Minutes
Data Integrity Work Group (DIWG)

Monday, March 18, 2024
Meeting materials are posted at this link.

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

Participants:
Alexandra Fries (UMCES), Amber DeMarr (CBL), August Goldfischer (CRC), Becky Monahan (MD DNR), Betty Neikirk (VIMS), Carl Friedrichs (VIMS/CBNERRVA), Carol Cain (MD DNR), Ceana Hoburn (UMCES), Chris Mason (USGS), Cindy Johnson (VA DEQ), Doug Moyer (USGS), Durga Ghosh (USGS), Emily Young (ICPRB), Heather Wright (ODU), Ian McMullen (DNREC), Jaclyn Mantell (CBL), Jake Kilczewski (MDE), James Colgin (USGS), Jamie Shallenberger (SRBC), Jay Armstrong (DCLS), Jerry Frank (CBL), Jimmy Webber (USGS), Kevin Minga (ODU), Lara Phillips (MDH), Lexis Carter (ODU), Liz Chudoba (Alliance for the Chesapeake Bay), Mariah Smith (ODU), Meg Gitter (UMCES), Meighan Wisswell (VA DEQ), Pam Higgins (PA DEP), Mike Mallonee (ICPRB), Samira Azemati (MDE), Sarah Holter (Blue Water Baltimore), Suzanne Doughten (ODU), Tracee Cain (DNREC), Tyler Shenk (SRBC), Verónica Figueroa Negrón (UMCES)

Next steps/action items:
- ✓ Carl Friedrichs (VIMS) will report on shallow water monitoring data for the Data Integrity Workgroup at a later date.
- ✓ Participants in the blind audit program should let Jerry Frank (frank@umces.edu) know if they have a change in address, and/or if they would like to have more or less samples than they currently are signed up for.
- ✓ Let Durga, Cindy (cindy.johnson@deq.va.gov) and August (agoldfischer@chesapeakebay.net) know if you have topics for future DIWG meetings.
- ✓ All accredited laboratory participants: Please submit to Durga (dghosh@chesapeakebay.net) the following information by May 3rd, 2024:
    - The minimum requirements/criteria that your lab has to follow according to your lab's accreditation requirements when modifications to methods are made (including switching to a new instrument).
    - Durga will use this information to make a barebones template to inform other non-accredited labs for them to implement, in order to ensure the CBP is not adding additional requirements on labs in addition to what they have to do to maintain accreditation.
- ✓ Elgin Perry will assist with statistical analysis help on the question around the 100-sample requirement for the parallel study.
    - August will schedule a meeting with Elgin, Durga and lab participants in mid-May.
- ✓ Potential monitoring funding need: funding to provide quality assurance for starting nontidal and bacteria Tier 3 community science data collection to be used by states.

Minutes:

1:00 PM Introductions, Announcements, Updates

Cindy Johnson (VA DEQ) announced that Betty Neikirk will be retiring from VIMS.

James Colgin (USGS) provided an update on the ongoing process for reconstructing the Nontidal Network (NTN) database for supporting the computation of nutrient and suspended sediment loads and trends across the NTN. The project team has brought together 5 or 6 different data sources now, and they all capture the vast majority of the sample dates for the period of record. They have 98-99% of each of the jurisdictions' data. They're looking at the values now and constructing some rules to identify any discrepancies. James is working with a few PA sites before he applies those checks and rules to the rest of the network. Then the group can take a look at how all the values are panning out. James is also working with Dawn Hintz at SRBC who is going to upload a good chunk of SRBC's historical data in the NTN. She's working on getting that into the Data Upload and Evaluation Tool (DUET) and the Data Hub at the Chesapeake Bay Program so that James' team can pull from that resource.

Cindy asked James if his team is on target to meet their deliverable date. James said he thinks they are. They'll have the data ready for actually calculating the updated loads and trends. The data release of the raw data might come a little bit later, but they can get started on the calculations.

1:10 PM Monitoring and Laboratory Analysis updates

- Ian McMullen (DNREC) said there are no updates for Delaware. Tracee Cain has been working on their new flow injection analysis method developments and getting everything validated.
- Lara Phillips (MDE) provided the update for Maryland and said they're working on trying to acquire these instruments, and it has been challenging with the permit process. Otherwise, they are moving along. They are now fully staffed.
- Carl Friedrichs (VIMS) provided an update for Virginia. He said regarding VIMS' involvement in shallow water monitoring, all their calendar year 2023 data from the Rappahannock River is uploaded to the Virginia Estuarine and Coastal Observing System (VECOS), including both continuous monitoring (con-mon) and data flow (which is fixed station) data. They are done with the Rappahannock and have moved into the new stage of program. Carl said he will report on it when they have that data completed. They have uploaded to the Chesapeake Environmental Data Repository (CEDR). Carl also added that it has been wonderful working with Betty Neikirk.
- Doug Moyer (USGS) provided an update for Virginia USGS. He said they are on target for the nontidal network, and will have their storm samples and monthly samples collected by the end of June.
- Cindy Johnson (VA DEQ) provided an update for Virginia DEQ. She said they've had issues with boats but hope to have them up and running shortly. They've been able to use smaller boats to get the most out of their sites in the meantime, and their data deliverables are up to date.

- Jay Armstrong (DCLS) provided an update for the laboratory. He said they are continuing routine operations. They had a change in leadership. The manager moved to another job, and they'll be advertising for a management position.
- Suzanne Doughten (ODU) provided an update for Old Dominion University. She said they've completed January and February cruises. They were not out today (March 18th) due to winds, but hopefully they'll finish those up soon. They are also working on getting the SEAL up and working. They have half the parameters running on SEAL now. They had to do some methods. Heather Wright was doing particulate phosphate. ODU runs it with a dilution line rather than pre-diluting the samples, and because of that they had to take the acid out of the molybdenum to get a good color and get it to work, and they changed some of the reagents on a few things, but pretty much it's going well.

1:15 PM Blind Audits Update – *Jerry Frank (CBL)*

Jerry Frank said he sent out the FY23 report on the blind audits last week. The samples for the next round of blind audits should be sent out next week. Jerry said to please let him know if anyone participating in the blind audits has a change of address, and/or if they would like to have more samples or less samples than they are currently signed up for.

1:20 PM Coordinated Split Sample Program – *Mike Mallonee (ICPRB)*

Mike Mallonee gave an update on the coordinated split sample for the mainstem and tributaries. Jay Armstrong (DCLS) said he looked at the Tributary NO_2-N F Split and checked it because it was farther away from the rest of the group. He looked at the data and for all three samples they got the same answer, so he's confident that this is the concentration of the solution that was analyzed. The blanks all indicated acceptance criteria within normal bounds. He's not sure why it is so different from the others, but the data looks good.

1:30 PM Coordinated Split Sample Program capabilities
Discussion on the following questions: How are these data further used? Are these results used to calculate uncertainty associated with values from the labs? Are these data used to correct or exclude data from compilations? How are outliers communicated to labs and lab users?

Doug Moyer (USGS) asked what kind of analysis is done on these data, and is there a flag about errors? Mike responded that Durga works these data up on an annual basis.

Durga said that originally all labs were required participate in all of the performance tests that are available to compare the labs. Since then, however, there has been a large change in the landscape in terms of participating labs, especially in terms of nontraditional monitoring groups increasing their capacity in sampling. It was difficult to get all the labs to participate in all 3 of the performance sampling. So it was decided that having these programs and participating in at least 1 or 2 of the programs for performance sampling would be adequate for each of the labs, and that's where it stands right now. All the labs participate in at least 2 of the programs.

In terms what is done with the data for the coordinated split sample program, Durga said she sees it as the labs being proactive in looking at how their data compares to the other labs' data from that timeframe. For example, as Jay mentioned, he looked at the data before today to make sure nothing was off and was able to see a discrepancy and investigate it. Things like decimal points are easy to overlook. But sometimes it's a deeper problem. It is much more useful to understand if there is a deeper problem now rather than several years later when it's published. Durga said she sees the program as a real time look at results over the last 3-6 months. Are these results used to calculate uncertainty associated with values from the labs? Yes and no. They don't formally use those numbers because there are other checks in place. But yes because it's a premonition of something going on if things look amiss continuously.

Durga explained that after Mike reviews the data and shows the Data Integrity Workgroup the result, Durga looks at all the composite data over time to make sure that nothing has been missed in that snapshot shown to the workgroup. Since the workgroup looks at it in brief periods of time, Durga takes a look at it annually to see if there are any trends of potential uses that need to be communicated back to the labs.

Doug Moyer asked, how different do the values have to be before a concern is identified? What level of uncertainty is acceptable? Durga replied that she communicates with the lab if the problem seems to persist. If there is a sporadic increase or decrease in value, Durga reaches out. There are some expected fluctuations, but if she starts seeing a trend that spans over time than she knows there is a problem. The reason this workgroup doesn't hear too much about that is there haven't been too many problems, which is good, but doesn't mean these checks aren't necessary.

Suzanne Doughten (ODU) commented that they get this data a week or so in advance so they look at the data in each lab internally and if they see an outlier they go back and let Mike Mallonee know. It's mostly the labs themselves looking at the data. Durga re-emphasized it is about the labs being proactive.

Doug Moyer said it's great to see this long-term comparison in the tidal waters, and asked is there any reason to think this is comparable in the nontidal waters? Is there a missed quality assurance (QA) opportunity in nontidal waters? Durga responded by confirming with Mike that the tributary samples are analyzed by the nontidal laboratories. Since they are processed by the nontidal labs that's how the comparison is drawn.

Doug responded that a part of that analysis would be, does that comparison cover the range of conditions that seen in the nontidal waters above the fall line where particulates may get much higher, like Total Suspended Solids. Certainly, the tidal freshwaters would begin to compare. It just depends on what the range of conditions represents. Durga said what Doug alluded to in terms of range - it is a wide range, and she doesn't know if that comparison can be drawn in terms of numbers. It may not be a part of this program, but she does look at all the QA samples and draw some comparison as much as possible. It is just too wide of a range to be included in

this program, but the tributary samples provide some comparison since they are processed at the same labs.

Cindy asked if they found funding to do the audits and Durga said she believes so. More details on that to come soon.

1:45 PM Lab comparison for Lachat switch out

Discussion of requirements for the sample comparison study when switching to a new instrument and how many samples should be required when all labs switch to the same instrument(s).

Durga provided some background on the issue. Everyone is switching to SEAL instruments and the question was raised at the October 2023 DIWG Lab Meeting if everyone needed to run 100 samples, which is required in the methods manual whenever a modification is made that will have ramifications on the data. A significant number of samples are run under different conditions to be confident that the data from the new instrument compares to data from the previous instrument. Durga said from a QA standpoint she would say that 100 samples are required. However, having heard the conversation from the last meeting, she said there is enough consensus to perhaps reconsider. Jerry pointed out that the labs don't have a choice; they all have to switch from the Lachat and it's happening no matter what. They won't be able to say the data isn't good enough and go back to the previous instrument. Having said that, it's still important that if there is variability in the data, it can be accounted for and tracked. Therefore, some number of samples still need to be run.

Durga made a proposal to the group on how to go forward. Since many of the labs are accredited labs, Durga suggested that she could compile the minimum requirements that accredited labs have to follow when a modification to a method such as switching to a new instrument is made, and then use those as a guideline/template for all the labs (even if they are not accredited). She proposed that instead of each lab submitting an individual modification form, to have a document that details the requirements for this particular switch (Lachat to SEAL), and share the data, putting out a formal report and an addendum to add to the method modification protocols. She emphasized the need to have this documentation for the future so that if something is found to be amiss later, it's possible to go back and know which lab did what. Durga offered to collect the information on minimum requirements for each lab and put out this report if everyone agrees to this proposal. She asked if that sounds reasonable.

Jerry asked for clarification on what Durga was asking for from the labs. Durga said she was asking labs to share with her exactly they are required to do to compare results from two instruments. What are the criteria they are required to do when modifications to methods are made? (For example, run x number of samples, make sure all of their internal controls are good, make sure if they have multiple matrices they're using multiple matrices, run samples over different times of the year, etc.) She could then use this information that accredited labs are required to follow to make a barebones template to inform other non-accredited labs for them to implement when they are not sure what they need to do. Not all labs are accredited, and

Durga said she doesn't want to implement additional requirements on labs in addition to what they have to do to maintain accreditation.

Jerry asked if Durga was looking for the path of least resistance for labs, or doing it the way the Bay program decided to do it a long time ago? For example, when CBL switched from segmented flow to discrete analysis, they understood that was a fundamental technology change, so they did the 100 pairs analysis and produced a report. For the labs making a same technology shift like segmented flow to segmented flow or flow injection to flow injection, Jerry asked if Durga is offering a less stringent path that still meets the minimum requirements of certification for certified labs?

Suzanne Doughten commented that when the labs first raised the question, it was because every lab was changing the same instrument, going from Lachat to SEAL.

Cindy added that when they did the YSI swap, they cut back on the number of samples that each field team was supposed to collect so overall they had 100 samples but they had all the matrices and seasons covered.

Durga said that she was worried if she comes up with a blanket rule that the Chesapeake Bay Program (CBP) wants all the labs to use, given that it's a certainty that all labs are doing this switch, would this mean more work for the labs that are already forced to do something as requirement by The NELAC (National Environmental Laboratories Accreditation Conference) Institute (TNI)? Would there be another set of procedures just for the CBP? Now is the time to make that decision. Durga said she was open to suggestions in terms of how to proceed for accredited and non-accredited labs.

Jay Armstrong commented that TNI and Code of Federal Regulations (CFR) have pretty much the same requirements as the Bay Program. TNI and CFR requirements are a little bit less stringent because they don't include the parallel study. They require a demonstration of capability. Under their requirements, labs will determine the method detection limit using a population of blanks and low-level standards to establish a limit of quantitation and the precision of reporting. The analysis of four certified reference materials are required as well with pre-determined passing and failing criteria, and this is called an initial demonstration of capability. Generally, they are running reference methods or modifications of reference methods under the 136.7, which is allowed modifications for environmental methods. As long as the chemistry or species isn't changing (ie not going from colorimetric to conductivity) then that reference method is operated within allowable changes, which makes it a reference method verification. The idea is these methods have been verified before they even get to the lab so the lab is just verifying that they can perform them. The twist with the CBP is all the labs do that, and then they do the parallel study to see what the difference will be to the population going forward. Jay said data with no bias doesn't exist, whether it is measurable or not. He thinks that the parallel study somewhat captures those things but is not sure if 100 samples is better than 50. The group has been talking about how once they make an instrument purchase their hands are tied. Of course, research goes in before the purchase. Jay said he's not sure if

100 samples are necessary especially if there aren't even 100 sampling sites; perhaps once at each site or one for each set of sites with similarity makes sense. There will be differences whether they're statistical or not. The more important thing is the practical difference. A lot of what the labs are looking at is below reporting limits, the most imprecise range that anyone can operate in. From day-to-day operation the curve can give intercepts that change the values across the board by 1ppb or 2 ppb.

Suzanne commented that the statistical workgroups wanted this [the parallel study] so they didn't get a big step trend when everyone changed instruments.

Durga said that given there is a wide variability of samples across watershed it becomes more important to be able to compare the results. She said she think that's why some of the CBP requirements are different from some of the EPA methods requirements. The comparison study is a little more stringent for that reason. Coming back to the question of 100 samples, it statistically made more sense. Durga said she was open to suggestions though.

Jerry said there were a couple of different scenarios going on and asked if Durga wanted groups to still submit the information on minimum lab requirements regardless? Durga said yes, they should submit this information to her. She said that as the program grows, it will help for further analysis downstream to know what past modifications were made and to have documentation to reference. She will share this documentation with the group.

Jay said it would be nice to hear from a statistician regarding the 100-sample question, and Durga said Elgin Perry may be able to help.

Mike asked if this would this be issue that needs a Data Analysis Issue Tracking System (DAITS) documentation? He said anytime an instrument or method changed it is documented it in a DAITS. Durga said yes, it would.

2:00 PM Break

2:15 PM Community Science updates – *Liz Chudoba (Alliance for the Chesapeake Bay) and Alex Fries (UMCES)*

Liz Chudoba introduced herself as the water quality monitoring initiative director at the Alliance, and the project manager of the Chesapeake Monitoring Cooperative (CMC). The CMC's goal is to work with the community-based water quality monitoring projects across the Chesapeake Bay watershed and integrate that data into a centralized place for use by the CBP and state agencies. CMC has a 3-tier system for assessing the quality of data that comes to them. Tier 3 is the highest Tier; it has standards for tidal monitoring including depth profiles at 1-meter increments weekly in the summer. There are 5 approved Tier 3 groups right now; Anne Arundel Community College is newest group. The other groups are Arundel Rivers Federation, Nanticoke Watershed Alliance, Blue Water Baltimore, and MDE's shellfish monitoring program. She said that the next community science Tier 3 group will most likely be the Severn River

association. Shore Rivers is currently Tier 2 and may be the next Tier 3 group after that. Right now, however, they're only collecting surface and bottom measurements instead of the full depth profiles.

2:25 PM **Bacteria Monitoring Discussion** **–** *Liz Chudoba (Alliance for the Chesapeake Bay)*

Presentation:
Liz started out by sharing that CMC has been having two related discussions: How bacteria monitoring fits into the tiered system; and the potential for a nontidal Tier 3 (since currently Tier 3 standards only apply to tidal water quality monitoring parameters). Liz went over the two types of bacteria monitoring available. Tier 1 level of bacteria monitoring used to be the Coliscan EasyGel but has since moved to R-card. Tier 2 level of bacteria monitoring is the IDEXX Colilert/Enterolert system and Membrane Filtration. Over the years, this system has become more accessible, more cost effective and time effective. Taking the samples to a lab can take up to a week to get results back. Since bacteria data is very time sensitive - about 48 hours after collection, it's not very viable for use – having the ability to run the samples in-house is valuable. The time considerations for using this system are huge; getting fast results allows groups to post results quickly, which allows the public to make informed decisions on how they are recreating on those waterways. Over the past couple years, the system has become more popular and community science groups have set it up in offices.

Liz explained that CMC ran into an issue on how to make sure the data from these labs met the quality standards to meet Tier 2 – specifically, they ran into differences across state boundaries.

Liz went over a reminder of basic requirements in CMC's Tier system. Tier 1 requires documented methods manuals, SOPs and what the groups are doing in the field; Tier 2 requires a monitoring program manual or an approved Quality Assurance Program Plan (QAPP) if a specific project requires that. For labs, Tier 2 status requires a state or EPA approved QAPP for Tier 2 data. For Tier 3 status, each monitoring program needs an approved QAPP, a field audit conducted by the DIWG, and the lab needs to be certified or CBP approved. Parameters of interest for Tier 3 status are total Nitrogen, total Phosphorous, and Chlorophyll A. The DIWG has been doing the field audits for those programs.

Liz said looking at the possibility of integrating bacteria and other parameters that are measured in nontidal waters, the data user would be the state integrated reports, and these Tier 3 requirements don't translate over to these particular parameters very well. The parameters used vary by state, and the ways that community science is integrated into integrated reports also varies by state. Across the Bay watershed, conductivity, dissolved oxygen (DO), water temperature, pH and bacteria are the most widely used parameters, but it varies state to state.

CMC has been working on figuring out what the program requirements are outside Tidal Tier 3. They've been able to get QAPPs approved by either a state agency or the CBP; Durga has been approving a lot of QAPPS for field and lab components. However, field audits and lab

requirements (lab certification or lab audit requirements) have been inconsistent. CMC is hearing from a lot of monitoring groups that having Tier 3 data is a high priority, specifically for bacteria. It gives them data credibility when educating the public on water quality issues and recreation decisions. It also helps to have reliable data when advocating for people to make recreational decisions based on that. Other priorities this data would address are lawsuits and identifying permit issues, helping to secure funding opportunities, and assisting regulatory decision making listing and delisting waterways. CMC has been having a lot of conversations about this in Maryland especially, and they're trying to figure out a pathway forward.

Liz said that the question is, who should do the field audits? Who should approve and/or certify the labs to make sure all the data is being collected consistently from all these different groups? Some state agencies have already been doing this. VA has been approving QAPPs and conducting lab and field audits for some time now. They use it as level 3 which is equivalent to CMC's Tier 3. They do use this data in the integrated report. CMC has discussed this with MD groups because they all have approved QAPPs. CMC is currently working on a process with MDE to conduct field and lab audits so the data can be used in their integrated reports.

CMC is also discussing how this might look across other jurisdictions as well. They don't want to make systems that don't work for other states. CMC is trying to balance what the quality of the data needs to be with making sure they're being consistent across all of the jurisdictions. One challenge is the regulatory data use is at the state level and there are different standards and ways data is used across states, which makes it hard to have consistent protocols. CMC is working towards it, and welcome suggestions.

Discussion:
Durga said that this was very helpful especially the last slide with comparisons between states. She said she sees that CMC has a CBP approved QAPP in MD and a potential MDE field audit. Durga asked a question about what Liz mentioned regarding regulatory roles. The CBP has no regulatory role in any of this and neither does Durga. Is it necessary to revisit the QAPP approval process if a regulatory component is being introduced to it? Liz said that's a good question and they've circled around it in multiple venues. She thinks they need to keep asking that. "Should the CMC do the field audits?" has been asked but CMC doesn't have regulatory authority. Liz said she thinks the end user of the data should make sure the data follows standards. It does pose challenges if every state is providing their own Quality Assurance (QA) resources. It makes it more challenging to think about it so siloed as just what the states can do. Liz said she thinks some centralized structures are needed even if there are some state structures too.

Becky Monahan (MDE) said that MDE doesn't have the expertise or bandwidth to do that now. They need to figure out what can be done in a realistic time frame and have no answers right now.

Cindy said from VA's point of view, it is a question of having standards. VA does have a quality assurance position and have had grants in place since before Cindy started working for VA DEQ.

They would prefer to keep their QA in house in order to meet their standards for their integrated report. But if there are states that don't have a QA position as VA does, maybe the Bay Program can take on that role, provided there is funding.

Liz said CMC appreciates the support of VA DEQ and they are figuring out what to do with other states. CMC doesn't want to leave other states out just because they can't afford the QA position. They want to have an opportunity for this nontidal/bacteria Tier 3 pathway for all the groups and states involved.

2:50 PM Topics for Next DI Meeting

3:00 PM Adjourn