Analysis of the 2013 Stormwater Local Assistance Fund Projects

The purpose of the Virginia Stormwater Local Assistance Fund (SLAF) is to provide matching grants to local governments for the planning, design, and implementation of stormwater best management practices that prioritize cost efficiency and water quality pollutant load reduction. In November 2013, DEQ received 114 applications from 35 localities across the state. It was determined that 102 of these were eligible for funding. DEQ staff decided that only projects with costs below $50,000 per pound of total phosphorous removal per year would be funded in this first phase of the SLAF. This resulted in 71 funded projects. Hampton Roads Planning District Commission (HRPDC) staff conducted a desktop analysis of the funded projects examining:

- the types of BMPs utilized,
- the range of total phosphorous removal costs,
- the amount of total phosphorous removed annually by the SLAF projects, and
- the localities receiving funding.

The purpose of this report is to identify the projects most likely to be funded and to compare BMP cost data. Because the SLAF program was based on TP removed using the Runoff Reduction Method, staff could not compare this cost data to the cost data now available in the Virginia Assessment Scenario Tool, which is based on acres treated and pounds removed using the Chesapeake Bay Model loading rates. It is suggested for future phases of SLAF awards that applicants be required to also calculate the acres treated and utilize the loading rate tables included in the draft Chesapeake Bay Action Plan Guidance. It would also be beneficial to know the effectiveness of the project in addressing the other two pollutants of concern in the Chesapeake Bay watershed, total nitrogen (TN) and sediment.

Types of BMPs

Figure 1 shows the number of eligible projects by BMP Type. Stream restoration, bioretention, wet ponds, and wetlands were the most commonly used BMPs, accounting for 66% of the eligible projects. Twenty-four stream restoration projects were submitted, and all of them were funded. However, only 11% of the bioretention projects that were submitted met the cost per pound threshold. The wet pond projects fared much better, with 13 out of 16 being awarded. Of the 9 wetland projects submitted, 7 of those were funded. Of note, the “other” category is for the four funded projects in which the type of BMP used was not available.

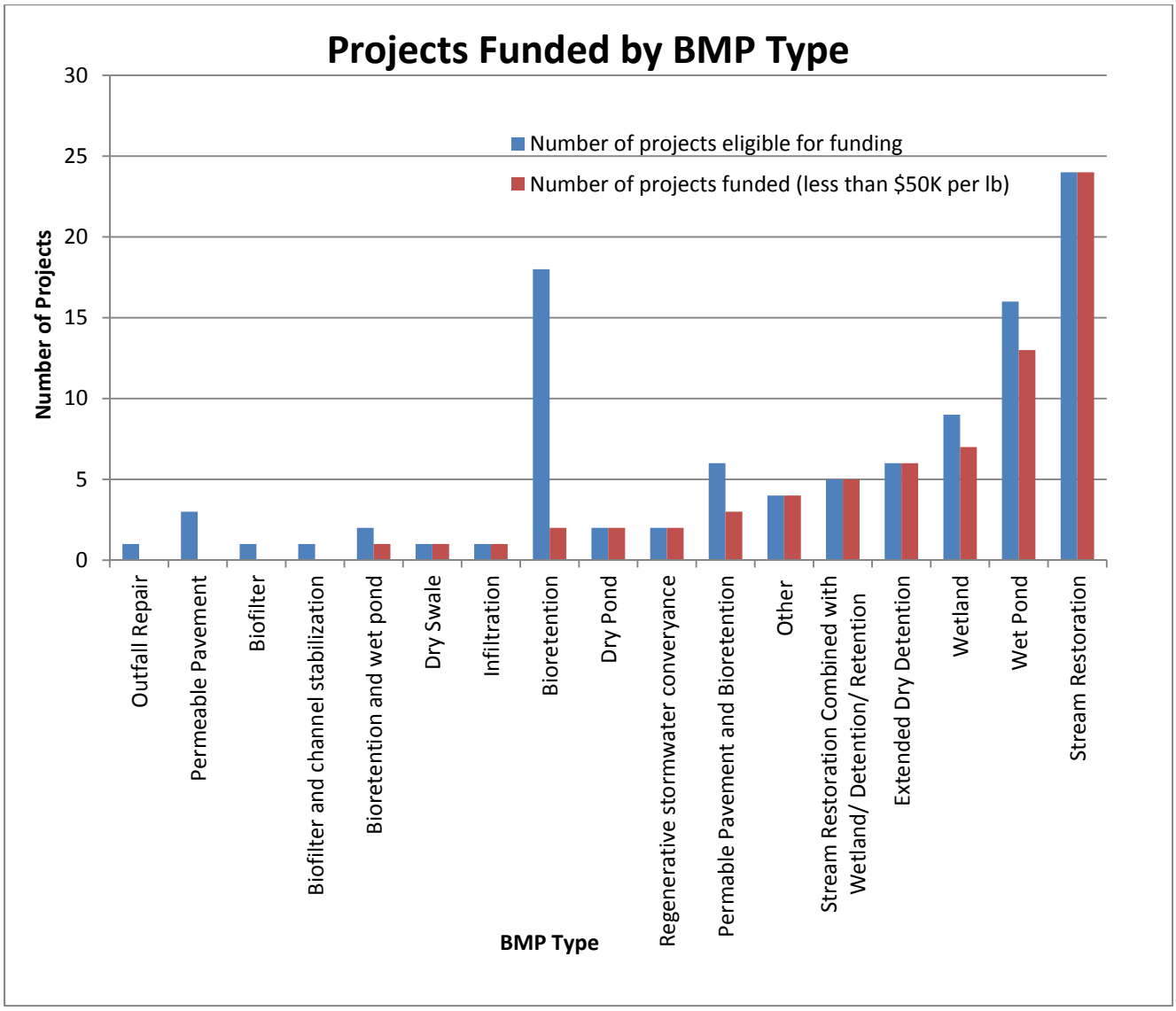

Figure 1. Projects Funded by BMP Type

Range of Costs

Local governments submitted projects with costs of total phosphorous removal per year ranging from $1,087 to $837,719 per pound. A summary of these costs, including the highest, lowest, and median costs, by BMP type are presented in Figure 2. The BMPs are displayed in order from the lowest median cost to the highest median cost. The permeable pavement projects were the most expensive, with a median cost of $353,922; while, projects using dry ponds and stream restoration combined with wetlands, detention, and retention were the least expensive, with median costs of $4,132 and $4,853, respectively.

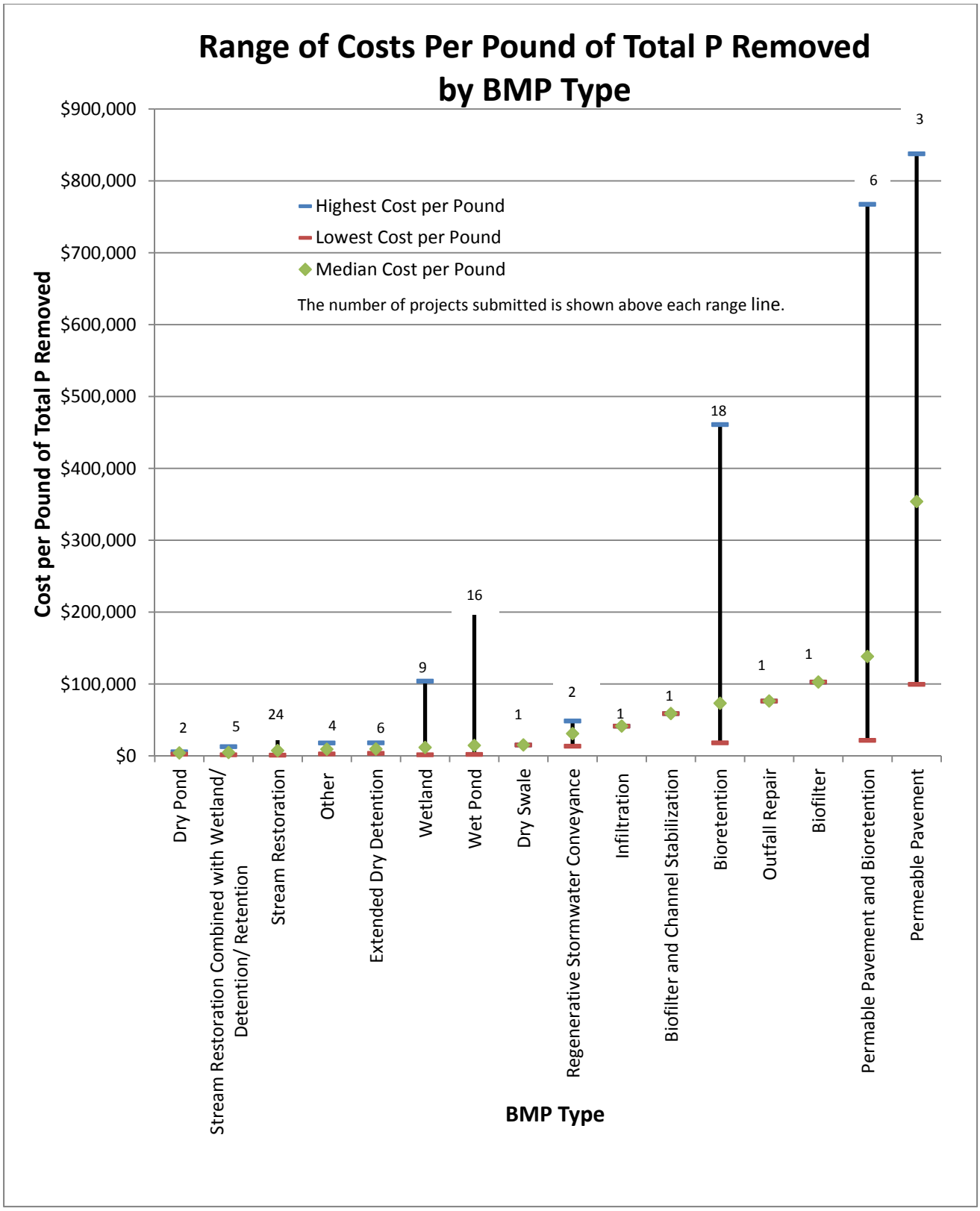

Figure 2. Cost Comparison of all Eligible Projects Submitted by BMP Type

Total Phosphorous Removed

The SLAF projects combined, once constructed, will remove a total of 7,374 pounds of total phosphorous annually. Figure 3 shows the distribution of the number of pounds removed by each BMP type. Stream restoration projects account for the majority, with wet ponds and wetlands also having a significant impact.

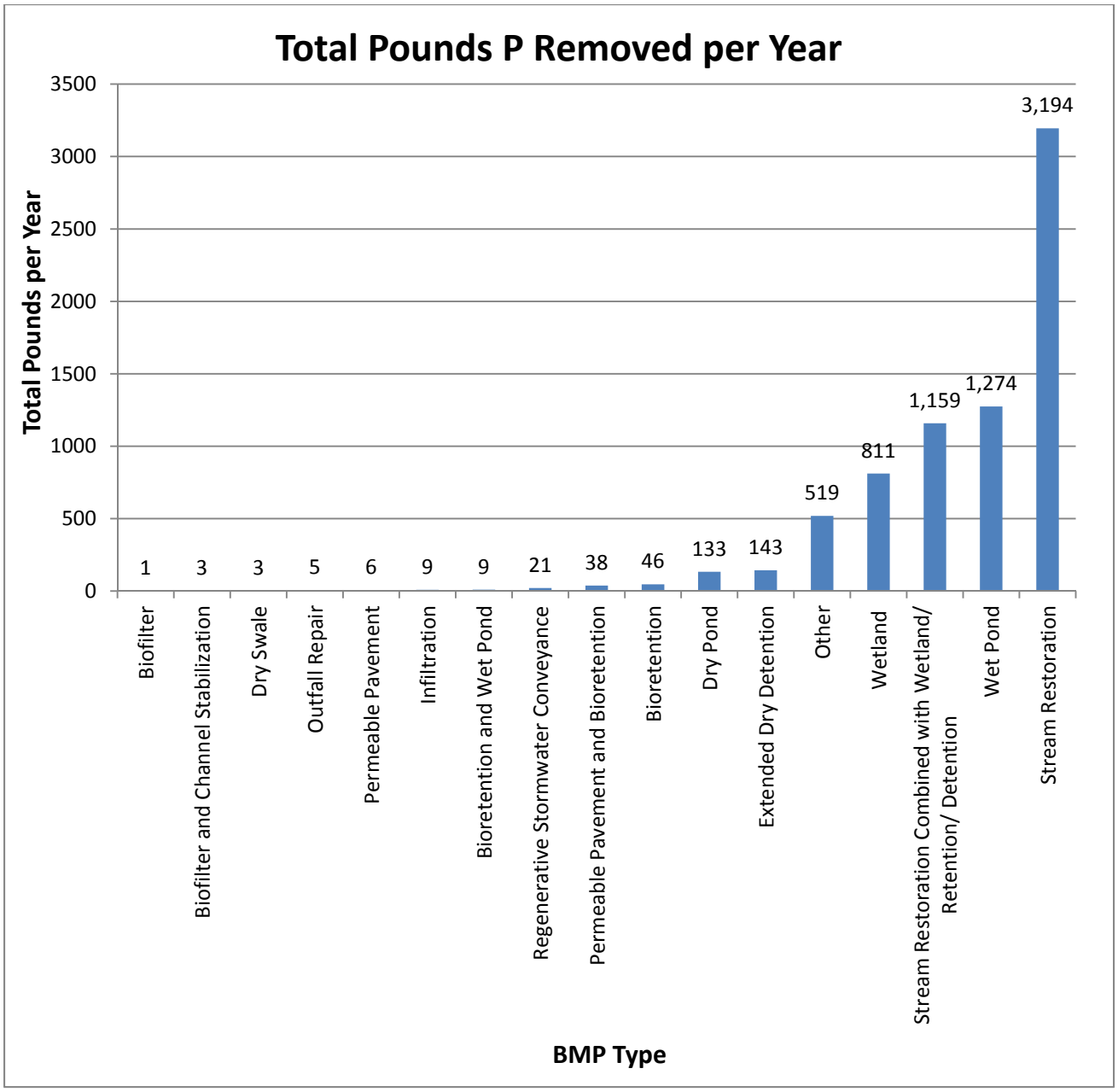

Figure 3. Total Pounds of TP Removed by SLAF Projects by BMP Type

Localities

Local governments from across the Commonwealth submitted projects to the SLAF program. Of the funded projects, 35% were submitted by Phase I MS4s and 59% were submitted by Phase II MS4s. Furthermore, 70% were submitted by Chesapeake Bay Preservation Area (CBPA) localities. Several CBPA localities have portions of their locality that are not in the Bay watershed. It was not determined which portion of the locality the SLAF projects are located in. The percentages are presented to provide a snapshot of the types of localities that received funding.

Recommendations

For future phases of the SLAF program, HRPDC staff recommends additional criterion be evaluated beyond phosphorus removal efficiency. Because these projects are being implemented to achieve Chesapeake Bay TMDL goals, nitrogen and sediment removal should also be considered. This will encourage the implementation of BMPs that target all three pollutants of concern. DEQ should consider utilizing a portion of the SLAF to encourage innovative projects by removing the $50,000 per pound of total phosphorous removed threshold for a portion of the available funds. These two changes may assist Virginia in addressing EPA's recent milestone evaluation comment that Virginia needs to increase implementation of infiltration and filtration practices in order to meet WIP targets.

DEQ should also change the methodology for calculating nutrient reductions. The SLAF guidelines directed applicants to use the Runoff Reduction Method Spreadsheet to calculate the load from the lands draining to the proposed BMP. The loading rates utilized in the Runoff Reduction Method Spreadsheet (which is designed for new development and redevelopment projects) are not consistent with the loading rates contained in the draft Chesapeake Bay TMDL Action Plan Guidance for MS4s (which is designed for retrofit projects, like those submitted for SLAF). According to the tables below, this discrepancy will lead to miscalculations of nutrients removed in Virginia. HRPDC staff utilized the tables below to evaluate the potential magnitude of the discrepancy in total phosphorus removed. For a 25 acre project in the James River Basin, the SLAF calculation method overestimated total phosphorus removal by 13 percent compared to the Action Plan Guidance. If this difference were extrapolated to all funded projects, then the pounds of total phosphorus removed would be approximately 1,000 pounds less than the 7,374 pounds reported.

Table 1: Comparison of Runoff Reduction Method (RRM) and Chesapeake Bay Model (Model) Loading Rates for Impervious Surface

Total Phosphorous and Nitrogen Loading Rates (lbs/ac/yr)						
Basin	TP (Model)	TP (RRM)	Percent Difference	TN (Model)	TN (RRM)	Percent Difference
James	1.76	2.17	23%	9.39	15.5	65%
Potomac	1.62	2.17	34%	16.86	15.5	-8%
Rappahannock	1.41	2.17	54%	9.38	15.5	65%
York	1.51	2.17	44%	7.31	15.5	112%

Table 2: Comparison of Runoff Reduction Method (RRM) and Chesapeake Bay Model (Model) Loading Rates for Pervious Surface

Total Phosphorous Loading Rates (lbs/ac/yr)						
Basin	TP (Model)	TP (RRM)				
		A soils	B soils	C soils	D soils	% Difference (C soils)
James	0.5	0.34	0.46	0.5	0.57	0%
Potomac	0.41	0.34	0.46	0.5	0.57	22%
Rappahannock	0.38	0.34	0.46	0.5	0.57	32%
York	0.51	0.34	0.46	0.5	0.57	-2%

Table 3: Comparison of Runoff Reduction Method (RRM) and Chesapeake Bay Model (Model) Loading Rates for Pervious Surface

Total Nitrogen Loading Rates (lbs/ac/yr)						
Basin	TN (Model)	TN (RRM)				
		A soils	B soils	C soils	D soils	% Difference (D soils)
James	6.99	2.45	3.26	3.59	4.08	-42%
Potomac	10.07	2.45	3.26	3.59	4.08	-59%
Rappahannock	5.34	2.45	3.26	3.59	4.08	-24%
York	7.65	2.45	3.26	3.59	4.08	-47%

It would also be beneficial to track specific project information in a database to allow for additional project comparisons, including cost comparisons in accordance with the Action Plan Guidance and VAST. This analysis could not be completed with the available information on the 2013 SLAF projects. It appears that the costs per pound of total phosphorous removed per year were calculated using the total project costs divided by the total number of pounds removed annually. It is unclear whether the cost effectiveness calculations included design and construction costs or just construction costs and whether it was consistently calculated for each project. A complete list of recommended data to be tracked is as follows:

- specific BMP(s) used and whether it is classified as a level 1 or level 2 (per Virginia's BMP Clearinghouse)
- acres treated
- impervious and pervious acres on the site
- nitrogen and sediment removed
- whether project is located in the regulated or non-regulated portion of a locality
- break out design versus construction costs