Integrated Trends Analysis Team (ITAT)
Meeting

Wednesday, December 13, 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 ask Elgin Perry if he is interested in presenting at the February 28th ITAT meeting on previously completed non-tidal and tidal cluster analysis.**
  - **Done**
- **Alex Gunnerson will check with Elgin Perry to see if the generation of his cluster analysis figures is automated.**
  - **Done**
- **Alex Gunnerson will update the tributary summaries excel tracking sheet to confirm which portions are automated.**
  - **In progress**
- **Kaylyn Gootman will check with Chris Mason, Doug Moyer, and Jimmy Webber on nontidal trends.**
  - **Done**
- **Alex Gunnerson will discuss with Breck Sullivan and Kaylyn Gootman the appropriate next steps to prepare the Franklin and Marshall intern for updating the story map for the James River and beginning updates for the other tributary summaries.**
  - **Done**
- **Alex Gunnerson will add the Beyond 2025 Clean Water small group standing item to the January draft agenda.**
  - **Done**
- **ITAT will find a time to discuss how to operationalize adding trends in dissolved oxygen (DO) percent saturation exceedance to the tidal trends and tributary summaries.**
- **Mike Lane will check the period of record for dissolved organic carbon (DOC).**
- **Breck Sullivan will share relevant points from ITAT's discussion with the Beyond 2025 Clean Water small group chairs as appropriate.**
- **Rebecca emphasized the need to have a conversation with Mike, Renee, and Cindy to discuss if more time should be allocated to new metrics based on Beyond25 input, or if we can drop a parameter currently not being utilized.**

Meeting Minutes

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

Announcements –

- CERF 2023 Debrief – Opportunity to share any comments or presentations ITAT could benefit from.

Upcoming Conferences, Meetings, Workshops and Webinars

- Environment Virginia Symposium – April 9-11, 2024, Lexington, Virginia. Presentation Proposals were due August 31, 2023.
- National Conference on Ecosystem Restoration – April 14-19, 2024, Albuquerque, New Mexico. Abstracts were due September 1, 2023.
- Choose Clean Water Coalition – May 20-22, 2024, Ellicott City, MD. Session proposals are due January 12, 2024.
- Chesapeake Community Research Symposium – June 10-12, 2024, Annapolis, Maryland. Abstracts are due February 1, 2024.

10:10 – 10:25 **Follow up from the Joint ITAT-Factors Team Meeting – Breck Sullivan** (USGS) and **Kaylyn Gootman** (EPA)

After the joint ITAT-Factors Team meeting on October 25th, questions remain about what ITAT's next steps are for continuing tidal – non-tidal analysis. Breck and Kaylyn presented a few of these questions and started a discussion about next steps.

Summary

Breck walked through ideas for follow up actions after the ITAT-Factors team meeting.

Rebecca Murphy asked if Elgin did nontidal cluster analysis. Breck said he did for Virginia and Pennsylvania. Rebecca said a refresher presentation on this topic and discussions of potential insights could be beneficial if Elgin has the time. Breck agreed this would be a good next step.

Carol Cain said maybe all the potential next steps presented should be pursued.

Rebecca said at a minimum, having an annual ITAT-Factors team meeting is a good idea as it fosters insightful discussion. The meeting in October was great. Roger and Breck agreed.

On the question of ITAT's Intended Audience:

Kaylyn asked who ITAT members feel is the appropriate audience for their work, as this is key in trying to achieve the group's goals. Rebecca said ITAT is only about five years old and spent much of the early days focusing on the tidal trends method. Rebecca said there has always been a challenge with the question of target audiences. This is partially because the tidal trends results are sometimes considered to be not immediately actionable by managers, so the presentations are generally received in silence. The academic papers on these topics gather interest across many estuaries and systems around the world. There may be slightly different answers to this audience question depending on the jurisdiction.

Jon Harcum said regarding the 4-D interpolator and integrating continuous monitoring data, further engagement with community monitoring and riverkeeper groups would be a bridge-like opportunity. This could involve bringing their data into our analysis, even if it is in a provisional way. Renee Karrh said she has used Baytrends for sentinel

continuous monitoring sites when there is at least 8 years of calibration data, but not sonde data. This works out to be monthly or bi-monthly data. There are still remaining questions about how to use the sonde data. Some data flow stations are also calibration stations.

Carol Cain said her thoughts on audiences include 1) scientific vetting and inclusion, 2) creating distilled report for middle managers at federal, state and counties, 3) further distill for a 2–3-page summary for decision makers and stakeholders. Kaylyn said she agrees and said tailoring products and findings for different audiences is key.

Claire Buchanan suggested targeting an audience beyond just the Water Quality Goal Implementation Team (WQGIT) to folks like those at Alliance for the Chesapeake Bay, Chesapeake Bay Commission, Scientific Technical Advisory Committee (STAC), and the Stewardship GIT. Claire said the two-three-page synthesis documents would probably be interesting to these groups. Breck said Rebecca has given more tailored presentations in the past to the WQGIT on connections to living resources. Kaylyn said there is also an opportunity to identify other monitoring networks and resources so that we can tie in their work to better address relevant questions to this expanded audience.

10:25 – 10:50 **Tributary Summary Discussion – Breck Sullivan** (USGS) and **Kaylyn Gootman** (EPA)

The updated James Tributary summary has been approved by USGS. It is available on the ITAT Projects and Resources webpage.

ITAT will be asked to consider how best to approach updating the tributary summaries going forward: update them all at once or proceed with them one at a time on a rolling basis?

Summary

Breck shared that through Franklin and Marshall College, ITAT was able to secure an intern for 10 hours a week during the spring semester to support updating the tributary summaries. This should partially address capacity issues for updating the summaries and creating the dynamic story map components.

Rebecca said the approach to updating tributary summaries should be decided by feasibility, but she would benefit from and prefer having the same period of data across the summaries. Kaylyn asked if it would be possible to cluster certain tributaries into "cohorts" and then update by these groupings, so related tributaries have the same period of record. This could look like grouping by jurisdiction and updating on a quarterly or semi-yearly basis. Breck said she likes this idea. Kaylyn said once a schedule is developed and we have a better idea of audience, we can adjust. Kaylyn said this raises the question of which cohort should be prioritized for updating first. Alex Gunnerson said he does not have a strong opinion, but it could behoove ITAT to start with the Eastern Shore or the Choptank since the most recent UMCES report card indicate degrading trends. Exploring that question further could be fruitful.

Kaylyn suggested having the story maps be developed in conjunction with the updates of the tributary summaries. Also, Kaylyn suggested ITAT consider which tributary

summaries could benefit from additional work to write an "insights on change" section. Factors influencing where to write an insights on change section could include specified interest from an identified target audience.

Breck asked if doing them all at once would be more time consuming. Rebecca said for her, Qian, Tom, and Olivia, they are all automated to be completed at the same time. Alex will check with Elgin to see if they are automated for his cluster analysis figures.

10:50 – 11:30 **Supporting the Beyond 2025 Clean Water Small Group Discussion – All**

The Beyond 2025 Steering Committee voted to create five small groups to discuss different topics in preparing their report to the Executive Council (EC). One of these small groups, Clean Water, could benefit from the expertise of ITAT, especially regarding the topic of "assessment to inform decision making" under water quality monitoring. ITAT members were asked to answer the following questions, whose results will be shared with the Clean Water small group chairs.

Discussion questions included but were not limited to:

1. How do we use the monitoring data? Identify examples of the different monitoring networks that can be used for different purposes.
2. What gaps are there in analyses of water quality monitoring? How could fulfilling those gaps inform our results and ultimately change our management approaches?

Summary

Breck gave a brief review of the Beyond 2025 Steering Committee's decision to create small advisory groups and the scope of said groups.

Tish Robertson said ITAT/the CBP should be doing dissolved oxygen (DO) trends on percent saturation. Alex said he heard from Gary Shenk at the Coastal and Estuarine Research Federation (CERF) conference that living resource managers care about percent saturation compared to DO concentration, and that DO percent saturation dominates the scientific literature for fisheries. Roger Stewart added that living resource managers care about DO percent saturation because DO concentrations do not consider salinity and temperature, so are less directly relevant. Rebecca said the tidal trends team has not done trends on DO percent saturation in the past because of resource limitations, but it is something the team can do if it is a priority. Peter Tango said this is a very timely conversation because similar points are being raised in other parts of the Chesapeake Bay Program. Mike asked if the formula for DO saturation in the water quality users guide was applicable. Tish and Rebecca said they think so. Mike said we can try those approaches relatively quickly.

Tish said there would be some value in looking at trends in the magnitude of water column stratification. Rebecca said Richard Tian did a publication last year on the forecasting of expected stratification changes with temperature increases. It would be helpful to put that idea to the test. Tish agreed – backing up assumptions with empirical data and statistical analysis would be helpful. Rebecca said using our techniques and data to answer how climate is influencing habitat shift in the estuary. Tish said if the

data show continued stratification into October and November, that would be informative.

Breck said one outcome of the ITAT-Factors team meeting was agreement that there needs to be more research on developing methods and protocols for analyzing continuous monitoring trend data. This could be a gap to share with the Clean Water Small Group. Kaylyn said a major question is how to integrate all these datasets with different temporal resolutions into a narrative with insights. Rebecca said Jon Harcum puts them in a large database currently, but this connects to the 4-D Interpolator, and we might have better ways to do this after that development finishes.

Carol Cain asked if non-tidal to tidal assimilation trends have been determined for tributaries. Kaylyn said she does not think so, but Jimmy Webber may have done so for nutrients. Jimmy has some ideas for how this might be done, but that is a need.

Peter said bioreference curves only exist for deep water designated use. Revisiting the benthic macro data and evaluating the possibility for open water, check deep water, consider deep channel bioreference curve development is a need. Claire said bioreference curves for chlorophyll *a* are also possible. Tish said trends on concentrations are important, but to improve communication of progress, it would be helpful to communicate trends in attainment or frequency of exceedance, using a threshold like instantaneous minimum or 30-day mean. Kaylyn added it comes down to the meaningfulness of the units and how that communicates the degree of progress being made to different audiences. Peter said rolling windows of frequency (3-year, 5-year, 10-year) with the binary attainment criteria use can be informative for trends.

Peter said given our consistency in methods, frequency of exceedances of critical physiological thresholds for key living resources might be a way to make the data more real - not just numbers but relevance to life history of resources. Peter said the DO Temperature squeeze was conceptually important to explaining bioenergetic impacts on striped bass and other species, a re-analysis of bioenergetic impacts of the present bay could again link living resource outputs with our water quality data. Peter mentioned the recent data showed warmer bottom waters and questions of how that will affect the food web. Tish said by looking at frequency, it is easier to incorporate disparate datasets, like community science or academic datasets, in a non-parametric way. Peter said community science data can have real meaning for living resources. Tish said they are meaningful for living resource managers, who think in terms of attainment or non-attainment. Expressing the trends in that way makes them more accessible to stakeholders. Kaylyn asked if taking that viewpoint or lens lends itself to explaining directionality of trends, providing a story telling element. Tish said the relevant question is, “if there is degradation, is it affecting aquatic life or is it just worse than before.” Kaylyn said from a management or implementation perspective, this helps target the areas we really need to focus on. Tish said we need to consider the status of systems, in addition to the trends, when understanding where to focus.

Breck said the CBP itself does not really discuss climate mitigation. Is there any role for ITAT in providing information on supporting nature-based carbon sequestration efforts?

Rebecca asked if Mike Lane provided her carbon trends in the past. Mike said he does not recall analyzing Dissolved Organic Carbon (DOC) at any time. Rebecca said anything they have data for has likely been spotty over the years. Breck asked if this is something states measure. Roger said Virginia Department of Environmental Quality measures carbon. Mike said if you want trends for DOC, he can see what the period of record looks like.

Tish said she has been using quantile regression lately and thinks there could be some value in exploring trends that we may be missing by focusing on the mean. For instance, there is a possibility that we may be seeing higher summertime 10th percentile DO concentrations in some places without seeing a change in the 50th percentile.

Peter said one gap in the analysis of water quality monitoring data is the need to develop short-duration water quality criteria protocol with the various continuous monitoring data.

Rebecca suggested directing Clean Water small group members towards the Eyes on the Bay website, as she refers to it quite frequently and finds it to be informative.

Peter said for added interpretability of impacts on resources and habitats there was a report on the MD Core Trend data from several years ago which included trends analysis on metals like copper and zinc. Other such assessments more broadly than nitrogen, phosphorus, sediment data seem high value. Claire said she does not recall, but she will investigate it as well as Peter.

Carol Cain asked if temperature changes will affect the bioavailability of inorganic nutrients. Mike said climate changes could increase nitrification by increasing bacterial production rates. Tish read some papers that indicate increased phosphorus release rates from soil/sediments at higher temperatures. Mike said PJ Statham has a couple/few papers along these lines.

Kaylyn shared that ITAT will likely be asked for more input by the Clean Water Small Group. Breck said this will be a two-part conversation, so the question of how we go about answering these questions would be after the EC Beyond 2025 small group. Kaylyn noted that we will likely want to start discussing that question before the EC decides. Breck added this is the discussion time, and the period for implementation will follow.

Rebecca said these conversations seem to indicate interest in trend product integration from existing data. Rebecca emphasized the need to have a conversation with Mike, Renee, and Cindy to discuss if more time should be allocated to these new metrics, or if the team can drop a parameter not being utilized.

11:30 Adjourn

Participants: Alex Gunnerson, August Goldfischer, Breck Sullivan, Carol Cain, Claire Buchanan, Efeturi Oghenekaro, Helen Golimowski, Jeremy Hanson, Jon Harcum, Kaylyn Gootman, Mike Lane, Mukhtar Ibrahim, Peter Tango, Rebecca Murphy, Renee Karrh, Tish Robertson, Tom Butler, Tom Parham, Roger Stewart.

Next Meeting: Wednesday, January 24, 2024