

# **Sand Branch Benthic Total Maximum Daily Load (TMDL) Study**

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## **Third Technical Advisory Committee Meeting**

April 21, 2021

Meeting Summary

**Location:** Virtual (GoToMeeting platform)

**Start:** 3:00 P.M.

**End:** 5:00 P.M.

### **Meeting Attendance:**

#### Project Team

Sarah Sivers – Virginia Department of Environmental Quality (DEQ)

Bryant Thomas – DEQ

Cathy Nicely – DEQ

Courtney Hayler – DEQ

Jeff Talbot – DEQ

Justin Loyd – DEQ

Mark Evans – DEQ

Rob Breeding – DEQ

Roland Owens – DEQ

Rebecca Shoemaker – DEQ

Ed Stuart - DEQ

Katie Shoemaker – Wetland Studies and Solutions, Inc. (WSSI), DEQ contractor

Robert Brent – James Madison University (JMU), DEQ contractor

#### TAC Members

Ashley Hall – Stantec, representing Virginia Department of Transportation (VDOT)

Chris Van Vlack – Loudon Soil and Water Conservation District (LSWCD)

Dennis Cumbie – Loudon County

Mike Smith – Virginia Department of Mines, Minerals, and Energy (DMME)

Heather Ambrose – Fairfax County MS4 coordinator

Joseph Fitterer – Chantilly Crushed Stone

Edward Hoy – Chantilly Crushed Stone

Niffy Saji – Fairfax Water

Normand Goulet – Northern Virginia Regional Commission

Sean Minavio – Environmental Systems Service, Ltd (ESS), representing Loudon Composting

Shannon Curtis – Fairfax County

Thomas Foley – Virginia Concrete

#### General Public

Donald Kerr

### **Meeting Materials:**

The meeting agenda is provided as an attachment to the PDF.

The meeting was conducted with the assistance of a MS PowerPoint presentation. Detailed information in the presentation (provided as an attachment to the PDF) is not repeated in these summary notes; instead, highlights from each general topic section of the meeting are summarized along with the questions and discussion held during the meeting.

### **Meeting Summary:**

Sarah Sivers, DEQ provided an overview of the GoToMeeting platform to help attendees become familiar with it. She then discussed requirements for holding a solely virtual meeting and read opening remarks (provided as an attachment to the PDF).

Introductions were conducted, starting first with DEQ staff and their contractor followed by roll call of Technical Advisory Committee (TAC) members. Ms. Sivers then provided an overview of the meeting agenda (provided below) and discussed the objectives of meeting:

1. Update the TAC on information new since the last meeting.
2. Share remaining information on the stressor analysis and the probable stressors identified for Sand Branch and receive the TAC's feedback.
3. Discuss the next phase of the project, TMDL development.

This is Part 2 of presenting information that goes into the benthic stressor analysis effort, with the first part being covered at the meeting held on January 25, 2021. At this meeting, biological and habitat data considered in the stressor analysis was shared, an overview of USEPA's Causal Analysis/Diagnosis Decision Information System (CADDIS) analysis, probable stressors identified and the TMDL targets was shared.

Ms. Sivers provided a brief refresher of information shared at the last meeting, held on January 25, 2021, which consisted of a summary of the physical data considered and which has stressor thresholds developed for those and which have water quality standards. She also shared again the threshold categories used to identify the level of probability a particular stressor may exhibit.

Ms. Sivers then shared the following updates that occurred since the last TAC meeting:

- Revised permit information to remove a VDPES stormwater industrial general permit that was terminated due to closure of the facility (VAR052245, William A. Hazel Inc. – Recycling Facility) and inclusion of a MS4 permit (VDOT, VA0092975).
- Inclusion of 2015 data for chloride and sulfate.
- Inclusion of August 2020 ammonia data for 1ASAN000.34 (downstream station) and revision of the calculated water quality acute and chronic criterion.

Ms. Sivers then turned the presentation over to Dr. Robert Brent, who provided an overview of the biological and habitat data considered in benthic stressor analysis, the CADDIS analysis and data that supports the identified probable stressors. The candidate stressors considered in the stressor analysis and how each were categorized are summarized below.

Non-Stressors	Possible Stressors	Probable Stressors
<ul style="list-style-type: none"> <li>▪ Dissolved Oxygen</li> <li>▪ Dissolved Metals</li> <li>▪ pH</li> <li>▪ Temperature</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ammonia</li> <li>▪ Chloride</li> <li>▪ Potassium</li> <li>▪ Sodium</li> <li>▪ Total Nitrogen</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conductivity (from TDS)</li> <li>▪ Sediment</li> <li>▪ Sulfate</li> <li>▪ Total Phosphorus</li> </ul>

After Dr. Brent completed sharing that information, Ms. Siverson then shared information on planning for TMDL development. The information included were the TMDL targets, water quality monitoring and the timeline. The pollutants which are proposed to proceed with developing TMDLs to address are identified below. Total dissolved solids (TDS) will address the probable stressors of conductivity and sulfate.

Stream	TMDL Target
Sand Branch	<ul style="list-style-type: none"> <li>▪ TDS</li> <li>▪ Total Phosphorus</li> <li>▪ Sediment</li> </ul>

Ms. Siverson also shared that there are other factors that contribute to the impaired benthic community but for which TMDLs cannot be developed. Those contributing factors are summarized in the below table.

Stream	Contributing Factors
Sand Branch	<ul style="list-style-type: none"> <li>▪ Underlying Geology</li> <li>▪ Land Disturbance</li> <li>▪ Percent Imperviousness</li> <li>▪ Degraded Riparian Buffer</li> </ul>

Ms. Siverson said that in preparation for TMDL development, the team was beginning to review data collected for the stressor analysis to identify if any additional information is needed or would assist in identifying sources of the three pollutants. The data will also be used in establishing thresholds for each of those pollutants as none of those have numeric water quality criteria. She mentioned that if any additional data is needed, such as water quality data, it will need to be collected within a timeframe amendable to the project schedule. She said that ambient toxicity testing will be conducted in May/June 2021 to collect additional information that will help to develop a site-specific threshold for TDS.

Next, Ms. Siverson summarized the timeline for the project, noting that the aim is to complete the project in March 2022. She also announced that the next public meeting will be held on May 26<sup>th</sup> at 4:30 P.M. The purpose of this public meeting is to share with the public information on the stressor analysis and request comments on the report and also kick-off develop of three TMDLs that will address sediment, total phosphorus and TDS. Ms. Siverson requested that TAC members share their comments on the draft stressor analysis by May 6, 2021, so that their feedback can be considered prior to moving forward with the public forum on the report. Lastly, she noted the next TAC meeting is anticipated to be held in June 2021 to share information on the TMDL process and model development.

Summarized below is the content of the discussion and comments shared during the meeting.

- Fairfax County commented that in Fairfax County, VSCI scores are consistently higher in the fall than in the spring.
  - Dr. Brent responded that was a trend he regularly saw as well.
- A question was asked regarding the difference of the reference stream, Licking Run, draining Triassic Lowlands versus the Trap Rock portion of the Triassic Basin ecoregion that Sand Branch mostly lies within.
  - Dr. Brent replied that it is difficult to find a good reference stream within the same ecoregion with an unimpaired benthic community. When conducting a stressor analysis, unimpaired watersheds are desired when reviewing potential pollutant stressors. The reference watershed was primarily used for evaluating parameters that do not have water quality standards or stressor threshold probabilities. Conductivity levels in Licking Run were lower than those in Sand Branch, which could be driven by differences in geology or other factors, but conductivity was not one of the parameters that was assessed based on reference watershed conditions.
  - A follow-up question was posed if the driver for high specific conductivity was chloride. Dr. Brent replied that there were high sulfate levels, but both chloride and sodium levels were not that high. The primary ions that comprise TDS in Sand Branch are sulfate, bicarbonate, calcium, magnesium, and moderate levels of potassium, chloride and sodium.
  - A follow-up comment was that some of the elevated conductivity could be from anthropomorphic sources in addition to underlying geology. Dr. Brent agreed that it is likely a combination of sources that contribute to high conductivity in Sand Branch.
- A question was raised if the four probable stressors indicate the possibility of four separate TMDLs?
  - Dr. Brent replied that the stressors for which TMDLs will be developed will be addressed later in the presentation. But yes, probable stressors are those for which TMDLs could be developed and in this case, we are proposing the development of three TMDLs.
- One attendee asked if the selection of a reference stream in a watershed draining Triassic Lowlands versus Trap Rock ecoregion in Sand Branch bias the analysis.
  - Dr. Brent answered that for TDS in particular, many of the lines of evidence are not related to the reference watershed. That there are many lines of evidence that supported TDS as a probable stressor.
- An attendee questioned what the potential source of sulfate was in Sand Branch.
  - Dr. Brent replied that some of the source is likely the underlying geology, but noted that the assessment of sources is part of the next steps of TMDL development. Ms. Sivers concurred, saying that the focus of the stressor analysis is on identifying probable stressors whereas the TMDL development portion will focus on identifying sources of those probable stressors for which TMDLs will be developed.
- One attendee asked if the toxicity testing conducted was whole effluent toxicity testing.
  - Dr. Brent replied that yes it was, using *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow).
- An attendee asked how a TMDL is established for phosphorus if it does not have a numeric water quality criterion.
  - Ms. Sivers replied that typically in these situations a reference watershed approach or modified reference watershed approach such as AllForX is used to develop the target or threshold for the pollutant. It was noted that all three pollutants that will be addressed in the TMDL do not have numeric criteria and therefore, thresholds will need to be established for each.

- An attendee commented on the challenges seen in implementing TMDLs for pollutants with no established criteria and expressed concern with TMDLs still being developed for pollutants with no numeric criteria.
- DEQ replied that the general methodology of using reference watershed and related methodologies (e.g. AllForX) to develop thresholds or targets for pollutants without numerical water quality criteria have been implemented throughout Virginia on a number of TMDLs developed for sediment and phosphorus, including for the Chesapeake Bay TMDL. Using a methodology such as AllForX, which uses an array of similar watersheds and is not reliant on those exhibiting an unimpaired benthic community, versus approaches that use a single reference watershed helps to establish a defensible TMDL threshold.
- DEQ noted that they are considering different methodologies for developing a TDS threshold, such as based upon literature values and a reference approach, and settled on the option of developing a site-specific threshold. It was noted that while DEQ has developed TMDLs to address TDS, those have been in the coalfields and also have used a single reference watershed approach. The ambient toxicity testing that is proposed will be conducted using both ambient water samples and synthetic water that replicates the ion composition of Sand Branch water. They will also include an additional test species, a mayfly.
- One TAC member requested that DEQ coordinate with the TAC on all options being considered to develop TMDL thresholds for the three pollutants and also, the models that are proposed to develop the TMDLs.
- Fairfax County commented that the conversation was moving towards TMDL development and shifted the conversation back to the benthic stressor analysis, understanding that the desired feedback today was on that topic. The TAC member commented that the report was one of the better stressor analysis reviewed and that DEQ's system for developing these analysis are clearly improving. As of the meeting, Fairfax County does not have comments on the draft report but will continue coordinating their review internally and share any comments they may have.
- Fairfax County asked if DEQ will be doing ground-truthing of all the contributions of pollutants throughout the watershed as the process proceeds into source assessment and developing models for the TMDLs.
  - Ms. Siverson responded that DEQ will be using all available data but that additional monitoring and ground-truthing to the extent assumed to be intended by the commenter may not be feasible within the project timeline.
- A TAC member commented that based upon the project timeline, input from the TAC on the model development is partway through source assessment and model development. It was requested that DEQ share documentation and request TAC input on this part of the process earlier so their feedback can be considered in those decisions.
  - Ms. Siverson replied that the comment was a good recommendation and she will review the project timeline and process to identify where additional coordination with the TAC can be incorporated, while remaining sensitive to the TAC members' time.
- A question was raised about the planned ambient toxicity testing, asking if that testing will be specific to TDS toxicity or will other toxics be considered.
  - Dr. Brent responded that the toxicity testing will be a combination of ambient toxicity testing of Sand Branch samples and testing of synthetic make-up water that will look specifically at TDS toxicity, isolated from other components. This will be performed by making up solutions that replicate the ion composition in Sand Branch then testing those

samples at various concentrations for toxicity. Dr. Brent also noted that an additional species will be used in the tests, the mayfly, which are more sensitive than the standard test species used, *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow).

- DMME commented that in the coalfields, TMDLs addressing TDS have been developed over the last 10 years. When utilizing whole effluent toxicity analysis of coalfield effluents, they have not seen toxicity exhibited when TDS is less than 1,500 mg/L, which is comprised predominantly of calcium, magnesium, sulfate, and bicarbonate. When TDS levels are around 1,000 mg/L, there tend to be benthic impairments but the Virginia Stream Condition Index (VSCI) scores are around 45 and not as low as what is seen in Sand Branch. DMME questioned if there was another factor involved, other than TDS, causing a more severely impaired benthic community?
  - Dr. Brent replied yes, there are other factors involved. There were four probable stressors identified and for which three TMDLs will be developed. Other than TDS (which will also address conductivity and sulfate), sediment and phosphorus were identified as probable stressors to the benthic community and also contributing factors, which are not suitable for the development of TMDLs.

Ms. Siverson wrapped up the meeting by providing the TAC with information as to how they could provide feedback on the virtual meeting format itself. Comments on the virtual meeting format, comment form provided as an attachment to the PDF, are to be submitted to FOIA Council.

Ms. Siverson asked that any questions or comments pertaining to the Sand Branch TMDL study be directed to her. She also noted that she will share with the TAC after the meeting the following:

- Copy of the presentation and Virtual Meeting Comment Form the day after the meeting. She noted a recording could not be shared as it was inadvertently not recorded due to human error.
- Provide a draft of the meeting summary for the TAC to review.

Ms. Siverson also reminded the TAC to provide any comments they have on the benthic stressor analysis report by close of business on May 6, 2021. Ms. Siverson also mentioned that the second public meeting is scheduled for May 26, 2021, which will initiate the 30-day public comment period on the stressor analysis report and kick-off TMDL development.

She then concluded the meeting with thanking those present for attending.