Integrated Trends Analysis Team (ITAT)
Meeting

Wednesday, May 24, 2023
10:00 AM – 11:00 AM

Meeting Materials: Link

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

ACTION ITEMS
- **Once the PRISM data is available, Breck Sullivan, Kaylyn Gootman, and Alex Gunnerson will share the tributary summaries with ITAT for review, make any relevant changes, and then submit to USGS for review.**
- **Peter Tango will raise the question of criteria evaluation for the 4-D interpolator to the Criteria Assessment Protocol Workgroup. Updates on this conversation will be shared with ITAT.**
- **ITAT members should notify Breck and Kaylyn if they believe any ITAT products other than the tributary summaries and 4-D interpolator are critical for sharing with the Reaching 2025 Committee and the Beyond 2025 Committee.**

Meeting Minutes

10:00 – 10:05   Welcome – Kaylyn Gootman (EPA) and **Breck Sullivan** (USGS)
<u>Announcements</u> –
- Mid-Atlantic Planning Collaboration Webinar: Presentation on Tributary Summaries – Breck Sullivan
- Joint ITAT-Factors Team Retreat on October 25th at the Patuxent Wildlife Refuge (10901 Scarlet Tanager Loop, Laurel, MD 20708) from 10am to 3pm.
- Conferences of potential interest
  - Citizen Science Association conference, C*Sci 2023 - May 22-26, 2023, Arizona State University campus in Tempe/Phoenix, Arizona.
  - Interagency Conference on Research in the Watersheds (ICRW8) – June 5-8, 2023, Corvallis, Oregon.
  - Chesapeake Studies Conference – September 15-16, 2023, Salisbury University, Salisbury, MD.
  - CERF 2023 Conference: Resilience & Recovery – November 12-16, 2023, Portland, Oregon. Abstracts were due May 10, 2023.

<u>Summary</u>

Breck Sullivan shared she will be presenting on the tributary summaries and the tidal water quality trends at the Mid-Atlantic Planning Collaboration Webinar on May 31st. The purpose of the presentation is to encourage planners throughout the watershed to utilize Chesapeake Bay Program (CBP) tools in targeting efforts and communicating trends with stakeholders.

The joint ITAT-Factors Team retreat in October is designed to have both an information transfer and relationship building component. Meeting information will be finalized in July. Breck said ITAT members are welcome to invite other related partners to this meeting. The next day, there will be a meeting exploring collaboration between the Chesapeake Bay Studies (USGS) and Great Lakes Region team (USGS) in the same area so attendees would be invited to stay for that meeting as well.

Breck shared she is leading a session on fulfilling CBP science needs at the Chesapeake Studies Conference.

Kaylyn Gootman announced that Olivia Devereux and Helen Golimowski added a new banner to the Chesapeake Assessment Scenario Tool (CAST) webpage which highlights the [Ecosystem Benefits Browser](#). Kaylyn said this tool is not new, but hopefully the banner leads it to receive more attention. Olivia added that Helen led a webinar on factors affecting trends and related available resources. Olivia suggested watching the webinar [here](#) (Trends Over Time, under Scenario Analysis).

Olivia asked about the status of the tributary summary updates. Breck shared that due to delays in the PRISM data being released, the climate section is not yet ready and needs some more writing before USGS review. Once this is completed, the rest of the tributary summaries should be updated rapidly given that many of the processes are automated. Breck added that the C-StREAM intern for the summer can help with tributary summary updates as well.

10:05 – 10:10   Update on EPA Regional-ORD Applied Research (ROAR) Program Proposal Funding – Kaylyn Gootman (EPA)

A brief update on the status of ROAR proposals and student involvement in the 4D interpolator.

<u>Summary</u>

Kaylyn shared that EPA has awarded funding through ROAR and ORISE to the 4-D interpolator. The ORISE participant is slated to begin in January 2024 and will support work on the 4-D interpolator throughout 2024. Kaylyn said this program is an effective way to secure additional EPA funding.

10:10 – 10:20   Bay Oxygen Research Group (BORG) Update – Rebecca Murphy (UMCES)

A general update on the BORG's progress.

<u>Summary</u>

Rebecca gave a brief update on behalf of the BORG. Rebecca began with explaining the current interpolation method for the criteria assessment of dissolved oxygen (DO). These current methods use inverse-distance weighting of observations from long-term fixed stations and the data takes the form of temporal snapshots, usually collected once or twice a month. Only some existing DO criteria are being analyzed with current methods, specifically the 30-day mean for Open Water (OW) and Deep Water (DW), plus the instantaneous minimum for the Deep Channel (DC). However, many other criteria

are left without assessment, so developing a new interpolation method is one of the steps towards addressing these criteria assessment needs.

Some requirements for an updated Chesapeake Bay Interpolator include new features such as:

- Temporal, in addition to spatial, interpolation
- Statistical estimates of uncertainty
- Ability to reproduce the short-term variability in the data
- Integrated vertical interpolation technique

Some features to retain from the current interpolator include:

- Usability by partner analysts with automation for routine analyses
- Visualization of results
- Identify regions for each designated use (using salinity and temperature)
- Analysis of dissolved oxygen, clarity, and chlorophyll a
- Incorporation of new data streams and types as available
- Reasonable spatial extents for interpolation (e.g., not interpolating across land)

Rebecca said water quality assessment using the 4-D interpolator will utilize Generalized Additive Models (GAMs) and statistical simulation.

Development on the 4-D interpolator started in 2022, but it will not enter the review period of 2026 and be fully operational until 2027. Currently, the team is still in the early stages of development and has created a prototype using GAMs to fit for mean daily mean prediction of DO in the Patuxent and mainstem. The team has evaluated prototype results by analyzing spatial patterns, seasonal and long-term patterns, and station hold-out tests. Next steps include expanding this GAMs prototype bay-wide, adding additional explanatory variables, and combine with hourly predictions. For the second phase of development, the team has started exploring hourly prediction data. For the third phase of development, the ORISE participant acquired through ROAR funding will focus on the linkage to shallow waters.

Tish Robertson asked if the timeline for the 4-D interpolator development includes the formulation of decision rules for defining nonattainment/attainment. The 10% CFD has been used for the OW 30-day mean criteria assessment. Tish asked if the same approach be used for the 7-day, 1-day, and instantaneous minimum periods. Tish said the state partners should be very involved in that decision making. Rebecca replied that task six on the development timeline addresses this topic and that while the BORG has not discussed this topic yet, Peter Tango plans to bring it to the Criteria Assessment Protocol workgroup. August Goldfischer shared the Criteria Assessment Protocol will convene in July to discuss the topic Tish raised. Qian Zhang said he would be in attendance due to its relevance for the attainment indicator computation. Breck said updates on this question will be shared with ITAT. Breck and Rebecca agreed with Tish that state partners should be involved in this decision making.

10:20 – 10:30   Report out from Strategy Review System (SRS) Biennial Meeting – Breck Sullivan (USGS)

A general update on the discussions of the SRS Biennial Meeting held on May 11 & 12 in Charlottesville to respond to the [Executive Council charge](#) for Reaching 2025 and 2025 & Beyond.

<u>Summary</u>

Breck provided some context on the SRS Biennial meeting and the executive council charge, given their influence in shaping the work of the CBP and ITAT. Under the science section, Breck highlighted "Identify new and emerging scientific data and studies which could modify our progress reporting and adaptive management approach, as well as the goals and outcomes under the Watershed Agreement" and "Enhance our monitoring and reporting capabilities to improve our understanding of existing conditions and trends" as being the most directly related charges to ITAT's work. Breck and Kaylyn have been bringing information from ITAT to the two committees working on Reaching 2025 and Beyond 2025. Major ITAT products that are informative to these two bullets include the tributary summaries and the 4-D interpolator. Breck asked ITAT members to notify Breck and Kaylyn of any other critical products they would like shared with the two committees responding to this charge.

10:30 – 11:00   [Follow Up Presentation from the National Water Quality Monitoring Conference: Coastal Pollution Data Explorer](#) – Arina Morozova and **Lauren Swam** (NOAA's National Centers for Coastal Ocean Science)

NOAA's National Centers for Coastal Ocean Science (NCCOS), Monitoring and Assessment Branch is developing the [Coastal Pollution Data Explorer (CPDE)](#), an interactive web-based data interface allowing users to explore spatial and temporal trends of chemical and toxicological data. Lauren presented a short overview of the Mussel Watch program (the source of data for the CPDE) and Arina performed a demonstration of the tool. ITAT members were asked to provide feedback on the tool as the CPDE is under development.

<u>Summary</u>

Lauren began with a brief overview of the Mussel Watch program and provided information on the scope, methods, and sampling frequency of the program. Bivalves are used because they are immobile and serve as an indicator of bioaccumulation of toxic contaminants. There are two categories of chemical contaminants in the program: legacy contaminants (e.g., PCBs, DDTs) and contaminants of emerging concerns (e.g., PFAS, current use pesticides). Each category has different data reporting standards given that legacy contaminants have a much longer range and volume of data values. Legacy contaminant data plays a role in contextualizing trends and comparing to regulatory values. Contaminants of emerging concerns are reported individually due to the low frequency of available data, so no trends analysis are available. These reporting standards are maintained in technical memorandum but given the difficulties in accessing and communicating this data, the CPDE is being developed to bridge this gap.

Arina summarized the CPDE ([slide 9](#)) before giving a live demonstration of the tool. Arina then asked for feedback using the questions on [slide 11](#) as a guide. Kaylyn said she likes the simplicity and formatting of the tool.

Jon Harcum asked Lauren if the contaminants of emerging concerns are being reported as frequencies of detection in bar charts. Lauren said yes, but the team is implementing some analysis to explore cluster grouping of detections. Lauren said they have not conducted any trends yet since the temporal longevity of the data is still immature, but the dataset is beginning to approach a threshold where trend analysis could be conducted.

Jon Harcum asked if the sampling regime lends itself to developing a trend on the proportion of detections, given their relatively low proportion. Lauren said the team has not yet determined trend analysis methods, but this is a really good idea they will keep in mind. Lauren said as the team works with stakeholders to determine how to group contaminants of emerging concern in trends, the method question will become more salient. Elgin Perry said it is certainly possible to do what Jon suggested using a logistic regression model or logistic regression in GAMs using a binomial distribution in R. Elgin said most statisticians would prefer to look at the observed concentrations, even if they are below the detection limit, because the limit is set for making a decision about an individual sample, but when looking at trends the information is aggregated over time, allowing for looking at data below the detection limit. Lauren said this is a really interesting point and something to look into further. Lauren said most of the data currently being reported is the concentration, but in the past, it was mostly reported as above or below. Since the team works with multiple labs, any change in reporting would need to be standardized. As it stands, concentrations below the detection limit are replaced with a zero and not reported because there is not enough confidence to do so. Elgin said is appropriate for individual concentrations and said the statistical value of concentrations below the detection limit would be useful when building the database out for trends. Lauren said they will take this data into consideration, but one problem might be the lack of concentration in earlier data which could skew the results. Elgin replied in those situations, one might use GAMs to perform censored data estimation for the earlier data without concentration levels.

Kaylyn said she shared the CPDE and Mussel Watch program information with the CBP Toxic Contaminants Workgroup.

ITAT members with additional comments or feedback can contact Arina (arina.morozova@noaa.gov) and Lauren (lauren.swam@noaa.gov) over email.

11:00   Adjourn

Next Meeting: Wednesday, June 28, 2022

Participants: Alex Soroka, Amanda Shaver, Arina Morozova, August Goldfischer, Blessing Edje, Breck Sullivan, Carl Friedrichs, Carol Cain, Cindy Johnson, Elgin Perry, George Onyullo, Helen Golimowski, Jon Harcum, Kaylyn Gootman, Lauren Swam, Mike Lane, Mukhtar Ibrahim, Olivia Devereux, Qian Zhang, Rebecca Murphy, Rikke Jepsen, Tish Robertson, Tony Timpano.