Hat and Black Creek Community Engagement Meeting

Nelson Memorial Library, Lovingston VA
January 10, 2024

Progress Update

I. Follow Up Phosphorus Monitoring

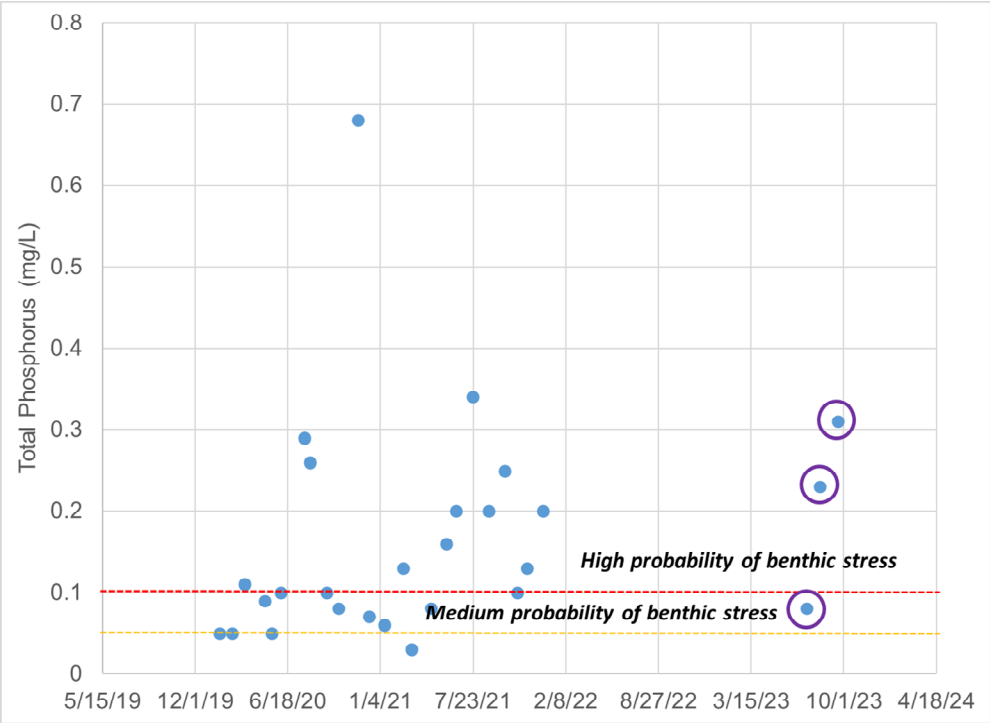

Figure 1 Phosphorus monitoring results for Black Creek including three follow up samples collected in June, July and August 2023 (circled in purple). These samples were collected from the VDEQ monitoring station just above the confluence with the Tye River.

II. Identifying a Phosphorus Endpoint for Black Creek

The first attempt to identify a phosphorus endpoint (a total phosphorus load that Black Creek could receive and still support a healthy population of aquatic life) included the use of the AllForX model. AllForX is a comparative regression model that is frequently used to support TMDL development in Virginia. The resulting endpoint would require modifications to the discharge limit included in the Nelson County Sewage Treatment Plant permit and an additional concentration limit along with significant reductions from non-point sources (Table 1). These reductions did not appear realistic for the watershed, nor did they feel necessary given current phosphorus concentrations in Black Creek and current biological monitoring results.

Consequently, VDEQ decided to explore other options for identifying an appropriate endpoint for phosphorus in the watershed. A concentration-based approach was attempted next, where the 90th percentile of total phosphorus concentrations in a reference stream (Hat Creek) was used to set the

target load for the impaired watershed. This approach resulted in a more reasonable target phosphorus load than the AllForX approach, but it still cannot be met without reductions from the Nelson County STP (Table 1).

Table 1 AllForX and concentration-based calculations to develop phosphorus endpoints for Black Creek

Source	Existing load		AllForX Target TMDL Load		Concentration Based Target Load (0.092 mg/L)	
	(lb/yr)	% total load	(lb/yr)	% Reduction	(lb/yr)	% Reduction
Point source load	1,676	72%	600	74%	1,368	41%
Non point source load	654	28%				

Discussion:
Do you have questions or concerns about the use of the concentration-based approach for establishing a phosphorus reduction goal for Black Creek? Is this an approach you can support?

III. Shifting to a Watershed Restoration Plan

Even with the alternative endpoint approach, reductions from the sewage treatment facility will be needed to meet the phosphorus reduction goal for Black Creek. VDEQ has been in discussions with the Nelson County Service Authority about their capacity to upgrade the regional treatment facility for phosphorus removal. They are invested in this effort and are eager to work with VDEQ to find resources to make these upgrades. If a TMDL were developed for phosphorus in Black Creek, the STP's permit would include a phosphorus limit upon the next reissuance in 2028. Considering the implications of this timeline, development of a watershed restoration plan may be a more appropriate option to address both sediment and phosphorus impairments in the Hat and Black Creek watersheds.

What is a watershed plan?

A watershed plan is a near-term plan, or description of actions, with a schedule and milestones, that is more immediately beneficial or practicable to achieving water quality standards. Impaired waters for which a state pursues a watershed plan to achieve water quality standards remain on the impaired waters list and still require TMDLs until water quality standards are attained. A watershed plan differs from a TMDL in that it does not include a wasteload allocation for point sources in the watershed. This means that reductions called for from point sources in the watershed plan are not incorporated into permit limits like they are in a TMDL. This provides additional flexibility for point sources with respect to meeting pollutant reduction goals. However, if these goals are not met within a reasonable timeframe, a TMDL will be required.

Discussion:
Do you feel that shifting to a watershed plan is an appropriate decision given the increased flexibility that it offers the STP? Do you have concerns about this approach?

Do you think that local landowners in the watershed would be interesting in participating in restoration efforts including implementing projects on their property?

IV. ***Pollutant Reduction Scenarios***

a. Review of selected sediment reduction scenario

Table 3 Sediment reduction scenarios selected to Hat and Black Creek to meet water quality improvement goals. *Note: TSS = Total suspended solids, a measure of sediment in the streams.*

Source	**Existing TSS Load (lb/yr)**		**Sediment Reduction Scenario**			
	Black Creek	**Hat Creek**	**Black Creek**		**Hat Creek**	
			Reduction (%)	TSS (lb/yr)	Reduction (%)	TSS (lb/yr)
Cropland	-	12,919	-	-	4	12,441
Hay	59,587	102,648	23	45,941	4	98,850
Pasture	214,279	1,078,022	23	165,209	4	1,038,135
Vineyard	-	15,794	-	-	4	15,210
Forest	87,308	364,329	-	87,308	-	364,329
Trees	32,305	57,301	-	32,305	-	57,301
Shrub	2,666	5,220	-	2,666	-	5,220
Harvested	14,012	17,614	-	14,012	-	17,614
Wetland	453	176	-	453	-	176
Gravel	908	3,028	5	862	1	2,986
Turfgrass	15,476	28,358	5	14,702	1	27,989
Developed Pervious	1,789	2,191	5	1,698	1	2,160
Developed Impervious	67,858	87,040	5	64,397	1	85,821
Streambank Erosion	21,197	275,434	23	16,343	4	265,243
VPDES Individual Permit	20,118	-	-	20,118	-	-
Domestic Sewage General Permit	-	91.44	-	-	-	91.44
MOS (10%)	52,962	226,544	-	52,962	-	226,544
Future Growth (2%)	10,592	45,309	-	10,592	-	45,309
TOTAL	**601,511**	**2,322,016**	**12**	**529,570**	**2.4**	**2,265,418**

Discussion

Does the idea of shifting to a watershed plan change your support for this sediment reduction scenario?

b. Black Creek phosphorus reduction scenarios

Table 4 Total phosphorus reduction scenarios for Black Creek to meet water quality improvement goal. *Note: The existing load for the STP is based on the facility's design flow (0.22 MGD) and a total phosphorus concentration of 2.5 mg/L. The STP currently discharges at a rate well below their permitted discharge rate (average = 0.12 MGD), but calculations must account for potential increases in phosphorous from the facility based on current permit limits.*

Source	**Existing**	**Scenario 1**		**Scenario 2**		**Scenario 3**		**Scenario 4**	
		Reduction	**Allocation**	**Reduction**	**Allocation**	**Reduction**	**Allocation**	**Reduction**	**Allocation**
	TP (lb/yr)	%	TP (lb/yr)	%	TP (lb/yr)	%	TP (lb/yr)	%	TP (lb/yr)
Hay	189	49	96	81	36	65	66	73	51
Pasture	81	49	41	81	15	65	28	73	22
Forest	18	0	18	0	18	0	18	0	18
Trees	9	0	9	0	9	0	9	0	9
Shrub	0.4	0	0.4	0	0.4	0	0.4	0	0.4
Harvested	3	0	3	0	3	0	3	0	3
Wetland	0.1	0	0.1	0	0.1	0	0.1	0	0.1
Gravel	0.4	49	0.2	0	0.4	25	0.3	12	0.4
Turfgrass	28	49	14	0	28	25	21	12	24
Developed pervious	1	49	0.6	0	1	25	0.8	12	0.9
Developed impervious	149	49	76	0	149	25	112	12	131
Groundwater	168	0	168	0	168	0	168	0	168
Streambank erosion	7	49	4	81	1	65	3	73	2
Permitted load for Nelson Co. STP	1,676	54	776	54	776	54	776	54	776
MOS* (10%)	137	NA	137	NA	137	NA	137	NA	137
Future growth (2%)	27	NA	27	NA	27	NA	27	NA	27
Total (lb/yr)	**2,494**	**1,370**		**1,370**		**1,370**		**1,370**	
Total (reduction)	**0%**	**45%**		**45%**		**45%**		**45%**	

Discussion: Do you have a preferred scenario from the table above? Is there a scenario you feel is fair, equitable and feasible?

An interim reduction scenario was developed for total phosphorus in Black Creek using the average measured discharge rate and average total phosphorus concentration at the STP, and a 27% reduction in phosphorus coming from non-point sources. This scenario was based on the assumption that implementation actions to address sediment from non-point sources would already be underway, and that it will take some time to locate funding sources to support upgrades at the STP.

Table 5 Interim phosphorus reduction scenario for Black Creek based on average discharge rate for the Nelson County STP and a 30% reduction in non-point source loads. This scenario shows uniform reductions from all sources but can be adjusted based on the final scenario selected from the options shown in Table 4.

Source	**Existing load**	**Interim Scenario**		**Final Scenario**	
		Reduction	**Load**	**Reduction**	**Load**
	TP (lb/yr)	%	TP (lb/yr)	%	TP (lb/yr)
Hay	189	27	139	49	96
Pasture	81	27	60	49	41
Forest	18	0	18	0	18
Trees	9	0	9	0	9
Shrub	0.4	0	0.4	0	0.4
Harvested	3	0	3	0	3
Wetland	0.1	0	0.1	0	0.1
Gravel	0.4	27	0.3	49	0.2
Turfgrass	28	27	20	49	14
Developed pervious	1	27	0.9	49	0.6
Developed impervious	149	27	110	49	76
Groundwater	168	0	168	0	168
Streambank erosion	7	27	6	49	4
Permitted load for Nelson Co. STP	1,676	48	878	54	776
MOS* (10%)	137	NA	137	NA	137
Future growth (2%)	27	NA	27	NA	27
Total (lb/yr)	**2,494**	**1575**		**1,370**	
Total (reduction)	**0%**	**37%**		**45%**	

Discussion: Would you like to see the interim scenario adjusted to match the final scenario selected from Table 4? Do you think that the goals established for the interim scenario are reasonable?

V. ***Key Watershed Restoration Plan Components***

a. Pollutant reduction goals
b. Implementation actions (best management practices)
c. Implementation costs and funding opportunities
d. Timeline with implementation and water quality milestones
e. Education and outreach strategies

VI. Next steps

At the next meeting, we will discuss appropriate best management practices to include in the plan along with expected costs**.** We typically look at existing state and federal programs to identify most of these practices (both agricultural and urban). We can also identify unique opportunities for pilot projects in the watersheds that may not be included in these programs. We will be looking for input from local landowners on practices that landowners will be interested in implementing. Once a suite of practices is identified, we will put together an implementation scenario to share, and discuss an appropriate timeline for implementation along with key partners and outreach strategies. Depending on the extent of discussion that occurs during these two meetings, 2-3 more small group meetings will be necessary before the final community meeting to present the draft plan to the public.

Discussion: Are there particular best management practices or pilot projects that you would like us to explore and present at the next meeting?

Are there other topics that you would like to see discussed at the next meeting?

Are there other organizations that should be engaged in this next phase of the project?

Contact information:

Nesha McRae, TMDL Coordinator
DEQ Valley Regional Office
Nesha.mcrae@deq.virginia.gov; 540-217-7173