MINUTES

Analytical Methods & Quality Assurance Workgroup (AMQAW)

Chesapeake Biological Laboratory, Bernie Fowler Lab, Room 1101
Thursday, June 19, 2014
10:00 - 3:00

Meeting Webpage: http://www.chesapeakebay.net/S=0/calendar/event/21741/

ACTION ITEMS

- Invite VA DEQ citizen monitoring coordinating staff to present at the next workgroup meeting. (AMQAW Leadership)
- Invite Diana Muller from the South River to join the AMQAW WG. (AMQAW Leadership)
- Mary Ellen Ley will contact the PADEP laboratories to determine the possibility of PADEP maintaining the role of the laboratory analysis agency for the six stations long-term.
- Elgin Perry and Bill Romano will revise the "Comparison Study" document based on comments from this AMQAW discussion.
- Mike Mallonee will check data submittals; DCLS did submit TN split sample results.

LEADERSHIP

Bruce Michael (Chair)	MDNR	Bruce.Michael@maryland.gov
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Lea Rubin (Monitoring Staff)	CRC/CBPO	lrubin@chesapeakebay.net

PARTICIPANTS

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Announcements *(Bruce Michael, AMQAW Chair – MD DNR, AMQAW)*

- The Chesapeake Executive Council convened on June 16, 2014 for the signing of the new Chesapeake Bay Watershed Agreement, signed by all six states in the Chesapeake Bay Watershed and Washington D.C.
    - All press materials are available at the CBP Press Center www.chesapeakebay.net/presscenter.
    - The Chesapeake Bay Program Goal Implementation Teams are responsible for developing management strategies over the next 6-12 months.

- In FY '14 the Chesapeake Bay Program monitoring budget is restored to FY'12 funding levels including mainstem grants and 117 (d) grants that support the NTN.

- In September the DHMH laboratory will be moving to a new facility.

- The director of the Occoquan Watershed Monitoring Laboratory, Dr. Thomas J. Grizzard is retiring. His replacement has been selected.

- Elgin Perry, Independent Consultant, has moved therefore his home number and address have changed and can be found on his new email signature.

- The MD-DNR email client has changed. MD-DNR employees can now be reached at the following: FirstName.LastName@Maryland.gov.

BASIN (Building and Sustaining Integrated Networks) Status *(Bruce Michael – MD DNR and Lea Rubin – CRC, CBPO)*

Bruce Michael and Lea Rubin provided an overview of the three phase BASIN review process coordinated by the STAR Team. The purpose of BASIN Phase II is to gather information on alternative long-term monitoring operational structures and additional funding sources to make recommendations on how to maintain the Chesapeake Bay Program long-term water quality monitoring networks until 2025.

BASIN Phase I *(complete)* was a response to the FY13 funding cuts and pushed the Chesapeake Bay Program community to examine the funding support thresholds of the long-term water quality monitoring networks.

- *Phase I results*

BASIN Phase II *(in progress)* is the information gathering phase focused on water quality monitoring. As part of phase II STAR hosted a panel series of nine case study long-term monitoring programs across the U.S. and around the world, as well as Tidal and Nontidal workgroup discussions to examine network design and funding alternatives. Phase II will conclude with the BASIN water quality report to consolidate the lessons learned and recommendations from Phase II.

- *BASIN website*
- *An overview presentation on BASIN*
- *Webinar on the BASIN phase II case studies* *(IAN webinar series, Bill Dennison – Vice President for Science Application IAN, UMCES)*

BASIN Phase III *(in progress)* is the inclusion of monitoring beyond water quality. Phase III is the evaluation of monitoring gaps in meeting the Chesapeake Bay Watershed Agreement.

Evolution of STAR and STAR Workgroups *(**Bruce Michael – MD DNR)***
Supplemental Material: STAR Revising Science Activities Draft Document

STAR is revising their science support activities to better support the Chesapeake Bay Program community needs. The restructuring of STAR and STAR workgroup leadership and functions is still in progress. As per the draft structure, AMQAW will evolve into the "Methods, Quality and Data Access Workgroup" with the following functions:

- Field methods
- Laboratory analyses
- Citizen science field, lab, methods and data management
- Center for Collaborative Computing cloud computing solutions
- Chesapeake Bay Data Center

Comments on new functions of the Workgroup:

- The Methods, Quality and Data Access Workgroup will be expected to provide advice for quality assurance/quality control of data throughout the program but will not be expected to manage all data.

- The new workgroup will be responsible for establishing and implementing quality standards for lab and field methods. Citizen science data will need to meet these standards to be used for Chesapeake Bay Program criteria assessments.

Comments from the AMQAW on new functions of the Workgroup:

- Virginia Department of Environmental Quality has a citizen monitoring program. The VA DEQ citizen monitoring coordinator should be invited to join the new workgroup.
    - Water Quality Data Liaison, Stuart Torbeck (Charles.Torbeck@deq.virginia.gov)

    - Quality Assurance Coordinator, James Beckley (James.Beckley@deq.virginia.gov)

- ACTION: Invite VA DEQ citizen monitoring coordinating staff to present at the next workgroup meeting.

- ACTION: Invite Diana Muller from the South River to join the AMQAW WG.

Nontidal Water Quality Monitoring Network Operational Challenge: six monitoring sites transfer in responsibility from Pennsylvania to Maryland *(Elgin Perry – Independent Statistics Consultant, Bill Romano – MD DNR)*
Supplemental Material: Perry & Romano Comparison Study Method Proposal

Due to resource limitations, beginning in October 2014, the Maryland Department of Natural Resources (MDNR) will assume full responsibility for sampling six stations that are presently sampled by Pennsylvania Department of Environmental Protection (PADEP) South-central Regional Office staff and analyzed by the PADEP Bureau of Laboratories. Elgin Perry and Bill Romano proposed a method of comparison to estimate the overall, combined effect of changing sample collection and lab analysis agencies.

AMQAW discussed options for side-by-side routine sampling field audit:

- Mary Ellen Ley and Doug Moyer volunteered to perform field audits for MDNR and PADEP field sampling methods. The options for comparing methods are as follows:

Option 1: Under the assumption that the six stations will be sampled by the MDNR field crew but will continue to be analyzed by PADEP laboratories.

1) PA and MD field crews can both monitor the six sites collecting concurrent samples
2) Both PA and MD field crews would send the samples to PADEP for processing.

    - PADEP may have the ability to continue processing both samples collected by MDNR and PADEP through October 2014 for the comparison study.

    - ACTION: Mary Ellen Ley will contact the PADEP laboratories to determine the possibility of PADEP maintaining the role of the laboratory analysis agency for the six stations long-term.

    - MDNR will need to adjust field sampling methodology for the six sites if samples are to be analyzed by PADEP laboratories due to differences in laboratory analysis methodology.

Option 2: Under the assumption that MDNR will be the responsible agency for the field sampling and laboratory analysis for the six stations.

1) MD field crew fills a churn splitter (S1) and PA field crew fills a churn splitter (S2)
2) MD will sample from S1 and S2, and PA will sample from S1 and S2,
3) Both PA and MD field crews will send their samples to their respective labs for processing.
4) For next sample collected: MD filed crew fills a churn splitter (S2) and PA field crew fills a churn splitter (S1) (alternating churn splitter)
5) Repeat steps two & three.

Additional questions and concerns regarding comparison study:

- **Will there be enough data collected during a three month period to properly calculate an adjustment factor of the combined effect of changing sample collection and lab analysis agencies?**

    - A three month study would grant a sample size of 18 routine samples and tentatively six storm samples. According to E. Perry's table, "mdd18" representing a sample size of 18 data point, would render the following minimum detectible difference:

Table 1. Minimum Detectable Difference for select parameters by sample size
Perry & Romano Comparison Study Method Proposal (Page 4)

Parameter	std.dev	mdd6	mdd12	mdd18	mdd24	mdd30	mdd36	mdd42	dl
PO4	0.037	0.0302	0.0214	0.0174	0.0151	0.0135	0.0123	0.0114	0.004
NH4	0.018	0.0147	0.0104	0.0085	0.0073	0.0066	0.006	0.0056	0.008
NO2	0.006	0.0049	0.0035	0.0028	0.0024	0.0022	0.002	0.0019	0.002
NO23	0.122	0.0996	0.0704	0.0575	0.0498	0.0445	0.0407	0.0377	0.002
TOC	1.078	0.8802	0.6224	0.5082	0.4401	0.3936	0.3593	0.3327	0.5
TN	0.272	0.2221	0.157	0.1282	0.111	0.0993	0.0907	0.0839	NA
TP	0.03	0.0245	0.0173	0.0141	0.0122	0.011	0.01	0.0093	0.01
DIN	0.124	0.1012	0.0716	0.0585	0.0506	0.0453	0.0413	0.0383	NA

- Doing this type of comparison study results in an average adjustment factor to be used for all stations alike, however the impact on the accuracy of the data could vary depending on the station, as learned by Elgin Perry in a previous study. (Contact: Elgin Perry)
    - Will the amount of data collected in the three month period be enough to create a linear model to determine whether the adjustment factor is attributed to a station effect vs. the methodology affect?
        - Elgin believes that a sample size of 18 is not enough data points to develop a linear model.
- A comparison study on monitoring procedures in Mattawoman Creek led to the conclusion that there was not enough data during the paired period to understand the ramifications and ultimately led to an incorrect adjustment factor. (Contact: Doug Moyer)

- **Are there other options for managing the new data sampled by MDNR if the comparison study does not result in the determination of an acceptable adjustment factor?**
    - Elgin Perry suggests putting an intervention component in the models to explain jumps in long-term data sets.
- **Storm event sampling will require a different comparison approach due to the challenges of storm water sampling.**
    - At least one storm event sample should be included in the study because of the ratio of storm samples to routine samples collected annually.

- **How will samples collected for the comparison study be recorded in the DUET database?**

    - MDNR will not include the data collected in the first three month transition period for the comparison study in the DUET submittals.

Summary & Next Steps:

1) Mary Ellen Ley will contact the PADEP laboratories to determine the possibility of PADEP maintaining the role of the laboratory analysis agency for the six stations long-term.
2) ACTION: Elgin Perry and Bill Romano will revise the "Comparison Study" document based on comments from this AMQAW discussion.
3) Mary Ellen Ley and Doug Moyer will schedule a field audits for MDNR and PADEP either Option 1 or Option 2 of side-by-side routine sampling depending on PADEP's response to step one.
4) Depending on the laboratory results from the side-by-side routine sampling field audit, a study will be conducted to determine if an adjustment factor is necessary.
5) AMQAW will make recommendations for transitioning the six stations to MDNR depending on the nature of the comparability/incomparability of the data.

Conowingo Pool Non Tidal Tributary Study *(Bruce Michael – MDNR, AMQAW Chair) Information on the Lower Susquehanna River Watershed Assessment (LSRWA) can be found al the following website: http://mddnr.chesapeakebay.net/LSRWA/index.cfm*

LSRWA partners plan to release the draft report on Monday, June 23, 2014 for review by a small group of stakeholders and the Chesapeake Bay Program's Scientific & Technical Advisory Committee (STAC) members. The report will express the lessons learned and recommendations from a three year study. In the 1990's early 2000's it was reported that the Conowingo Pool which acts as a retainer of sediment from entering the Chesapeake Bay, blockaded by the Conowingo Dam, had 10 to 15 years time before it would reach maximum capacity. Now, based on the work of the LSRWA we know that the Conowingo Pool has reached a critical state called "dynamic equilibrium" defined as the state at which the Conowingo Pool has reached a limit where storm events cause scouring of the sediment, depositing the sediment into the Bay creating space in the Pool to continue to act as a retainer of sediment during hydrological base river flow.

LSRWA Report Conclusions:

- If the sediment and nutrients collected in the Conowingo Pool is not mitigated now that the Conowingo Dam has reached dynamic equilibrium the Chesapeake Bay will not meet the Total Maximum Daily Load (TMDL) by 2025, with full

implementation of Watershed Implementation Plans (WIPs) in the Chesapeake Bay Watershed.

- It is not necessarily the sediments impacting the water clarity, but the nutrients associated with the sediments that are impacting the segments of the Chesapeake Bay from meeting the water quality standards criteria for water clarity. Without mitigating the Conowingo Pool, and with full implementation of Watershed Implementation Plans (WIPs) in the Chesapeake Bay Watershed, three segments will exceed dissolved oxygen criteria.

- A majority of the sediment (~80%) entering the Chesapeake Bay still comes from the watershed, therefore while mitigating the Conowingo Pool it is important to continue with WIPs.
- The LSRWA studied the hydrological high flow storm events (i.e. Hurricane Irene and Tropical Storm Lee) but not the storm events at lower flows (under 400,000 $ft^3 \bullet sec^{-1}$) which are now believed to similarly cause scouring.

LSRWA Report Recommendations:

- Enhanced monitoring at the Conowingo Dam as well as Dams north of Conowingo on the Susquehanna River, of lower flow storm events and nutrient loading during those lower flow storm events (200,000 – 400,000 $ft^3 \bullet sec^{-1}$).

    - Exelon has agreed to fund additional monitoring over the next two years to capture data during the lower flow storm events.

    - Exelon funds will contribute to placing continuous monitoring stations to capture samples during the lower flow storm events to examine the loading of sediment into the Chesapeake Bay.

- The inclusion of 4 major tributaries flowing into the Conowingo pool (4 additional monitoring sites) to capture storm events only. Chesapeake Biological Laboratory (CBL) will do the SSC laboratory analysis.

- This LSRWA will help inform the process of the 2017 Chesapeake Bay TMDL mid-point assessment. Therefore the data collected at the additional 4 tributaries should be comparable to the Chesapeake Bay Program Water Quality Monitoring Networks data.

ODU Comparisons of Skalar and Lachat Instruments *(Suzanne Doughten – ODU)*
A Presentation on the comparison study can be downloaded from the Meeting Webpage below heading 'Related Files' named "ODU Comparison Study – Skalar and Lachat Instruments"

ODU is switching to the Lachat system due to reasons such as lower detection level, speed, cost, volume of sample required for analysis, lower level of maintenance as well as others. The comparison study included samples with a range of concentrations, salinity, and seasonality. ODU will be using the Lachat system as of July 1, 2014.

Parameters analyzed in the comparison study:

- Nitrate + Nitrite (NO23F)
- Nitrite (NO2F)
- Total Dissolved Nitrogen (TDN)
- Orthophosphate (PO4F)
- Total Dissolved Phosphate (TDP)
- Particulate Phosphate (PP)
- Ammonia (NH4F)
- Silicate (SIF)

Conclusions from the comparison study:

<u>NH4F/SIF/TDP/PO4F/PP</u>

- Overall the results suggest that for the concentration ranges encountered during sampling in the Lower Chesapeake Bay Mainstem, any differences related to change in instrument will unlikely result in a substantial change.

- Status and Trend analyses should be unaffected by instrument switch.

- No adjustment factor is needed for long-term data sets as a result of using the Lachat instrument.

<u>NO23F/NO2F/TDN</u>

- The results suggest a bias between the instruments, with the Lachat having higher results compared to the Skalar.

- The difference between instruments increases with increasing sample concentration.

- It **may be** possible to develop correction factors or alternatively use statistical methods that take these effects into account (e.g. Blocked Seasonal Kendall analysis, Generalized Additive Models).

Coordinated Split Sample Program *(Mike Mallonee – ICPRB/CBPO)*

Mike Mallonee presented results from the Mainstem and Tributary Split Sample Program.

- February Mainstem Results
  - DCLS did an extra rinse during the procedure of measuring TSS/FSS as recommended by AMQAW members previously. Results continued to be biased high with the August 2013 and November 2013 Split Samples.

- March Tributary Results
  - ACTION: Mike Mallonee will check data submittals; DCLS did submit TN split sample results.
  - Does the Chesapeake Bay Program have a preference between reporting Total Dissolved Phosphorus (TDP) versus Total Phosphorus (TP)?

    Some labs measure both TDP and TP and some labs measure only TDP. ***If your laboratory measures both parameters, please report both to Mike Mallonee.***

Blind Audit Final Report *(Jerry Frank – CBL)*

Results from winter Blind Audit survey have been submitted; Jerry Frank will have the final report for the group at the next AMQAW meeting.

- Laboratories used by Citizen Monitoring/Non-traditional partners will be encouraged to participate in the Chesapeake Bay blind audit Program.

USGS Reference Sample Program *(Lea Rubin – CRC/CBPO)*
The Spring 2014 Results can be downloaded from the Meeting Webpage below heading 'Related Files' named "USGS Reference Sample Program – Spring 2014 Results."

- ODU's TP result on study sample N-121 was biased low relative to the Most Probable Value (MPV). As discussed at the March AMQAW meeting, they increased the TDN/TDP digestion temperature from 105°C to 120°C. The higher temperature produced a result of 0.161 mg/L TP, very close to the MPV (0.0162 mg/L TP). The TN concentration was the same at the higher digestion temperature. The laboratory will change their SOP to 120°C.

2013 Summer Anoxia *(Bruce Michael – MDNR, AMQAW Chair)*

- Eyes on the Bay – MDNR 2014 Chesapeake Bay Hypoxia Report – Late June Update

- Continue to track the hypoxia during the summer at Eyes on the Bay – Monitoring Stories.

Next AMQAW Meeting: September 30, 2014