Status and Trends Workgroup Meeting

Monday, August 8th, 2022

1:30 PM – 3:30 PM

Meeting Materials: Link

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

ACTION ITEMS

- **Gary Shenk, Qian Zhang, Peter Tango, and the team creating the new, supplementary TMDL factors indicator will consider Dave Montali's point about explicitly visualizing wastewater treatment load reductions above RIM stations in the pie charts.**
- **Gary Shenk, Qian Zhang, Peter Tango, and the team creating the new, supplementary TMDL factors indicator will add a slice to the pie charts to represent atmospheric deposition to the tidal waters of the Chesapeake Bay, at Dave Montali's suggestion.**
- **Katheryn Barnhart said she can follow up with Gary Shenk on elements from these new indicators that could be useful for communicating these outcomes on ChesapeakeProgress.**
- **For the LUMM indicator, Peter Claggett will work with John Wolf on supplementary data visualizations to the maps.**
- **For the LUMM indicator, Peter Claggett will look at the Protected Lands ChesapeakeProgress page to inform the decision on geographies.**
- **Katheryn Barnhart will follow up with Peter Claggett to identify which next steps should be taken to advance the LUMM indicators.**

Meeting Minutes

1:30 Opening and Roll Call, Announcements – Katheryn Barnhart, Coordinator

- Focus area group document has been updated with new language for the group names.

1:40 New TMDL Indicator – Qian Zhang (UMCES), **Peter Tango** (USGS), and **Gary Shenk** (USGS)

Gary provided a presentation on the new Total Maximum Daily Load (TMDL) indicator. A question-and-answer period followed the presentation.

Summary

Gary began with an overview of the current indicators: tidal water TMDL indicator, nontidal load indicator, and Watershed Implementation Plan (WIP) indicator. Gary explained how the differences between what the indicator report is due to normalization for flow, lag times, non-management factors, and errors in both estimates. Gary stated the purpose of the work he is presenting on is to build an indicator that is relevant to the TMDL, based on monitored changes in load to the extent possible, and bridges monitoring and modeling by assessing lag time and other effects.

Gary then moved to an explanation of the reductions required to meet the TMDL goals. 84% of the expected reduction is monitored, using the River Input Monitoring (RIM) stations for the watershed and monitoring at wastewater treatment plants below RIM stations. Gary said the 28% of expected reduction assigned to wastewater is easy to measure and has been successful. The non-point source (NPS) reductions below the RIM stations are about half implemented and is not fully monitored. The NPS reductions above the RIM stations are also half implemented, but only show a small reduction. Gary added that flow normalized loads are examined since the measured load is often representative of flow.

Gary provided reasons for the differences between the modeling and monitoring, such as the two major factors: lag times from nitrate in groundwater and phosphorus in soils and the effect of the Conowingo Dam infill. Gary then provided visualizations of TMDL reductions for both Nitrogen and Phosphorus. Gary concluded that the new indicator summarizes Nitrogen and Phosphorus progress towards the TMDL by dividing loads into the categories of implemented and realized, implemented but unrealized due to lag, implemented but unrealized due to uncertainty, and not implemented.

Discussion

Kristin Saunders asked if the "implemented but unrealized due to uncertainty" category captures a Best Management Practice (BMP) that was implemented but failed. Gary said yes, it would include a BMP in that category.

Scott Phillips asked if Gary has a graph over time of what the loads to the bay would be with this new visualization approach. Gary said they were anticipating these pic charts would be updated every year, so they could serve as record of how things change over time. Gary said this is the first approach they devised, so one could use the pie charts to create a stacked line graph. Scott commented he thought this was going to be the new indicator. Gary replied that is a proposal for a new indicator, but that it can be whatever the partnership wants. Gary emphasized his main goal was to create an indicator that is solely based on the monitoring data, to the extent possible. Gary said the goals of this indicator would be to communicate where many reductions have been monitored and the reasons for the differences between the model and monitoring data. Gary said if these pie charts were to be converted to a line graph, it would need to start at zero in 1995 and then grow to represent implementation over time. Scott said he appreciates the need to describe and consider the factors affecting attainment but shared his concerns that this indicator might be too complicated for the general public to understand. Scott added he thinks this work should not be described as a watershed indicator, but instead as a "loads to the bay indicator" since it includes below RIM data and would differ than the tidal or non-tidal trends standing on their own. Scott said perhaps this data could be put on a three-year average so they can be compared with the tidal indicator, and then the pie chart information presented today can be supplementary. Qian Zhang replied there is already a simple time series included in this work that could address Scott's concerns about the indicator being too complicated. Qian said the purpose of this new indicator is to explain the factors, rather than replace the currently existing indicators. Gary clarified that they do not want to get rid of any indicators, only add a new one. Scott said that addresses his concerns.

Dave Montali asked about the wastewater treatment reductions above the RIM stations and if the effect of implementation is being masked since there is not an explicit category for these reductions. Gary replied that Robert Sabo made the same point and Gary said they could divide the RIM monitored slice of the pie chart to account for reductions above the RIM stations that are the result of wastewater treatment reductions. Dave caveated that this only makes it more difficult to communicate to the public.

Dave Montali asked about atmospheric deposition and if loads from the airshed below RIM stations is included in these pie charts. Gary said atmospheric deposition that falls on the watershed is included in these plots, but deposition directly to the tidal waters of the Bay is not included. Gary said there is certainly a reduction of atmospheric deposition from 1995-present that is not being tracked here, so he thinks that category should be added as a slice on the pie chart.

Scott Phillips commented one of the most difficult communication aspects of this indicator is the effect of Conowingo. Scott said Gary could consider not including that component to help simplify the indicator.

Doreen Vetter said the presentation and work being done on this indicator is great, as it dives into important factors affecting TMDL progress. Doreen said she agrees there should be more discussion about communicating these factors more simply. A few ideas Doreen suggested include being clearer with terminology and use a line graph with color coding to describe change in implementation and loads over time. Gary agreed and said the team will continue to focus on this.

Rachel Felver asked which outcome this indicator would be located in. Doreen said it would be for the Water Quality Standards Attainment and Monitoring Outcome and it would not replace any current indicators, it would only be supportive information. Doreen commented this indicator reads to her as a "bridge" indicator to better tie together the 2025 WIP outcome with the Water Quality Standards Attainment and Monitoring (WQSAM) outcome.

Kaylyn Gootman asked who the target audience is for these results as that may change how they are communicated. Katheryn replied this is for the audience on ChesapeakeProgress, where indicators are reported for stakeholders and the public, so one should imagine an educated, non-water quality specialist. Gary added his motivation is to address members of the partnership who are hearing conflicting narratives about the progress towards the TMDL and what the monitoring and modeling results mean. Gary also said he thinks people will want to know what the Bay has actually seen, what has been done but has not yet been seen, and what still needs to be done. Gary said those three components could be the indicator level for the public. Doreen said one key audience is oversight. Kaylyn commented there is a lot of potential for effective communication with stakeholders and the general public using these visualizations and tools. Scott replied he thinks the audience is probably the Water Quality Goal Implementation Team (WQGIT) representatives as this indicator is taking a technical approach.

Scott commented the message Gary is hearing from some of the jurisdictions are not accurate, so part of the challenge is to make sure others know the story being told by the data. Scott said this approach provides some valuable explanation. Kristin Saunders said we should definitely

eliminate the confusing narratives, and whether this becomes an indicator or a communication tool - we need to correct the storyline and all have the same message to combat the errors when they arise. Kristin said this indicator could benefit from its own YouTube animated video explanation.

Peter Tango commented this indicator seems to cover part of the Factors Affecting Change indicators - something beyond just the status of health of some parameter or phenomenon of interest to conserve or restore. Doreen agreed this is a good point.

Peter Tango said with space elements and time elements combined, it could help to include the period of measure on this slide for example. Peter said that context is missing in its current state.

Caroline Donovan commented that knowing one's audience is critical and that this indicator should be adjacent to the indicators currently on ChesapeakeProgress, because they help set the stage for these more complex graphics. Caroline added how she believes this indicator is too complicated right now to be a public facing indicator, but for states thinking about implementation, this indicator would be appropriate. Doreen agreed and said this indicator fills an information gap on ChesapeakeProgress, namely to explain how the WIP model loads fit together with indicators under standards attainment and monitoring. Doreen said this new TMDL indicator serves as a bridge or storyline that effectively connects these two outcomes. Doreen said this aligns with the ChesapeakeProgress Team's current efforts to improve the clarity of the WQSAM outcome and it addresses the oversight audience of ChesapeakeProgress.

Caroline commented in the chat that despite being a negative story, the point does need to be made that phosphorus above RIM stations is not decreasing as expected. Caroline said this is an understandable point that can and should be communicated to the general public.

Gary said he is hearing two different indicators from the conversation. The first indicator is the one presented today and would dig in more to expand the TMDL indicator, such as looking at loads over time, explicitly identifying wastewater load reductions above the RIM stations, and identifying direct atmospheric deposition to the bay. The audience for this indicator would be the Modeling Workgroup, WQGIT, and other stakeholders. The second indicator is for a broader public and would contain three elements changing over time on a line graph: this much is implemented, this much is lagged, and this much is unimplemented. Katheryn Barnhart commented she likes the second indictor option (three elements) being used for the audience on ChesapeakeProgress since it would help communicate the trends and it would more digestible. Doreen agreed and said she would like to see both indicators developed and communicated, it just depends on where they are housed and if that corresponds with their audience. Scott said he likes the direction Gary suggested and the first indicator option would have to fit into the overall WQSAM findings to be most effective. Doreen commented she could see this fitting in at the end of the outcome page where the connection to results in the WIP Outcome is already mentioned. Doreen said the text could read something like "how do these results connect with ...." and then present key points. Scott agreed this could be a nice addition on the outcome page to help explain some of the connections between the two outcomes.

Allison Ng said a reader may be curious to know how long the "lag" will be- how long will it take for the lagged items to be measured. Gary responded to Allison offline.

Katheryn said she can follow up with Gary on elements from these new indicators that could be useful for communicating these outcomes on ChesapeakeProgress.

2:25 Land Use Methods and Metrics (LUMM) Indicator Development – Peter Claggett (USGS)

The LUMM team sought additional feedback from STWG about how to present their metrics as indicators. A short presentation was given on the available metrics, which was followed by a discussion on communication.

Summary

Peter Claggett began with the questions his team has been asking each workgroup they present to. Peter said there are five main indicators they are thinking of: Percent Impervious Cover by Watershed, Tree Cover, Natural Land, Forest, and Community Tree Cover. The goal is to find the least number of meaningful indicators necessary to report the most information.

Peter provided some background on each of the five indicators, such as what they are measuring specifically, what issues it applies to, why this matters, interpretation of change, and general notes. Peter then showed static maps, change over time maps, and change matrix tables with calculations for each indicator. The indicators planned for release in 2023 include effective impervious cover, farmland conversion to development, natural land conversion to development, and riparian natural lands.

Discussion

Peter Claggett asked the following questions of the STWG: Which of the proposed indicators are appropriate for hosting on Chesapeake Progress? Are the documentation, maps and charts accurate, clear, and sufficient for Chesapeake Progress?

Caroline Donovan asked about slide 8, specifically if having multiple versions of similar indicators might be confusing. Caroline gave the example of how the middle map showed north central Pennsylvania as very green, but in some of the other maps it is lighter. Caroline said the audience might not understand the meaningful difference between the maps and asked if all three need to be shown or if one would suffice. Peter replied that they are inclined to keep all the graphs because it is a complicated story, and they want to share the different perspectives that paint a fuller picture. For example, depending on the metric being used (tree cover vs natural land vs forest), certain jurisdictions might appear to be doing worse or better, and each jurisdiction defines these categories differently. Peter emphasized the need of the Chesapeake Bay Program Partnership to tell a story about how the landscape is changing and the implications of this change, without picking favorites. One member of the Healthy Watersheds Goal Implementation Team expressed the perspective that all three types are helpful. Caroline replied she does like all three options and agreed with this reasoning.

Scott Phillips asked what the next steps were for sharing and getting approval and if there are any other goal teams Peter Claggett needs to run these indicator presentations by. Peter said

he was not sure either. Doreen replied that what goes on ChesapeakeProgress is what answers the questions about status of the outcome. Doreen said that since the outcome language speaks to quantifying the potential impacts of land conversion to water quality, healthy watersheds, and communities, that needs to be part of the messaging. Doreen added that all maps on ChesapeakeProgress are interactive, so these would need to be interactive as well. Doreen said one thing that sticks out to her is the piece about tree cover in communities and where change is occurring because it has a lot of salience to the people who live there and it begs the questions: who should be aware of this, can something be done.

Doreen asked if the Tree Canopy Outcome indicator is pulling from this data or protected lands. Carin had the same question. Peter Claggett replied the tree canopy folks are the Forest Service and the community tree cover indicator is their indicator. Peter said he displayed the indicator the way they are currently displaying it here, but LUMM will also display it at a catchment and watershed scale. Peter said the remaining section that needs to be engaged is communities because no one GIT has taken custody of it, so the Land Use workgroup has been toying with how to make this information relevant to communities. Doreen asked if Peter Claggett and the Land Use Workgroup have been in contact with the Local Leadership Workgroup or the Diversity Workgroup. Doreen said those conversations might be useful, as well as the 20 focused communities of concern or other similar efforts being led by EPA Region 3. Doreen wondered if there is a way to connect the maps done for Justice 40 and most effective basins to these metrics. Peter Claggett said on one hand there is getting the data out there and trying to be as objective as possible. Peter said that for this conversation and ChesapeakeProgress, he feels the driving question should be “what is the story we are trying to tell” and how should we tell this story. Peter said he is not sure if ChesapeakeProgress is the story telling site, but that because the phenomena these indicators are measuring are generally outside the control of the Chesapeake Bay Program, referred to as influencing factors, it might make more sense to focus on how these factors influence outcome attainment. Renee Thompson said she in chat she likes Doreen’s line of thinking. Renee is envisioning 3 sections on the LUMM indicator landing page: Water Quality, Healthy Watersheds and Communities, where the data and maps within those themes are nested to tell the story of farms, forest, impervious cover and eventually wetland change. Renee said she is not sure the maps would all fare best under those themes but it’s an idea for how to organize. Katheryn replied this is a good idea for gathering input from each goal implementation team. Scott said he sees two questions here: one refers to the data on ChesapeakeProgress which just lists what has changed, and the other one which is about explaining and interpreting change. Scott said this interpretation could take the form of Story Maps, and that all communication related to this data should not be limited to ChesapeakeProgress. Doreen said she always refers to the outcome language and that based on her reading, she was wondering if Peter Claggett has also broken it down by TMDL segments and land river segments. Peter Claggett replied this data is informing Chesapeake Assessment Scenario Tool (CAST) and that we would be hesitant to have data reside only within CAST since it might more easily be lost amid the many foci of the tool. Scott replied to Doreen and suggested that ChesapeakeProgress does not display by 92 tidal segments and contributing area. Land change is really a watershed focused tool, and it would be difficult to make the link to tidal segments.

Doreen said one thing to look at is where to include this information as influencing factors with the other outcomes this affects. Doreen also asked if there is a way to communicate a higher level of change over time without using a map (such as a chart or graph). Doreen said a summary at a glance might be helpful for accompanying a map. Doreen emphasized how this is great work. Peter Claggett said ChesapeakeProgress is more of a reporting tool, than a data tool. Peter Claggett said he thinks catchments are the best geography to represent the patterns in the data across the watershed, but if there is a better geography for ChesapeakeProgress he is open to suggestions. Doreen replied that in looking at Protected Lands, information for each parcel is provided. Doreen said it would be good to be consistent where possible in communicating the categories and scale of information. Katheryn replied it will be difficult to compare the datasets between LUMM and Protected Lands dataset has more vector inputs as opposed to just raster data with LUMM. Katheryn wondered if the data format will affect the understanding of the audience. Katheryn asked Renee if there is a preferable scale to use here since Renee is intertwined in the work of the Healthy Watersheds Goal Team. Katheryn also agreed with Doreen on the importance of supplementing the maps with bar charts and there might be a need to establish thresholds to break the data down into categories. Peter Claggett he said he can work with John Wolf on this point since John has a lot of experience in this space. Peter said since consistency seems to be important, he will look at the Protected Lands indicator to inform the decision on geographies. Katheryn said for Protected Lands they simplified it to one map and one bar chart since it balances nicely on the page. Carin Bisland said she thinks these metrics and indicators would be really helpful for climate resiliency and vulnerability considering how nature-based vs impervious is important in that space. Carin said these LUMM metrics should be influencing factors since they effect many outcomes. Carin expanded on this, talking about how it applies to Brook Trout and how it probably would be most helpful at the catchment level. Scott said this is a good suggestion as did Katheryn. Katheryn suggested bringing the topic of influencing factors to the goal teams associated with the three elements of LUMM identified by Renee to gather more input.

Peter Claggett said he thinks one of things this data can inform is the areas where water quality is improving despite increased impervious cover and decreased tree canopy. Doreen replied that this is similar to questions around river loads and flows, and it is important to understand in interpreting this work.

Peter Tango commented that animal communities are not the same in a harvested forest as an intact forest. Degree of change, fragmentation, edge effects - tracking change is important in all the dimensions Peter Claggett is presenting. Dynamic habitats tend to be more susceptible to invasive species. This stuff is all important and impressive to see. Benthic macroinvertebrates often relate to imperviousness by seeing a triangular relationship where the max score is related to degree of imperviousness. Peter Tango would love to see catchment level outputs on the frequency distribution for degree of imperviousness, degree of tree cover, degree of agriculture cover for example. Scott Phillips commented to Peter Tango that John Wolf presented some tools to the Healthy Watersheds Goal Implementation Team to have the user look at different thresholds of impervious cover and relate them to different biological indicators. The approach Peter Tango suggest is good analysis to be considered for the future.

Scott added that Peter makes some good points overall and that for Chesapeake progress, the land change indicators should be objective and not have too much interpretation. The factors could be more follow-up analysis and story maps.

Laura Cattell Noll said she would be happy to speak with Peter Claggett sometime about communities and the LUMM indicator. Peter Tango replied to Laura that as Peter Claggett mentioned early on, with such new resolution, and many studies previously having perhaps lower resolution, our sense of sensitivity to land change should be helped by these new data over time. Critical levels may look different with 1m data than 10m data or 30m data as we better understand what is out there and how critters relate to what is there.

Alison Santoro said she appreciates relating the metrics to counties/communities. As a resident of Prince George's County, MD, she is not shocked that her county had the highest amount of community tree loss.

Kaylyn Gootman said interactivity would be nice for users to zoom into a county or region of interest and see finer scale details.

3:20 End of Meeting Survey – Alex Gunnerson

Meeting participants will be given the opportunity to complete an end of meeting survey to inform STWG leadership about how to best organize these meetings going forward. If you have specific feedback and wish to submit it anonymously, this form is the opportunity to do so.

3:30 Adjourn

Participants: Alexandra Fries, Alexander Gunnerson, Alison Santoro, Allison Ng, Amy Goldfischer, Angie Wei, Carin Bisland, Caroline Donovan, Chris Moore, Dave Montali, Doreen Vetter, Doug Austin, Gary Shenk, Jake Solyst, Julie Mawhorter, Katheryn Barnhart, Kaylyn Gootman, KC Filippino, Ken Hyer, Kristin Saunders, Kurt Stephenson, Laura Cattell Noll, Lee McDonnell, Lew Linker, Peter Claggett, Peter Tango, Qian Zhang, Rachel Felver, Renee Thompson, Rikke Jepsen, Scott Phillips, Tom Butler.