



## Integrated Trends Analysis Team (ITAT) Meeting

Wednesday, April 27, 2022  
10:00 AM – 12:00 PM

Meeting Materials: [Link](#)

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

### ACTION ITEMS

- **Tributary Summary Communication**
  - Breck Sullivan, Vanessa Van Note, and Alex Gunnerson will reach out to the Virginia Planning District Commissions to see if they would be interested in the tributary summaries
  - Breck, Vanessa, and Alex will share feedback with the web team about revising the format of the ITAT webpage to provide easier access to data and supplementary information to stakeholders.
- **Rappahannock Tributary Summary Updates**
  - Mike Lane will come to the next ITAT meeting with a new draft completed.
  - Mike Lane will send draft text on model definitions and cluster analysis work to Elgin Perry and will send attainment deficit text and figures to Qian Zhang for review.
- **GIT Funding**
  - Breck will bring the cluster analysis proposal to the monitoring team for discussion.
  - Breck or Alex will share the two GIT Funding ideas from Renee Karrh at the Coordinator/Staffer meeting to determine which idea gets more cross-outcome support.
- **Tributary Summary Timeline**
  - Alex, Breck, and Vanessa will get a time estimate from Jimmy Webber for effects of physical setting section.
  - Alex, Breck, and Vanessa will meet with Tom Butler about Volume figure (how the volume of segments impact nutrient loads of that segment).
  - Alex, Breck, and Vanessa will work with Gopal and the modeling team to introduce climate rainfall intensity and rainfall volume (climate section).
  - Vanessa will update the tributary summary timeline with the appropriate information of when the different datasets will become available. Alex will distribute the updated timeline for commentary from ITAT members.
  - Alex will follow up with Qian Zhang and Tish Robertson about the new chlorophyll criteria assessment.
- **Tributary Summary Draft Climate Change Materials**
  - ITAT members should review the [Draft Climate Change Materials](#) created by the Modeling Team and provide feedback on this information to Alex, Vanessa, Breck, and Gopal.

## Meeting Minutes

**10:00 – 10:15 Welcome – Vanessa Van Note (EPA) and Breck Sullivan (USGS)**

### Announcements –

- Conferences of potential interest:
  - [Joint Aquatic Sciences Meeting](#) - May 14-22, 2022, Grand Rapids, MI.
  - [Chesapeake Community Research Symposium](#) - June 6-8, 2022, Annapolis, MD. (Hybrid: virtual and in-person)
  - [Chesapeake Watershed Forum](#) – November 4-6, 2022, Shepherdstown, WV. [Request for Proposals](#) due June 3, 2022.

### Summary

Breck Sullivan reminded attendees of the upcoming Chesapeake Community Research Symposium and the closure of early registration on April 30th. Breck announced the Chesapeake Watershed Forum, highlighting its role in bringing in a lot of local decision makers and stakeholders from around the Chesapeake. Breck suggested ITAT submit a session proposal for the Chesapeake Watershed Forum on Communicating Chesapeake Science to Stakeholders, where the tributary summaries could be discussed along with other communication materials like the non-tidal trends and the Chesapeake Bay Report Card. Breck added she is not necessarily looking for someone to write the session proposal, more so looking for comments on suggestions on other locations where the tributary summaries should be communicated. Rebecca Murphy agreed with the session proposal idea, and said while the tributary summaries are on Chesapeake Assessment Scenario Tool (CAST), there are many ways they could be communicated. Breck replied hopefully the participants at the Chesapeake Watershed Forum would provide insight on how the tributary summaries might be used in decision making. Karl Berger commented on the Choose Clean Water Coalition and suggested discussing the tributary summaries at their upcoming annual meeting in June, as it might be similar to the Chesapeake Watershed Forum in terms of audience. Karl suggested asking the Choose Clean Water Coalition and the Virginia Planning District Commissions to see if they would be interested in the tributary summaries.

Qian Zhang asked if the team sees value in providing more context for tributary summaries. Qian suggested reorganizing the ITAT webpage so there are tabs that direct the users to different pages like accessing the data and learning more context. Qian shared that from a researcher perspective, some may want more information than just the report. Qian said he thinks the ITAT webpage would be a perfect central location for all of this information and there should be more than a short description for the tributary information. Breck suggested that for ease of access the tributary summary reports can be put directly on the webpage along with more information to assist with navigation. Breck said in terms of making the data accessible, a conversation would need to be started with the web team. Rebecca and Qian said it would be nice to have separate tabs for different information, like one for tidal trends, so readers know where to go and know what to click on. Qian suggested thinking about the audience and how a student or researcher might look for information. Qian said another example is the report that Jimmy Webber put together, as in its current state it is just a link to the PDF and readers do not know why they should check it out. Breck said maybe we can model the ITAT webpage in a similar way to

ChesapeakeProgress. Breck commented that making the data and information more accessible on the webpage emphasizes ITAT's scope of sharing research and information to different communities so that they can utilize the information. Breck added that potentially webpage development and communication could be connected to a Goal Implementation Team (GIT) Funding proposal. Karl Berger suggested getting feedback on the webpage from the Virginia Planning District Commissions as well. Karl said there should be effort to explain what was done, why it was done, and why the audience should care about this information. George Onyullo commented he agrees with Karl, and that since the overarching goal is to achieve the standards set out under the Clean Water Act and Section 303b outlines the need to empower our stakeholders with monitoring data and analysis, the website could be a good way to achieve these goals as it could include supplementary information.

Breck announced that the week before, the cluster analysis small group met to discuss Elgin's work, the parameters and profiles being used, and how to best interpret it. One next step was the decision to include flow in the General Additive Model (GAMs) model and the group will continue to meet, with periodic reporting to ITAT.

- Rappahannock Tributary Summary Update - Mike Lane

#### Summary

Mike Lane has included Qian's attainment deficit graph and Elgin's cluster analysis into the Rappahannock Tributary Summary draft and is working on the text for those sections now. Mike hopes to have a new draft done by the May ITAT meeting and was not able to complete the draft by today because of other pressing projects. Mike is thinking about adding a new paragraph on model definitions as it might be useful for subsequent texts and wants to write an initial version of it before he sends it to Elgin Perry for review. Elgin said he would be willing to help write the text for the cluster analysis section and that he is working on new versions of the cluster analysis, that focus on stations within each state. Mike said for the sake of time, the new cluster analysis should be saved for the next time the report is updated. Mike said he will send the narrative for attainment criteria and figures to Qian Zhang for review. Breck and Vanessa Van Note offered to help review the Rappahannock Tributary Summary draft as it is needed.

#### **10:15 – 10:30 [GIT Funding Opportunity](#) – Breck Sullivan**

GIT Funding is opening up in early May. While GIT Funding has not been used extensively in the past to support ITAT projects, there is potential for alignment with the tributary summaries. Breck explained GIT Funding and led a discussion on how we could weave GIT Funding into the Tributary Summaries work. Potential examples include contractor support for hosting a workshop on the insights on change section, using story maps to communicate tributary summaries, developing a series of webinars targeting local governments, and any remaining tasks that need to be operationalized.

#### Summary

Breck began with an overview of the purpose and eligibility for GIT Funding. Any project under ITAT would fall under the Water Quality Standards Attainment & Monitoring Outcome which is: "Continually improve the capacity to monitor and assess the effects of management actions being undertaken to implement the Chesapeake Bay Total Maximum Daily Load (TMDL) and improve water quality. Use the

monitoring results to report annually to the public on progress made in attaining established Bay water quality standards and trends in reducing nutrients and sediment in the watershed.” Breck then showed the timeline for GIT Funding and commented on the key decisions, phases, and deliverables.

Breck then asked for feedback from ITAT. Breck asked some questions to get the conversation started and provided some potential ideas for GIT Funding, such as a series of webinars to help local governments communicate the results of their tributary or producing StoryMaps for additional tributary summaries. Breck cautioned that a decision will need to be made since there are other ideas from the Monitoring Team, so there is potential that ITAT might not be able to submit a proposal this year. If ITAT cannot submit a GIT Funding proposal, pursuing a STAC workshop is a possible route.

Breck asked if any ITAT members have ideas. Elgin said that following up on the suggestion to operationalize the tributary summaries, perhaps a proposal could have Tetra Tech build Elgin’s cluster analysis software into the baytrendsmap R package. Carl Friedrichs and Mike Lane agreed this could be a good proposal. Breck said if there is extra time in the Tetra Tech contract, that is also an option.

Breck commented that GIT Funding projects get more support when the proposal supports multiple outcomes. Breck said there might be a need to brainstorm the other outcomes the cluster analysis work connects to, for example the Climate Monitoring and Assessment outcome in terms of temperature and precipitation data. Carl Friedrichs suggested the cluster analysis might connect to the SAV outcome since it seems that is a time series with different areas of SAV each year. Breck agreed saying this could be phrased as a potential way of utilizing the cluster analysis work. Mike Lane said the cluster analysis work might be helpful for examining patterns in rainfall intensities. Breck said she can help match a potential ITAT proposal with other outcome needs. Breck said she will bring this cluster analysis suggestion to the monitoring team and will come back to ITAT with more information about what would be needed for the Table 1 proposal for GIT Funding.

Renee Karrh suggested two ideas in the chat (hosting a workshop for a local technical community and operationalizing cluster analysis) and then seeing which idea gets more support outside of ITAT. Renee said these would be her two choices of the list. Breck replied these are good ideas and that GIT Funding ideas are shared with other Coordinators and Staffers, so Breck can bring these ideas up to see if we get other support.

### **10:30 – 11:15 [Draft Outline of Timeline for Updating the Tributary Summaries](#) – Vanessa Van Note**

Continuing from the [discussion at previous ITAT meetings about operationalizing the tributary summary updates](#), Vanessa presented a draft outline of the timeline for updating the tributary summaries. ITAT members were asked to provide feedback on the outline.

#### Summary

Vanessa began with a reminder that the main focus for operationalizing the tributary summaries at this time is to understand the timeline. Vanessa then briefly overviewed each section and the expected time needed for completion. Vanessa highlighted five major milestones over the course of 11 months: May 2022 (2021 Progress is finalized), June 2022 (CAST-21 approved), November 2022 (2021 Tidal Trends made available), March-April 2023 (Review Tributary Summary Edits), April 2023 (publish tributary summaries on CAST).

Breck commented that if we find some sections take longer or shorter, we will revise the timeline accordingly.

Breck said the River Input Monitoring stations (RIM) are updated every year because there are only nine of them, and the Non-Tidal Network (NTN) is updated every other year because there are about 123 stations. Renee Karrh commented these results are in water years (WY), defined as October 1 to September 30, and asked if the NTN trends are through 2020 or 2021. Breck replied that in this year's instance, the NTN results are through 2020 WY, but RIM will be 2021 WY.

Qian commented perhaps we should think about the NTN trends from USGS, which are typically available in April or May. Qian said for water quality standards and attainment, they try to complete the assessment in January of each year, but it depends on when the data becomes available. In this case, water quality standards and attainment will cover the results from 2020, which is defined as a three year window for assessment (2018-2020). Vanessa clarified we can update the tributary summaries with the 2020 water quality standards attainment data, 2020 NTN data, 2021 progress and CAST, and 2021 tidal trends. Qian said that seems correct. Vanessa suggested waiting until the 2021 tidal trends are available before updating those sections of the tributary summaries. No one opposed this suggestion. Vanessa said she will update the timeline with this information and then distribute the updated version to ITAT members for review.

Vanessa then moved into some questions for ITAT members:

- For the tidal trends section, is the 1-month timeline to edit one tributary summary or to change all of them?
  - Rebecca Murphy replied that it is her estimate to update all 20 of them for 2020 because those graphs have already been created. Rebecca estimates that for future years, it might take more like 1 month and a half. Rebecca said the timeline on the slides presented work fine.
- What month is the Water Quality Standards Attainment (WQSA) indicator updated?
  - Qian Zhang said typically the indicator is updated in January, but there are three parts to it. Dissolved Oxygen and Chlorophyll-a data are available in the fall, SAV data becomes available in December or January. Then the final indicator assessment is produced. Qian added there is a need to have a conversation offline with Tish Robertson about the new chlorophyll criteria assessment, but the timeline is generally correct. Everything should be ready no later than February.
  - Vanessa asked for updating the tributary summaries in spring of 2023, would it be too quick of a turnaround to incorporate the WQSA data from that January. Qian replied that should be fine and is probably not too short of turnaround as it only takes a few weeks to update everything, assuming the WQSA indicator is done by January or February.
- Which sections can be updated simultaneously?
  - There was no response to this question. ITAT members were asked to think about this question and respond later.
- Which section is most appropriate for the climate change data (precipitation intensity and volume)? Is it tidal factors?
  - Rebecca Murphy and Mike Lane both said tidal factors would probably be best since the end point of these documents is tidal waters and the main focus of the climate change conversation would be impact on the tidal waters.

- Elgin Perry asked Rebecca about the work she did linking responses in the estuary to fall line loads and if something like that will be part of the tributary summaries going forward. Rebecca said that had not been discussed but this makes sense as it would be within the integrated information section and falls into the need to update the tributary summaries with new research. Elgin agreed, saying he could see this work connecting well. Rebecca emphasized this connects to the visualizations produced by Tom Butler that show watershed area loads compared across systems.
- Which tributary summaries should be our priority for updating? Is it possible to do all of them?
  - Rebecca Murphy said the team was able to update all of them within a year the last time the tributary summaries were updated, and she believes the input on the timeline was provided under that assumption. Vanessa said the goal will be to update all of the tributary summaries at the same time, but the team will remain flexible since this is the first time operationalizing the tributary summaries. Breck said this is a great idea and that for sections like insights on change, the information provided from the Water Quality Goal Implementation Team (WQGIT) and the Modeling Team suggests this section can be flexible.
  - Mike Lane said state and federal agencies should determine priority. Breck replied that if we find that we can't do them all, maybe we can ask for priority at a STAR or WQGIT meeting.
  - Renee Karrh commented she thinks the ability of the team to update all of the tributary summaries will depend on how quickly the local research/technical community could develop the 'factors affecting trends' section.

For the detailed proposed timeline for updating the tributary summaries, Vanessa will revise it based on the feedback and information shared at the meeting. Vanessa asked ITAT members to please review and comment on the soon to be updated detailed timeline for updating the tributary summaries.

For the [climate change section produced by the modeling team](#), Vanessa said this is a general introduction and provided some overview, including a description of the figures that highlight precipitation intensity and volume. This section has been budgeted approximately 3 months in the tributary summary update timeline. Vanessa asked if this document includes modeled data. Breck said it does not include modeled data and is based on precipitation volume data from 1972 to 2014 and then projected out to 2025. Vanessa asked members to respond with any questions or comments on this section, specifically on how to improve the visualizations or its descriptions, and the conversation on this section is expected to continue.

#### **11:15 – 12:00 Attainment Deficit Visualizations for Tributary Summaries – Qian Zhang (UMCES)**

Qian solicited feedback from ITAT members on the updated attainment deficit visuals. Qian asked if ITAT members are supportive of additional efforts to visualize (1) the attainment deficit over time (with animations) and (2) the attainment deficit trends (with 2-D maps).

#### Summary

Qian began by showing the updated attainment deficit visualizations for dissolved oxygen. These visualizations include the designated use for each segment, and each segment is represented as a colored line. Some designated uses only have one segment, so there is only one line on that graph. Qian indicated that open circles mean it is not in attainment, and a closed circle is in attainment. Qian said he has grouped the data in two different ways: one set is by designated use and one set is by segment.

Qian also showed a table which displays the statistical significance of trends for both designated use and segment. In the case of the Rappahannock, there were no statistically significant trends using the Mann-Kendall test. After showing the figures for the Rappahannock, Qian then displayed the visualizations and table for the Potomac to be able to compare approaches. Qian commented that the benefit of organizing by segment is that each panel/figure has no more than four lines, which makes it easier to interpret. Qian asked ITAT members for their input on which visualization approach they preferred for dissolved oxygen: organizing the number of panels by designated use or by segment.

Elgin asked if the Potomac has the greatest number of segments. Qian said that the Potomac has a lot of segments, but the lower eastern shore of Maryland has the greatest number of segments - 15. Elgin said his preference is to have a separate panel for each segment, but the problem then is that each panel gets quite small. To avoid the problem of panels getting too small, Elgin suggested separating the panels onto multiple pages, with one page for the Tidal Fresh, one for the Oligohaline, one for the Mesohaline, and one for the Polyhaline. Qian said this is a good idea for tributaries with many segments.

Mike Lane said one option would be to put the Potomac itself on one page, and the tributaries of the Potomac on a different page. Qian said that is a possible option to be done as well.

Renee Karrh said she prefers organizing by segment because it will work better in the basins that are not just a single river. Carl Friedrichs also prefers by segment and recommended keeping a minimum size for each segment panel so they remain legible.

Carl Friedrichs asked about the units for the Mann-Kendall trends and recommended including the units. Qian said the units were in percentage values of attainment, and he would include captions if it were incorporated into the report. Carl said he would like to have the table included, as well as the graphs. Breck said she would also like the table included.

Tish Robertson said that from the perspective of a regulator, the migratory fish spawning and nursery (MFSN) designated use being applied to all of the segments does not seem consistent with the water quality standards because that designated use only applies to Tidal Fresh and Oligohaline waters. Tish added these are hard boundaries. Qian said what is shown here is based on the indicator computation and there are 72 or 73 segments with those designated uses. Tish said they have not really been assessing the MFSN designated use because it is short duration criteria and has been telling her management that they do not have the data. Qian said he is fine not including MFSN since it was not in the previous reports either. Tish said these visualizations are an effective way of communicating long term assessment results. Qian added that the table provided is only based on the long-term trend. Qian said he can provide both short and long-term trend data for comparisons sake.

Breck asked what timeline Qian expects this work to take, and if he expects they can all be done in a week. Qian said that it takes a few hours to write the code, a short time to customize the graphs, a few minutes to run the code to generate the graphs, and a few days to write the text since that is the most difficult part.

Qian then presented the new chlorophyll-a criterion attainment deficit visualizations. Qian asked for feedback and if these visualizations should be included in the reports. Tish said she thinks it makes sense to include them, but she could go either way. Tish added that in Virginia's biannual assessment, they get

a different picture because they use all available data, whereas these visualizations for attainment deficit only use a subset of the data. Provided this nuance can be effectively communicated, Tish does not have a problem including the chlorophyll attainment deficit visualizations. Qian said at this point he is inclined not to include them but could go either way. Tish said that besides the Anacostia River and James River, she did not know who would be interested in using these results. George Onyullo said he has no problem with including chlorophyll and asked about the practical difficulties of updating chlorophyll. Qian said all the results here come from the criteria assessment datasets which passes through the modeling team and involved work from Richard Tian. Notably, the Chesapeake Bay Program does not use all the data available (available on the data hub), which is a different method from what Tish and Virginia DEQ use. Additionally, Richard Tian codes in Fortran, unlike Qian who uses R. Tish and Qian agreed that as long as they are clear and consistent with the data being used and how it is communicated, the current visualizations are fine. Tish said the differences from the two methods are probably not dramatic but do exist to some extent. George, Tish, and Qian will continue the conversation on chlorophyll offline.

Breck said for next steps, perhaps we leave the chlorophyll visualizations on the side for now and focus on the dissolved oxygen. If there is more time available, we could return to the chlorophyll visualizations. Qian agreed and said based on what he learned today it should be quick to update the dissolved oxygen visualizations. Qian said his focus will be on updating dissolved oxygen visualization with MFSN excluded, putting chlorophyll visualization to the side for now, and learning the new chlorophyll criteria.

**12:00            Adjourn**

**Next Meeting: Wednesday, June 22nd, 2022**

**Participants:** Alex Gunnerson, Amy Goldfischer, Andrew Keppel, Blessing Edje, Breck Sullivan, Carl Friedrichs, Carol Cain, Claire Buchanan, Dave Parrish, Elgin Perry, Erik Leppo, George Onyullo, Helen Golimowski, Jeremy Hanson, John Clune, Karl Berger, Mike Lane, Mukhtar Ibrahim, Qian Zhang, Rebecca Murphy, Renee Karrh, Rikke Jepsen, Roger Stewart, Tish Robertson, Tom Butler, Vanessa Van Note.