

Moores and Mill Creek Technical Advisory Committee Meeting #1

Jordan's Point Park Pavilion, Lexington

November 3, 2021

Participants

David Mims

Spencer Suter (Rockbridge County)

John Pancake (Rockbridge Area Conservation Council)

Sidney Huffman

Sarah Coffey (Chesapeake Bay Foundation)

Jay Lewis (Rockbridge County BOS)

Sara Bottenfield (DEQ)

Tara Wyrick (DEQ)

Nesha McRae (DEQ)

Meeting Summary

Nesha McRae (DEQ) began the meeting with a summary of the role of the Technical Advisory Committee in the process of developing the Moores and Mill Creek Water Quality Study (Total Maximum Daily Load, TMDL). She explained that the committee is open to anyone who is interested in participating, and that the group will meet 3-4 times during the study development process. The advisory committee is intended to serve as a representation of the local community, and provides input on data to be used in the study including land use (historical, current and future), key stakeholders to reach out to, and other local information that may be relevant to the study. The group agreed that it would be helpful to have better representation on the committee from local landowners. Nesha offered to reach out to any prospective participants and catch them up on discussions to date before the next meeting.

The group discussed with primary objective of the first committee meeting, which is to review the draft benthic stressor analysis for Moores and Mill Creeks. Nesha explained that the benthic stressor analysis identifies the pollutant(s) responsible for biological impairment in the streams. She explained how potential pollutants are scored as non-stressors, possible stressors and probable stressors, noting that for both Moores and Mill Creeks, sediment is a probable stressor while conductivity is a possible stressor.

The group began with a review of evidence supporting sediment as a probable stressor in the streams. Nesha shared data on spring and fall Stream Condition Index scores, which measure diversity and relative abundance of aquatic life in the streams. Nesha explained that in cases where pollutant runoff during precipitation events is causing a problem, spring scores are typically lower than those measured in the fall are. This is the case in both streams, indicating that runoff of sediment in the spring and scouring of sediment from streambanks during high flow events could be a source of the biological impairments.

Nesha shared a comparison of the benthic macroinvertebrate community in Moores and Mill Creeks with a reference watershed, Strait Creek, located in Highland County. Nesha explained that a healthy reference watershed was selected based on its size, land use, ecoregion, stream gradient and other ecological characteristics for comparative purposes. A participant asked where in Highland County Strait Creek is located. Tara Wyrick (DEQ) responded that it is a tributary of the South Branch of the Potomac. Nesha offered to follow up with a better description after the meeting. Follow up response: Strait Creek is located north of Monterey, with West Strait Creek running through the town. Strait Creek flows north,

where it joins the South Branch of the Potomac just south of the VA/WVA line. The group reviewed the types and relative abundance of aquatic benthic macroinvertebrates in the streams. Nesha noted that both Moores and Mill Creek had higher numbers of Oligochaeta (aquatic worms) and Diptera (true flies). The predominant Dipteran taxa was Chironomidae, which can be an indicator of excess sediment in a stream. Most Oligochaeta taxa are relatively tolerant of pollution as well. Participants asked about other differences between the reference stream and the impaired streams. Nesha noted that stoneflies, mayflies and caddisflies are key indicators of good water quality in a stream. There were very few caddisflies in the impaired streams, while mayflies were present in numbers comparable to the reference stream. A participant noted that mayflies are typically pretty sensitive to pollution and asked about differences between the impaired streams and the reference. Nesha explained that Ephemeroptera were the predominant mayfly taxa present in Moores Creek, which fall somewhere in the middle of the spectrum with respect to sensitivity of mayfly taxa. Another participant asked whether the overall abundance of aquatic life is considered when making these comparisons. Nesha explained that the pie charts shown in the handout reflect relative abundance of macroinvertebrate taxa in the stream, but not the overall number of insects in the samples collected. She explained that samples are rarified to 110, meaning that subsamples reflect relative abundance, but not overall abundance. A participant asked if there were many water penny beetles in the streams. These were present in the streams and are captured under the order Coleoptera in the pie charts. Water penny beetles are indicators of good water quality. Nesha noted that Mill Creek is really a borderline impairment. It does not appear that it will take a lot to restore the stream, which makes it a great stream to focus on when it comes to restoration measures. Moores Creek is not in as great of shape, but still has considerable restoration potential as well. Nesha noted that it makes sense to focus efforts on these streams that have real potential, and that once stream health is restored, we can focus on protecting it.

The committee moved on to discuss habitat measurements in the impaired watersheds compared to those taken from Strait Creek, the reference watershed. Nesha pointed out significant differences in streambank conditions, riparian buffers and bottom substrate in Moores Creek compared to the reference stream. Evidence of sediment deposition on the stream bottom and bank erosion in Moores Creek is significant. A participant asked how riparian buffers are measured and whether there is a specific width that biologists are looking for when taking measurements. Follow up response: The optimal width of the riparian zone for the riparian habitat metric is >18 meters wherein human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted the riparian zone. Evidence of excess sediment in Mill Creek is less clear when reviewing habitat measurements from the watershed. Nesha explained that there is some evidence of streambank erosion and excess sediment deposition in the stream bottom in Mill Creek. In addition, measurements of bottom substrate in Mill Creek indicate that suitable habitat may be limited due to the extent of bedrock in the stream bottom. The combination of excess sediment and limited habitat may be enough to push Mill Creek into the impaired category.

The group reviewed measurements of bottom substrate in the streams in comparison to Walker Creek, an unimpaired stream with considerable bedrock in Rockbridge County. While Strait Creek was a suitable reference site for other measurements, bottom substrate measurements were not available for the stream, which also does not have the extent of bedrock that Mill Creek does. Nesha noted that it was difficult to find a stream with a comparable amount of bedrock to Mill Creek in DEQ's database. The group reviewed measurements for Mill Creek, showing bedrock comprising nearly 50% of the stream bottom along with some evidence of excess sand in the stream bottom. Moores Creek had considerably more fines than Walker Creek. Both streams had less cobble and coarse gravel than Walker Creek, which provide excellent habitat for benthic macroinvertebrates.

The group moved on to discuss high conductivity levels measured in the streams. Nesha explained that her analysis of the data led her to conclude that conductivity was a possible stressor, meaning that it would not be targeted for reductions if the committee agreed. Conductivity is a measure of dissolved ions in the water, so while high conductivity itself is not harmful to aquatic life, it can be an indicator of high concentrations of dissolved ions that can be toxic to aquatic life (e.g. sodium, chloride, sulfate). Nesha noted that road salts are a common source of high conductivity, and that both Moores and Mill Creek run along I-81 for an extended length. She shared a graph showing discharge rates at the USGS gage on the Maury River near Buena Vista compared with conductivity levels in the two streams. While the gage is a good distance away from Moores Creek, it may be representative of periods of higher flow due to precipitation events in Mill Creek. The chart shows no relationship between stream flows and conductivity, which would be unlikely if road salts were the source of the high concentrations. Additionally, there is no seasonal pattern in conductivity. Concentrations remain high in both the summer and winter months. Nesha suggested that groundwater with naturally high dissolved ion concentrations is the likely source. She shared diurnal measurements of conductivity and pH, which further support this conclusion. The group reviewed a figure from Mill Creek showing that when pH was highest, conductivity was lowest. This may be due to the precipitation of calcium out of the water column when pH is elevated due to photosynthesis during the day (groundwater in karst streams is commonly high in calcium carbonate). Unfortunately, calcium was not one of the dissolved ions that DEQ has been monitoring in the streams over the past several years, though DEQ is working with the Master Well Owner Network to see if they have any calcium data for groundwater in the area. Nesha also noted that several nearby streams that were unimpaired had similarly high levels of conductivity (e.g. Hays Creek, Cedar Grove Branch, and Marl Creek). Another participant noted that these levels are comparable to other measurements that she has seen in valley streams. The group agreed that given the likely natural source of elevated conductivity in the streams, it does not make sense to prescribe any sort of reduction in dissolved ions in the watersheds.

The group discussed next steps in the study process. Nesha explained that at the next committee meeting, the group will review land use data and estimates of sediment coming from different sources in the watersheds. The study will include a series of recommended reductions in sediment from the different sources, which the committee will assist in developing. Once the study is complete, Sara Bottenfield (DEQ) will work with the community to develop an implementation plan, which will include a series of implementation actions that can be taken to reach the prescribed reductions. Sarah Coffey (Chesapeake Bay Foundation) suggested sharing results from a computer based tool CBF uses to prioritize particular properties in the watersheds for restoration measures. Nesha said that a tool like this could be helpful, but that we will need to be careful not to single any landowners out. She suggested that Sarah could demonstrate the web-based James River Riparian Consortium Tool (<https://jamesriverconsortium.org/>) at the final public meeting so that landowners could see what opportunities there were for restoration on their property and who to contact about pursuing these opportunities. Participants expressed concerns about participation levels in the committee and Nesha agreed that additional outreach may be needed to recruit more participants. A poll will be sent out to participants regarding preferences for the next meeting as it will be too cold to hold it outside by then.

Nesha thanks participants for attending the meeting and the committee adjourned.