Woods Creek TMDL

Fourth Technical Advisory Committee meeting

February 23, 2017 at 2pm

Meeting Room at the Rockbridge Regional Library – Lexington, VA

Attendees: Gretchen Sutton (50 ways Rockbridge), Phyllis Fevrier (RACC), Dave Agnor, Mike Kennedy and Jeff Martone and Thomas Wagner (Lexington), Morris Trimmer (NBSWCD and W&L), Elise Sheffield (Boxerwood), Jeff Karlstrand (Lexington Golf Course), Barbara Walsh (RACC), Gene, Wesley, Ebrahim (VT-BSE) and Tara Sieber (DEQ)

Tara Sieber, DEQ's Water Monitoring and Assessments Program Manager, opened the meeting by welcoming folks and asking everyone to introduce themselves (attendees listed above). She recapped the agenda for the meeting, which would start with a recap of the benthic (or aquatic life) issue, then continue with a discussion of the reduction scenarios for the bacteria impairment, and then hopefully the group would have time to discuss next steps (including public meeting planning) and possible bacteria monitoring network coordination.

BENTHICS: Gene Yagow (VT-BSE) told the group that he didn't have much to add to his past presentations but pointed them to the handout that had been provided (Chapters 4&5 from the TMDL summary document). He summarized that the two "Most Probable" stressors to the aquatic life in Woods Creek had been identified, which are **Organic Matter** and **Hydrologic Modification.** Due to the fact that these stressors are indicators of pollution and not a specific pollutant, it was decided that a narrative approach to describe the issues at work, analyze possible sources, and suggest reductions would be the best approach. Gene also noted that the organic matter issue will also be covered by the bacteria TMDL, since the sources are probably overlapping and may be contributing to both impairments. Gene briefly outlined the current issues including pond management, the low water dam behind Waddell Elem, continuing the City's efforts to correct sewer system issues and septic issues. He also added that additional monitoring of bacteria concentrations of Woods Creek will be helpful. And of course, proactive implementation (before the Implementation Plan is developed or finalized, or other issues are required) would be very helpful. Gene reminded the group that revisions and comments on the draft benthic TMDL document are welcome. For now, the reports are separate, but for the final version, they may include the benthic descriptions and TMDL issues with the bacteria TMDL document in order to make a stronger case of the connection between organic matter and bacteria. Also, the report must pass EPA approval. The question of whether organic matter meant algae was asked. No, Gene replied, algae is an indicator not an issue. Because of the bugs, we know that there are high levels of detritus which feeds the detritus worms. Organic matter as a whole, is not just contained to leaves and grass clippings. Sediment is not included. Gene reminded the group that some nutrients and some organic matter is important for growth and health of a stream. However, in Woods Creek, "The recipe is wrong", which means that there are messed up amounts of the various components (the balance is off).

BACTERIA: Wesley Tse and Ebrahim Ahmadisharaf led the next discussion topic which was the bacteria issues of Woods Creek. Tara made sure that everyone had a copy of the provided handout. First, Wesley reviewed the six steps of modeling to create a TMDL for a watershed.

1) Characterization of watershed
2) Simulate bacteria sources
3) Calibration of model
4) Analyze calibrated model to understand source contributions
5) Allocation
6) Present to TAC to gather input

Due to the "wonkiness" of the data from two DEQ monitoring stations, VT had a hard time calibrating (tweaking the knobs of the model) and then validating (ensuring its accuracy). Two different time periods of DEQ bacteria data were used; calibration was 2015-2016 and validation was 2008-2009. After this process, the model is run to determine the contributions of bacteria sources under existing conditions in Woods Creek (this is shown in Table 1 in the handout). Figure 1 is a pie chart of the relative breakdown of general sources of bacteria in the watershed annually. A participant asked whether sewer overflows were accounted for and Wesley responded that the table does but the pie graph does not. The general question of how this water quality study takes overflows into account was raised and Wesley described how VT used the study done by Andersen and Associates (paid for by the city). Also, Wesley reviewed how they used precipitation data for indications and predictions of when sewer overflows would occur. An attendee asked the city, was pressure testing done on the sewer pipes? The City of Lexington explained that the contents of the pipes are not under pressure. Although 1 psi (pound per square inch) equals 230 ft of water column, the city pipes are not under that type of pressure. The discussion then turned to where the high levels of bacteria are coming from (since at previous TAC meetings, it has been discussed that there is no correlation with precipitation, date/time, or any other variable thus far investigated) and if it could be that there is another leakage at a lower level that makes it into the system from some lateral line. The City responded that most of the primaries have been lined and videotaped by camera, including the Sarah's Run confluence line which has a lot of documented overflows. Most recently, 2000 ft of line was completed and most portions of the overall system have been videotaped over time (even dating back to the 1980's). Most downtown portions of the sewer line have been slip-lined so there is no leakage. Another participated asked whether the flow data matched the precipitation data. Daily rainfall data was from the National Climatic Data Center (NCDC) in Lexington and the flow data came from other watersheds, including the Maury River and Kerrs Creek. There is no flow gage in Woods Creek which makes it difficult to draw strong correlations between flow and observed bacteria concentration. When looking at the map of the watershed, the question of how the streamline coming from the Moores Creek pipe overflow came to be red was raised. Tara answered that when impairments are defined, they continue up to the headwaters of streams unless other monitoring data exists that can declare a different stream condition. The Moores Creek icon on the handout map is just an indicator of where the inflow comes into Woods

Creek. The stream is determined to be impaired, not the Moores Creek inflow pipe. A follow-up question was asked; was the model run without the Moores Creek reservoir influence, and Wesley answered that it was, but more details were coming soon.

Next, the discussion turned to the allocation scenarios. Wesley described to the group that there were two goals **#1: 0% Geo Mean violation** (monthly average of 126 cfu/100ml), and **#2: under 10.5% instantaneous WQS** (235 cfu/100 ml). The table below was referenced and discussed by the group at length. The first thing Wesley told the group is that bacteria concentrations in Woods Creek, generally, exceeds the instantaneous water quality standard about 27% of the time. The next step is to remove all sources of E. Coli except wildlife and ensure that the Creek can meet water quality standards (Woods Creek does in scenario 01 – whew!). The next scenario (02) removed all the sewer system inputs and outputs (Infiltration and Inflow and overflows), which actually increases the violation rates in Woods Creek. Scenario 03 was the removal of the Moores Creek reservoir overflow pipe which also increases the violation rate significantly! This is significant because it proves that the clean water from the reservoir is providing a dilution effect for Woods Creek and is an important piece of the hydrologic puzzle. The next scenario (04) removed all livestock direct deposit of bacteria from the watershed; this resulted in an achievement of the Geometric Mean standard (no violations!) but not of the single sample maximum (SSM) water quality standard. The following scenarios are played with so as to bring the SSM down to below 10.5%. After discussion, the group requested additional scenarios including: one detailing reductions needed to meet Water Quality Standards without the Moores Creek pipe, and the possibility of lowering the pasture reductions to 60% if at all possible. Wesley and Ebrahim will work on this and get it to the TAC.

Table 2. Bacteria Allocation Scenarios for Woods Creek.

Scenario	E. Coli Loading Reduction (%)					% Violation of *E. coli* Standard	
	Livestock Direct Deposit	Wildlife Direct Deposit	Pasture	Failing Septic Systems[1]	Residential[2]	Geometric Mean	Single Sample Maximum
Baseline	0	0	0	0	0	41.7%	27.6%
01	100	0	100	100	100	0%	0%
02	0	0	0	0	0	43.1%	28.5%
03	0	0	0	0	0	55.6%	39.6%
04	100	0	0	0	0	0%	13.6%
05	100	0	0	100	0	0%	13.6%
06	100	0	0	100	50	0%	13.5%
07	100	0	50	100	50	0%	11.7%
08	100	0	70	100	50	0%	9.9%
09	85	0	70	100	25	0%	10.0%
10	70	0	70	100	25	11.1%	10.1%

[1] Assumed no straight pipes in Woods Creek watershed
[2] Does not include loads from failing septic systems

TMDL Allocation
Stage 1 Implementation Option

Tara then asked the group if these reductions looked reasonable. The group found this difficult to mentally picture. A participant asked if the residential reductions were primarily pet-waste sources? Wesley confirmed that and then it was said that there were already pet waste bags in place along the Woods Creek trail. Tara brought up the "Its Your Doodie" campaign in Harrisonburg and other social media campaigns). Gene also reminded the group to consider efficient and effective reductions to get "the biggest bang for your buck". All these sources are part of the entire watershed ecosystem and have an impact on water quality. Adaptive management will be used to determine whether the practices installed are making improvements along the way. Another participant pointed out that Moores Creek pipeline makes a big difference and additional reductions in bacteria sources will be needed if it is removed. An attendee asked for more detail on pasture management BMPs and Gene answered that rotational grazing, manure break-up, reducing livestock densities are all practices that can be employed to reduce bacteria on pasture land, including steep slopes. One question regarding the possibility of mulch or compost being a source of bacteria was addressed by Tara, who responded that no, they were not. The details of bacterial source tracking were requested; this is a way of determining the exact contributor of bacteria through antibiotic resistance testing in a laboratory or comparing the DNA of the bacteria to a library of sources. Gene also added that this is expensive, a bit outdated, and doesn't give enough details to really help make decisions.

The following tentative meeting dates and times were proposed:

Next TAC – 2pm March 16th (Tara will set up and send out more details)

Public meeting – April 18 (back up date of April 20 – more details to come)

At the next meeting, the group will discuss Coliscan – a procedure for bacteria monitoring that anyone can use (no lab needed!), materials, sources, etc. The City offered to provide maps so that folks can decide monitoring locations. One participant suggested that a short demonstration may be helpful to see and Tara agreed to give a short training demo. Tara told the group that a one-year commitment to monitor the location of choice would be requested from all participating monitors.