. For those bringing new instruments online, he's happy to provide extra samples to do comparison analysis as well, just let him know as soon as possible. Jerry sent the FY21 final report to everyone and members should email him (frank@umces.edu) if they did not receive it, and/or if they have any colleague labs interested in joining the program.

12:50- 1:20 Viewing Quality Assurance Samples **Durga Ghosh**

- *Durga Ghosh will demonstrate how to access the data for and view the QA samples.*

Durga Ghosh (USGS) demonstrated how to use access and view data using the Data Upload and Evaluation Tool (DUET). The data team and Mike Mallonee were instrumental for starting this tool. The tool allows for comparative analysis of QA samples across the watershed to see how much variability there is in the data sets. Durga said that if you don't have access to DUET but would like to, access may be provided on a case-by-case basis – contact Durga (dghosh@chesapeakebay.net) and Mike (mmallone@chesapeakebay.net) if you'd like access. Durga also said to let her know if you have suggestions for improvements to DUET.

How to view data and access QA samples:

- Log in, then go to the top right corner and select reports.
- Select either Bias Report (which shows all the blank samples that are collected), or Precision Report (which shows all the duplicate samples and replicate samples that are collected).
- Select the program, project, parameters, station, and sample begin and end dates that you want to look at. Not all parameters or dates are reported for all stations. If you select Precision Report, you are asked to select compare line and base line begin and end dates.
    - Base line is all data collected from 2012 to the end dates you select. The compare line data is a subset of that entire dataset focusing on the most recent 3-5 years within your selection.

- The data will be downloaded as a spreadsheet and as plots.

Discussion:

Durga commented that there are some glitches in the compare line and base line functions, and said she thinks the issue is within the coding and it may need some tweaking. She'll ask for clarification on the issue.

The group discussed that only some people have access to this part of DUET and that is intentional, since when sampling groups submit their data it's with the expectation that only a limited selection of people will have access. Mike Mallonee (ICPRB) said access could be provided if groups wanted to look at the data they submitted, but only on a case by case basis.

Durga asked if it would be useful for groups to have access to the capabilities demonstrated. Suzanne Doughten (ODU) said they already do their own control charts, tracking their field blanks and replicates.

1:20–1:40 Citizen Monitoring Updates **Alex Fries**

1:40-2:00 Prioritizing Citizen Science Groups to move from Tier 2 to Tier 3 **Alex Fries**

Alex Fries (UMCES) introduced herself and her role at UMCES in the Integration and Application Network. UMCES is one of the partners that make up the Chesapeake Monitoring Cooperative (CMC). Alex explained that CMC is in the second set of six years of funding for their program. The first six years focused on how to determine the quality of citizen science monitoring data and how to best support these groups in bringing their data quality up to a level that can be used by state agencies and other groups for regulatory purposes. In the second set of six years, they are more focused on where to prioritize to make the best of their time and resources. Alex explained the data ranking system that CMC uses, called the Tier Framework. Tier 3 data is considered the highest quality and most rigorous data, requiring a Quality Assurance Project Plan (QAPP) that is approved by Durga, completion of field audits, and continual maintenance of their status. Tier 2 data is the next level and describes a majority of groups that CMC works with; indicating there is some level of quality control but the group has not been able to write their own QAPP and get it approved. Tier 1 is the least rigorous level of data collection that meets a baseline minimum of requirements.

Alex also introduced the group to the Case Studies that CMC put together as examples highlighting how community science data are utilized to affect change and make an impact, and the success of volunteer monitoring programs.

Alex then focused on discussion how to prioritize which volunteer monitoring groups to support moving from Tier 2 level to Tier 3 level, and asked the group for input on the prioritization process. There are a number of Tier 2 groups in Maryland that have good potential for moving to Tier 3. The groups have a variety of capabilities and monitor for a variety of parameters. Alex asked the group for feedback on where to focus geographically, in terms of parameters that groups are collecting, and how frequently they are sampling.

Mike Mallonee (ICPRB) said the parameters used for the water quality standards attainment are water temperature, salinity and dissolved oxygen (DO). Alex asked if a specific sample

frequency is needed for these criteria. Mike said the greater frequency, the better. Peter Tango (USGS) said there are multiple needs for different levels of the criteria. Alex asked if depth profiles are needed or not needed, and Peter said he would be happy to follow up to address this question and more.

Durga commented that the map and diagram demonstrated by Alex (posted on the meeting calendar page) have a wealth of information and are easy to follow. She asked if Alex could highlight the groups on the map that have Tier 3 capabilities. Durga also asked if all groups that are certified as Tier 3 are certified as Tier 3 for every parameter they collect, or only for some parameters. If it is only for some parameters, is CMC looking to focus on increasing capacity for groups that are Tier 3 for only some parameters collected to include all parameters as Tier 3? Alex said that she wasn't sure for each individual group, but their QAPPs provide the specifics. Peter clarified that Tier 3 designations typically are for DO, salinity, and temperature, and other parameters are not necessarily classified as Tier 3 monitoring because they are not specific to regulatory criteria. Bacteria might be another parameter under consideration for Tier 3 certification. Alex said that in addition, groups that are using EPA approved labs have their total nitrogen (TN) and total phosphorous (TP) collections categorized as Tier 3 as well, due to the lab certification. However, Tier 3 bacteria is a separate conversation CMC. The groups Blue Water Baltimore and the Nanticoke Watershed Alliance collect nutrients at Tier 3 level. Alex asked the group which volunteer monitoring groups they would want to prioritize moving to Tier 3, and if they need any additional information.

Peter said that it would be valuable to prioritize working with groups on the lower Choptank River such as Shore Rivers, since that would complement hypoxia monitoring on the Choptank.

Breck Sullivan (USGS) said if Alex wants more input from people who may use the data, a good group to get feedback from is the Integrated Trends and Analysis Team (ITAT), which has representatives from academia and jurisdictions. She also added that she would advocate for prioritizing the Rappahannock Indian Tribe since the Chesapeake Bay Program would like to prioritize working with tribes. Peter added that working with their monitoring group would additionally be beneficial since the lower Rappahannock is on the list of sites for hypoxia monitoring.

2:00-2:15 Updates on field audits — Durga Ghosh

Durga shared that she is in contact with the relevant citizen monitoring groups and she plans to start field audits with Arundel Rivers Federation first.

Doug Moyer (USGS) said it would be good to get the conversation going on who would be interested in tackling nontidal network audits in different jurisdictions in collaboration with USGS. Durga explained that efforts got delayed to start those audits because she got sick in the fall when she was going to start them, and since she is the only person working on them, there's only so much she can do at once. The next step is to solidify dates for each audit.

Doug Moyer suggested collaborating between the USGS offices and states offices within each state. For example, VA USGS would collaborate with VA DEQ, and MD USGS would collaborate with MDNR and DNREC, and PA USGS would collaborate with DEP and SRBC.

He suggested that USGS take the lead on making sure the field audits are accomplished in that particular jurisdiction and figure out how to go between jurisdictions in future years. Durga clarified she was going to start with this method and move forward with it. Everyone is on board with using this method for audits; the next steps are to get dates to do the audits. Doug said ideally they would target higher flow conditions where the isokinetic equipment is being used instead of grab samples. Sometimes these conditions are unpredictable, but fall is generally a good time to get them. Durga also suggested auditing the bigger streams during the summer and smaller streams later in the year.

Next steps: revisit the details of this methodology for field audits, and fill in any missing information such as points of contact. Then, reach out to points of contact and get confirmed dates for field audits. If needed solicit feedback from the nontidal network workgroup.

2:15-2:25 Break

2:25-3:00 4-Dimensional Interpolator **Elgin Perry**

- *Elgin Perry will provide an overview of the 4-Dimensional Interpolator tool being developed by the Bay Oxygen Research Group*

Elgin explained that the goal of the 4-Dimensional Interpolator is to allow the CBP to address some criteria that have been on the books but haven't been addressed due to not having the tools to address them. Those criteria missing assessment include short term weekly mean and daily minimum. Elgin said the tool will not be expected to accurately predict DO in 3 dimensions in the Bay on an hourly basis, but instead, to give a fairly accurate picture of the frequency of violations of the instantaneous minimum criteria.

Elgin gave an overview of the development process that the interpolator developers undertook. They first started out with observed data, then used a Generalized Additive Models (GAMs) approach to produce a 4-D prediction of DO. The first step is to get a daily prediction of DO. Then they addressed more short term and short space variations. For example, in many places in the Bay, the diel signal can be seen reflected in DO. It might have a deterministic component but there will also be some random noise reflecting variability in DO that the tool is not able to predict. These will be put into the water quality assessment to come up with the frequency of violations.

For testing the interpolator, a dataset from a segment of the Bay was utilized. This particular segment was chosen for testing because it includes the deep trench. The test period used was from 1991-2019. First, they measured the distance to every station location in the Bay. Then they had that same metric system identify each location in the Bay where they want to do prediction. They have one strategy that measures the distance along the thalweg of the Bay. That's the longitudinal estuarine dimension. They get the latitude from measuring the shortest distance from station to thalweg. Observations east of the thalweg are positive numbers and west are negative numbers. Another strategy is based on National Hydrology Dataset (NHD) flow lines.

Elgin highlighted the principal variables that the team is using. A difficulty of using other variables is that it is necessary to understand how they operate in the 4-D space as well, and some are not available to them. Other variables they're considering adding to the model are flow,

solar radiation, wind and temperature. However, they haven't had much luck with adding flow; they get lag times that are very long.

Elgin demonstrated some outliers in the data, which stations from Tangier Sound that had an unusual low DO event early in March. It is these kind of phenomenon the team wants to capture with the second stage of their model.

Discussion:

Tish Robertson (VA DEQ) asked if the GAMs model will perform in a similar fashion in the Lower Bay mainstem as it does in the Middle Bay, thinking of the effect that the Atlantic has on DO concentrations in the Lower Bay mainstem. Elgin responded that's something the team is just starting to explore. Their first exploration will be to see if they can fit this model in a tributary like the Patuxent and then couple that with what's going on in the main channel of the bay. They don't know yet if they'll fit those two segments as one model or as two models and then force the two models to join up using some kind of penalized likelihood method. Tish also asked the probabilistic data generated by the benthic monitoring program might have some utility as a validation tool. Elgin responded that any data they can get is valuable for validation. To use it in model development, however, they have to have data that's observed on a rigid timescale. For validation, it doesn't have to be in a rigid timescale, though. So they are thinking there is a lot of data flow data at least for surface data. The DO data from other programs such as the benthic program would be helpful. The team is specifically short on bottom observations that would give them a handle on what spatial autocorrelation would look like at the bottom of the Bay. That's a gap in the data arsenal.

Carl Friedrichs (VIMS) complimented the explanation of Wavelet Analysis. He also commented that he liked Tish's concept of using the benthics data. Car added that there's a long term monitoring program at VIMS called ChesMMAP which is used to model fish populations at the bottom. They do random sampling and collect DO data in a lot of different scales spatially, so that could be a great validation tool for later use.

3:00-3:30 Coordinated Split Sample Program **Mike Mallonee**

Mainstem Split Sample Data November 2021-November 2022

Tributary Split Sample Data December 2021-December 2022

Mike commented for the PP outlier from VIMS in the Mainstem, they'll check their calculations and get back to him. Betty Niekirk (VIMS) said Carol contacted her today and will have the recalculated values to Mike by next week.

3:30-3:50 Topics for Next DI Meeting **All**

Cindy Johnson (VA DEQ) asked if members would be interested in a hybrid in person and virtual meeting. Some were and some were not due to distance or other concerns. August will send out a poll to see if there is enough interest to host a hybrid meeting.

3:50 Adjourn