



Financing Green Infrastructure in Blair County, Pennsylvania

Developed by the Environmental Finance Center

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Executive Summary

Project Background – With support from the National Fish and Wildlife Foundation (NFWF), the Environmental Finance Center (EFC) at the University of Maryland has been working with a team led by the Alliance for the Chesapeake Bay and including American Rivers to accelerate the implementation of green infrastructure in Blair County’s watersheds and continue the development of regional stormwater management opportunities. The EFC’s role has been to work closely with the Blair County Municipal Separate Storm Sewer System (MS4) Workgroup partners to identify opportunities to incorporate green infrastructure practices into long-term planning, as well as develop a supporting financing strategy that looks to improve efficiencies and reduce costs through a regional approach. This report details the EFC’s process and findings for developing a set of financing recommendations for the MS4 Workgroup that creates a cost effective, collaborative program for addressing the County’s urban stormwater management and water quality goals.

Project Approach – The EFC sought to create a logical sequence to the financing technical assistance provided to the Blair County communities, beginning with a generalized approach that progressed into community-specific data collection and analysis as the project unfolded. The process began with financing workshops held in January and March of 2015 designed to ensure that all of the participating communities had a shared starting point for a financing conversation. This was followed by a series of “office hour” conversations intended to provide a level of community context and needs assessment that would inform the development of financing recommendations. Finally, as a shared vision emerged from the office hour conversations, additional dialogues were had with stakeholders outside of the MS4 Workgroup that could prove to be critical to stormwater program implementation partners. Throughout the process, the MS4 Workgroup was an invaluable forum for engaging the communities, discussing potential approaches, and vetting proposed solutions.

The EFC ultimately developed a set of financing recommendations designed to support the implementation of projects and on-going activities that would serve to address the projects identified by the Center for Watershed Protection’s (CWP) Total Maximum Daily Load (TMDL) Plan for the impaired sections of the Little Juniata watershed and a Chesapeake Bay Pollution Reduction Plan (CBPRP) for the Beaverdam Branch and Little Juniata watersheds, along with the individual communities’ MS4 permit compliance and local stormwater management goals.

Project Findings – The EFC found variance in the MS4 permitted communities’ overall approach to managing stormwater, particularly based on the composition of stormwater infrastructure in each community, the individual municipal capacity to implement stormwater management activities, and the levels of investment being directed towards managing stormwater. However, more importantly, the EFC identified recurring themes during office hours and additional meetings and communications with all project partners that lay a foundation for areas in which the Blair County communities can continue and/or begin to collaborate. These include mapping the structural and nonstructural components that support stormwater conveyance and treatment systems; devoting resources and staff capacity to stormwater program implementation; engaging and educating the broader community; developing templates for tracking and reporting activities; and, seeking better guidance from Pennsylvania DEP.

All of the communities the EFC worked with expressed a strong desire for a robust stormwater program, but cited fiscal and capacity constraints as major hurdles. Forming their existing MS4 Workgroup and actively participating in this project demonstrates the communities’ commitment to regulatory compliance, as well as their desire to go above and beyond by protecting the natural environment and ensuring the health and safety of the broader community by better maintaining stormwater infrastructure.

Finance Discussion and Recommendations – Findings from the office hours and the EFC’s independent research identified what would be needed for the Blair County MS4 permittees to finance water quality improvement projects associated with the regional TMDL Plan and CBPRP, as well as additional revenue needs to support MS4-related tasks. The EFC developed a host of financing scenarios and timeframes for implementation that were then vetted with the MS4 Workgroup and project partners. Following the vetting process, representatives from each of the 12 MS4-designated municipalities and the County met independently to come to consensus on a shared path forward. Juniata Township and Newry Borough opted out of the initial program, and were subsequently removed from the financing discussion. The communities also elected to have the Blair County Conservation District (BCCD) as the lead entity for the regional effort, chose a 20-year timeframe for implementation, and selected a financing scenario modeled and adapted from York County’s regional CBPRP to support the program.

In addition to developing a financing scenario designed to be sufficient in supporting program implementation in an equitable manner, the EFC also suggested cost saving strategies that the communities should consider including employing a comprehensive regional approach, integrating green infrastructure into existing and future project opportunities, and accessing state, federal, and foundation grants to accelerate the implementation of projects and bolster the program. Finally, the EFC suggested a series of steps for advancing implementation in the short-term as well as into the future, which include adapting recommendations in a way that enable the communities to take ownership of the financing solution; pursuing grants to supplement funding needs as appropriate; advancing efforts to establish a shared stormwater coordinator; clearly defining implementation partner roles and responsibilities; and, routinely reassessing and reevaluating program needs.

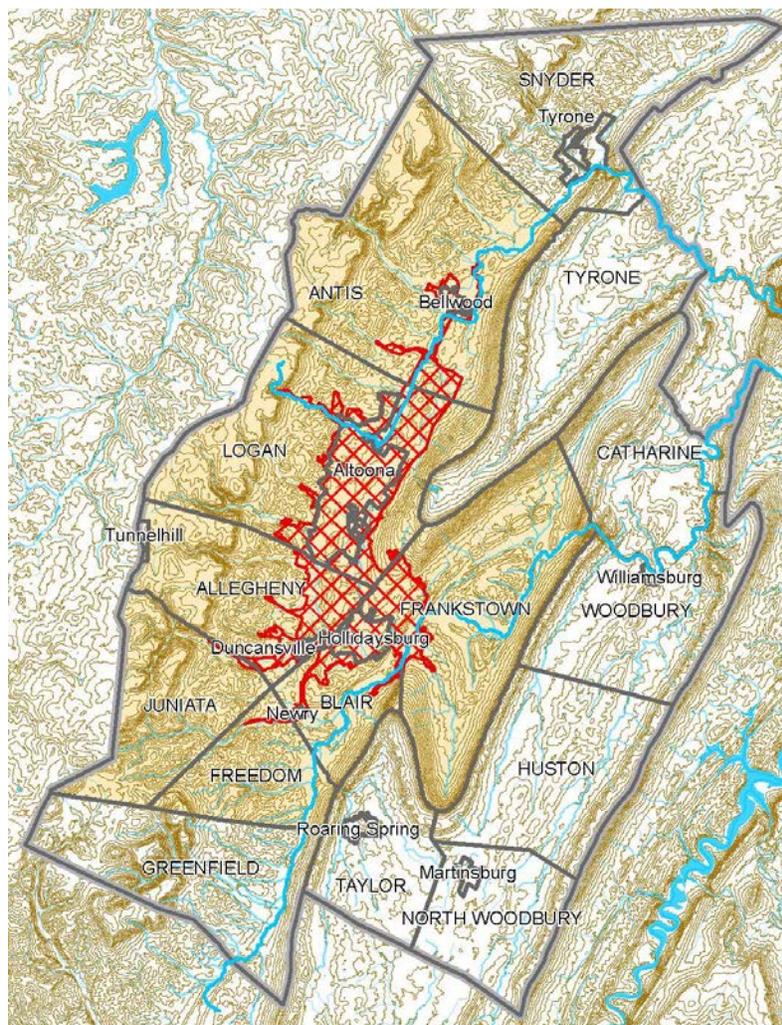
Project Conclusion – The EFC believes successful financing strategies are rooted in local context, and in this case the regional approach to enhancing stormwater programming and project implementation will require a shared vision and blending of individual municipal agendas and values. The efforts of the Blair County MS4 Workgroup offer an exciting opportunity to improve water quality in the Juniata watershed. There are immediate next steps that will address short-term capacity issues while the development and implementation of some of the larger-scale solutions described in this report evolve. Building on the regional dialogue and pollution reduction planning with a shared approach to implementation that is supported by a sustainable financing strategy will enable participating municipalities to more efficiently manage stormwater runoff, to realize cost savings in meeting their regulatory obligations, and to more effectively achieve local water quality goals.

Introduction

Local Context for Managing Stormwater

Blair County is home to 24 municipalities, ranging in population from 270 to over 46,000,¹ each with a diverse set of planning, land use, development, and agricultural needs that shape the County's natural and built environment. Of the 24 municipalities, 12 plus Blair County hold Municipal Separate Storm Sewer System (MS4) Permits that regulate stormwater runoff in urbanized areas. In addition to general MS4 permits, the municipalities must address local, state, and Chesapeake Bay regional water quality regulations by implementing projects to address local stream and watershed impairments.

Figure 1. Map of Blair County MS4-Designated Municipalities



Blair County depicting MS4 communities (bierge) and Altoona Urbanized Area (red). Fully-capitalized municipalities are townships, others are boroughs (excluding the City of Altoona). Map compiled by the Alliance for the Chesapeake Bay, with data pulled from the US Census Bureau, Chesapeake Bay Program, USGS, and PADEP.

The 12 MS4 municipalities (see Figure 1), including Allegheny, Antis, Blair, Frankstown, Freedom, Juniata, and Logan Townships; Bellwood, Duncansville, Hollidaysburg, and Newry Boroughs; and the City of Altoona, in addition to Blair County and other local and regional entities, have joined in partnership through the Blair County MS4 Workgroup, where municipal staff, engineers, consultants, elected officials, County agency representatives, and other interested stakeholders convene regularly to support each other's efforts in addressing stormwater regulations and water quality goals. Through this partnership, the 12 MS4 municipalities and Blair County received technical assistance from the Center for Watershed Protection (CWP) to develop a Total Maximum Daily Load (TMDL) Plan for the impaired sections of the Little Juniata watershed and a Chesapeake Bay Pollution Reduction Plan (CBPRP) for the Beaverdam Branch and Little Juniata watersheds.²

¹ 2010 Population, United States Census Bureau, <http://www.census.gov/quickfacts/>

² *Blair County Total Maximum Daily Load and Chesapeake Bay Pollution Reduction Plan*, Prepared by Center for Watershed Protection, April 2014

Project Context

With funding from the National Fish and Wildlife Foundation (NFWF), the Environmental Finance Center (EFC) at the University of Maryland has been working with a team led by the Alliance for the Chesapeake Bay and including American Rivers to accelerate the implementation of green infrastructure in the County's watersheds and continue the development of regional opportunities. The EFC's role has been to work closely with the Blair County MS4 Workgroup partners to identify opportunities to incorporate green infrastructure practices into long-term planning, as well as develop a supporting financing strategy that looks to improve efficiencies and reduce costs through a regional approach. This report details the EFC's process and findings for developing a set of financing recommendations for the MS4 Workgroup that creates a cost effective, collaborative program for addressing the County's urban stormwater management and water quality goals.

Approach

The EFC sought to create a logical sequence to the financing technical assistance provided to the Blair County communities, beginning with a generalized approach and moving to community-specific data collection and analysis as the project unfolded. The process began with financing workshops designed to ensure that all of the participating communities had a shared starting point for a financing conversation. This was followed by a series of "office hour" conversations intended to provide a level of community context and service needs assessment that would inform the development of financing recommendations. Finally, as a shared vision emerged from the office hour conversations, additional dialogues were had with stakeholders that could prove to be critical to stormwater program implementation partners. Throughout the process, the MS4 Workgroup was an invaluable forum for engaging the communities, discussing potential approaches, and vetting proposed solutions.

Workshops – The EFC worked with project partners to develop appropriate content for financing workshops held in January and March of 2015. Much of this content and direction was based on the feedback obtained by the Alliance for the Chesapeake Bay team during their survey and interview process.

The January session focused on: the elements of successful financing strategies; the cost reducing, revenue generating, and market-based mechanisms available for stormwater management programs; and examples of regional stormwater management approaches from around the region. The March session built upon the January session and related: the enabling conditions needed for comprehensive stormwater management programs; five steps to assessing local programs, identifying programmatic gaps, and planning for program enhancement and financing; the application of these five steps with six communities in Lancaster, PA; the cost-savings potential of asset management and green infrastructure and regional approaches to stormwater management; and, the value of a robust outreach program to educate and engage citizens in order to create public demand for comprehensive stormwater management programs that use a green infrastructure approach.

Office Hours – A core component of the EFC's process was to follow up on the generalized green infrastructure financing workshops held earlier in the project with more localized "office hours." These were designed to discuss regional opportunities to create programming efficiencies, as well as approaches that have the potential to address localized stormwater programming needs.

The first step in this stage was to engage interested community representatives in one-on-one dialogues to assess local stormwater program drivers, goals and needs, as well as the existing level of service and capacity. Overall, eight communities expressed an interest in participating, and nine preparatory

community calls were held over the course of a week in May,³ which was followed by several days of in-person office hours in July where a set of conversation triggers were used to tee up a discussion around potential regional and community specific recommendations. See **Appendix A** for the list of conversation triggers provided to all communities prior to the initial community phone calls.

Stakeholder dialogues – The office hour conversations, as well as community dialogues had at subsequent MS4 workgroup meetings, indicated a common interest in a shared stormwater manager that would reduce the burden to each individual municipality and curiosity around what shape a regional revenue stream might take. The EFC then convened dialogues with a smaller set of stakeholders that could potentially play a role in the creation and long-term support of these types of solutions, including existing project partners, the Blair County Conservation District, and the Blair County Planning Commission.

Developing green infrastructure and stormwater financing recommendations – The EFC used the information and community feedback gathered to develop a set of financing recommendations designed to support the implementation of projects and on-going activities that would serve to address the regional CBPRP and individual MS4 permit compliance, as well as local stormwater management goals. Short term recommendations focus on creating efficiencies that will reduce implementation costs. This begins with building on the regional approach initiated through the MS4 Workgroup, employing asset management to become more proactive in addressing issues, and relying on a holistic, green infrastructure approach that can deliver a higher return on investment due to the multiple benefits achieved. Longer term recommendations adapt existing models that are working well elsewhere in Pennsylvania to the unique circumstances and community context within Blair County. This included building on CWP’s TMDL Plan and CBPRP, considering the shared stormwater manager approach employed by Lycoming County, and looking to the York County model for creating a regional financing system.

Findings

The MS4 communities differ greatly in their overall approach to managing stormwater. The composition of the stormwater infrastructure, the individual municipal capacity to implement stormwater management activities, and the levels of investment in stormwater vary widely. This variance can be attributed to a number of factors, including but not limited to population, land area, land use, and political and community support (see Table 1).

³ The eight communities included the townships of Antis, Allegheny, Blair, Freedom, and Logan; the Borough of Hollidaysburg; the City of Altoona; and Blair County. The ninth call was with the Blair County Planning Commission to assess their role in a broader regional approach.

Table 1: Municipal Data of 12 MS4s⁴

Municipality	2010 Population	2010 % Blair County Population	Land Cover Area (% of Total Area)			% Total Area in Urbanized Area
			Built/Urban	Forest	Agricultural/Fields	
Allegheny Township*	6,738	5.30%	17.52%	64.33%	17.48%	20.58%
Altoona City*	46,320	36.45%	91.15%	4.73%	3.40%	99.59%
Antis Township*	6,499	5.11%	7.78%	75.65%	15.70%	4.69%
Bellwood Borough	1,828	1.44%	91.11%	4.44%	2.22%	97.78%
Blair Township*	4,494	3.54%	18.76%	53.02%	25.53%	15.20%
Duncansville Borough	1,233	0.97%	72.55%	13.73%	9.80%	94.12%
Frankstown Township	7,381	5.81%	9.51%	67.00%	21.77%	9.29%
Freedom Township*	3,458	2.72%	12.00%	67.51%	19.46%	1.15%
Hollidaysburg Borough*	5,791	4.56%	59.66%	17.60%	19.74%	99.57%
Juniata Township	1,112	0.87%	3.51%	80.02%	15.81%	0.80%
Logan Township*	12,289	9.67%	15.77%	70.89%	10.74%	17.86%
Newry Borough	270	0.21%	92.71%	0.31%	6.25%	93.75%

*All 7 municipalities plus Blair County participated in the EFC's office hours.

While some staff expressed a general satisfaction with their existing MS4 compliance program, others would like to see a more accelerated rate of project implementation and regional coordination. The office hour sessions held identified a number of key differences across the eight participating municipalities, including:

Stormwater Infrastructure: The EFC found a broad range of stormwater infrastructure systems. As would be expected, the larger, more urban municipalities have a complex network of gray infrastructure, some even with combined sewer overflows (CSOs), while other more rural communities do not have the typical pipe infrastructure seen in urbanized areas. While some of the municipalities know where most, if not all, of their outfalls and inlets are located, others do not have an adequate understanding of the makeup and condition of their system. All of the municipalities acknowledged the need for a greater effort to map the components of their system and develop an asset management approach to understanding not just where the system is located, but the size, age, and condition of the system, in order to more efficiently and effectively plan for the repair and replacement of system components over time.

⁴ Population & Urbanized Area: 2010 Population, United States Census Bureau; Land Cover: PAMAP Program Land Cover for Pennsylvania, 2005, Pennsylvania Spatial Data Access (PASDA), <http://www.pasda.psu.edu/uci/MetadataDisplay.aspx?entry=PASDA&file=palanduse05utm18nad83.xml&dataset=1100>, all data compiled by the Alliance for the Chesapeake Bay project partners

Stormwater Asset Management

Asset management has long provided a framework for strategically managing drinking water and waste water systems, and while stormwater infrastructure may seem different, there are many overlaps between these sectors. Waste water and drinking water operators routinely use asset management to make decisions about investing in the physical infrastructure that conveys and treats these essential utilities in communities, planning for the repair and replacement of assets, so that the risk is reduced for all users.

Stormwater asset management can be used to understand and prioritize investments in a community's existing conveyance and treatment system. Once an asset management framework is in place, it can then be used to guide decision-making for best management practices, including green infrastructure, prioritizing the most cost-effective projects for installation, and regularly and adequately operating and maintaining green infrastructure and other best management practices.

Municipal Capacity for Managing Stormwater: All 12 MS4 municipalities and Blair County contract with a consulting engineer that they rely heavily on for stormwater services and guidance, along with other County, regional, and nonprofit entities. Of the eight MS4 communities that participated in office hours, the number of public works staff ranges from two to 55 and is directly tied to the population size of the municipality. All of the municipalities expressed a need for additional staffing, in the absence of funding limitations. Administrative and managerial staff whose job entails some level of stormwater management tasks spans from one to five individuals across the communities.

Stormwater Financing: All eight office hour participants identified limited funding as an impediment to having a robust stormwater management program. A few of the municipalities with greater resources for stormwater programming include a line item for stormwater-related expenses in their general budgets, as well as have stormwater projects included in their capital budgets. However, the majority of municipalities do not budget for stormwater specifically, and any stormwater-related expenses typically fall under the public works budget in the General Fund. Beyond this, even those actively budgeting for stormwater needs are not necessarily considering how green infrastructure practices might address priorities across multiple departments.

In spite of the differences found across the municipalities, the EFC's process indicated a number of areas where these communities are jointly grappling. These commonalities offer the opportunity to work collaboratively, creating a more efficient and effective program. There is a growing body of research for

“Regional approaches are more comprehensive and cost-effective than single municipal-led projects. These approaches often increase public support and community engagement, which are critical to successful implementation. From comprehensive multi-jurisdictional planning efforts to community engagement campaigns, the efficacy of the regional approach continues to attract support from organizations nationwide, including the Environmental Law Institute and Harvard Law School.”

Source: Regional Stormwater Management Snapshots, National Association of Regional Councils, <https://allianceforthebay.org/wp-content/uploads/2015/01/NARC-Regional-Stormwater-Management-Snapshots.pdf>

why stormwater should be managed regionally, touting the resource management gains from taking a watershed-wide approach to the efficiency gains from regional financing, among other benefits. Not only is the research on regionalization growing, but more and more communities are adopting regional approaches to water resource management.

The following recurring themes identified through office hours and additional meetings and

communications with all project partners lay a foundation for areas in which the Blair County communities can continue and/or begin to collaborate:

- **Mapping** – While the majority of the communities had at least some mapping in place already, including a few who had all outfalls mapped, all cited the need for more complete mapping of their entire system. Several mentioned an interest in also mapping the nonstructural components that support their gray infrastructure system.
- **Resources** – Not surprisingly, all of the communities indicated that they could deliver a more comprehensive level of service if they had more resources – both in terms of funds to support the program and staff capacity to implement it. All of the communities recognized the importance of having a stormwater program that addresses all of their MS4 obligations, but because of resource limitations, these tasks typically become the additional responsibilities of existing staff, and while contractual arrangements with engineering firms has helped to alleviate some of the burden to local staff, it is difficult to ensure all aspects of a comprehensive stormwater program are routinely achieved.
- **Outreach** – While many of the communities spoke of their written outreach and community engagement plans, most acknowledged that they rely heavily on the MS4 Workgroup and the Blair County Conservation District for outreach and could benefit from being more specific in defining activities, target audiences, and messaging needed. All believed that there remains a need to make sure that the general citizenry understands why stormwater is a concern, how activities on the land can impact local waters, and the actions that can be taken to better manage stormwater. The need to engage and maintain elected officials in a dialogue about stormwater was also cited as an important need, particularly as communities reach a point where they will need to begin to dedicate funds to raising the level of stormwater services delivered.
- **Tracking & Reporting** – All of the communities would like to do a better job of tracking and recording their efforts. They suggested that templates that help them to standardize the type of details recorded, as well as a process for how these are collected and reported both internally and externally would enable them to improve the efficiency of their program(s) and ensure that they more fully receive credit for all of the stormwater management activities taking place.
- **Guidance** – All of the communities expressed frustration with the level of guidance they are receiving from the state, and spoke of a need for a better understanding of precisely what is expected of them, as well as recommended timelines for when and how permit obligations should be implemented.

In spite of the differences found across the municipalities, the EFC's process indicated a number of common challenges, offering a prime opportunity to work regionally to manage stormwater and more efficiently and effectively address local water quality.

In short, all of the communities expressed a strong desire to have a robust stormwater program, but cited fiscal and capacity constraints as major hurdles. Forming their existing MS4 Workgroup and actively participating in this project demonstrates the communities' commitment to regulatory compliance, as well as their desire to go above and beyond by protecting the natural environment and ensuring the health and safety of the broader community by better maintaining stormwater infrastructure.

The communities understand there are both financial and environmental benefits to working together across the watershed to meet stormwater program requirements. The MS4 Workgroup is well on their way to working regionally, as they are waiting for approval from the Pennsylvania Department of Environmental Protection (PA DEP) of the regional plan that was developed by CWP as of January 2016. Should PA DEP approve the plan, the group will need to have a strategy in place for implementing projects in the plan. The following section frames the EFC’s recommendations for financing these projects, as well as MS4-related activities, more efficiently and effectively than if the communities were to implement solely individual programming.

Financing Discussion

The findings from the office hours and the EFC’s independent research led to the identification of what is required for the Blair County MS4 communities to finance both water quality improvement projects associated with the regional TMDL plan and CBPRP, and additional revenue needs to support MS4-related tasks. The EFC’s approach is to, where possible, utilize existing planning documents, data, and similar models across the State in order to inform the local financing recommendations. In this case, the EFC pulled from many local and regional planning documents, local and regional data, and two exemplary models from communities employing a regional approach to stormwater management in Pennsylvania.

The EFC developed a host of financing scenarios and timeframes for implementation that were vetted substantially with the MS4 Workgroup and project partners. Following the vetting process, representatives from each of the 12 MS4-designated municipalities and the County met independently to arrive at a chosen path forward.

Ultimately, Juniata Township and Newry Borough opted out of the initial program, and were subsequently removed from the financing discussion. The communities also chose which entity they would like to lead a regional effort, the timeframe for which to implement projects, and the financing scenario to support the program.

This section outlines the development of the final recommendations, from the revenue needs identified and vetted with the MS4 Workgroup and project partners, to the financing scenarios modeled after York County’s regional financing strategy to support its County CBPRP and adapted to fit the local context, to the cost saving strategies that will further the region’s ability to meet its stormwater management and water quality goals over the long-term.

Considerations for Altoona

The City of Altoona and Antis and Logan Townships have specific waste load allocations through the Little Juniata TMDL rather than more generalized water quality requirements. The Blair County Total Maximum Daily Load Plan and Chesapeake Bay Pollution Reduction Plan developed by CWP indicates that Altoona will not fully meet its sediment waste load allocation even with full implementation of the plan, while Antis and Logan Township exceed sediment waste load allocations. Therefore, the City of Altoona will need to incorporate additional strategies to achieve compliance. This could include implementing projects in neighboring jurisdictions, supported either through a shared grant proposal or a direct investment of City funds, or by implementing green infrastructure projects on City lands to address both water quantity and quality issues related to stormwater. One way for the City to address water quality is to examine the language that guides the City’s successful blight removal program for opportunities to encourage green infrastructure practices that would earn additional sediment credits.

Revenue Needs

Little Juniata River Watershed TMDL and CBPRP Cost Estimates

Implementation: The regional plan developed by CWP includes a list of 91 best management practices (BMPs) across the Little Juniata, the Frankstown Branch of the Juniata, and the Beaverdam Branch watersheds in order to meet the Little Juniata sediment TMDL and CBPRP sediment, nitrogen, and phosphorous loads. The report was developed for Blair County and all 12 MS4-designated municipalities in the County. Ultimately, since Juniata Township and Newry Borough chose to opt out of the initial program, one project that would be implemented in Newry Borough was removed from the list by EFC for the purposes of the financing plan. Therefore the total cost of 90 projects totals **\$2,675,290**. There was no timeframe associated with these projects, thus the EFC developed scenarios for a 20-year, 15-year, and 10-year implementation schedule. The MS4 Workgroup heavily favored the 20-year schedule, and thus the annualized cost to implement all projects over 20 years is **\$179,822**.⁵

Operations & Maintenance (O&M): While the CWP report did not include O&M costs, in order to develop a more complete financing plan for the implementation of BMPs, it is critical to include some assessment of annual O&M costs. The depth and breadth of available research related to green infrastructure O&M costs is limited, which makes it difficult to predict annual cost estimates with any level of certainty. In order to provide as accurate O&M cost estimates as possible, the EFC relied on BMP maintenance estimates developed by CWP to approximate site-specific O&M costs in Blair County.

CWP categorized BMPs into “Urban BMP Types,” and calculated the annual O&M cost of each type as a percent of the initial project cost. The EFC used the same Urban BMP Types to categorize the 90 projects in Blair County, and the total annual project O&M costs were estimated from there. All estimates are shown in Table 2.

Table 2: Estimated Total Cost of Annual Project O&M

Urban BMP Type	Annual O&M Costs as a % of Initial Project Cost	# of Projects	Average Initial Project Cost	Annual O&M Cost per Project	Total Annual O&M Project Cost
Bioretention (new - suburban)	1.53%	11	\$9,785	\$150	\$1,648
Wet Ponds and Wetlands (retrofit)	0.06%	16	\$77,533	\$45	\$715
Tree Planting	0.48%	9	\$1,652	\$8	\$71
Forest Buffer	6.72%	12	\$1,057	\$71	\$853
Urban Stream Restoration	0.00%	23	\$47,049	\$0	\$0
Bioswale (new)	1.38%	7	\$8,122	\$112	\$786
Hydrodynamic Structures (new)	4.17%	1	\$8,362	\$348	\$348
Impervious Urban Surface Reduction	0.67%	7	\$8,944	\$60	\$417
Unclassified ⁶	5.00%	4	\$22,404	\$1,120	\$4,481
Total Annual O&M Project Cost					\$9,319

⁵ This cost assumes a 3% annual interest rate.

⁶ The "unclassified" urban BMP type consists of four regenerative stormwater conveyance projects for which O&M cost estimates had not been completed. The EFC applied a 5% O&M baseline cost to account for the annual costs of these projects.

It is important to note that the cost estimates do not include intermittent maintenance projects, but rather only annual maintenance costs. For each BMP, there is the potential for larger-scale maintenance projects to be needed on occasion, but those instances are difficult to predict, and thus the costs are difficult to estimate. Since O&M costs vary greatly and are challenging to estimate, the EFC believed the best method for estimating total annual O&M project costs would be based in assuming all 90 projects have been implemented rather than phasing them in over time, resulting in a total annual O&M project cost of \$9,319. The EFC used this base dollar amount and annualized the cost over a 20-year term, achieving a more realistic annual O&M cost of **\$12,528**. Because this is an estimate grounded in limited data, an adaptive management approach that adjusts up or down depending on actual annual spending will be key to ensuring O&M funds collected are sufficient to cover needs over time.

Total Annual CBPRP Implementation Costs: \$179,822
+ Total Annual CBPRP O&M Costs: \$12,528
= Total Annual CBPRP Costs: \$192,350

MS4 Administrative Program Costs

MS4 Shared Stormwater Coordinator: Many of the recurring themes identified in the office hours are directly related to a community’s compliance with its independent General MS4 permit. While the communities rely heavily on their consulting engineers to help comply with the permits, there are many components that could be done more efficiently by one individual and shared across the communities. Early on in the project, the concept of shared stormwater coordinator housed at a regional office was raised. It was intended that this individual could help administer the CBPRP program, serve as a liaison to municipal staff and consultants, work with the County’s newly hired Geospatial Information Systems (GIS) Coordinator to manage and organize mapping, develop templates, and coordinate reporting, among other tasks. This concept was well received by all partners, but exactly how that model would operate in Blair County required further discussion.

Both the Blair County Conservation District (BCCD) and Blair County Planning Commission (BCPC) expressed a willingness to house this staff person, and the EFC met with representatives from both groups and brought in project partners on multiple occasions to discuss the feasibility of hiring a shared coordinator that would be funded independently. Both entities are suitable candidates given their current role in helping the municipalities address stormwater management and resource protection, and programs in other

Lycoming County: A Model for Shared Staff

The idea for hiring a shared stormwater coordinator came from an example in Lycoming County, where the 10 MS4 permit holders developed the Lycoming County MS4 Coalition (a more formalized version of the Blair County MS4 Workgroup). The coalition created a new position – the MS4 Planner – to be housed at the Lycoming County Planning and Community Development Department, and whose role is to coordinate the efforts of the coalition and pursue the most cost-effective regulatory compliance possible. The MS4 Planner is fully funded by all 10 MS4 permit holders for a trial period of 16 months. The job description for this position can be found [here](http://www.lyco.org/Portals/1/PlanningCommunityDevelopment/Documents/2014AnnualReport.pdf), and should be used as a starting point for the MS4 Workgroup when developing a job description for a Blair County MS4 shared staff person.

Source: Brownfields to Housing, The Annual report of the Department of Planning and Community Development, Lycoming County, Pennsylvania, 2014, <http://www.lyco.org/Portals/1/PlanningCommunityDevelopment/Documents/2014AnnualReport.pdf>

communities have successfully used either. Ultimately, the MS4 Workgroup chose to house the position at the BCCD. Given the existing memorandum of understanding (MOU) that the BCCD has with each municipality, and the current support the organization provides on other stormwater program components suggests a seamless fit for a shared coordinator to work from the BCCD.

The BCCD provided the EFC with cost of employment estimates including salary, benefits, and administrative expenses that estimated the total cost of employment for a full time MS4 Coordinator to total approximately \$75,000. The EFC projected this cost over a 20-year period and assumed a 3% inflation rate, to generate the annual estimated cost of **\$100,824**.

MS4 Regional Support Services: There are many MS4 support costs that remain unknown, and a great deal of uncertainty regarding the costs associated with consulting services, technology, and capital projects. Thus, the EFC included a line item for MS4 regional support services that may include, but is not limited to, GIS services above and beyond County services, consultants for additional planning and studies, and maintenance training. The estimated cost for these services is set at \$25,000. The EFC projected this cost over a 20-year period and assumed a 3% inflation rate, to generate the annual estimated cost of **\$33,608**.

Total Annual MS4 Shared Coordinator Position: \$100,824
+ Total Annual MS4 Regional Support Services: \$33,608
= Total Annual MS4 Program Costs: \$134,431

All total annual program costs are shown in Table 3 below. See **Appendix B** for all annual program costs across the 20-, 15-, and 10-year projections.

Table 3: Total Annual Program Costs, 20- Year Projection, 11 Participating Municipalities

Annual CBPRP Program Costs	\$192,350
Annual MS4 Administrative Program Costs	\$134,431
Total Annual Program Costs	\$326,781

Financing Scenarios

The EFC used York County as a model for developing four financing scenarios that would support the revenue needs to implement a regional stormwater program in Blair County. The York County Planning Commission (YCPC) has taken the lead on developing planning materials to guide the implementation of a regional approach to managing stormwater. CWP also worked with the YCPC to develop a regional CBPRP, with an associated financing strategy that has been approved and implemented by 43 of the County’s 72 municipalities and York County.⁷ The EFC has spoken directly with York County representatives on many occasions to gain access to local data, processes, and documents. The YCPC Executive Director also spoke to the Blair County municipalities and other attendees at the March workshop.

This communication indicated similar needs and approaches across the two counties, and thus the four potential financing scenarios York vetted locally served as the basis for the scenarios developed by the

⁷ York County Regional Chesapeake Bay Pollutant Reduction Plan, Prepared by the York County Planning Commission and Center for Watershed Protection with the Regional CBPRP Steering Committee, October 2014

EFC. See **Appendix C** for a list of all four scenarios developed and vetted with the MS4 Workgroup and partners, including the description and the individual municipal cost equation of each scenario.

At the final stage of the project, the MS4 Workgroup chose Scenario 3, a weighted system that considers total stream length, population, and impervious cover. This is also the financing scenario that York County chose (with some specific modifications for the region), and the scenario EFC recommends based on its most equitable distribution of costs compared to the other financing scenarios. In this case, 20% of the total annual cost (\$65,356) is based on a community’s total linear feet of streams within the urbanized area, 30% of the total annual cost (\$98,034) is based on the total population within the municipality, and 50% of the total annual cost (\$163,391) is based on the total impervious coverage within the urbanized area. The individual municipality then pays based on its individual amount of linear feet of stream, population, and impervious coverage.

Municipal cost per linear foot of stream: \$0.15
 Municipal cost per capita: \$1.02
 Municipal cost per acre of impervious coverage: \$43.76

The individual municipal cost breakdown based on Scenario 3’s weighted system is shown in Table 4. See **Appendices D-H** for the breakdown of all scenarios and the corresponding municipal costs.

Table 4: Annual Municipal Contribution, Scenario 3 – Weighted Cost, 11 Participating Municipalities

Municipality	(A) Total Stream Length in UA (feet) ⁸	(B) Population (2010) ⁹	(C) Impervious Cover in UA (acres) ¹⁰	Annual Cost per Municipality (A+B+C)	Annual Cost per Capita
Allegheny Township	91,869	6,738	510.59	\$42,621	\$6.33
Altoona City	67,447	46,320	1478.1	\$121,806	\$2.63
Antis Township	52,222	6,499	64.31	\$17,065	\$2.63
Bellwood Borough	1,764	1,828	73.23	\$5,328	\$2.91
Blair County ¹¹	--	--	41.90	\$1,834	\$0.06
Blair Township	31,340	4,494	229.29	\$19,192	\$4.27
Duncansville Borough	10,289	1,233	83.18	\$6,399	\$5.19
Frankstown Township	45,800	7,381	151.12	\$20,828	\$2.82
Freedom Township	8,178	3,458	83.61	\$8,382	\$2.42
Hollidaysburg Borough	25,707	5,791	364.8	\$25,625	\$4.42
Logan Township	113,522	12,289	653.54	\$57,701	\$4.70
Total	448,138	96,031	3,734	\$326,781	

⁸ Alliance for the Chesapeake Bay project partners derived this data from publicly available Pennsylvania Department of Environmental Protection GIS layers.

⁹ 2010 Population, United States Census Bureau, data compiled by the Alliance for the Chesapeake Bay project partners.

¹⁰ Data was based on CWP’s Blair County Total Maximum Daily Load and Chesapeake Bay Pollution Reduction Plan.

¹¹ The impervious area for Blair County facilities was calculated using local GIS and engineering consultants’ data. The impervious area where the facility is located was subtracted from the corresponding municipality. See **Appendix I** for the list of each facility, location, impervious and total areas.

Throughout this process, the EFC developed multiple iterations of potential financing scenarios based on local concerns and context. While the EFC recommends the above approach for financing the region's CBPRP and parts of the MS4 program, it is the participating municipalities who must ultimately come to consensus around the details of how the program will be implemented. The EFC believes successful financing strategies are rooted in local context, and in this case the regional approach to enhancing stormwater programming and project implementation will require a shared vision and blending of individual municipal agendas and values. The following concerns were addressed through discussion and included in the corresponding appendices for consideration by the local partners:

- Blair County has not made a final decision whether it will opt into the initial program. While the EFC recommends the County opt in, since it has responsibilities under both the County's MS4 permit and CBPRP, **Appendix J** shows an alternative Scenario 3 should the County choose to opt out initially.
- The City of Altoona and Hollidaysburg Borough also have requirements to manage its combined sewer system, which often intersects and works in tandem with the municipalities' MS4. The City of Altoona requested the EFC subtract the estimated population in the CSO area, since the CSO was subtracted from CWP's impervious coverage area and is being managed separately. While the EFC is recommending the total population be used for each participating municipality, **Appendix K** shows the alternative financing Scenario 3 should the City of Altoona's population exclude its CSO estimated population.
- York County used the total linear feet of *impaired* streams within the urbanized area as one of its metrics for Scenario 3. The EFC, by recommendation from the consulting engineers, calculated the municipal costs under Scenario 3 using total linear feet of streams in addition to Scenario 3b using total linear feet of *impaired* streams (see **Appendix G**). Ultimately, the MS4 Workgroup chose the total linear feet of streams as its metric since the regulations apply to the entire area that drains to the Chesapeake Bay.
- Juniata Township and Newry Borough opted out of the initial program. While the EFC's recommendation would be all MS4-designated municipalities opt into the program, each municipality has its own autonomy in this decision and without participating will have to address its regulations independently. Throughout the study, the EFC also discussed with local partners the idea of requesting participation from non-MS4 communities. While this was not thought feasible by local stakeholders, the EFC still believes that non-MS4 municipalities should be given the opportunity to participate in the program, potentially at a discounted rate.
- Lastly, the Pennsylvania State University (PSU) – Altoona campus is located in the City of Altoona and Logan Township. PSU – Altoona has its own MS4 permit, and is the only other non-municipal permit holder in Blair County aside from the County itself. While the MS4 Workgroup decided not to include PSU – Altoona in its initial program, the EFC recommends working closely with this partner in the coming years since there are opportunities to mutually benefit from the University's participation – from shared resources, additional BMP implementation, and educational opportunities for students to help work on MS4-related tasks (either at the BCCD or individual municipalities).

Cost Saving Strategies

The above finance discussion assumes the communities pay for the full program over a 20-year period. While the data above shows high-end cost estimates based on this assumption, there are many ways the communities can reduce costs through employing a comprehensive regional approach, integrating

green infrastructure into existing and future project opportunities, and accessing state, federal, and foundation grants to accelerate the implementation of projects and bolster the program.

Regional Approach

As federal stormwater regulations have become more stringent, the need for effective stormwater management has grown, and the use of green infrastructure has become more established. To meet federal requirements, many communities across the country are increasingly choosing to join together in regional approaches to address stormwater, rather than acting alone. While some may wonder why there is an expanding interest in regionalization, a 2014 report from Harvard Law indicates that, "This type of approach benefits municipalities by addressing the stormwater runoff problem in a more comprehensive, cost-effective way than any single municipal body could on its own."¹²

Municipalities are often working under tight budgets and limited staff, and are looking for every opportunity to save time and money. Tackling stormwater permits through a regional approach is an effective way of doing so. By joining together, municipalities can share resources such as equipment, vehicles, and expertise; collaborate on public

outreach campaigns; hire shared staff; and write consolidated reports. It is with this in mind that the EFC developed a financing strategy that would enable greater and more formalized regional cooperation in order to more effectively manage stormwater throughout the County.

Pursuing a regional approach to stormwater management not only saves municipalities time and money, it also makes more sense when considering the hydrological cycle, leading to greater water quality improvements. Stormwater does not abide by municipal boundaries, nor do municipal boundaries usually confine entire watersheds. Research on stream restoration suggests that attempting to improve water quality through a localized approach, and by focusing on the stream itself rather than watershed-wide inputs to the stream produces insufficient results.¹³ Working through a regional program allows for a much more comprehensive and effective view of stormwater management and can allow for important cross-municipal projects with greater potential for water quality improvements that could not be implemented otherwise.

In one example, by sharing resources and working regionally, the Greater Lansing Regional Committee in Michigan was able to receive savings on the level of several hundred thousand dollars per year, benefitting greatly from the economies of scale that a regional approach produces.

Additionally, since the stormwater management needs of one municipality might be greater than others, a regional plan allows for projects to be prioritized and implemented in a logical and cost effective sequence. In part due to the ability to prioritize projects, another example of a regional stormwater management program in Long Creek, Maine was able to lower the annual cost to program participants from \$5,885 –\$10,475 to \$2,500 – \$3,000 per impervious acre by participating in a regional permit and coordinated effort.

Sources: Franzetti, R., *Regional Stormwater Utilities a Growing Practice*, Water World, <http://www.waterworld.com/articles/uwm/articles/print/volume-2/issue-1/features/regional-stormwater-utilities-a-growing-practice.html> and *Long Creek Watershed Management Plan, A Community-Based Collaborative Approach to the Restoration of Long Creek*, FB Environmental Associates, Inc. July 2009, http://www.restorelongcreek.org/docs/plan/lc_wmp.pdf

¹² *Regional and Municipal Stormwater Management: A Comprehensive Approach*, Harvard Law School, June 2014, <http://environment.law.harvard.edu/wp-content/uploads/2015/08/regional-municipal-stormwater-management-comprehensive-approach.pdf>

¹³ Palmer, M., Hondula, K., and Koch, B., *Ecological Restoration of Streams and Rivers: Shifting Strategies and Shifting Goals*, Annual Review of Ecology, Evolution, and Systematics, Vol. 45: 247-269, November 2014, <http://www.annualreviews.org/doi/full/10.1146/annurev-ecolsys-120213-091935>

Green Infrastructure Approach

Green infrastructure is an approach to resource management decision-making that considers the interaction between natural areas and the built environment and looks to use natural systems to address environmental and social priorities. Because green infrastructure can yield multiple benefits, the reason communities turn to this approach is varied. At the regional scale, green infrastructure tends to refer to the network of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. On a local or site scale, green infrastructure often refers to stormwater management systems that mimic nature, soaking up and storing water.

A green infrastructure approach to stormwater management uses practices that slow runoff allowing water to soak into the ground, enabling nutrients and contaminants to be absorbed and treated by vegetation, and reducing the frequency of peak flow events. From an ecological and quality of life perspective, this translates into less runoff, fewer sewer overflows and pollutants in streams, more opportunities for groundwater recharge, and fewer flooding events. From a financing perspective, this means fewer instances of damage to public and private property, reduced water and energy usage and treatment costs, and increases in the available water supply. Green infrastructure practices also tend to have lower capital costs than their gray counterparts.

In addition, green infrastructure has the capacity to deliver benefits beyond those related to water quality and quantity. Incorporating green infrastructure into local stormwater programming can address community priorities related to air quality, recreation, public health and safety, economic development, energy conservation, transportation and a host of social concerns. This means the return on an investment in green infrastructure spans well beyond the improvements to water quality and quantity management.

While the majority of the communities in the MS4 Workgroup are focused strictly on complying with their permit, a few are looking to opportunities for a green infrastructure approach to address multiple community priorities, with an eye to how this approach might create efficiencies that result in implementation cost-savings.

The available research on O&M costs for green infrastructure practices in particular is scarce. However, the available literature does suggest generally the O&M costs of green infrastructure are lower than that of traditional stormwater management practices (i.e. gray infrastructure). An April 2013 report by American Rivers found that the research is beginning to show that **life-cycle costs are less than traditional practices when evaluating maintenance activities for green infrastructure.**¹⁴

That same report assesses case studies related to green infrastructure O&M costs, and notes that New York City will save hundreds of thousands of dollars by utilizing green infrastructure that complements the City's gray infrastructure. The report explains that green infrastructure initially costs more because new practices "require more intensive maintenance until they become established." It goes on to explain that once established, **the City will save \$200,000 a year on O&M costs** because of the much lower energy needs of green infrastructure projects.¹⁵

American Rivers is not alone in coming to these conclusions, either. The US Environmental Protection Agency (EPA) conducted an in-depth survey of research related to green infrastructure O&M costs and determined that green infrastructure is "generally a less costly alternative than gray infrastructure due

¹⁴ *Staying Green: Strategies to Improve Operations and Maintenance of Green Infrastructure in the Chesapeake Bay Watershed*, American Rivers, <http://www.americanrivers.org/assets/pdfs/reports-and-publications/staying-green-strategies-improve-operations-and-maintenance.pdf?1ef746>

¹⁵ Ibid

to savings in installation, cost of maintenance activities, and greater adaptability of the infrastructure.”¹⁶ US EPA’s report cited one study, which found that **green infrastructure is equally as effective in removing pollutants from stormwater as gray infrastructure, but costs 5-30% less initially, and approximately 25% less over the life cycle of a project.**¹⁷

Beyond that, the multiple benefits associated with green infrastructure suggest that an investment in this approach will simultaneously address community priorities beyond water quality – such as recreation, public health and safety, climate mitigation, and the like – in a way that gray infrastructure cannot. More research is still needed to accurately assess the overall life cycle and specific O&M costs of green infrastructure, and that will certainly accumulate as these practices become more commonplace over time. In the meantime, evidence suggests that the costs of implementing and maintaining green infrastructure are lower than traditional stormwater management practices.

Grant Opportunities

There are many federal, state, and foundation grant opportunities available to communities to alleviate the financial burden associated with water quality programming. While these grant opportunities tend to be highly competitive, funders are often looking to support programs that employ both regional and green infrastructure approaches that are grounded in a consensus-driven plan and demonstrate support beyond the grant itself. The MS4 Workgroup is in a prime position to take advantage of the opportunities to jumpstart its regional program, generating costs savings in the near term, and creating a more effective and efficient program over time.

The EFC provided the MS4 Workgroup with a resource guide that lists two dozen funding opportunities local partners can potentially link to installation of BMPs in the CWP plan, as well as help build capacity for a shared MS4 coordinator. Two included in the resource guide in particular offer promising opportunities to fill the interim capacity gap:

Two programs in particular included in the resource guide offer promising opportunities to help fill interim capacity gaps: DCED’s Municipal Assistance Program and DCNR’s C2P2 Circuit Rider Program.

(1) Municipal Assistance Program – Administered by the Pennsylvania Department of Community and Economic Development (DCED)’s Governor’s Center for Local Government Services (GCLGS), this program was created to help local governments efficiently and effectively plan and implement a variety of services, improvements, and soundly managed development.

- Eligibility: For shared service and community planning, eligible applicants include: cities, boroughs, towns, townships, home-rule municipalities, counties, or public or quasi-public bodies duly authorized to act on behalf of one or more municipalities.
- Funding Amount: No limit
- Deadline: Rolling
- Contact: Encouraged to call a representative from the GCLGS prior to submitting an application. Contact the Center at 1-888-223-6837 or 717-787-6837.

¹⁶ *The Importance of Operation and Maintenance for the Long-Term Success of Green Infrastructure*, A Review of Green Infrastructure O&M Practices in ARRA Clean Water State Revolving Fund Projects, US EPA, http://www2.epa.gov/sites/production/files/2015-04/documents/green_infrastructure-om_report.pdf

¹⁷ Jaffe, Martin et al, *The Illinois Green Infrastructure Study*, A Report to the Illinois Environmental Protection Agency on the Criteria in Section 15 of Public Act 96-0026, The Illinois Green Infrastructure for Clean Water Act of 2009, May 28, 2009, <http://www.epa.state.il.us/green-infrastructure/docs/draft-final-report.pdf>

- Priority funds: For shared service and community planning, funding will be prioritized for projects that advance community partnerships, promote innovation, and advance the Commonwealth’s Keystone Principles for Growth, Investment and Resource Conservation.
- Match: 50% required

For more information on this program, go [here](#).

(2) C2P2 Circuit Rider Program – Administered by the Pennsylvania Department of Conservation and Natural Resources (DCNR)’s Bureau of Recreation and Conservation, the circuit rider’s purpose is to initiate new programs and services for a county and municipalities that individually do not have the financial resources to hire a professional staff person. The intended result of such a hiring is to increase the ability of county and local officials to more efficiently and effectively meet their recreation, park, greenway, open space and/or natural resource conservation needs.

- Eligibility: To be eligible, two or more municipalities must cooperate in a new intergovernmental effort by adopting an intergovernmental agreement. A single county can be eligible without an intergovernmental agreement providing the county is undertaking or has completed the appropriate recreation and/or greenway planning and will be providing services countywide to their residents and municipalities.
- Funding Amount: Grant for circuit rider's salary only & Bureau-approved technical assistance & training expenses
- Deadline: Rolling
- Contact: Michelle Hoffman, 717-772-3321, mhoffman@pa.gov
- Priority funds: Projects supporting intergovernmental cooperation
- Match: The grant provides: (1) First year up to one hundred percent (100%) of gross salary; (2) Second year up to seventy-five percent (75%) of gross salary; (3) Third year up to fifty percent (50%) of gross salary; and, (4) Fourth year up to twenty-five percent (25%) of gross salary

For more information on this program, go [here](#).

The following section frames out the critical next steps the local partners should take to get this program up and running.

Recommended Next Steps

The Blair County MS4 Workgroup has already made great strides in laying the foundation for more effectively managing stormwater and achieving local water quality goals. They have developed a consensus driven plan that will guide decision-making; they have identified the municipalities and supporting agencies and organizations that will partner in plan implementation; they recognize the efficiencies to be gained through a shared stormwater coordinator housed at the BCCD; they see the value of implementing the plan collectively; and, they are pursuing a supporting financing strategy designed to equitably and sustainably support implementation over time.

Clearly, the collaborative implementation of close to 100 on-the-ground projects and the establishment of the supporting revenue stream are efforts that will take time, patience, and political will, but maintaining the momentum built to this point is critical. While these large-scale efforts continue to take shape, the EFC suggests the following series of immediate next steps that will enable the MS4

Workgroup to continue to make progress towards their collective goals. They are not intended to be entirely sequential, as some of these activities will need to occur in parallel.

Make these findings and recommendations your own. An important first step will be for the MS4 Workgroup to consider EFC's data, assumptions, analysis, and findings with a local lens and adapt these, if necessary, to better reflect the physical, socioeconomic, cultural, and political landscape of Blair County. The water quality implementation and financing strategies that see the greatest level of success are those that are deeply rooted in local context.

Communicate the need for a new approach to stormwater. The Blair County community is not going to be willing to invest in something they do not understand the value of. Once the MS4 Workgroup has come to consensus around the implementation plan and financing strategy of choice, there will be a need to develop buy-in from both elected officials, as well as the general citizenry. While there are clear regulatory drivers that demand these projects move forward, there are also multiple benefits to the community associated with implementation and being able to articulate those will be key. There are organizations, like the Alliance for the Chesapeake Bay and the BCCD, that have extensive experience in this arena and would be useful partners for crafting and delivering messaging.

Take advantage of grants. The ability to reduce long-term costs to the municipalities with the pursuit of grant funding will likely resonate with both elected officials and the broader community. Included in the Resources Guide developed by the EFC are grants that could support project implementation as well as capacity. Grant-supported demonstration projects can become valuable outreach tools that help the community understand the many benefits of green infrastructure practices. Capacity grants, like those discussed from DCED and DCNR, could potentially support a shared stormwater manager while a more sustainable funding stream is established.

Move forward with establishing a shared stormwater coordinator. Bring in a shared stormwater coordinator as soon as is reasonably feasible. This will likely require developing consensus around the expectations and tasks associated with the job description, as well as logistical specifics. The MS4 Workgroup will also want to consider which of the common issues identified through office hours would be appropriate for this position to address and what support services will be needed.

The MS4 Workgroup should use the Lycoming County MS4 Planner's job description as a starting point for developing a local job description for a MS4 Coordinator to meet their needs. Simultaneously, the MS4 Workgroup should identify a lead entity (a municipality or County agency) to submit a grant on behalf of the participating municipalities to obtain funding for the startup of the MS4 Shared Stormwater Coordinator's position. Once established, the MS4 Coordinator can take the lead on helping obtain implementation funding for BMPs and other MS4-related activities.

Define partner roles and responsibilities. Once sufficient community buy-in has been established, the BCCD, the municipalities, and any other relevant partners will likely want to develop an MOU, or revise an existing MOU, to clearly define the roles and responsibilities of each party. This can and should include discussion of how the shared revenue stream will be collected, administered, and invested.

If a community chooses to submit a grant independently for a project included in the BMP list, there will be an impact on the overall program cost and associated fees. Communities who take a more proactive role in improving water quality and have the capacity to submit grants should be encouraged to do so. However, the participating municipalities will need to reach consensus on how that will impact the fee system. The fee could be reduced for all if the project is part of the existing CBPRP, since all will receive credit for this project, or it could only reduce the fee of the community that is implementing the project, or a hybrid of the two approaches.

Routinely reassess and reevaluate program needs. Any successful program adapts to community advancements, regulatory changes, local priority shifts, and improvements in science and technology, among other things. As the regional program develops, the lead partner(s) and staff representatives should continually reassess and reevaluate projects and program needs. Since the focus of this effort was to meet the communities where they are currently, our initial recommendations focus more heavily on permit compliance; however, as local capacity and priorities evolve, the program should consider how best to incorporate green infrastructure opportunities into stormwater-related projects. Because of the holistic vision green infrastructure yields, efficiencies will be gained and opportunities created that contribute to the resilience of the local economy, environment, and way of life in a powerful way. This shift in approach will open the door to connecting stormwater management efforts to additional resources and potential partners previously unavailable.

Closing

The efforts of the Blair County MS4 Workgroup offer an exciting opportunity to improve water quality in the Juniata watershed. These immediate next steps will address short-term capacity issues while the development and implementation of some of the larger-scale solutions described here and in the TMDL Plan and CBPRP evolves. Building on the regional dialogue and pollution reduction planning with a shared approach to implementation that is supported by a sustainable financing strategy will enable participating municipalities to more efficiently manage stormwater runoff, to realize cost savings in meeting their regulatory obligations, and to more effectively achieve local water quality goals.