Nontidal Network Workgroup Monthly meeting

Wednesday, March 16th, 2022
1:00 PM – 2:30 PM

Meeting Materials:
https://www.chesapeakebay.net/what/event/nontidal_network_workgroup_march_2022_meeting

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

ACTIONS

- ✓ All USGS employees who are interested fill out survey for NASA technology innovation initiative before March 22
- ✓ Peter Tango talk to Chuck Walker about prioritizing the Conowingo continuous monitoring (con-mon) site and what the longevity of the current funding is
- ✓ Tom Parham, Alex Soroka, Joel Blomquist to loop in Peter Tango as necessary to meetings discussing the Conowingo con-mon and other sites
- ✓ Doug Moyer, Chris Mason, Tammy Zimmerman, James Colgin and Cindy Johnson get on a call to talk about the consolidation of NTN data and plan improvements for Chesapeake Environmental Data Repository (CEDR) over an 18-month timeline
- ✓ Qian Zhang, Elgin Perry, John Clune and Jimmy Webber have a conversation about the referencing of the nontidal cluster analysis

MINUTES

1:00 PM **Welcome and Announcements**

-NASA technology innovation initiative – Breck Sullivan (USGS)

Peter Tango (USGS) began the meeting by welcoming everyone and having everyone introduce themselves with their names and affiliations. Peter announced that the Scientific and Technical Advisory Committee (STAC) Rising Water Temperatures workshop day 2 occurred yesterday and they are producing recommendations to move forward with science, policy and management needs.

Breck made an announcement about an opportunity with NASA and other agencies using the Small Business Innovation Research (SBIR) program to explore new observations or new tools to synthesize data. The NASA SBIR program will ask USGS employees to help identify possible topics and emerging technology that would support USGS work. There is a broad focus and topics include technologies that address observation gaps, or new tools and algorithms, or production of new services. The USGS National Innovation Center (NIC) and Community for Data Integration (CDI) are seeking to gather input from a diverse range of USGS scientists, engineers and program staff in a 10-15 minute survey found here: https://forms.office.com/g/w1d99piWUF. They'll pick from those to work with and help a

subset of the promising topics to work towards a proposal for this program. This group can think of what new technology is needed to help with monitoring and analysis and go through this NASA program to get this done.

Peter commented that they've worked with the EPA office of research and development occasionally on exploring opportunities like this. In the harmful algal bloom world they've gone through EPA Science to Achieve Results (STAR) grants and National Science Foundation (NSF) panels and even Sea Grants to explore new technology and innovation. This sounds helpful. Maybe there are elements of discrete assessments that they're doing that would be benefitted from trying to move them into more real time, miniaturized sensors. There are a host of innovations that make the monitoring program more effective, efficient and with greater coverage so perhaps they should take advantage of this opportunity. Peter asked when the closing date of the program is.

Breck said the deadline to fill out the survey is March 22nd, but she wasn't sure what the deadline for the full proposal was.

Peter said on the tidal-nontidal connection they have some turbidity sensing capacity in the tidal zone but when they talk about the water clarity sensing question, if people are using satellite imagery to look at a host of ocean color related issues, something like a way to widely disperse Kd assessments which are useful in calibrating and verifying the algorithms that folks are using to interpret imagery would be helpful. A low-cost sensor with a widespread application would facilitate them having a stronger tool set. Maybe there is something on the watershed side they can talk more about.

Tom Parham (MD DNR) announced a series of webinars from the EPA talking about the new bipartisan infrastructure law and how much money is available and where it will go and the pathway for these dollars. The series will explain where it's going and how roll outs will happen. The information was sent out to the group via email.

Peter announced that Chesapeake Community Research Symposium abstracts are due at the end of the month. This meeting moved from a modeling focus to a broader modeling/monitoring/research focus and has become a showcase for local work. Breck has a session on the Strategic Science and Research Framework, Qian Zhang and Rebecca Murphy have a session on monitoring and monitoring outputs, and there will also be one on science communication. One of the things that came out of the STAC Rising Water Temperatures workshop as an important need was science communication and public engagement.

1:15 PM PSC Monitoring Review Update – Peter Tango

Peter gave an update on the Principals' Staff Committee (PSC) Monitoring Review process. The monitoring review team gave a presentation on the monitoring recommendations to the PSC on March 2, 2022. The PSC had more questions and the team has continued to respond to the

questions. They are interested in looking at certain questions they posed back to the monitoring review team about previous work or details. The details are in the report. Breck and Peter are winding down the final review with a 15-page report that has turned into 80 pages of very detailed review of the monitoring program, what the Watershed Agreement outcomes need, the status of those programs and a financial assessment. The report is trying to explain the purpose of each line item and how it fits into the needs of the program going forward. The PSC heard our recommendations and now they have turned it back to us. The monitoring review team is coming back to STAR and going to interact with them going forward. The utility of the infrastructure money and other funding pots seems to be part of the discussions going on about where resources can be applied to address recommendations that the review team is putting forward. On the nontidal side, the recommendations are focused on covering the River Input Monitoring (RIM) stations and completing the continuous monitoring (con-mon) network. This ties well to recommendations on the tidal side for high frequency monitoring that feeds 4D interpolation work for supporting water quality standards and fish habitat. The recommendations also have some Susquehanna related contributions. The team is hours away from closing the full draft of the report for review and targeting the end of the month to officially release the report.

Breck added that while the PSC itself didn't have a lot of action items and next steps as a group, they have heard from individuals within the PSC and jurisdictions with their interest on pursuing the opportunities and they will be moving forward with all the hard work that the nontidal network workgroup has provided.

Doug Moyer (USGS) said he spoke with Joel Blomquist (USGS) about the con-mon at Conowingo. Joel is concerned the center won't be able to support that monitor much longer, the way funding has gone on the project and inflation costs. If funding were brought forward, Conowingo would rise to one of the top stations or the top station that needs to be supported over some of the others listed. Maybe this is a conversation Peter needs to have with Joel and the MD water science center and see their status and what is the longevity they see for the con-mon there below the dam. It is built on a sandy shoal (metaphorically). Peter responded that the director of the MD Water Science Center went on detail, then the acting director went on detail, and there is a new acting director Chuck Walker. Peter is now 50% assistant deputy director of MD water science center. He will talk to Chuck as soon as he gets a chance.

Tom added he has a meeting coming up with Joel, Alex Soroka and others to talk about Conowingo and putting con-mons at other places. MD funds the RIM monitoring. They were looking at trying to make sure that continues and look for any holes in funding. They're still trying to set a date for this meeting. They always have discussions about losing stations here and there and things get more expensive. Peter said to loop him in as necessary.

1:25 PM Update on CEDR NTN data inventory – Mike Mallonee

Mike Mallonee showed a spreadsheet with the data inventory. The inventory can be downloaded from the meeting materials page. He updated an old spreadsheet from 2015 that they had developed. All of the current 125 nontidal network stations are in the spreadsheet, by state and with their monitoring station name. The spreadsheet has the number of events for each site, the date range of what data is in Chesapeake Environmental Data Repository (CEDR) with the total number of data records, and any comments. Some of the stations have changed names over time as well as who samples them and that's captured in the file. Mike created individual files for the events and all data for each of the 125 stations. Mike said to Doug if he was interested in those, the Bay program recently did away with their FTP site due to security issues but now that they have a secure archive drive Mike can post all the files to that and send the link out with all the event data files.

Doug Moyer (USGS) responded this is really good information and he would like to talk to Mike more about this information and how it might impact the data delivered to James Colgin at the PA Water Science Center. He wants to see if they can work together to see if the historical data can be put in the same format so James can pull it into his scripts for the complete record. This is a great first step in identifying what they have and make sure it aligns with what they believe they should have or what were currently represented from Mike Langlin's historical data.

1:30 PM Discussion on CEDR NTN data inventory – all

Doug said the concern he raised on a previous call was that for some of the NTN stations that have been operated long-term since the late 1980s or early 1990s, those data were not captured in any of the Bay databases, whether it's CEDR or older ones. His concern was the analysts were using current data that Mike provides, provided by the states, entered in DUET and ultimately evaluated and reformatted and sent to James Colgin. They use those data plus they query the historical data that Mike Langlin has kept for quite some time that the states provided to him many years ago, and then build these data sets for Weighted Regressions on Time, Discharge and Season (WRTDS) input. They were losing confidence in that historical database, whether or not changes had been made in the state database which are the owners of the data and wanted to make sure they're consistent with that. Also, there were some oddities showing up in some of the database that didn't make sense. If they could have a single location for this data, all historical data back to the 1980s for each of the 125 NTN stations, and then they can do a fresh data pull every year, they would have greater confidence in those and know that they truly reflect what the jurisdictions are providing and have collected for those samples. That's the basis for this query. Now Mike has identified what he has access to which is great, and then if it's complete, what is needed to get this information in the right format to James and compare what they have to what Mike has now. It would be good to get from the jurisdictions to say this is the data we had, they reflect what we provided, it wasn't fed in from Mike Langlin's database, it truly reflects the raw data from data owners. The next step is to get Doug, Chris Mason, James Colgin, Tammy Zimmerman and others on a call to talk about pulling together data sets to determine that these are complete and have everything represented.

Mike said that sounds like a plan. DUET has been around since 2012, and a similar upload tool DUQAT was used before that. Anything that's been accepted and imported since 2008 is probably similar in quality. But going back to the 1980s, there were core trends stations, and that's bucket sampling, so that's included in here for some of the historical data. Mike said he wasn't sure what Mike Langlin was receiving directly from the states prior to Mike Mallonee starting to work with Mike Langlin and sending him those annual files.

Doug asked if the pre-DUET data could be fed through the DUET process? Is it possible, and is it worth it? If not, what might we want to add to the QA process on our side?

Mike said there have been some changes in file structure since the early years. There's a data tier field that would have to be added to anything that's not uploaded in the past two or three years. They also have a test environment that they could do a lot of this stuff without affecting the contents of their production database. He said he'd recommend doing this there in the test environment.

Doug said that's a great direction. The end goal is to have all data for the NTN in one location that can be queried and reproduced at any time. Down the road, they have some QA as well and want to identify some suspect sites based on the total concentration vs some of the parts. It would be good to say what are they learning, how can they inform or evolve the DUET process to better improve the quality of data they're receiving so when they get it, it's truly final and the states and labs have had an opportunity to go back. This would be an evolution of that process to further improve that data.

Mike said he agreed and if Doug and colleagues had an additional check that they always do with NTN data and if they can incorporate that as a new DUET check that would be a good route to go. Doug said there's lots to be learned from the process and added that Chris Mason is wrapping up the latest NTN loads and trends analysis, so this is a good time to be thinking about changes or updates to the database because the next analysis in 18 months is not too far away. It's a good time to invest effort in improving handling the data and building the datasets. Mike said he'd love to have all the data in one place and go from there.

Peter summarized the next steps which are to have a smaller meeting with Doug, Tammy, Mike James and Chris to plan this and see what can be accomplished over an 18-month timeline. Mike added that they'll make sure to loop in Cindy Johnson (VA DEQ) as well.

2:00 PM **Discussion on future methods publication and release of cluster analysis of nontidal network – all**

Discuss with group releasing cluster analysis of nontidal network as part of future publication(s) on NTN methodologies (including WRTDS-K).

Jimmy Webber and John Clune, who brought this topic forward, were not able to be on the call. Breck provided some background. Elgin was working on some nontidal cluster analysis work to identify different groups of trend responses and to see if there were similarities between

stations' trends in the NTN and to explain drivers. This was focused on the Susquehanna watershed. A lot of this information was to support work that John Clune was doing on communicating a story narrative on what is going on in the Susquehanna. With the follow up with him asking if there's any more work to be done closing off the NTN analysis work, he said one thing that would be beneficial is if Elgin's work could be published because currently he can include some of the information but it's not citable and for communication needs it needs to be from published work. Jimmy and John had some suggestions and one of them was through a method release of the NTN trend work.

Elgin Perry commented to dispel the notion that this is his cluster analysis. He did start doing this type of clustering using data from the tidal estuaries, but at the same time Qian Zhang and Joel Bostick started to apply cluster analysis on the nontidal network. So they have as much claim to this kind of clustering that Elgin does, it's not very different from what they've done. Publishing is not something Elgin typically does. He is happy to work with others if they want to publish it, though. Elgin asked if Qian would be interested in collaborating on a publication.

Qian replied that there is a separate focus between what he is working on with Joel Bostick and Robert Sabo and the work that Elgin is working on. This is really the Susquehanna, the stations that Elgin is working on. There are pieces for the Susquehanna that Elgin's work can be published with. Qian said he doesn't know if it should be published as a methods paper. Neither Elgin's work or Qian's work is inventing a new method here. With many different directions of analysis for the Susquehanna alone, it can fit very nicely into that. Qian said he lost track of the status of the Susquehanna work that John Clune and Jimmy and Qian had meetings on. Maybe they can catch up and see if they have ideas on publishing on the trends and other things. He thinks this can be published somewhere but he's not sure about the methods paper.

Peter added that he found it confusing to think that if Joel, Robert and Qian are working on a publication, if they captured it within that, wouldn't that suffice as the core reference, rather than needing to reference something that was done separately. Cluster analysis is not a novel approach. How it's being applied might be different, but the approach has been around a long time. We need a little more information from Jimmy or John where the issue is with using what's there. For many of the projects Elgin's typical approach is providing a page or two that lays out the steps he used and the technique and example of results with any other information needed. That's always been helpful for reports or other publications. Peter wondered if this can be enough or if it needs to be something independent.

Qian commented that the proof itself is out there, we're applying the approach that's published. But the code that Elgin wrote is valuable, and the way that he displays the results showing the seasonal monthly or other trends among those stations, that is something that's not there. Maybe if people want to approach this as a method paper maybe that can be the code that he wrote and the way the code is being used. Qian, John, Jimmy and Elgin can have a conversation about all of this. Elgin agreed that they all should talk. Elgin asked Qian what the

status of Joel's publication is. Qian said that Joel is defending it this month. The paper mentioned is under review. Maybe it will be published in another month.

Elgin added that there are differences in the way he scales data that are slightly different than what Qian and Joel did, but the concept is the same so in terms of having something to cite it seems that what Joel publishes would fill that role. Although would need to talk to John and Jimmy. Qian said that the results that Elgin found out for the Susquehanna alone deserve to be published, either alone or with other results.

Peter commented that depending on what Joel's publication looks like, is this something that a 500-word environmental note could help with to complete the reference?

Qian said that's possible but this can be discussed in a separate meeting.

Elgin said he didn't send to Qian the last thing he sent to John and Jimmy which was a 5-parameter summary for the clusterings for the Susquehanna. Elgin said he'll send this to Qian and then they can talk about how to proceed. Qian said that Elgin has been working on more parameters than Qian and Joel. It could be a method paper if focused on the code, or it could be more results oriented to explain and interpret the results along with other trends information.

2:25 PM Topics for next meeting

Peter said that for the next month, Qian has been coordinating with Matt Cashman on the network optimization question. There also will be an update on the PSC monitoring review, sharing highlights on the final findings. The full report should be available by that time. In two months (May), there will also be a round robin on current work, challenges and opportunities. If anything comes up over the course of the next month for something that has risen in priority for your jurisdiction or region and you'd like to bring it forward, this is always a forum and venue to discuss that – just send Peter a note.

2:30 PM Adjourn

Participants:

Peter Tango (USGS), Amy Goldfischer (CRC), Mark Brickner (PA DEP), Lucretia Brown (DC DOEE, water quality division), Ellyn Campbell (SRBC), Elgin Perry (statistics consultant), Durga Ghosh (USGS QA coordinator at CBPO), Doug Moyer (USGS VA-WV Water Science Center), Qian Zhang (UMCES), Mike Mallonee (ICPRB at CBPO, data manager), Curtis Schreffler (USGS PA Water Science Center), Chris Mason (USGS VA-WV Water Science Center), Carl Friedrichs (VIMS and Chesapeake Bay National Estuary Reserve), Breck Sullivan (USGS at CBPO, MD-DE-DC center, STAR Coordinator), Tom Parham (MD DNR), Tammy Zimmerman (USGS, PA Water Science Center), Cindy Johnson (VA DEQ).