Integrated Trends Analysis Team (ITAT)
Meeting

Wednesday, March 22, 2023
10:00 AM – 11:30 AM
Meeting Materials: Link

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

ACTION ITEMS

- **Alex Gunnerson will make a list of contacts for the stakeholders in the James watershed so they can be contacted when the tributary summary update is ready for distribution.**
- **Alex Gunnerson will follow up with Tish Robertson to share the James Tributary Summary update so she and any other interested members can review.**
- **Alex Gunnerson, Breck Sullivan, and Kaylyn Gootman will complete the climate change draft section of the James Tributary summary and include information about relative sea level rise compared to the global average.**

Meeting Minutes

10:00 – 10:10 **Welcome – Kaylyn Gootman** (EPA) and **Breck Sullivan** (USGS)

Announcements –

- Call for recommendations for which stakeholder groups ITAT should present to on the James Tributary Summary. The following groups were recommended:
  - James Riverkeeper
  - James River Association
  - Virginia Commonwealth University/Rice Rivers Center
  - Hampton Roads Planning District Commission
  - Hampton Roads Sanitation District
  - Virginia Association of Municipal Wastewater Agencies
- The STAR meeting on March 23rd may be of interest to ITAT members as living resource trends will be discussed during the Comprehensive Evaluation of System Response (CESR) portion of the agenda.
- Breck Sullivan, Kaylyn Gootman, and Alex Gunnerson are interviewing candidates for the Tributary Summary internship next week. The tentative start date is late May. The intern will help with some/all of the following duties:
  - Creating a template for tributary summary story maps.
  - Helping ITAT update future tributary summary updates.
  - Working with connecting the social vulnerability index to water quality data.
- Conferences of potential interest
  - Environment Virginia Symposium - March 28-30, 2023. Location: Lexington, Virginia. Session proposals were due in September 2022.

        - Kaylyn will be attending and presenting on tidal water quality criteria. Doug Moyer, Jimmy Webber, and Brendan Foster will be attending.
    - National Water Quality Monitoring Council's 13th National Monitoring Conference – April 24-28, 2023. Location: Virginia Beach, VA. Session proposals were due June 24, 2022.
    - Species on the Move – May 15-19, 2023. Everglades National Park, FL.
    - Interagency Conference on Research in the Watersheds (ICRW8) – June 5-8, 2023, Corvallis, Oregon.
    - Citizen Science Association conference, C*Sci 2023 - May 22-26, 2023, Arizona State University campus in Tempe/Phoenix, Arizona.
    - Chesapeake Studies Conference – September 15-16, 2023, Salisbury University, Salisbury, MD.
    - CERF 2023 Conference: Resilience & Recovery – November 12-16, 2023, Portland, Oregon. Abstracts due May 10, 2023.

10:10 – 10:45 Compiled Tidal and Nontidal Trends for the Pamunkey Tribe – Brendan Foster (USGS)

A watershed story of the Pamunkey River - Incorporating traditional knowledge is an essential and invaluable part of learning about watersheds. For this presentation to ITAT, Brendan focused on insights gained from synthesizing scientific and traditional knowledge about the York River watershed, which includes the Pamunkey River. Of particular interest to many groups is linking nontidal and tidal water-quality data. A summary of these linkages in the York River watershed was presented.

Summary

Brendan began with the context that his previous work has been on fish passage at a more local scale, but this project has been at a much broader scale. This work was completed in collaboration with the Pamunkey Indian Tribe, which were the originators of this project idea. The objectives of this report were to synthesize published scientific literature, learn from the Pamunkey Tribal Elders, and identify gaps in combined knowledge. The presentation was focused on high-level takeaways from the Pamunkey Tribal elders and making connections between the tidal and nontidal trends.

The Pamunkey Tribe's priority topics fall into three categories: hydrology and water quality, river ecology, and relative sea level rise. For the sake of time, the presentation focused on water quality and relative sea level rise.

For the physical context and study area, most Pamunkey live within 5-10 m above sea level, but much of the reservation is below this level.

For relative sea level rise, Brendan overviewed how intensive groundwater pumping throughout Virginia's coastal plain over the past century has altered flow pathways and reduced groundwater levels in Virginia's coastal plain. Brendan provided some figures and maps showing where and how much groundwater levels have declined. One of the pumping stations is near West Point, VA, which is only ten miles away from the Pamunkey Reservation. Intensive groundwater pumping is also leading to aquifer compaction and subsidence, which contributes to how relative sea level rise in the southern Chesapeake Bay exceeds the global average. Consensus in scientific literature show that projecting the data out to 2100 suggests 3 feet of sea level rise, which

predicts a dire situation for the Pamunkey Indian Tribe and Reservation. Pamunkey tribal elders are acutely aware of how groundwater is affecting subsidence and sea level rise is directly impacting their community now.

For hydrology and water quality, Brendan noted there is a lack of hydrological analysis in the Pamunkey system. Brendan briefly highlighted some of what has been published, then compared the surface water quality impairments throughout the York River watershed based on the different agencies in the area. One major focus has been on bacteria.

Brendan walked through total nitrogen (TN) data in the tidal and nontidal portions of the York River watershed, using the USGS station near Hanover, VA (slide 15). One question this data raises is why despite decreasing inputs, higher TN is still present. Brendan compared some of the data from Rebecca Murphy and Chris Mason to show there was generally agreement in changes over time and magnitudes throughout the tidal and nontidal Pamunkey and Mattaponi despite differences in methodology. Another note Brendan made was 65% of the TN load originated in the tidal portion of the York River watershed.

For total phosphorus (TP), approximately equal contributions of the load are coming from tidal and nontidal. Brendan said more research is needed for understanding the TP trends.

Brendan also walked through total suspended solids (TSS), dissolved oxygen (DO), and best management practice (BMP) implementation. Brendan noted that the recent three years in the York have seen a decrease in DO attainment which are troubling and merit further investigation. Tribal elders verified secchi desk depth reading decreases with reports from their fishing activities.

In conclusion, tidal and nontidal water quality through the York River watershed is a complicated story with gaps in knowledge. One takeaway message is there is a lot to be learned from tribal elders who have critical long-term knowledge on these systems.

Brendan concluded with some next steps for this research (slide 28).

Discussion

Rebecca Murphy said this work is great, especially the decision to use same symbols for both tidal and nontidal trends. Rebecca said one of the symbols for TP on slide 22 appears to be headed in the wrong direction based on the line graphs in other parts of the presentation. Brendan said he will take a closer look at the symbols to ensure they are consistent and correct. Alex Fries said phosphorus in the bay is decreasing overall.

Tish Robertson said she hopes the 4-D Interpolator will produce more accurate DO assessment results for the Pamunkey tidal fresh (PMKTF) segment. The VIMS continuous monitoring station in PMKTF indicates improvement in DO, but this trend is not visible in once-a-month grab samples. Tish has hope for the Pamunkey oligohaline (PMKOH) segment as well, but especially for PMKTF.

Kaylyn said this a gold standard for integrating many different sources of information. Regarding land cover/land use, Kaylyn asked what the major land use types were in the York watershed. Brendan said it is mostly forest, but there is a lot of agriculture which is about half row crop, half pasture and hay.

Kaylyn asked if changes in groundwater due to sea level rise are affecting TN measurements at stations. Brendan said Randy McFarland wrote a report on groundwater quality and some of those transects go right through the Pamunkey. While this data is sparse, it is illuminating for the general picture of groundwater in this area. Brendan said future work on this topic will focus on how changes in pumping and groundwater level recovery may be affecting surface water quality.

Elgin Perry asked how the pumping stations are categorized. West Point is an industrial paper mill. For the Franklin pumping station, Brendan is unsure what the source was, but says Jason Hope's work should identify the source. Doug Moyer noted the Franklin pumping station has been discontinued and they are starting to see recovery. Brendan and Doug Moyer said they will look into the original source for the Franklin pumping station and will get back to Elgin. Elgin said he finds it interesting they are starting to see recovery already.

Elgin asked how large the tidal watershed is relative to the nontidal watershed. Brendan said he is not sure but can get back to Elgin. Doug Moyer said the drainage area above the Pamunkey and Mattaponi River Input Monitoring (RIM) stations is 1,078 and 603 mi^2, respectively.

Breck asked if the Pamunkey Tribal Elders have ideas why the short-term TN loads were increasing. Brendan said it depends on who you ask, but a few of them think agricultural runoff is the number one reason causing decreases in water quality.

Breck said STAR at the CBP would like to hear about the river ecology/wetlands portion of Brendan's report. Brendan said he would be interested in sharing his work at STAR. Brendan said he will share his report with ITAT once it is published.

Anyone with follow up questions can reach out to Brendan at bfoster@usgs.gov.

10:45 – 11:00 **Update on James Tributary Summary – Breck Sullivan** (USGS), **Kaylyn Gootman** (EPA), **and Alex Gunnerson** (CRC)

Breck, Kaylyn, and Alex gave a brief update on the status of the James Tributary Summary. Breck, Kaylyn, and Alex are drafting the climate change section and reviewing the tributary summary document.

<u>Summary</u>

Breck shared the Parameter-elevation Regressions on Independent Slopes Model (PRISM) data for the precipitation component of the climate change section of the tributary summaries is currently going through USGS review and should be available relatively soon.

Julie Reichert-Nguyen and Jamileh Soueidan of the Climate Resiliency Workgroup are supporting the climate section of the tributary summaries by reviewing it once Breck, Kaylyn, and Alex finish writing.

Anyone is welcome to review the tributary summary before it is sent to USGS for a full review. Tish Robertson offered to review the tributary summary.

Rebecca suggested considering and including relative sea level rise, global sea level rise, and subsidence in the climate section. Breck, Kaylyn, and Alex agreed that would be good to add, even if it is just a few sentences and a figure. Elgin suggested including a

graph showing relative sea level rise compared with the global average. Brendan said the figure he used was adapted from Egglestone and Pope (2013) https://pubs.usgs.gov/circ/1392/. Doug Moyer said his report may be relevant to the sea-level rise citation for the York: https://pubs.usgs.gov/of/2011/1191/. Rebecca said she has easily gotten long-term graphs on sea level rise from NOAA before and gave this example for Annapolis: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8575512.

11:00 – 11:30 **Chesapeake Monitoring Cooperative (CMC) Case Studies and Prioritizing Data for Tier 3 Accreditation – Alex Fries** (UMCES), **Matthew Kierce** (IWLA), **Liz Chudoba** (Alliance for the Chesapeake Bay)

Matthew Kierce and Alex Fries began by presenting CMC's new case studies. Alex Fries then presented the potential groups and parameters being proposed for advancement to Tier 3 Accreditation.

Summary

Alex began with an overview of the Chesapeake Monitoring Cooperative, its organizational structure, and how it has evolved since 2015. Much of the information gathered by CMC can be found on their Chesapeake Data Explorer.

Matthew said CMC decided to move forward with case studies because it was considered to be an important and effective tool, it was requested by volunteers and organizations, and case studies are a part of the CMC prioritization process. Matthew said the major components of case studies are their interactivity, geographical connection, and scalability. Effective case studies utilize effective visualizations and a clear, core message. Matthew walked through two case studies where non-traditional volunteering was key to restoration success. The CMC case studies can be found here.

Discussion

Breck said when ITAT goes to different places to present the tributary summaries, speakers can include the CMC case studies when relevant given the complementary nature of these products. One example of this is Breck sharing these case studies at the Association of American Planners conference in April.

Kaylyn asked what updates are planned for the CMC data explorer and noted the improvements thus far have been fantastic. Matthew Kierce says Dave Parrish has been working on more updates and plans to test the new functionality this year before a rollout next year.

Peter Tango commented tier designations are parameter specific. Specific data of a specific quality is key.

Kaylyn asked ITAT members if there were natural next steps for integrating this data into our work. Alex suggested reviewing the data for prioritization as a way to look for more connections.

Alex displayed a map of the groups and asked if ITAT has preference on where they want more data and which parameters are of interest. ITAT members responses are below:

- Breck asked if for the Wicomico Creekwatchers, there is potential for involvement with Salisbury University. Liz Chudoba said Salisbury University is already involved, but do not have a Quality Assurance Project Plan and are currently considered provisional tier two. To increase the standard, there would need to be a QAPP, a lab audit process, blind audits, and split samples. Breck said if Wicomico Creekwatchers is not selected, CMC should be aware Salisbury University has a green fund which might be used for lab updates. Liz said this is good to know.
- Elgin said by and large the ITAT data is a gross average of broad scale large tributary summaries. Elgin said he sees value in utilizing community monitoring groups at the smaller systems to tease out problems only visible at a finer scale.
    - Kaylyn said this is a good point and emphasized the importance of making a connection between station data and more localized information.
- Jon Harcum asked why the Rappahannock Indian Tribe is grayed out on the table of potential groups.
    - Liz Chudoba said the Rappahannock Tribe is just starting their monitoring program and has not yet determined which specific parameters they are going to measure.
- Rebecca Murphy, Jon Harcum, and Peter Tango all gave a vote for prioritizing Shore Rivers accreditation to Tier 3 given the lack of station data in that area.
    - Peter Tango said Shore Rivers seems like an important target since that program, monitors multiple tributaries in the region.
- George Onyullo asked how DC DOEE can integrate this data into their internal planning data and maps.
    - Liz Chudoba suggested having a follow up conversation to identify data needs and have a discussion with the CMC developer so DC DOEE can connect to the data explorer using an API. George asked who he should be in contact with. Alex (afries@umces.edu) and Liz (lchudoba@allianceforthebay.org) said he can contact them about this. George said he will reach out to start this conversation.
- Breck noted the parameters being monitored that align with the Water Quality Standards Attainment and Monitoring Indicator: dissolved oxygen, clarity, and chlorophyll *a*. Qian Zhang already includes Tier 3 data from those categories in the indicator, so a focus on those three parameters is useful. Breck noted parameters aligning with ITAT's work include TN, TP, salinity, water temperature, clarity, dissolved oxygen, and chlorophyll *a*.
    - Liz Chudoba noted not all of the parameters are necessarily being monitored for full depth profile samples or at weekly time scales in the summer. For example, the Blackwater site takes monthly samples for surface and bottom. Liz asked if ITAT needs full depth profile data weekly in the summer or if there is a use for other frequencies and samples that are only at the surface.
        - Peter Tango said there is precedence for the inclusion of single or once a month samples as a monthly average in long term monitoring programs, sampling designs, and datasets. This has been done in Maryland. Peter added that in a place like

Blackwater, a surface and bottom sample might as well represent the full profile given the local habitat and shallow depth. Hypoxia vertical profiles are another example of the flexibility in temporal and water column variability for samples.

Anyone with additional comments for CMC should contact Alex (afries@umces.edu), Liz (lchudoba@allianceforthebay.org), and Matthew (mkierce@iwla.org) to share their feedback.

11:30 Adjourn

Next Meeting: Wednesday, May 3, 2022

Participants: Alex Fries, Alex Gunnerson, Andrew Keppel, August Goldfischer, Breck Sullivan, Brendan Foster, Carl Friedrichs, Carol Cain, Cindy Johnson, Doug Moyer, Efeturi Oghenekaro, Elgin Perry, George Onyullo, Jamileh Soueidan, Jimmy Webber, Jon Harcum, Kaylyn Gootman, Liz Chudoba, Matthew Kierce, Mukhtar Ibrahim, Mike Lane, Peter Tango, Qian Zhang, Renee Karrh, Roger Stewart, Tish Robertson.