

**Integrated Trends Analysis Team (ITAT)
Meeting**

Wednesday, July 26, 2023

10:00 AM – 11:20 AM

Meeting Materials: [Link](#)

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

ACTION ITEMS

- **Alex Gunnerson will update the October 25th ITAT invite with the new meeting location information.**
 - **Completed**
- **Peter Tango, Leah Staub, Andrew Sekellick, and Breck Sullivan will discuss where it would be ideal for CMC to set up new monitoring locations to help address the stream gauge networks' lack of optimization for addressing environmental justice. After discussing this at the USGS annual meeting, they will share their thoughts with the Chesapeake Monitoring Cooperative.**
- **Breck Sullivan, Kaylyn Gootman, and Alex Gunnerson will review the tributary summary ranking exercise to determine which tributary summary to update next.**

Meeting Minutes

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

- Breck introduced Anoosh Tauqir, the C-StREAM fellow working with ITAT this summer on creating a story map template for the tributary summaries. Anoosh has been connecting with local watershed groups to gather their input on how to communicate the tributary summaries.
 - Anoosh explained she is in her third year at The George Washington University and is studying civil and environmental engineering, with a minor in sustainability. Anoosh plans to work within green engineering, sustainability, and public communication in the future.
- Breck announced the joint ITAT-Factors Team Retreat will take place on October 25th from 10am to 3pm at the USGS MD-DE-DC Water Science Center. Due to limited availability, this was the only location available. The meeting will be hybrid, but in person attendance is highly encouraged and post meeting activities are planned. The calendar invite will be updated shortly. The purpose of this meeting is to link patterns in the watershed with the estuary, including opportunities to explain why these trends are occurring and to build connections between team members.
- Thanks to the work of Alex Soroka and Chris Mason at USGS, (Parameter elevation Relationship on Independent Slope Model) PRISM data has been approved in a data release. This was the final component for the climate change section, so now the tributary summary climate change section has been completed and the James Tributary Summary has been submitted to USGS for

review as a cooperator report. However, the team still needs to identify a USGS reviewer. Anyone with ideas for USGS reviewers should contact Breck (bsullivan@chesapeakebay.net) and Kaylyn (gootman.kaylyn@epa.gov). The report is approximately 60-70 pages long with figures and appendices.

- James Webber suggested asking a USGS researcher at the Great Lakes Restoration Initiative, given positive interactions recently with the Chesapeake region. Kaylyn agreed this could be a good idea, especially in the context of the upcoming meeting on October 26th.
- Olivia Devereux asked if Jeni Keisman could be a reviewer. Breck replied that the team decided to keep Jeni as an author since she originally conceived the reports.
- Kaylyn asked which tributary would be second on the list for updates. Breck said we completed a ranking exercise when we decided on the James, so perhaps this would be a good time to revisit that ranking for number two. Kaylyn emphasized the James will serve as a template for future reports so they can be updated rapidly.
- Kaylyn shared that the Environment Virginia conference will be taking place the first week of April and will be accepting abstracts August 1st-31st. Kaylyn recommended attending this conference, and possibly putting a group together.

Upcoming Conferences, Meetings, Workshops and Webinars

- [Chesapeake Studies Conference](#) – September 15-16, 2023, Salisbury University, Salisbury, MD.
- [Potomac Conference](#) – September 21, 2023, Lorton, VA.
- [Virginia Water Monitoring Conference](#) – September 26, 2023, Henrico, VA.
- [Chesapeake Watershed Forum](#) – November 3-5, 2023, Shepherdstown, VA. Session proposals were due June 11. Poster proposals are due July 28.
- [CERF 2023 Conference: Resilience & Recovery](#) – November 12-16, 2023, Portland, Oregon. [Abstracts](#) were due May 10, 2023.
- [National Conference on Ecosystem Restoration](#) – April 14-19, 2024, Albuquerque, New Mexico. [Abstracts](#) are due September 1, 2023.

10:10 – 10:40 [Connecting the SPARROW Model to Social Science](#) – Andrew Sekellick (USGS), Leah Staub (USGS), Tristan Mohs (USGS)

An increase in environmental impacts on vulnerable communities may be expected due to enduring historical influences, present-day challenges, and anticipated future effects from climate change. An initial analysis of an existing SPATIally Referenced Regression On Watershed attributes (SPARROW) water quality model and the Centers for Disease Control social vulnerability index (SVI) suggest a possible relationship between predicted in-stream nutrient loads and SVI risk factors. This work demonstrates that the USGS can

use existing tools and data to address environmental justice issues. The presenters discussed this work.

Summary

Leah began with the definition of a vulnerable community in this context, which is informed by the CDC Social Vulnerability Index (SVI), and the importance of focusing on vulnerable communities. Leah provided examples of federal interest in this topic as one of multiple reasons for this project.

Andrew provided a bit of background on the SPARROW model predictions, which were employed here to answer the question “What do our existing water quality models tell us about conditions in vulnerable communities?” Results concluded that preliminary statistical analysis suggests a possible relationship between predicted in-stream nutrient loads and SVI risk factors. This presents concern given that excessive nutrients in streams and waterbodies can lead to harmful algal blooms, drinking-water treatment issues, and other negative health effects.

Andrew explained how stream gauges, which have critical uses including flood warnings, monitoring pollutant discharge, and mapping floodplains, are often not optimized for monitoring a community’s social vulnerability. A team at USGS is working on identifying these network optimization challenges.

Andrew concluded with next steps for this work now that funding has been acquired. Next steps include:

- Evaluate relationships between all SVI factors and SPARROW water quality predictions. These analyses could also be performed with other models or spatial data layers (pesticides, toxic contaminants, etc.)
- Perform gage network analysis to identify the range of social conditions represented in our monitoring network. Evaluate network for both flood warning and assessment of contaminants
- Support interdisciplinary collaboration opportunities to investigate human and socioeconomic impacts

Discussion

Breck said she was very happy to see funding for this project, especially given the interest from the Chesapeake Bay Program (CBP).

Breck asked if it would be possible to integrate bacteria data from the Chesapeake Monitoring Cooperative (CMC) into this work, since that is often a parameter of interest for residents wishing to use the waterway for recreation. Leah said she will look into this idea. Breck added that this work pairs nicely with CMC’s efforts to ensure they are increasing monitoring in under-resourced communities and co-producing with local communities by reducing barriers to entry in monitoring. Peter Tango said the annual CMC meeting is coming up in August, so it might be helpful to connect with CMC now or around that time to see if USGS can inform which new sites they decide to monitor. Peter suggested he, Andrew, and Leah discuss this topic at the annual USGS meeting in August and then send some notes to CMC on the topic. Andrew agreed with this idea. Breck suggested that during the USGS annual meeting small group discussion, this work can lead a guided discussion on this topic. Andrew agreed and mentioned they will have a poster on this project.

Kaylyn said this work represents where the CBP should be spending our time, which is synthesis now that we have all of this scientific information and can draw some conclusions to inform the public and decision makers.

10:40 – 11:15 [Impacts and uncertainties of climate-induced changes in watershed inputs on estuarine hypoxia](#) – Kyle Hinson (Pacific Northwest National Laboratory)

Kyle presented on work from his recent paper "[Impacts and uncertainties of climate-induced changes in watershed inputs on estuarine hypoxia](#)." Discussion followed the presentation.

Summary

Kyle began with the motivation of this paper, which was to answer the question “How will climate change impact the Bay watershed, and how certain are our projections of future oxygen levels?” Despite climate change affecting dissolved oxygen through sea level rise, increasing temperatures, and changing runoff, this research focused on changing runoff since environmental managers can have the greatest impacts on watershed actions.

Kyle explained the paper comprised of Earth System Models (ESMs), which were downscaled using Multivariate Adaptive Constructed Analogs (MACA) and Bias Correction and Spatial Disaggregation (BCSD) to create climate forcings, temperature and precipitation, for the Phase 6 Chesapeake Bay Watershed Model and the Dynamic Land Ecosystem Model (DLEM). This produced discharge nutrient loads, which were fed into the Chesapeake Regional Ocean Modeling System - Estuarine Carbon Biogeochemistry (ChesROMS-ECB) to forecast hypoxia. Kyle described how the ESMs were compared and selected, as well as results for the various combinations of models. Kyle quantified scenario uncertainty at a broad level and summarized hypoxia cumulative uncertainty, attributing 40% of uncertainty to the ESM, 35% of uncertainty to the watershed model, and 25% of uncertainty to the downscaling method. Kyle situated these results in a management context but provided some key caveats such as the efficacy of BMPs in the future and complete implementation of Watershed Implementation Plans (WIP).

Kyle concluded that:

- Uncertainties in climate scenario and watershed inputs produce highly variable marine hypoxia responses
- All future simulation factors (ESMs, downscaling, watershed models) contribute to scenario uncertainty
- Full implementation of management actions to reduce nutrients is the greatest source of uncertainty

Implications for future work include the importance of nutrient reductions, the need for collaborative modeling efforts, and continued simulation of the long-term evolution of climate impacts.

Discussion

Jeremy asked if the implementation of management actions is based on fully implemented 2025 WIPs, or on a progress scenario like 2021. Kyle said these are WIP scenarios that Gopal Bhatt ran in the Phase 6 Watershed Model.

Claire Buchanan said Kelly Maloney found [somewhat similar results](#), which said land use change will have more effect on stream macroinvertebrates in the next few decades than climate change. Kyle said this is an interesting finding, and he will check out the paper.

Lew commented on the utility of Table 6 on [slide 40](#), noting this identifies and structures the body of evidence on how climate change is affecting hypoxia in the Bay. Lew said the table effectively illustrates the contribution of each paper to this body of work. Kyle said in creating this paper, they learned researchers used different metrics, so they tried to standardize where possible so the results can be appropriately compared. Lew applauded these efforts as synthesis is difficult.

Jeremy asked what is next for Kyle's work, and if he will still be working on Bay issues. Kyle said he is serving as a post-doc at the Pacific Northwest National Laboratory working on different topics, but that there are many others still working on these questions in the Bay, like Marjy Friedrich's lab and others at VIMS. Kyle said it will be interesting to compare the delta method versus a continuous method to understand projections of hypoxia.

Gary said this work demonstrates Kyle has a command of these issues and this work will be critical for informing the upcoming Scientific and Technical Advisory Committee (STAC) workshop in May of 2024 on climate change. Gary said he is on the steering committee, and he would like this work to be presented at the workshop. Kyle said that sounds good.

Breck asked if climate change uncertainties on BMPs were considered for this report. Kyle said it was mentioned, but not fully addressed, and recognized this is a good question for future work. For example, understanding how BMPs fair under heavy precipitation events. Kyle said Jeremy was [involved in a report](#) which focused on this topic, but much more work is needed to address this question. Jeremy agreed.

11:15 – 11:20 Poll for Future ITAT Meeting Topics – Alex Gunnerson (CRC)

Alex solicited input from ITAT members on potential agenda items for future ITAT meetings.

Summary

ITAT members provided the following suggestions for future ITAT meetings:

- Follow up on the tidal/nontidal workshop
- Follow up or next steps for the Chesapeake Student Recruitment, Early Advisement, and Mentoring (C-StREAM) project, potentially including a dashboard and how to share/update with other tributary summaries
- Any items for the Water Quality Standards Attainment and Monitoring (WQSAM) or 2025 WIP outcomes' logic and action plans involving expertise for trends or analysis. If there are multiple, maybe we can discuss and pick actionable items

- Presentation on progress meeting the Stream Health outcome. Composed of three parts: pre-baseline (2000-2005), baseline (2006-2011), and first interval (2012-2017)
 - If interested, contact Claire Buchanan (cbuchan@icprb.org)

11:20 Adjourn

Next Meeting: Wednesday, August 23, 2023

Participants: Alex Gunnerson, Andrew Keppel, Andrew Sekellick, Anoosh Tauqir, August Goldfischer, Bailey Robertory, Blessing Edje, Breck Sullivan, Carl Friedrichs, Carol Cain, Cindy Johnson, Claire Buchanan, Efeturi Oghenekaro, Gary Shenk, Helen Golimowski, Isabella Bertani, James Webber, Jamileh Soueidan, Jeremy Hanson, Jon Harcum, Kaylyn Gootman, Kyle Hinson, Leah Staub, Lew Linker, Marjy Friedrichs, Mike Lane, Olivia Devereux, Peter Tango, Qian Zhang, Renee Karrh, Roger Stewart, Tish Robertson.