Nontidal Network Workgroup Bi-Monthly meeting

Wednesday, August 21st, 2024
1:00PM – 2:30PM

Meeting Materials: **Link**
This meeting was recorded for internal use to assure the accuracy of meeting notes.

Participants:
Alex Soroka (USGS), Andrew Keppel (MD DNR), Ashley Hullinger (PA DEP), August Goldfischer (CRC), Bhanu Paudel (DE DNREC), Lucretia Brown (DOEE), Chris Mason (USGS), Cindy Johnson (VADEQ), Dawn Hintz (SRBC), Doug Moyer (USGS), Gabriel Duran (CRC), James Colgin (USGS), Jamie Shallenberger (SRBC), Jimmy Webber (USGS), Joe Duris (USGS), Kaylyn Gootman (EPA CBPO), Lori Brown (DE DNREC), Mark Nardi (USGS), Mark Brickner (PA DEP), Maya Sterett (Alliance for the Chesapeake Bay), Mike Mallonee (ICPRB), Molly Pulket (PA DEP), Natalie Schmer (USGS), Peter Tango (CBPO), Tammy Zimmerman (USGS), Tom Parham (DNR), Tyler Shenk (SRBC), Tyler Trostle (PA DEP), Nick Murray (WV DEP).

Next steps:

- ✓ *Based on the poll results NTN WG leadership will schedule the field trip component of the October in-person meeting.*

Minutes

1:00 PM - Welcome, introductions

- Staffer introduction: Welcome Gabriel Duran as the new NTN WG Staffer, who will be taking over for August.
- Quick introductions from everyone in the call.

Announcements:

- Upcoming conference National Water Quality Monitoring Conference in Green Bay, Wisconsin – 2-week extension for abstract submissions.
- *Tammy Zimmerman (USGS):* announcement of stream site (super gage site) demonstration at York County at the fishing creek near Goldsboro, for Wednesday September 25th at 10 o'clock (during York County watershed week). [Registration link]

1:10 PM - Updates

Historical database reconstruction (James Colgin - USGS)

> *James Colgin:* NTN data compilation is still in the works. Finished reviewing of inputs to go into Weighted Regressions on Time, Discharge and Season (WRTDS) for loads and trends with more reviews to follow. Finished up reviewing sediment and

almost close to finishing the rest of the parameters. Will soon start running WRTDS-Kalman (WRTDS-K) estimates on sediments and other parameters. Hopefully have them complete by the end of year/early January. Closer to the finish line!

Explanation/context: In the past, other tools were used to get load and trends estimates for the nontidal trends (like estimator, the databases historically used were in SAS). But we have been modernizing our procedures for the last few years to pull data from the web, using more modern API data calls using R and other USGS packages – gathering historical data and data stored on the web of all the nontidal network data – full review/data inventory. Ensuring and solidifying data is comparable and consistent across time.

NTN funding analysis and proposed next steps (Kaylyn Gootman)

Kaylyn Gootman: How is the nontidal network paid for? *Big takeaway* – this is a network of partners (at least 30 different groups) that funds this modeling network. Partners are listed by the following: 8 Federal, 9 Jurisdictions, 9 local government, 4 other. The majority of stations are funded by 2-5 partners.

Generally, it costs about ~7.5 M/Yr (FY22/23) across 123 stations (in today's dollars it is pricier). The median station cost is ~52k/Yr. The annual cost breakdown for all 123 stations in NTN is the following: O&M for streamflow at all stations (32% of annual cost), discrete sampling at all stations (56% of annual cost), continuous water quality monitoring at 28 stations (12% of annual cost).

Next steps:

Outcome of the PSC meeting – Lee McDonnell and Ken Hyer will be leading a P2 effort to develop funding strategies that address vulnerabilities and protect the investments in Chesapeake Bay Monitoring Networks (which includes the nontidal network). This will be done through assessment, and partner coordination. This is an ongoing discussion with more to come soon.

For this exact analysis, Mark, Kaylyn, Lee and other colleagues, are having conversations about how to make this information more useful to partners? How do we roll this up into a summary format for our audiences and sharing with our networks? *Mark Nardi*: hoping to create a product that looks like a USGS fact sheet (2-3 pages) – quick info about the different partners, dollar amounts, science on the backside and the outcomes of these stations.

This work will be part of a proposal to the Environment Virginia panel discussion that will include Kaylyn, Jimmy, and Bryant Thomas with Kasey as moderator and Peter as reviewer. The aim is to discuss lessons learned from 40+ years of water quality monitoring in the Chesapeake Bay Program.

1:40PM - Restoration Monitoring with CMC and NFWF – *Maya Sterett (Alliance for the Chesapeake Bay, Water Quality Monitoring Projects Coordinator, msterett@allianceforthebay.org)*

Maya Sterett: Community Based Restoration Monitoring Program (Chesapeake Monitoring Cooperative, CMC). Looking specifically at stream restoration and not just water quality monitoring. Partners include National Fish and Wildlife Foundation (NFWF), Chesapeake Monitoring Cooperative (CMC), Stroud Water Research Center, Chesapeake Bay Program (CBP), Alliance for the Chesapeake Bay, Alliance for Aquatic Resource Monitoring (ALLARM) at Dickinson College, and Izaak Walton League of America (IWLA). Funding comes from NFWF (EPA).

Background/context: 2021 – CMC partnered with NFWF to develop a program to have volunteers track the progress of stream Best Management Practices (BMPs) funded through the NFWF Chesapeake Bay Stewardship Fund. The goal was to see what the BMPs look like 5 years down the road. Pooling our resources and networks together, we developed some background research to identify the water quality impacts of these restoration practices, and we conducted stakeholder meetings to see what efforts were already happening. Development efforts:

1. Background research of the water quality impacts of the restoration efforts. What are they? Not a lot of consistencies across the different efforts and programs.
2. Stakeholder meetings and surveys.
3. Study Design to determine the best monitoring protocol to answer questions.
4. Protocol development. A lot was reused – not to reinvent the wheel, but more consistent and allow for the data to really hold across the states.
5. EPA Quality Assurance Project Plan (QAPP) approved.
6. Database Development (survey 123)
7. Data collection

Monitoring Goals:

1. Assess the status of the intervention pre, during and post restoration (5 years after BMP installed).
2. Develop case studies that help NFWF document visual/physical impact of practices on local streams.
3. Alert project managers to potential issues (e.g., fallen fences, bank erosion).
4. Community engagement and education. Piloting the Protocol – year long testing in 2022. Full roll out in 2025 with 7-10 sites annually.

Piloting the Protocol:

1. Testing of the protocol developed began in May 2022 followed by revision and training materials.
2. We had piloted some sites in 2023-2024 (9 sites).
    a. Currently, we are recruiting volunteers with a full roll out in 2025 with 7-10 sites annually.

What BMPs are we looking for? Cattle fencing, forest buffer, stream restoration. All efforts need to be funded by NFWF. Additionally, with the data that we are taking, we are looking only within that site, i.e., does this BMP work at this site? We are also looking at comparing in between BMPs. For instance, what is forest buffer doing in 2 different sites?

Some constraints to site selection – not only do the BMPS need to be funded by NFWF but also safe for the project managers. Also, projects can only be in order 1-3 perennial streams. Monitoring occurs in Spring and Fall, so water needs to be year-round. The stream must be at least 100 meters of treatment. Property owners need to agree for all 5-years, twice a year.

Monitoring: doing water quality indicators. This includes water temperature and clarity. Visual/physical assessment of stream geometry, stream viewer measurement, etc. In spring only we collect benthic macroinvertebrate (family level ID – Wheeling Lab).

What are the actual impacts on the stream? Visual/Physical Assessment:

1. Cross section Measurements, wetted width, bank angle, stream viewer measurements (stream bed – substrate, phytoplankton and submerged aquatic vegetation (SAV), embeddedness, etc.), bank height, bank characteristics (cracks? mud? Erosion? Checklist of present/not present). Lastly, general reach characteristics, like riffles/pools/runs, aquatic vegetation, floodplain inundationm, impacts on animals, etc. This happens 3 times at a site (3 cross sections).
2. Standardized photos – six standard stream reach photos from the bank at the 25% reach length, mid-channel at the 50% reach length and the bank at the 75% reach length.
3. How is the riparian area looking (4m corridor – 2 m on either side of the transect line)? Number of pre-established trees, planter trees (post-restoration), dead or fallen trees, invasive species, and any general concerns – including impacts on animals.

8 current sites – mostly in PA, 1 in MD and 2 near Richmond, VA.

Discussion:

Jimmy Weber: ***Q:*** What do the activities look like for community engagement? ***A:*** We want to engage with landowners on what we're doing and a lot of the organizations that get NFWF funding. Encouraging these orgs to come out for site visits and conduct sampling.

Kaylyn Gootman: ***Q:*** have you talked with landowners about how they will utilize this information/outcome after the 5-years? Passing the torch? Help with decision making? ***A:*** We are not entirely sure what we will find in the data, but we will end with a 5-year report and case studies. If things go well or not, we want to take our work to other organizations to share our successes/shortfalls.

Jamie Shallenberger: ***Q:*** any control sites? ***A:*** Short answer, No. Only looking at pre and post BMPs at a given site. There are some anticipated major results, specifically the cattle fencing.

Peter Tango: There is good connection with some of the monitoring that looks at both major expected responses and legacy results according to BMPs. These delayed responses are important to capture and relevant in the long-term work happening in this project that is often not captured.

New website [link]

2:00 PM - Real-time Sediment and nutrient concentrations and loads in York County, PA – *Natalie Schmer (USGS)*

York County sites: Super Gages! A super gage is a USGS monitoring stations with real time data of watershed process, including land use change, ecosystem processes, etc. These stations monitor usual water quality parameters like discharge, turbidity, etc. But they commonly monitor additional parameters including nitrate, etc. with next generation sensors. If it doesn't have these sensors, it is still considered a super gage since it gives us real time data that can inform other variables, for example turbidity for sediment. York sites were established to monitor York County progress towards satisfying existing regulations and meeting regulatory goals: CBP, EPA, State Total Maximum Daily Loads (TMDLs) or Watershed Implementation Plans (WIPs), and progress determined by Bay Model.

The YC Monitoring Program is 6 sites (3 previously existing NTN stations), and 11 sites total across 4 different counties in PA that do this kind of monitoring. This program specifically is partnered with the York County Planning Commission. Operation includes lab data of discrete samples and continuous monitoring data for concentration and load estimation (Surrogate Regression Model). The discrete samples are taken to capture the range of hydrologic conditions, base flow to high

flow, and across the seasons. These models are sent out for publication and sampling is continued to validate the models.

Surrogate Regression Model – Focus on sediment concentration (SSC), Total Nitrogen (TN) and total Phosphorus (TP). Currently using combinations of turbidity, nitrate, seasonal terms, and flow. This data is published in a "model archive summary". These equations are applied to the continuous data to calculate concentrations and loads, daily mean loads, and annual loads.

Model Archive summary – This is done using R markdown for consistency, reproducibility across all project and sites. This is published in a publicly accessible USGS database (ScienceBase). R Markdown allows controlling of the format and producing HTML file that can be opened in a browser. The model archive summary includes:

1. Formula for the relation of sensor and sample, with statistics and plots that describe the relationships.
2. Relation calibration data (how does the sensor relate to the discrete sample).

Data to date (as of yesterday!) - Preliminary

Load plots – these are helpful in estimating annual loads and estimating timing and magnitude of load events in a particular watershed (events can be very localized as demonstrated in the site West Conewago Creek).

Yield – a useful way to compare exports because it is normalized by the drainage area. This can be a tool to target implementation of management practices.

Next Steps – Additional data:

BMP data – where are they, how long have they been there, and how effective are they? *Use CAST as supporting data for estimating reduction?*

- Baseflow separation for nitrate/dissolved constituent transport.
- High-res land use and landcover.
- Permitted discharges.
- Ecosystem analysis – Gross Primary Production (GPP)/Ecosystem Respiration (ER) modeling (stream metabolism). They have Dissolved Oxygen (DO).

We want to compare their surrogate models to the NTN loads – using their sites as calibration or verification for the Bay models (on the county scale). NTN loads via WRTDS and WRTDS-K on the site level as site-specific calculations.

Next Steps – Products:

Stakeholders need additional tools and data presentations that will help with decision making - more accessible and easier to understand.

- This might look like something of a “dashboard” - using R Shiny. Highly customizable, can include plots, maps, texts, links, interactive maps and plots.
- Geonarratives – various platforms like ArcGIS Online. Highly customizable, can include plots, maps, text, links, etc., and can be more appropriate for educational purposes.

2:20 PM- Poll: Will you attend an in-person meeting at SRBC on October 22nd? [link]

We are looking forward to the 22nd of October (at SRBC – 10AM – 3:30PM) as a workshop centered day with Q&A and planning of priority stations. The second day will be a site visit to an NTN station.

2:30 PM - Adjourn