

New Options for Watershed Collaboration

An Options Paper for the Water Quality Improvement Plan

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Table of Contents

Executive Summary.....	4
Acronyms:	7
Introduction: Purpose of the Water Quality Improvement Plan	8
1.0 Process for developing the WQIP	10
2.0 Context: Regulatory drivers and existing tools	12
2.1 Regulatory drivers and related frameworks	12
2.1.1 MS4 permits	12
2.1.2 Milwaukee River Basin TMDL.....	13
2.1.3 Intergovernmental Cooperation Agreement to recognize Joint Water Quality Improvement Initiatives (ICA).....	13
2.2 Existing watershed planning and collaboration tools.....	14
2.2.1 Regional Watershed Restoration Plans.....	14
2.2.2 Nine key element watershed restoration plans.....	15
2.2.3 Plans and resources to scale up Green Infrastructure.....	17
2.2.4 TMDL dashboards	18
2.2.5 Chloride Study.....	18
2.2.6 Adaptive management.....	19
2.2.7 Water Quality Trading.....	19
2.2.8 Integrated Watershed Management (IWM).....	19
3. Preliminary Analysis, Key Questions going Forward, and Recommended Strategies	20
3.1 Implementation strategy #1: Funding structures and pathways.....	21
3.1(a) Proposed funding arrangement for Green Solutions	21
3.1(b) Private Public Partnership model	24
3.1(c) Watershed-wide price supports	26
3.1(d) Adaptive management approach	30
3.2 Implementation strategy #2: Expanding watercourse projects to watershed projects	31
3.3 Implementation strategy #3: Supporting desired management efforts.....	33
3.4 Implementation strategy #4: Partnering with private sector development.....	35
3.5 Implementation strategy #5: Creative repurposing of relic properties.....	37
4. Monitoring Strategies	38
5. Preliminary stakeholder analysis	40
5.1 Municipalities.....	40

5.2 Watershed-focused nonprofit organizations..... 43
5.3 Private sector – construction and suppliers 45
Conclusion: Putting in all together..... 46

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Executive Summary

The Water Quality Improvement Plan (WQIP) aims to facilitate rapid improvement of water quality in the Greater Milwaukee Watersheds. The plan will build on the technical strength of the TMDL Report, the specificity of several nine key element (9KE) plans, the vision of Milwaukee Metropolitan Sewerage District's (MMSD) Regional Green Infrastructure and 2050 Facilities Plans, and the comprehensiveness of a number of Southeastern Wisconsin Regional Planning Commission's (SEWRPC) plans (most directly the Regional Water Quality Management Plan). While recognizing the value of each of these planning efforts, the WQIP intends to serve a more targeted role of identifying challenges to effective watershed restoration and presenting a number of pathways that might help address these challenges. While these other plans focus largely on the *what* and *why*, this plan hones in on the *where* but more specifically the *how*.

This document is an 'options paper' that provides a preliminary analysis from which a set of final WQIP recommendations will be developed following extensive vetting by watershed stakeholders. The final WQIP report and recommendations will be completed in March 2020.

Several pathways for success are presented for consideration in this options paper. These pathways are not stand-alone approaches; they address different aspects of current and future efforts and may be combined, altered or further developed as discussion with relevant stakeholders occurs. They are:

- Alternative ways of funding watershed restoration work
 - Modified approaches for Green Solutions funding
 - Potential of a Private Public Partnership approach
 - Watershed-wide price supports for green infrastructure components
 - Adaptive management approach
- More comprehensive project scoping and delivery: Expanding watercourse projects to watershed projects
- Supporting desired management efforts with new coordination approaches
- Partnering with private sector development to build upon economic development interests of municipalities
- Creative repurposing of relic properties by engaging and challenging diverse nonprofit sector

The first category of pathways suggests **alternative ways of funding watershed restoration work**. MMSD and other funders are currently heavily invested in funding efforts that improve water quality. In some cases, there may be opportunities to streamline the mechanisms or to create new arrangements for funding this work. The overall goal is to deliver cost-effective projects that deliver social, environmental, and economic value.

Within the category, **creating Green Solution funding zones that push local municipalities to both find the best projects and find ways to realize triple bottom line benefits** is the first pathway. This approach looks at how to modify the existing funding structure so that municipalities have both **greater flexibility** and **greater responsibility** for **more cost-effective outcomes**.

Public Private Partnerships is another alternative way of funding. This model has been successful in Prince George's County, Maryland, where it has allowed the county to greatly accelerate its requirement

of retrofitting 10% of the impervious surface in the county. Additionally, the requirements for local, small, and minority owned business utilization have been exceeded in impressive fashion. Commonly mentioned barriers such as maintenance have been addressed by this format. Finally, the county has **retained oversight and approval of all work** but has been able to **offload much of the risk** associated with meeting this regulatory requirement.

The next approach examines the **use of watershed-wide price supports as a way of funding green infrastructure**. This section discusses how this approach could **harness the private sector to help mainstream GI practices as well as realize efficiencies through greater private sector competition in the sector**. New roles for nonprofits or other partners in monitoring the quality of GI installed through this model are also discussed.

Although this is likely not a compliance pathway for MMSD, the **Adaptive Management** approach may be useful in continuing to **fund important agricultural practices such as no-til in the upper watershed**. Pros and cons are discussed in this section.

MMSD is currently planning several **major stream de-channelization projects**. The second category of pathways discusses how these projects might be expanded. **Incorporating stormwater retrofits and recreational add-ons can multiply the impact of these investments and may leverage federal funds**. Examples like the Menomonee River De-channelization and Kinnickinnic River De-channelization projects are good examples for this approach.

Another approach considered is to **partner with private development as a strategy for expanding green infrastructure and recreational benefits**. Facilitating new development is a significant goal for many municipalities so finding ways to expand the reach of these projects is important. Some challenges such as contracting issues and maintenance issues can be better managed through partnerships such as these.

Lastly, this options paper suggests that the **creative ideas of the nonprofit sector be tapped to address the vast areas of relic properties with impervious surface**. Retrofitting these areas is typically difficult to fund due to ownership issues or due to the fact that, by definition, the use of relic properties may evolve. However, in an urban area such as greater Milwaukee, it is important to look at these sites and identify inexpensive short- to mid-term uses. These uses might range widely but all will reduce impervious coverage significantly. **Using these relic parcels as “idea-labs” may allow for projects that build social bonds and/or create economic opportunities**.

The context and the required actions of watershed restoration in a multi-jurisdictional area are complex and require the persistent attention and involvement of a broad set of stakeholders. **The potential approaches outlined in this options paper are intended to act as a springboard for soliciting stakeholder reflection, participation, feedback, and investment**. Outreach around this options paper will determine which issues resonate most with watershed stakeholders and which issues stakeholders are most willing to invest time and energy into solving. The final version of the WQIP will be shaped by the feedback that the planning team receives. **Ultimately, the WQIP will be a reflection of the priorities and interests of the watershed stakeholders. Its utility will be directly proportional to the degree to which it draws out the involvement and participation of those stakeholders**.

Fortunately, **important pre-conditions are present**. There is a regulatory framework that can encourage action. Although funding constraints exist, there is a general openness to new approaches and there is a desire on the part of nearly all stakeholders to be part of the solution. There is ample technical knowledge in the private sector that can bring solutions to specific problems. There is a nonprofit sector that brings clear energy to this work. Lastly, structures exist for collaboration although new ones may need to be formed. In sum, **the work ahead is not simple but is clearly possible**.

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Acronyms

WQIP:	Water Quality Improvement Plan
TMDL:	Total Maximum Daily Load
9KE:	Nine Key Element plan (EPA)
RWQMPU:	Regional Water Quality Management Plan Update
NPDES:	National Pollutant Discharge Elimination System
WPDES:	Wisconsin's Pollutant Discharge Elimination System
MS4:	Municipal Separate Storm Sewer System
POTW:	Publicly Owned Treatment Works
IWM:	Integrated Watershed Management
EPA:	Environmental Protection Agency
WDNR:	Wisconsin Department of Natural Resources

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Introduction

The Water Quality Improvement Plan (WQIP) will recommend integrated watershed management approaches for restoring the Greater Milwaukee Watersheds (GMW). The GMW includes the Milwaukee River Basin (the Milwaukee River, Menomonee River, and Kinnickinnic River Watersheds, and the Milwaukee Harbor Estuary), as well as the Oak Creek and Root River Watersheds within the MMSD planning area.

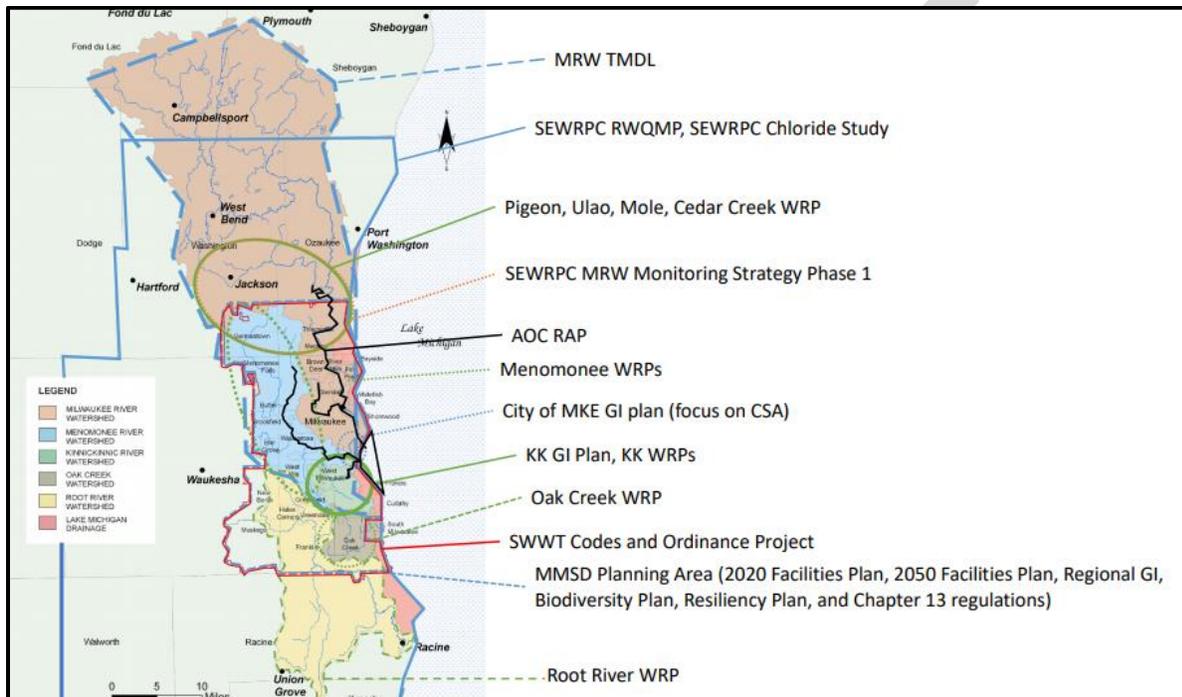


Figure 1: Map of planning areas in the Greater Milwaukee Watershed

These watersheds cover a variety of landscapes, from agricultural and rural communities to suburban and urban developments, that contribute a diverse set of pollutants to the waterways. Over the years, this has resulted in the development of several resources that suggest management of these pollutants, which are described further in section 2, below.

The new Wisconsin Pollutant Discharge Elimination System (WPDES) permit for the Milwaukee Metropolitan Sewerage District (MMSD) requires a WQIP for the GMW within MMSD’s planning area by March 1, 2020. MMSD has commissioned the Southeastern Wisconsin Watersheds Trust (“Sweet Water”) to develop the WQIP. The intended audience for the WQIP – and for this document as a starting point for the final WQIP report and recommendations – is the watershed community of practice comprised of

- municipalities and elected officials;
- non-governmental organizations (NGOs);
- foundations that support watershed restoration in the region;
- private sector professionals involved in the design and installation of green infrastructure and or other aspects of watershed restoration and related issues;

- state and local agencies with watershed-relevant responsibilities such as the Wisconsin Department of Natural Resources (WDNR) and the Southeastern Wisconsin Regional Planning Commission (SEWRPC); and
- local officials responsible for parks, planning, public works, and sustainability.

This document refers to this community of practice as watershed stakeholders. For the integrated watershed management approaches recommended in the WQIP to be relevant and successful, buy-in from these watershed stakeholders will be essential, because the implementation of the WQIP recommendations will require the active and supportive engagement of these same stakeholders.

This document is an ‘options paper’ that provides a preliminary analysis from which a set of final WQIP recommendations will be developed following extensive vetting by watershed stakeholders. The final WQIP report and recommendations are expected to be disseminated in March 2020. This options paper does not intend to define one specific problem and an associated answer. Rather it acknowledges that the most difficult challenges are frequently the ones that require greatest attention and involvement of the affected stakeholders. As such, the preliminary analysis and potential approaches outlined in this options paper are intended to act as a springboard for soliciting stakeholder reflection, participation, feedback, and investment. Outreach following the dissemination of the options paper will determine which issues resonate most with the watershed stakeholders and which issues stakeholders are most willing to invest time and energy into solving. The final version of the WQIP will be shaped by the feedback that the planning team receives. Ultimately, the WQIP will be a reflection of the priorities and interests of the watershed stakeholders. Its utility will be directly proportional to the degree to which it draws out the involvement and participation of those stakeholders.

Determining *where* to apply the strategies that attract support is also an end goal of the WQIP. This process will be assisted by a GIS analysis that will draw upon the TMDL dashboards described in section 2.2.4, below. This analysis will present geographically how some of the strategies might be applied in specific areas. The analysis will identify key drivers of prioritization such as:

- Planned de-channelization projects
- Available areas for GI (i.e., available public space)
- Segments closest to attainment
- Proportion of area that drains a permitted MS4

As the outreach process for this plan develops, certain strategies will likely have greater support and the criteria above (and others) can be used for evaluating the potential that these strategies would have in specific areas. It is likely that the application of two or three strategies in a specific area will be necessary to realize significant water quality improvements. As such, the process of prioritization is a process intricately tied to the stakeholder outreach and engagement process. Each will inform the other, with the desired result being a fully supported strategy applied to specific areas where they will have the greatest likelihood of success.

The process for developing final WQIP recommendations in collaboration with watershed stakeholders is described in more detail in section 1, below. Section 2 provides a preliminary analysis of the context and drivers for the WQIP and includes a brief assessment of existing tools and the relevant regulatory framework. The core of this options paper is section 3, which offers a set of approaches to collaborating on watershed restoration to achieve greater efficiencies and synergies with other community priorities.

An analysis of stakeholder concerns to which the WQIP must respond is provided in section 4, but it is important to emphasize that this analysis is only preliminary. The planning team will learn more about stakeholder perceptions, priorities, concerns, capacities, challenges, and interests in the context of further conversations about the options set out in this paper over the coming months. It is through this process of discussion and learning that a final set of relevant, practical, and actionable WQIP recommendations can be determined.

1. Process for developing the WQIP

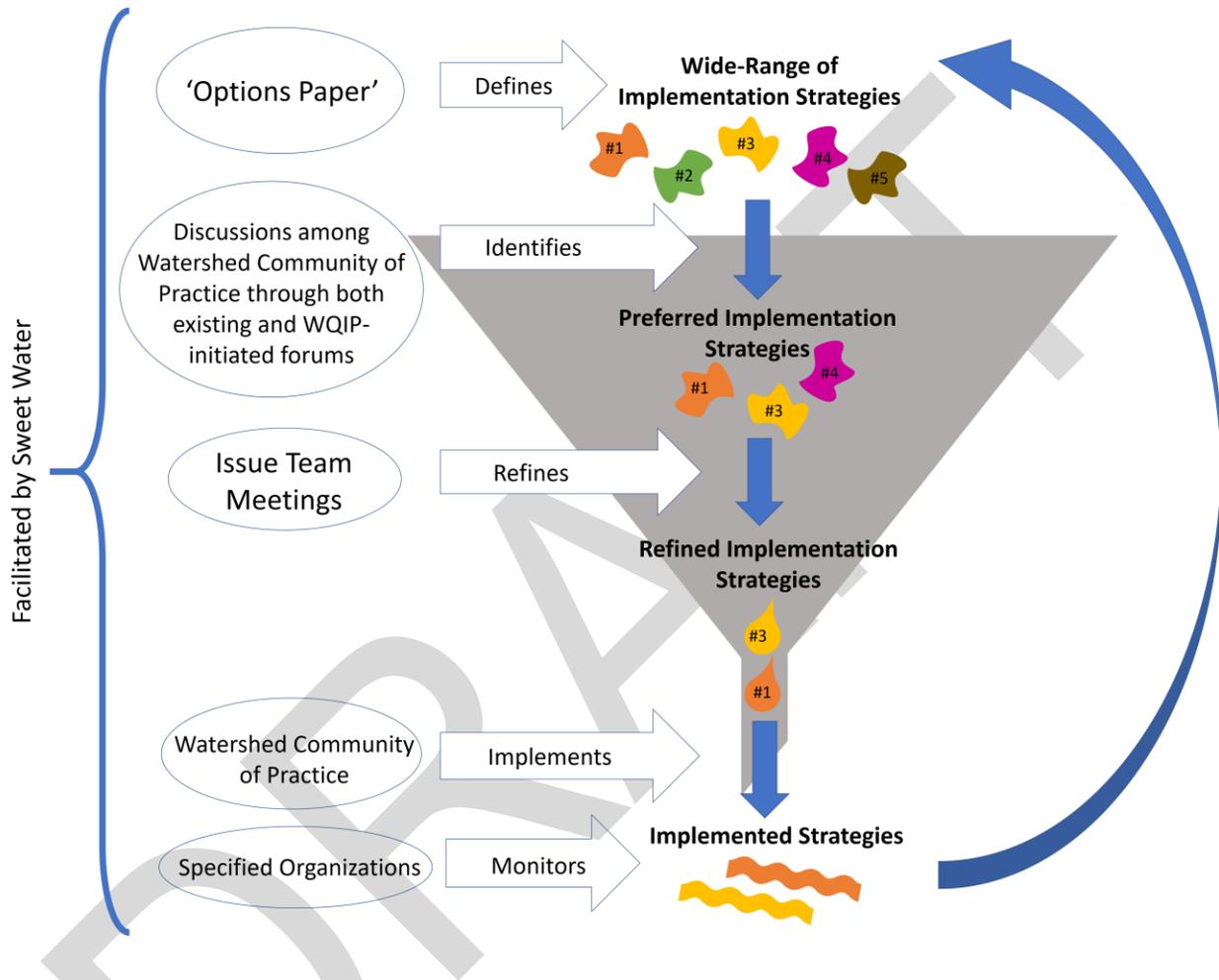
As emphasized above, the development of the WQIP will rely heavily on input from stakeholders. Over the period of February – September 2019, the planning team will convene various groups and individuals to gather feedback on the analysis and options set out in this paper to evolve a set of final WQIP recommendations. Tie-ins to existing plans and future efforts will be part of this discussion. Through this process, it is expected that some ideas will be taken up, elaborated, modified, and validated. Others may garner little interest, or be judged unworkable or otherwise not responsive to stakeholder concerns. The WQIP Planning Team will provide a web platform where stakeholders can remain up-to-date about how the WQIP is evolving, access relevant documents, and learn about stakeholder meetings and other relevant events.

“Oh no, not ANOTHER plan??!!”

This is not the first planning effort for the Greater Milwaukee Watershed community. In fact, the same stakeholders whose input is sought for the WQIP will have attended numerous meetings throughout recent years to discuss watershed restoration and how to approach it; some stakeholders may suffer from ‘planning fatigue’ and be wary of yet another watershed planning effort. *So what is different this time?* As noted above, prior watershed assessments, plans, and tools have clarified the *what* and *why* of watershed planning. These resources are summarized in section 2. They provide valuable data, analysis, and other insights that help frame the problem and the scale of action that is needed to address watershed impairments and restore area waterways to their designated uses. The WQIP, on the other hand, focuses on *how* to make sure the recommendations in these other planning documents are put into action in an efficient way while also achieving important co-benefits. This relates directly to *how* work is funded and implemented, *how* collaboration can work, and *how* to leverage the strengths of each sector in this. Figuring out these *hows* will allow us to make the strides needed to achieve our lofty collective goals.

Following the dissemination of this options paper through various forums and channels, Sweet Water will solicit feedback both by bringing the WQIP onto the agenda of existing forums and by scheduling meetings specifically for the WQIP. After a period of ‘temperature-taking,’ Sweet Water will identify which strategies have the greatest interest and will then ask stakeholders to join ‘Option Teams’ to provide guidance to the Planning Team on strategies that interest them. The role of the issue teams is to draw upon the knowledge of the participants and to work towards an actionable and fully supported process for implementing the desired strategies and defining how these strategies might work in concert. It is anticipated that a 3-4 month time-frame will be sufficient for developing fully vetted strategies.

The WQIP Planning Team welcomes not only your thoughts on the content of this options paper but also your suggestions on how to most effectively and efficiently engage you, and other stakeholders, to develop the WQIP. Contact details for the planning team are provided in Appendix A. Please feel free to contact us to share your ideas and suggestions.



Funding WQIP Recommendations

One important factor, of course, is the provision of sustainable funding to support watershed restoration work. It is assumed, however, that simply allocating or increasing funding is not enough, in itself, to make existing watershed plans and prescriptions self-implementing. There is still a need to define the processes and partnerships through which funding can be mobilized into action, and this is what the WQIP aims to define. Over the first half of 2019, the WQIP Planning Team will undertake an analysis and assessment of existing and potential funding to support implementation of WQIP recommendations. Insights from this analysis will be integrated at every stage of the WQIP process to ensure that WQIP recommendations can be supported by realistic and sustainable plans for funding the strategies recommended.

2. Context: Regulatory drivers and existing tools

The regional context and potential drivers related to watershed restoration efforts will ultimately shape the nature of watershed collaboration. This section lays out some of the key regulatory drivers for watershed restoration as well as existing data watershed plans and other tools that provide useful data and analysis that will be valuable technical inputs for the future collaboration envisioned by the WQIP.

2.1 Regulatory drivers and related frameworks

2.1.1 MS4 permits

Municipal Separate Storm Sewer System (MS4) permits are significant in that they are the primary regulatory method by which TMDL pollutant reductions from urban and suburban areas can be addressed. These permits are written and issued by WDNR and are given to WPDES phase 1 and 2 jurisdictions on a 5-year rotation. WDNR has communicated that they are open to flexible arrangements in these permits. Some of this flexibility has taken form in the creation of “group MS4 permits” where neighboring jurisdictions are issued a group permit that spells out actions required of the group as a whole. WDNR is also working to align the schedule of these permits so that they coincide with other point source permits that apply to POTWs or other point sources.

An explicit goal of MS4 permits is to address the urban loads identified in the Milwaukee TMDL. The Reduction targets for each section have been developed through the TMDL and is visually presented in the dashboard tool developed by CDM and described in section 2.2.4. Given that the reductions required for some stream and river segments are significant, many municipalities in the region are concerned about what these future permits may contain. The nature of future permits is far from clear and this represents great uncertainty for the delisting of impaired streams in the greater Milwaukee River watershed.

Recent MS4 permit history

The recent rounds of MS4 permits have placed only limited requirements upon municipalities. The 20% reduction of TSS from developed areas is one quantitative requirement. The existence of public outreach plans is another. However, understanding the ability of these permits to assist in watershed restoration efforts is complicated both by political factors and level of engagement.

First, the WDNR is constrained from including any additional elements in the MS4 permit that are not listed in State statutes. Secondly, there is no set timeframe by which all parties must meet the load reductions. A set timeline allows for the apportioning of load reductions over a set schedule. The lack of a timeline indicates that attainment is a process that could take decades or perhaps never be accomplished. This ambiguity sets the stage for confusion as well as a general lack of imperative for the work. Finally, the lack of enforcement by WDNR for noncompliance is important to recognize. Political factors over the past 8 years have created a situation where most municipalities are not concerned about meeting obligations listed in permits. The message of maximum flexibility has led to some new thinking but has also created significant confusion on the part of municipalities.

Opportunities within MS4 permit structure

The creation of MS4 permit groups means that there are currently structures for collaboration amongst municipalities. This collaboration could take the form of prioritized implementation within permit groups or perhaps informal trading within the confines of the permit. This could lead to more cost-effective implementation and the sharing of information. Furthermore, this collaboration could lead to the creation of common standards for improved salt management, leaf collection, or other management measures than can have benefits to local waterbodies.

The flexibility allowed by WDNR opens up the possibility to specifically call out coordination amongst municipalities with numeric goals that will lead to delisting. Should actions like participating in salt management taskforces, identifying ways to prioritize actions within MS4 permit groups, and finding ways to collaborate on new actions such as leaf removal be included in MS4 permit language, municipalities would be required find ways to improve existing management efforts.

2.1.2 Milwaukee River Basin TMDL

Three of the most widely addressed pollutants that are common in the WQIP planning area are phosphorus, TSS, and fecal coliform. These pollutants have a variety of urban and rural sources. More information about the causes and sources of these three pollutants in the Milwaukee River Basin can be found in the Milwaukee River Basin TMDL Report.¹ Approved by the US EPA in March of 2013, this document provides information about the sources, loads, and required reductions of these three pollutants in the Kinnickinnic, Menomonee, and Milwaukee River watersheds, as well as in the Milwaukee Harbor Estuary.

The TMDL Report notes geospatial aspects of pollution in these watersheds such as the sub-basins that contribute the highest loads, and identifies impaired sections of stream reaches, noting their associated designated uses, impairments, pollutants, and sources. The report also notes whether the sources within each sub-basin are primarily agricultural or urban. Point sources of pollutants are assigned Wasteload Allocations (WLA) and nonpoint sources are assigned Load Allocations in the report. Finally, the report assesses critical conditions, taking into account flow variability, margin of safety, reserve capacity, seasonal changes, and wet weather events.

One drawback of the TMDL report is that it does not cover all of the waterways to be covered by the WQIP. It does not cover the Root River or Oak Creek watersheds.

2.1.3 Intergovernmental Cooperation Agreement to recognize Joint Water Quality Improvement Initiatives (ICA)

MMSD does many projects that improve water quality in the watercourses. The municipalities served by MMSD contribute financially to these projects, and therefore are contributing to greater water quality in receiving streams and Lake Michigan. The municipalities will face TMDLs in their upcoming MS4 permits and would like to be able to acknowledge their part in MMSD projects that improve stream water quality. The degree to which these contributions factor into municipalities MS4 permit obligations is a matter to be determined by WDNR, but to streamline the connection between MMSD projects and the municipalities' MS4 permit requirements, MMSD has developed an Intergovernmental Cooperation

¹ The TMDL Report is available here:

<https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=158809714>

Agreement to recognize Joint Water Quality Improvement Initiatives (ICA). The municipalities are currently reviewing and signing the ICA.

The ICA recognizes that MMSD is leading a host of activities that will improve local waterbodies and that municipalities have and are currently contributing to this via a property tax for member communities or via a capital charge in lieu of a property tax for non-member communities. It makes sense, therefore, that municipalities should share credit for the water quality improvements resulting from MMSD-led watercourse projects. The ICA will form the basis of collaboration and credit-sharing among MMSD and the participating municipalities. This agreement recognizes that both watercourse projects and green infrastructure have benefits beyond the immediate area and, as such, joint contribution to these projects should be recognized as benefiting the watershed as a whole.

It should be noted, also, that many aspects of integrated watershed restoration require active participation by the local municipalities. For example, management issues related to salt application and leaf management are typically best handled by the local municipality. Preventing illicit discharges and other pollution prevention activities are also most frequently handled by local staff and can have major implications for water quality. Other issues such as construction oversight and oversight of plumbing codes are typically the purview of local municipalities. Although the ICA in no way prohibits municipalities from focusing on these local management issues, there may be a temptation to use the ICA to address any and all responsibilities related to meeting the TMDLs. As stated in the agreement, WDNR will determine the degree to which these joint activities meet permit compliance. This agreement simply provides the broad framework for compliance, while the details of specific projects and activities undertaken by each municipality will be spelled out in each general or group MS4 permit.

The TMDL and the related ICA are key drivers of the WQIP, and WQIP recommendations should provide clear guidance in reference to both. At the same time, however, the scope of WQIP recommendations are not constrained to the TMDL or the ICA but can also reach beyond these to include other mechanisms and processes for effective collaboration to restore watershed health and delist impaired waters in the GMW, in accordance with the needs, interests, and opportunities identified through stakeholder discussions with municipal staff, MMSD, and other watershed stakeholders.

2.2 Existing watershed planning and collaboration tools

2.2.1 Regional Watershed Restoration Plans

The most comprehensive watershed restoration plan is SEWRPC's Regional Water Quality Management Plan Update (RWQMUPU).² The RWQMUPU evaluates water quality and provides a plan to achieve water quality goals for the KK, Menomonee, Milwaukee, and Root Rivers, Oak Creek, and the Lake Michigan Direct Drainage Area. Originally published in 1979, the Regional Water Quality Management Plan evaluates water quality conditions as they apply to designated use objectives and associated water quality standards, evaluates methods of reducing water pollution to improve quality, and recommends cost-effective methods for improving water quality. The updates to this plan that were published in

² The Regional Water Quality Management Plan Update for the Greater Milwaukee Watersheds can be found here: http://www.sewrpc.org/SEWRPCFiles/Publications/pr/pr-050_part-1_water_quality_plan_for_greater_mke_watersheds.pdf

2007 and 2013 revised the land use, point source pollution abatement, and NPS pollution abatement elements of the original plan and added a groundwater element.

Nine key element (9KE) plans are watershed plans that cover smaller areas than the RWQMPU and follow the EPA's format for identifying the causes and sources of nonpoint source pollution and then recommending strategies to address these water quality issues. These plans contain specific recommendations for NPS pollution control measures as fit the needs of the watershed. Because the 9KE framework was approved after the creation of many watershed restoration plans, many plans are currently being revised to meet the 9KE format, and they all are prepared in the context of the RWQMPU.

2.2.2 Nine key element watershed restoration plans

Nine key element (9KE) plans refer to the requirements set by EPA for approval of a watershed restoration plan. These key elements are critical aspects that, if followed, can lay out a rational model for undertaking watershed restoration. Important aspects such as public outreach and monitoring are components. Identification of funding sources, strategic targeting of practices, and an implementation timeline are also required elements. The plans, while not regulatory documents, also should mirror TMDLs and, as such, should lay out practices and projects that will ultimately result in meeting TMDL load allocations. EPA requires these elements since the successful implementation of these plans requires that these elements are present and accounted for. The existence of an approved 9KE plan is generally a requirement for receipt of any grant funding from EPA and sometimes from other federal agencies. As such, there is great interest in making sure that these plans are in place and are approved by EPA.

There are a few organizations working on these updated plans. Southeastern Wisconsin Watersheds Trust is preparing the Menomonee River Watershed Updated Implementation Plan (for HUC 10, number 0404000304), Kinnickinnic River Watershed Updated Implementation Plan (for HUC 10, number 0404000305), the Cedar Creek, Pigeon, Ulao, and Mole Creek- Milwaukee River Watershed Restoration Plan (for HUC 10, number 040400030301 plus HUC 12s 040400030603 and 040400030604). Once complete, these plans will create goals for the watershed and the metrics used to evaluate them, list priority projects identified to achieve the aforementioned goals, recommend an implementation process, and provide a detailed tracking and data housing process for determining the success of watershed restoration.

SEWRPC prepared a watershed restoration plan for the Root River in 2014 and is currently preparing a 9KE watershed restoration plan for the Oak Creek watershed.^{3,4} Similar to the Sweet Water 9KE plans, these two plans will provide guidance towards improving water quality.

Although the data and analysis incorporated into 9KE plans can be useful, in practice these plans are frequently less useful than they might seem. One reason for this is the challenge in identifying specific projects that are to be implemented over a 15-30 year time horizon. Most of the potential practices rely upon landowner approval. Due to the unpredictable nature of landowner approval, it is oftentimes very

³ Link to SEWRPC Page with Root River Watershed Restoration Plan:

<http://www.sewrpc.org/SEWRPC/Environment/Root-River-Watershed-Restoration-Plan.htm>

⁴ Scope of work for the Oak Creek Plan:

<http://www.sewrpc.org/SEWRPCFiles/Environment/OakCreekWshedRestoration/OakCreekWRPScopeofWork.pdf>

hard to predict what sorts of practices landowners might adopt and when. Whether the sector is an agricultural one or an urban nonpoint source such as a golf course, there are many factors that play into landowner approval. As such, project lists are typically “wish lists” of potential practices for which certain implementers hope to receive approval at some future point.

Another factor that limits the ability of these plans to target resources stems from the manner in which much of this work is undertaken. In the agricultural sector, the approach taken by soil and water conservation departments is a voluntary, service-focused approach. This means that staff are available to answer questions and provide available subsidies should farmers be interested. It rarely means that these staff are actively marketing practices in a specific area (i.e., strategically focusing on worst polluters, etc.). The same is true in non-agricultural sectors for similar reasons. Those in control of parks or other sources of nonpoint source runoff are usually not prioritizing their actions based upon control of nonpoint source pollution. The methods by which they prioritize their work may be in the form of capital budget plans, but rarely exceed a five-year planning horizon and typically aren't focused on components that can treat nonpoint source runoff. Should a 9KE plan reflect these other capital project plans, this would indicate an optimistic understanding of the implementation of capital plans whereby the capital projects maximize nonpoint source control elements. Although this can indeed happen, it is not guaranteed and typically is dependent upon the raising of additional funds.

A final limitation of these plans is the combination of a lack of credible enforcement of progress and a lack of their primacy in relation to broader planning efforts. In terms of enforcement, there is a tacit understanding that timelines are aspirational. In terms of primacy, these plans seldom play a central role that affects the budgets, performance metrics, or other critical issues for the agencies that have a role in implementing the plans. As such, these plans can at times be lists of potential practices but without compelling buy-in from stakeholders and without any regulatory enforcement.

Given these limitations, the utility of these plans is in practice mixed. Many contain good ideas for projects that could be pursued following additional fundraising, planning, and outreach. Some contain good ideas for management measures that, if actively pursued, could result in water quality improvements. Yet in practice, these plans typically represent a wish-list of potential practices by those stakeholders who intend to seek funding at some future time.

For the purposes of the WQIP, 9KE plans can be of use but have important limitations. They are useful in identifying the sorts of practices that are deemed most acceptable by a range of stakeholders. They also are useful in getting a rough picture of the scale of implementation required to achieve water quality standards. However, in most cases, they should not be assumed to be actionable project schedules that can be implemented step-wise as funding arises. In most cases, additional outreach to landowners will be required as well as obtaining additional resources. Most critical to the implementation of the WQIP, it will also be necessary to assess other planned actions that are primarily driven by obligations other than watershed concerns, and the integration of nonpoint source practices into these other projects. A relevant example of this would be understanding of the schedule of MMSD-led water course naturalization projects that may be dictated by infrastructure decay or collapse. The prioritization of those projects should influence the implementation of complimentary floodplain creation or stormwater retrofit projects that could add to the overall net benefit to receiving waterbodies. It is precisely through identifying these project integration opportunities that cost efficiencies and greater ecological impact can be realized. An example of project integration in the

agriculture sector would be a close understanding of any potential regulatory enforcement of “bad actors” that may be planned. Combining this with the existence of targeted outreach efforts by county land and water staff would point towards areas where significant water quality improvements could be realized. Adding an understanding of potential land easements or purchases that are being contemplated could further add to a picture of where actions could be concentrated.

Ideally, the understanding of these different actions, which are frequently undertaken by different stakeholders outside of the watershed sector, *and* the factors driving them, can lead to a prioritization and integration of efforts to incorporate watershed concerns. However, the mere existence of a 9KE plan seldom acts as a catalyst for this coordination. For this coordination to happen, other key elements which not part of most 9KE plans -- such as political alignment, funding alignment, and the alignment of agency work plans -- need to be understood, and a strategy developed for how to steer these to support and incorporate watershed needs. This coordination is the goal of the WQIP and will be discussed in later sections of this plan.

2.2.3 Plans and resources to scale up Green Infrastructure

One of the ways that the watersheds will be restored is through the use of green infrastructure. The US EPA defines green infrastructure (GI) as infrastructure that “reduces and treats stormwater at its source while delivering environmental, social, and economic benefits”. Examples of GI include rain barrels, permeable pavers, rain gardens, cisterns, bioswales, and more. GI practices that are best fit to southeastern Wisconsin are explained in a variety of sources. The Regional Green Infrastructure Plan is a tool that MMSD created to support its “2035 Vision for zero basement backups, zero overflows, and improved water quality”.⁵ This vision includes capturing the first half inch of rainfall on impervious surfaces throughout the district through the use of green infrastructure, and this report explains the types of GI that are necessary to achieve this goal as well as where they are best implemented.

MMSD also contracted the development of the Kinnickinnic River Watershed Green Infrastructure Plan.⁶ The Regional Plan recommended that additional GI plans be created for the watersheds, subbasins, and municipalities that were covered in the Regional Plan so that more detailed analysis could lead to more customized solutions. The KK plan was the first effort at this, and includes such materials as a Priority Subbasins Map that identifies subbasins that would benefit the most from GI, a Reduce Impacts to Structures Map that locates the best placement of GI as it would benefit structures, a Water Quality Map that highlights locations with the highest levels of NPS pollution, and a Potential for Implementation Map.

The Fresh Coast Resource Center is another resource for GI support that is available to groups as diverse as residential property owners, private businesses, and municipalities.⁷ This offshoot from MMSD supports these groups by highlighting GI events, identifying sources of funding, and providing resources for the design and implementation of GI projects. Their website hosts such plans as the Regional GI Plan and KK Plan mentioned above as well as a GI Operations & Maintenance Implementation Framework, a Tackling Barriers to GI workbook for municipalities, and more.

⁵ <https://www.mmsd.com/what-we-do/green-infrastructure/resources/regional-green-infrastructure-plan>

⁶ https://www.freshcoastguardians.com/application/files/4515/3263/3427/WEB_KK_Watershed_GI_Plan.pdf

⁷ <https://www.freshcoastguardians.com/>

2.2.4 Chloride Study

A significant pollutant that is not addressed in the TMDL report is chloride. The main source is ice and snow control that takes the form of road salt, and is spread over streets and other impermeable surfaces in the winter. Currently SEWRPC is conducting a Chloride Impact Study for the Southeastern Wisconsin Region.⁸ Thirty-seven streams will be monitored during the winters of 2018-19 and 2019-20 to gauge the levels of chloride in the water. At the end of this study, areas with current and projected high chloride loads will be identified as well as best practices for reducing these loads.

2.2.5 TMDL dashboards

The TMDL dashboards created by CDM Smith and hosted by MMSD provide an interactive geospatial tool for visualizing the sources, loads, and required reductions of the pollutants across the watersheds. There are three dashboards – one for each of the Milwaukee, Menomonee, and KK River watersheds.⁹ The dashboard for the Milwaukee River watershed can be seen in Figure 2.

There are four windows within the dashboard. These can be viewed all at the same time or expanded and viewed individually. The top middle window shows a map of the watershed, including layers of the planning area boundary and combined sewer area, the watershed boundary, TMDL sub-basins, and municipal boundaries as well as impaired rivers and streams. Each sub-basin can be viewed individually.

The left and right panels respectively show the average annual baseline loads and the TMDL annual load allocation for each sub-basin. The tabs below each panel allow the user to switch between viewing the TP, TSS, and Fecal Coliform loads, and the scroll bar can be shrunk to view as few as one sub-basin's loads at a time or expanded to view all of the sub basins' levels at the same time to compare them. The loads are broken down into agriculture, background, general permit, individual permit, MS4, and non-permitted urban baselines/allocations for each sub-basin. The user can view all of these loads at the same time or a subset of them.

The bottom panel shows the water quality targets for each sub-basin. As with the load allocation and baseline load panels, the scroll bar can be adjusted to view anywhere from all to one of the sub-basins at the same time, and three tabs at the bottom allow the user to switch between viewing each of the pollutant targets.

⁸A presentation explaining the study and the deliverables can be found here:

http://www.sewrpc.org/SEWRPCFiles/Environment/RoadSaltStudy/ChlorideImpactStudyPresentation_3-23-2018.pdf

⁹ Kinnickinnic Dashboard

<http://mmsdgis.maps.arcgis.com/apps/opsdashboard/index.html#/427c6819198c4f808b2585d2d52c3667>

Menomonee Dashboard

<http://mmsdgis.maps.arcgis.com/apps/opsdashboard/index.html#/d45257e635004e0882151a460678ea30>

Milwaukee Dashboard

<http://mmsdgis.maps.arcgis.com/apps/opsdashboard/index.html#/66b483ecde564dbc82d0cc70fe2953ae>

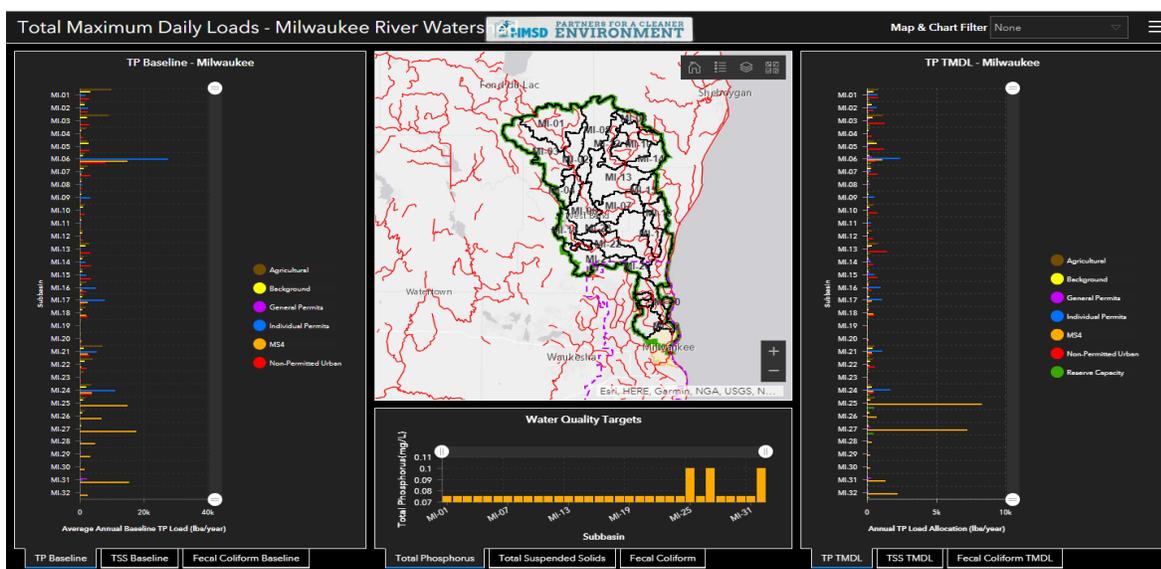


Figure 2: Milwaukee River TMDL dashboard

2.2.6 Adaptive management

WDNR has developed a path to compliance with phosphorous standards that has been used in several areas in the state. This compliance requires three elements which do not exist in the current context of MMSD and the Milwaukee River. This compliance pathway is a possibility when a POTW is under requirements for significant phosphorous reductions (currently to the 0.1 mg/l), the POTW is discharging to a waterbody impaired for phosphorous, and 50% of the phosphorous load is coming from nonpoint sources. For MMSD, these technical conditions for Adaptive Management do not apply. However, one general theme of Adaptive Management is the assessment of watershed actions and their improvement upon local waterbodies. This broader meaning is applicable and is also an inherent component of Integrated Watershed Management.

2.2.7 Water Quality Trading

Water Quality trading is another compliance option for point sources that must lower their pollutant discharges. Broadly defined, water quality trading allows for lower cost practices to substitute for reductions that otherwise would be made at the point source. After these practices are identified, implemented, and verified, they can be used in a trade. These trades may be subject to certain trading ratios depending upon the proximity of the practice to the point source requesting the trade. Should tighter limits be set in the future, this compliance option may come into greater demand.

2.2.8 Integrated Watershed Management

Integrated Watershed Management (IWM) recognizes the need for collaboration amongst a range of stakeholders in an impaired watershed. Rather than reducing the specific pollutant in each political jurisdiction based upon apportioned TMDL loads, IWM looks to find specific projects and actions that could result in a segment of a waterbody meeting its designated uses in a faster and less expensive manner. The identification of projects and actions that can have this cumulative and timely benefit requires evaluation of several factors.

To successfully undertake IWM, an understanding of the impairments within a watershed, the likely causes of the impairment, and the ability of the water segment to show improvement with specific interventions is crucial. In some cases, detailed monitoring of a watershed can point to areas where attainment could be met should specific actions be taken. One example from the Dupage River Salt Creek watershed is where the partners identified an impaired water segment immediately above a damn. Monitoring indicated that the segments immediately below the damn were attaining their designated uses even though subject to a very similar pollutant load. The parties determined that, by removing the damn, the impaired river segment could be brought into attainment in a shorter period of time than could be achieved by trying to only address pollutant loads in the contributing watershed. Although the damn removal project was costly and challenging, it resulted in attainment in a relatively short period of time for a cost that was lower than traditional source controls.

Another important aspect of determining projects and activities that could form the basis of actions under an integrated watershed management approach is an understanding of two important factors. The first is an understanding of the capital projects planned by important stakeholders. In this context, MMSD's planned watercourse projects and any roadway projects planned by the state or municipalities would direct IWM actions. Factors such as ownership, life cycle condition, unplanned damage, and/or transportation plans will greatly inform these investments. The second major factor in determining the suite of actions to comprise IWM are the attitudes and desires of the municipalities and residents themselves. In large part, the actions that would make up the IWM are actions that are updates or modifications of "standard practice." These modifications result in greater environmental benefits but must also be supported by residents and their representatives. Finding municipalities that embrace these types of practices that result in improved watershed health is a perhaps an obvious, but frequently overlooked, point.

The conditions in the GMW lend themselves to the IWM approach. Over the past decade, MMSD has undertaken an extensive and important effort to inform local municipalities and their residents of the benefits of watercourse, floodplain, and green infrastructure projects. MMSD has issued a regional green infrastructure plan that commits to capturing 740 million gallons of stormwater through GI practices by 2035. Additionally, MMSD has a Greenseams program that is focused on setting aside floodplain properties to better manage flood events. Last but not least, MMSD is tasked with and is planning several major de-channelization projects that will significantly improve habitat. MMSD has involved municipalities in planning these projects and these projects are positively received. The elements that require additional work revolve around coordinating management of certain pollutants, addressing issues such as illegal sanitary connections, and more broad-scale retrofitting of impervious surface with green infrastructure. Specific recommendations for how MMSD, municipalities, watershed-focused NGOs, and other stakeholders could collaborate to achieve these elements through IWM are described in the following section.

3. Preliminary Analysis, Key Questions going Forward, and Recommended Strategies

The Context and Drivers section identified Integrated Watershed Management (IWM) as the recommended approach for addressing water quality impairments in the GMW. The following is a description of different implementation lenses or approaches under this broader IWM framework that might lead to more effective water quality improvements and more rapid delisting of stream segments. The following recommendations are not intended to be complete or a final determination of what might be needed to fully achieve TMDL targets and delist all impaired waterways in the GMW. Rather, what is offered here are specific implementation strategies for effective IWM in the GMW. While hopefully presenting some useful solutions to challenges, it should be noted that there are many existing strategies and likewise past efforts that have been made to address these issues, with some success. As such, not all of the strategies proposed here are entirely new ideas. Some approach familiar challenges in a slightly different manner, to build upon prior good work and lessons learned in an effort to do even more and even better.

Additionally, the following recommendations are not meant to be stand-alone approaches. In many cases, these approaches may be combined or merged to address the issues they attempt to address. These lenses address different aspects of implementation challenges, from issues surrounding the scaling-up of practices to issues related to building a culture of appreciation and value surrounding sound watershed management activities. Their order does not imply importance or preference; each one addresses important issues related to watershed management. Finally, these approaches are described here to more effectively garner constructive stakeholder input on the WQIP. The nature of the WQIP is such that the eventual success of these strategies is almost entirely dependent upon the buy-in of the important stakeholders. This options paper is the first stage in the process of achieving this support.

3.1 Implementation strategy #1: Funding structures and pathways

How funding for watershed restoration efforts is made available can have major implications on how the work is completed, what types of projects are undertaken, and what information and knowledge is passed on to others over time. Although MMSD is a main funder in the watershed, the recommendations below need not only apply to MMSD. Other funding sources contribute to watershed restoration and still others remain untapped. The primary question is: can new structures of funding be developed that encourage more cost-effective practices, greater knowledge transfer, and a realization of triple bottom line benefits?

3.1(a) Proposed funding arrangement for Green Solutions

The primary source of local funding for green infrastructure is funding obtained through municipal rate payers and made available to the municipalities in proportion to their contributions. MMSD calls this pot of funding Green Solutions and it is available to all municipalities who have opted-in to the program. MMSD provides these funds for

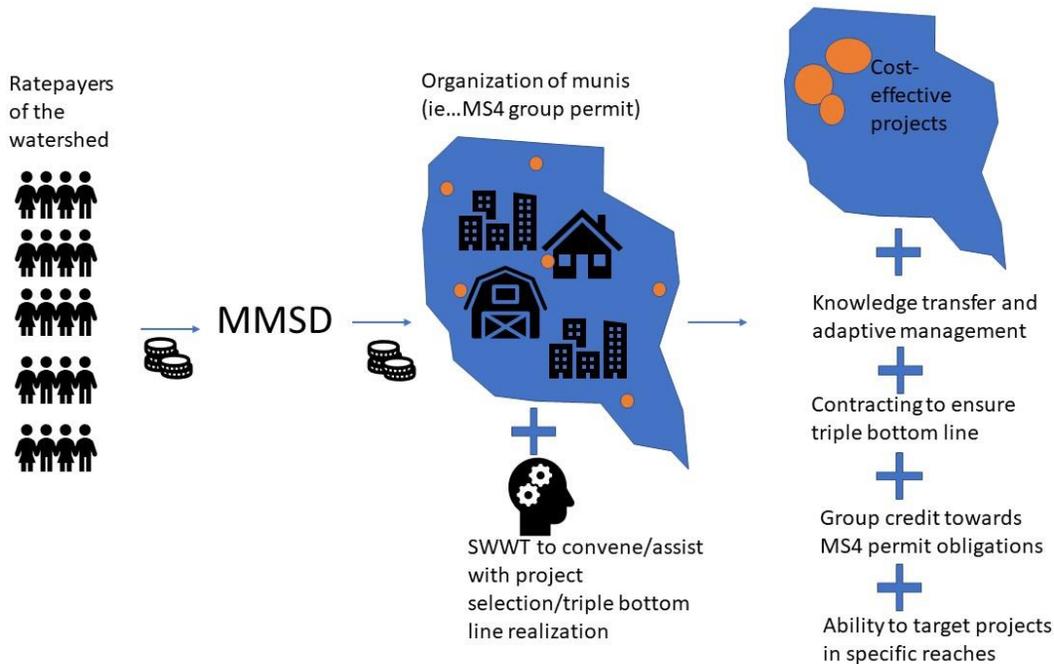
How could this strategy benefit me?	
Municipalities	Potential to fine-tune construction, contracting, maintenance
Nonprofits	Potential role to locate projects, add co-benefits, bring additional resources
MMSD	Larger scale, cost-effective projects, potentially realize triple bottom line benefits
Private sector	Could help find cost-effective construction and maintenance approaches
Academic/research	Monitoring needs

specific projects that meet certain requirements listed in the guidelines and encourages swift expenditure of these funds through a limit on roll-over funding of \$120,000. Municipalities are tasked with identifying projects that meet their needs as well as some siting requirements laid out by MMSD. This first phase in green infrastructure funding has been very effective at encouraging all municipalities to seriously consider where and how green infrastructure can be applied in their town or village. This has facilitated improved understanding and acceptance of green infrastructure, not only by municipal staff but also the general public. Lessons have been learned and expertise has been gained through this approach.

Feedback from some municipal leaders mentioned that this arrangement indeed puts pressure on municipalities to find projects and therefore pushes all to adopt green infrastructure. No one wants to “lose the money.” However, the limitations of the existing approach include the fact that several municipalities are effectively built-out and cost-effective projects are difficult to find. Other issues are that, for several municipalities, only a portion of their village drains to local tributaries to the Greater Milwaukee Basin, while a significant portion may drain directly to lake Michigan or to another watershed. This can lead to the construction of projects that are not the most cost-effective and some that don’t directly benefit the impaired waterbody of concern. In contrast, other municipalities may have ample high-value projects and a relatively small amount of Green Solutions funding.

An additional challenge is that there is no regular mechanism for municipalities to share information about contracting costs, maintenance issues, construction challenges, or other issues such as the ability to hire firms that may be participating in job-training or work-force development initiatives. Specific issues related to constructing green infrastructure in colder climates such as Milwaukee may be missed. These issues surrounding green infrastructure are complex and require ample time for discussion and consideration. Although there are occasional opportunities to share and exchange information relevant to these points, without a designated information sharing venue, municipalities may rely upon partial information from limited sources.

One pathway that might yield additional benefits would be the creation of Green Solution funding zones that might align with current group MS4 permit boundaries. Although the Green Solution program currently allows the exchange of funds from one municipality to another, current funding arrangements don’t specifically encourage or facilitate it. A new arrangement could specifically focus on group identification of cost-effective projects and group sharing of funds. This approach could be considered a second phase in Green Solutions funding that aims to foster collaboration, identify cost-effective projects, and realize triple bottom-line benefits. These groups of municipalities would jointly decide upon the highest value projects with the great cost-efficiencies. A convening organization may need to be tapped to help assess these potential projects and to tie the implementation of these projects into other efforts that might yield triple bottom line benefits. If municipalities were able to obtain credit towards their MS4 permits for work done in other municipalities (with their share of the larger Green Solutions pot of funds), this arrangement could be justified to their residents.



It should be stated that MMSD already encourages minority and small business contracting in its Green Solutions guidelines. These goals are important. However, the realization of these goals is recommended, not required. Most municipalities do not have specific contracting requirements that prioritize SWMBE organizations. Furthermore, there is a widespread feeling that these contracting preferences do not always have the desired impact of improving opportunities for those most disenfranchised. Tasking municipalities with identifying new methods to realize triple bottom line benefits could lead to new arrangements that result in more co-benefits. The proposed funding zone structure, particularly if it was organized as separate from standard municipal contracting processes, might allow for these ideas to be put in place. Should this approach be pursued, it is recommended that municipalities work with contractors to identify effective ways of structuring these contracts so that the additional co-benefits that can be delivered through the installation and maintenance of green infrastructure are realized.

With regards to funding, it is possible that the scaling that could result from pooling these Green Solutions funds could bring other funds to the projects. Grants might be available to assess issues such as performance, maintenance, or realization of workforce development goals since the larger scale would enable these goals to be adequately tackled. For example, if a Green Solution funding zone identified a significant stormwater wetland opportunity, it may be possible to obtain habitat centered grants to augment the project. Or if a large project were identified by a Green Solution group, it might be easier to identify ways to incorporate workforce development training funding and realize those benefits. Should a nonprofit entity be available to help facilitate this collaboration and fundraising, one could imagine implementation that has greater visibility. Importantly, a collaboration of municipalities such as this would allow for a broader advancement of the lessons learned.

A hypothetical example of the roles and responsibilities this arrangement, and the results that could come from it, can help build understanding of how this might be useful:

- *Identification of large-scale stormwater retrofit site (i.e., 20-40 acres):* MS4 group collectively identifies one or two sites to be implemented. MMSD and nonprofits to assist.
- *Bridging workforce development and GI worlds with goal of bringing job-training funds towards the maintenance of this project:* Sweet Water or other nonprofit that can develop these new relationships.
- *Assessment of the economic benefit of this work (additional income benefiting what areas) as well as cost-effectiveness:* UW Milwaukee research faculty.
- *Reporting on how training programs have worked with local businesses:* Contractors involved in the construction/maintenance.

This is just one example of how this scaling-up of projects and involvement of additional partners in this effort might help address long-standing challenges and help realize the desired triple bottom-line benefits.

Attaining these additional benefits will require additional organization and effort. However, realizing the triple bottom line goals that MMSD has clearly articulated should be a major goal of the WQIP. By combining the funding pots for groups of municipalities, these existing partnerships will have more weight and investment. Charging an entity to help organize and document these efforts could help ensure that the municipal representatives have the necessary information and support to undertake this broadened scope.

3.1(b) Private Public Partnership model

One model that has been used effectively in Prince George’s County Maryland is the Private Public Partnership or P3. This model funds an outside private entity that is tasked with implementing a specific quantity of green infrastructure to set standard. This outside entity has

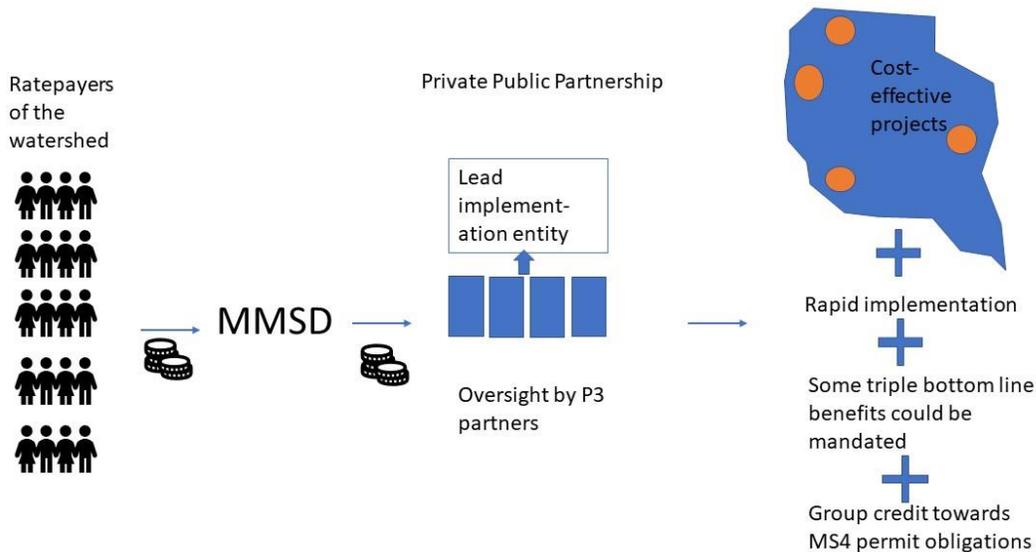
How could this strategy benefit me?	
Municipalities	Administration simplified, long-term maintenance addressed
Nonprofits	Potential role in outreach
MMSD	Administration simplified, goals achieved in shorter time-frame
Private sector	Small/minority business engagement/training
Academic/research	Need to assess efficiency of model

the potential to bring additional private capital to the overall endeavor. Typically, a financial incentive is implicit in the model such that if the private entity can find efficiencies, it can realize greater profit. In many cases, specific financial bonuses are paid for meeting specific preferential contracting goals. Importantly, the long-term maintenance is incorporated into the overall cost.

Key questions for this model are:

- What private capital could be leveraged in such a scenario? How much would it be and how would this accelerate implementation?
- What would the long-term costs of paying for this contract management (and maintenance) be?
- Can requirements for SBE and MBE translate to hiring of underserved populations?
- Does the aggregation of project implementation represented by a P3 approach actually lead to lower costs?

- Can such an arrangement be directed towards specific portions of a watershed or an area where a watercourse project is planned?



The P3 approach holds significant promise for large-scale stormwater retrofitting. The efficiency of contracting and the inclusion of long-term maintenance address long-standing issues. Furthermore, the greater Milwaukee watershed contains thousands of acres that could be retrofitted for stormwater control and capture. Finally, the stimulation of small, minority, and local businesses seen in the large-scale application in Prince George’s County would be of great interest to most communities in the greater Milwaukee region. The questions listed above suggest additional research is needed to see how well an approach such as this could work in the MMSD planning area.

Public Private Partnership Spotlight: Clean Water Partnership

In order to make necessary upgrades to its stormwater infrastructure and meet federal regulations, Prince George’s County in Maryland plans to retrofit up to 15,000 acres of impervious area with green infrastructure by 2025. To meet these goals, the Prince George’s County’s Department of the Environment (PG DOE) has entered into a community-based public private partnership with the private company Corvias Solutions to launch the Clean Water Partnership (CWP). PG DOE has initially contracted with Corvias to retrofit 2,000 acres of impervious surface in the county at a cost of 100M. The contract is a Design-Build-Operate-Maintain contract which ensures maintenance is address for a 30-year time horizon.

Under the partnership, Corvias Solutions and Prince George’s County have committed to creating benefits for the local economy through a range of performance requirements including subcontractor utilization, local subcontractor development and mentorship, workforce utilization and development, and community outreach. As opposed to a traditional procurement model, the public-private partnership shifts many of the program’s risks to the private sector, while the county retains ownership over the program and ensures accountability to community interests. This allows Prince George’s

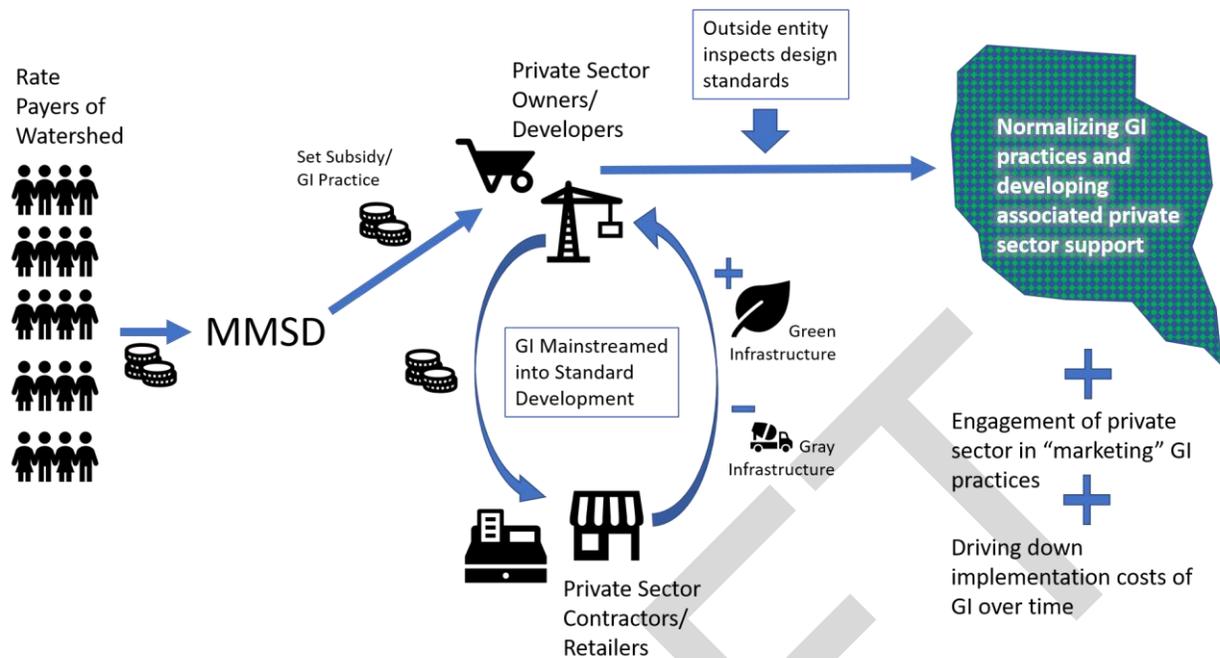
County to access private sector efficiencies and expertise, while providing county residents with higher quality stormwater services at minimal tax-dollar investment and enhancing local business participation in the county’s infrastructure projects.

One of the performance requirements established by the CWP is to utilize county-based minority- and women-owned businesses for 30 to 40 percent of the total project scope, with 50 percent of that participation being county-based small businesses. In a metropolitan area with several neighboring state and county political jurisdictions, utilization of local county businesses was a priority. The contract includes incentives for Corvias to eliminate barriers to entry for small/minority businesses and provides training to these businesses as needed. In the first option phase of the agreement, CWP is exceeding these social economic performance metrics, with 77 percent participation coming from county-based businesses, small businesses, and minority-owned businesses, and 95 percent of that participation from county-based small businesses.

3.1(c) Watershed-wide price supports

One model used in other sectors is supporting a specific set of practices that are deemed to be beneficial to the broader environment with price supports. There are several examples of this approach in the energy sector; solar energy development, renewable transport fuels, electric cars, replacement of inefficient light bulbs or appliances with more efficient models, to name just some. In a watershed context, the most likely practices would be ones that capture stormwater runoff. Subsidizing practices such as permeable surfaces, rain water storage (i.e., cisterns), or bioretention systems at a set rate could incentivize installation at a lower cost than if governments or their representatives paid for these projects in standard ways and at current full-market prices.

How could this strategy benefit me?	
Municipalities	Burden of implementation may be lessened
Nonprofits	Potential role in inspection
MMSD	Administration burden reduced/greater adoption of GI
Private sector	Rapid access to subsidies, can work into business model
Academic/research	Need to assess economic impact



MMSD currently provides reimbursable funding for green infrastructure at set rates per gallon or square foot. Calls for proposals are made once a year and applications are “competitively scored based on an established set of criteria focused on the applicant’s ability and commitment to implement, maintain, and promote the project.” MMSD has funded many important projects through this process and these projects have put green infrastructure on the map.

These criteria described above are understandable, however the effect of this process is that the application process demands a level of attention and time that may scare off many applicants. Additionally, the existence of a set date and time for review confers a set of time restrictions that may not fit with a project schedule and consequently discourage participation. This review process also puts the focus on an application and the numerous aesthetic aspects of that application rather than an assessment of project specifics and attainment of all design specifications. It also may communicate that funding may not be available, and thus perhaps it is not worth the time and effort required to try to receive the funding. It also implies a sense of ownership on the part of MMSD that some people may not like.

The model here also sets a rate, but imagines a more streamlined process for receiving the rebate. What if, instead of a detailed application process, a pot of funding was available for the installation of a certain GI practice to specified design standards? Any contractor that had convinced a property owner to install this practice could notify MMSD or another delegated entity of the size and installation date of the project. Those responsible for installation would know instantly if funds would be available for that size project at that date, pending inspection. MMSD or contracted nonprofits would be tasked with inspecting the installation based upon accepted design standards prior to the transfer of any funds. This inspection work could also be a great opportunity for those who are recently trained in green infrastructure construction and inspection. This simplified process would divert energy from the development of applications and the review of those applications to closer inspection of project

installation. It could be selectively applied to certain practices or applied more broadly, depending upon priorities.

The primary difference in this approach would be the expansion of interested parties and the full utilization of the private sector. All developers, architects, designers, and contractors would be aware of these rebates and would factor them into their designs. They would more effectively communicate the cost-savings to the client. If the demand were greater than the available funding every year, that would only further incentivize participation. The effect would be to empower the entire private sector to incorporate green infrastructure into their project and could lead to a significant scaling up of green infrastructure.

Key questions for this approach would be:

- Who is able to administer this subsidy? Who can keep tabs on the demand and communicate with those interested?
- Which practices are most amenable to this type of approach?
- How can funders be assured that design standards are being met? Who inspects? What percentage of practices need to be inspected?
- Is it important to provide the subsidy in only certain areas prioritized in relation to their provision of greatest social or environmental benefits? (for example, prioritizing support for low-income neighborhoods or small and minority owned commercial enterprises? or prioritizing GI 'hotspots' where the installation of GI is likely to have greater water quality benefits than in other sites?)

Potential benefits include:

- Engagement of the private sector in "marketing" these practices
- Driving down implementation costs of these practices over time
- Mainstreaming these practices and developing associated private sector support (e.g., maintenance crews/systems)
- Providing excellent work opportunities for those just entering the GI workforce

Initial feedback from the private sector indicate that this approach would be well received. Many contractors have indicated some frustration with the current funding arrangements and processes for supporting GI. Assuming that the standards were clear, this approach could engage a wider range of contractors. The major limitations would be the need for some level of inspection, however this might provide a great tie-in to MMSD's current workforce development efforts.

Watershed-wide price supports: Can Green Infrastructure become as attractive as solar?

The solar market has matured, and the cost of installing solar panels has gone down significantly, in the last 10 years as a series of tax credits, tax exemptions, and incentives have become available. The private market has been able to communicate and market these incentives to the public in very clear and compelling formats. One can understand the costs and savings of a potential solar system after about 10 minutes of filling out an online form. It is this simplicity and ease of access that is making solar such an attractive option for many.

Can Green Infrastructure reach this level of ease for the end consumer? There are some similarities but also some important differences.

---While the climate benefits of switching from fossil fuels to solar energy is a public good, the owners of solar energy installations can also expect to receive a direct economic return on their investment over the long term. In contrast, the water quality benefits of green infrastructure are all public benefits, although some flood mitigation, water savings, aesthetic, and other more localized benefits might also flow to the property owner installing GI.

---Stormwater fee reductions are not available to residences in the greater Milwaukee area. In any case, residential stormwater fees are generally much lower than residential energy bills -- approximately 10-20% of the average energy bill. Although stormwater fees may increase, it's not likely that they will be major driver in the near future.

---The benefits of any solar system are very clear and measurable. Average energy production is understood before purchase and actual production is measured through metering. Green Infrastructure has storage amounts based upon the particular practice and application, and is typically calculated based upon modeling rather than real-world measuring. Only in studies is the actual storage measured.

---Qualified installers of solar are plentiful while there are much fewer contractors qualified to install green infrastructure. New efforts at certification like the NGICP training and certification are positive steps to establish standards for installers. One could argue that the plentitude of installers and the development of a mature market is in large part due to these clearly understood and readily available incentives. Similar impacts could be anticipated for GI businesses in an incentivized GI market.

---There is arguably more funding available for green infrastructure than solar. Solar is incentivized mainly through credits, while a range of funders are subsidizing the construction of green infrastructure. What if this range of funding was directed into a price support that made adoption of green infrastructure compelling?

---Green Infrastructure requires more maintenance than solar. As such, it is frequently seen as an ongoing cost.

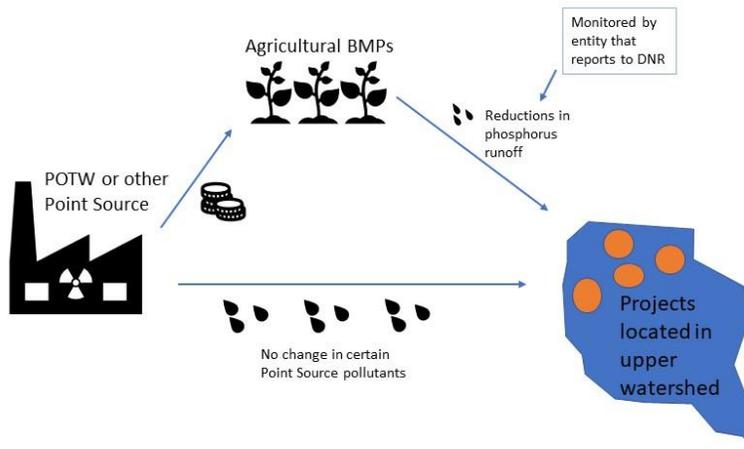
---Green Infrastructure is comprised of a number of different practices. It also typically requires design to ensure that the elements are correctly sized and situated. Solar is much simpler process of identifying the available area for a system.

Although solar and green infrastructure are different in many ways, governments could offer similar tax credits and exemptions in the future.

3.1(d) Adaptive management approach

Adaptive management has been used in nearby areas where significant reductions in phosphorous effluent limits on a point source (typically a POTW) are regulated. This regulated point source is allowed to find and fund practices (typically nonpoint source agricultural BMPs) in lieu of making some or all of the required point source reductions. In-stream phosphorous levels are monitored for improvement and (up to) a fifteen-year period of implementation is allowed to meet the required in-stream phosphorous water quality standards. The benefit of this approach is lower overall costs for reaching water quality targets. To the extent that the adaptive management framework includes agricultural BMPs, these practices become enforceable upon the point source, a regulatory arrangement not previously seen for nonpoint sources.

How could this strategy benefit me?	
Municipalities	Shift implementation to other sources
Nonprofits	Role TBD
MMSD	TBD
Private sector	Ag producers receive additional funds
Academic/research	Need for monitoring



In the Greater Milwaukee River watershed, the situation is slightly different because there are only a couple of smaller point sources that are subject to new lower effluent limits. MMSD is not subject to new lower standards for phosphorus, so its role would not be central. However other POTWs in the watershed might be interested in using this compliance option. The key questions that will determine if an adaptive management approach would be useful in the Greater Milwaukee Watershed are:

- Would the practices enacted to control phosphorous also provide sufficient reductions for other pollutants? In other words, would an AM framework for phosphorous deliver additional benefits for bacteria and sediment?

- Is there sufficient demand in the agricultural sector for the types of practices that could help meet in-stream phosphorous water quality standards? In the Milwaukee River watershed, there are indications that finding farmers willing to participate in these incentive programs can be challenging.
- The costs of AM include transactional costs to create and manage the relationship, not just the costs of implementing the agreed BMPs. What amount of time and effort would be needed to identify willing farmers, define and agree the performance metrics, and verify successful implementation?
- Would additional funding (from a POTW or other point source) supplant existing grant or federal cost-share funding for agricultural BMPs? Would the funds made available in an AM scenario provide clear added benefit beyond the funding that is currently available?
- Would an AM scenario draw attention away from nascent efforts to build green infrastructure in the greater Milwaukee watershed?

The answers to the above questions are not fully known but initial feedback indicates that some of the above concerns might make AM a less attractive option, either due to transactional costs or issues of broader efficacy.

3.2 Implementation strategy #2: Expanding watercourse projects to watershed projects

This second strategy of watershed implementation looks at more tangible issues related to definition and scoping of MMSD planned stream de-channelization projects. MMSD has an impressive schedule and vision of dechannelizing all hardened watercourses in their service area. MMSD has completed many miles of these projects already and has implemented some of these projects on their own and some

How could this strategy benefit me?	
Municipalities	Leverage federal funds for capital roadway improvements, additional recreational opportunities
Nonprofits	Role in facilitating recreation, engagement
MMSD	Builds upon existing or planned efforts
Private sector	Large projects with numerous contracting needs
Academic/research	Potential to assess impact

through partnerships with the Army Corps of Engineer (ACE). This section looks at how to build upon the existing positive efforts underway by MMSD. This approach could also fit well with the Capital Connect initiative supported by the Center for Community Investment. Milwaukee was recently selected as one of six national teams that will follow a Capital Adsorption Framework that aims to align capital investments with community goals surrounding economic, social, and environmental goals.

MMSD has entered into feasibility studies and other funding partnerships with the Army Corps of Engineers as a way of bringing additional expertise and funds to these large capital projects. These ACE funding programs encourage (and in some cases require) that a certain portion of the overall project costs go towards efforts aimed at reducing peak stormwater flow. These stormwater efforts can take many forms but typically involve the retrofitting of areas for bioretention or other green infrastructure.

This ACE funding program provides an opportune template for the expansion of these MMSD/ACE partner projects to include additional stormwater and recreational elements. ACE allows for additional

partners to be formally engaged and, in this way, green infrastructure components of municipal roadway projects could be partially or entirely funded through these partnerships. Since these Army Corps funding mechanisms typically have extensive planning stages, municipalities should be brought into project scoping early so that planned municipal capital projects can be staged to fit into the broader schedule. One could imagine that certain municipalities might see great benefit in partnering in these expanded stream projects that could include targeted stormwater improvements.

Another type of project expansion would be the inclusion of certain management efforts in the area of the stream de-channelization project. The types of management efforts that could be added are:

- Coordinated chloride reduction efforts by municipalities and private sector
- Recreational programming, such as new pathways, signage, programming
- Habitat/pollinator initiatives, such as backyard habitat efforts tied to local stream restoration

Although the specifics of this expanded project scoping would be determined by the interest of the adjoining municipalities and residents as well as the specific realities of the project (e.g., existing infrastructure, open space, etc.), there is good reason to use this existing framework and build upon the good work planned by MMSD. There is a potential that the expansion of these projects to include other elements that might be relevant to the public could build support of this work. In fact, MMSD is adding many of these types of elements in its Kinnickinnic River restoration project. This project is an excellent one on which to build.

Key questions that would determine the utility of this implementation strategy include:

- How challenging would the integration of municipal capital project planning and the Army Corps/MMSD stream restoration project be?
- Can green infrastructure projects be identified that can meet the requirements of peak flow reduction? Are these projects desired by the municipalities?
- How can other stakeholders (e.g., municipal departments, public at large, NGO partners) be brought into these projects in a way that effectively leverages their potential contributions?
- Can a holistic project with multiple partners serve as a model of collaboration that can then be duplicated elsewhere?
- To what degree can these additional elements lead to the delisting of impairments?
- How can municipalities receive 'credit' towards their MS4 permit obligations for these MMSD-led watershed projects? What are the processes and metrics for assigning 'credit'?

Expansion of watercourse project: Kinnickinnic River De-channelization Project

The MMSD-led KK River de-channelization project is an excellent local example of this expanded watercourse strategy. MMSD developed a KK-River Corridor Neighborhood Plan and the Pulaski Park Neighborhood Stormwater Plan which has incorporated community recommendations into stormwater retrofits and park improvements.

The important additions to the formative stream project include the development of recreational and environmental education opportunities, the creation and support of a Neighbors In Action program, implementation of green infrastructure on private property and in alleys, and the support of economic development and housing infrastructure improvement.

This expansion of watercourse projects builds support for these projects and has the potential to deliver water quality improvements through human behavior modifications. The lessons learned in this project can be used for future efforts elsewhere in the watershed.

3.3 Implementation strategy #3: Supporting desired management efforts

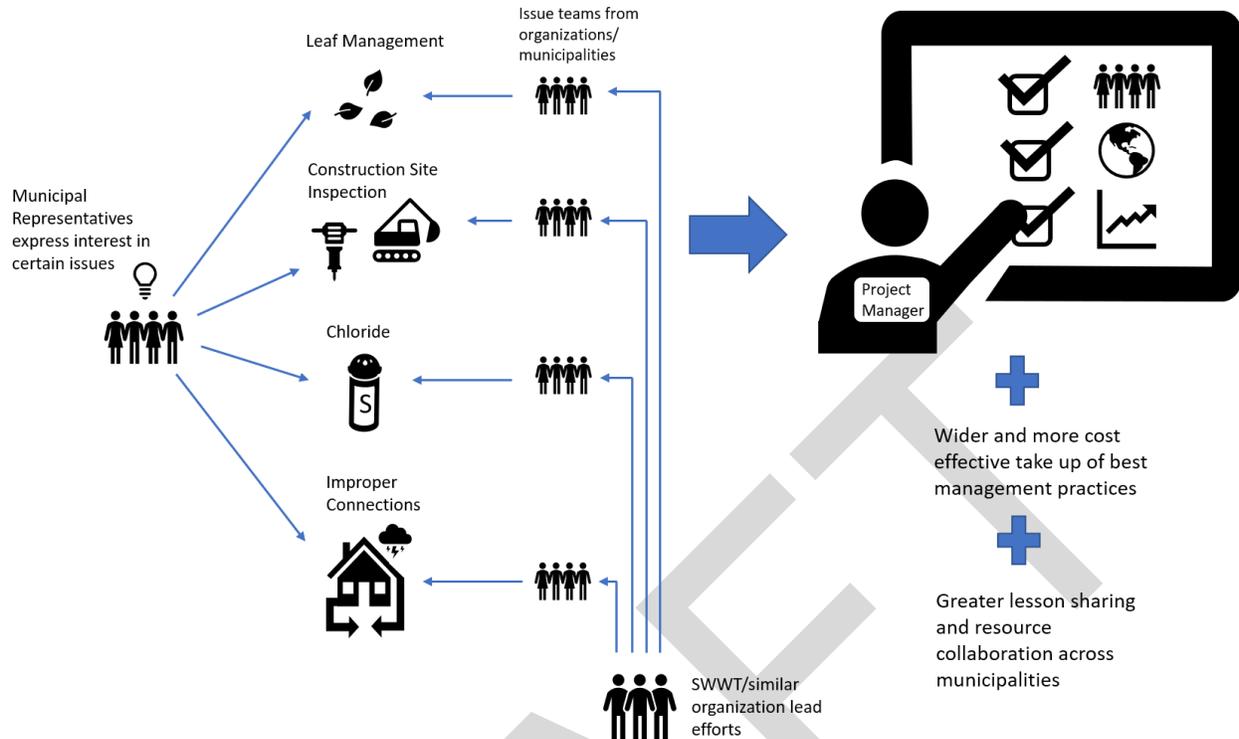
This strategy looks at the suite of management actions that could be improved or altered to address specific pollutants impairing our waterbodies. In many cases, current or past studies can help inform positive steps that can be made to address these pollutants. The structure of the WQIP holds the potential to support and elevate certain management efforts that, if done successfully, could have major benefits to local waterbodies.

How could this strategy benefit me?	
Municipalities	New support and visibility for challenging management issues
Nonprofits	Coordination roles, addressing long-standing important issues
MMSD	Lower cost efforts, potentially big returns
Private sector	Recognition for taking right measures, TBD
Academic/research	Role TBD

The types of management efforts that could be the focus of this kind of approach are many and varied. One example is the management of salt applied to public and private roads and parking lots. Feedback from our municipal stakeholder outreach indicated that there is a growing awareness of the overapplication of salt in winter months and a desire to address the issue. There are, however, many challenges with this particular management issue that require coordinated and thoughtful approaches to address.

Some specific approaches that could be pursued to address salt application include:

- Investigation of legal liability structures and how other states have limited liability in order to disincentivize overapplication of salt
- Organizing a group of willing municipalities and setting comparable standards for application
- Understanding equipment needs for brine application
- Examining the results of studies (such as SEWRPC's current study) to understand hotspots and priority areas
- Developing incentives and recognition campaigns for applicators who do the right thing
- Target permeable surface projects to areas where freeze/thaw patterns currently dictate excessive salt application



Supporting constructive and supported action on these types of interconnected issues can move the needle on tough issues like salt application. Feedback from municipal representatives indicates that although there is interest in taking on some of these issues, there is currently no organization that is leading the charge on these issues. Designating Sweet Water or a similar organization to lead these efforts in close coordination with municipalities is a good first step.

Other management issues that could benefit from an integrated approach are:

- Leaf management efforts
- Construction site inspection
- Illegal sanitary sewer connections

The specific approaches that would be needed for these issues vary and would require examination. However, it is clear that significant water quality improvements can be made by improving current practices. These approaches do not come without a price tag, but generally don't involve significant capital outlays. Rather they require significant time and coordination and frequently new approaches to yield results. The WQIP offers an opportunity to raise up 1 or 2 of these issues.

As discussed with the salt example, there are many stakeholders that have expertise or experience with these issues. One way to develop movement on these issues is to assign a lead organization to each issue and develop working teams that can support them. In most cases, municipalities will be critical "end users" of the suggestions. Developing working groups of willing municipalities on these voluntary actions is necessary. In order to build structure and to reward participation, constructive participation in these issue teams can become MS4 permits requirements.

The key questions that would determine the utility of this approach include:

- What has been missing in past efforts aimed at addressing these challenging issues?
- Can a structure of coordination be created that creates pressure to deliver results but also acknowledges limitations (e.g., funding, etc.)
- What sort of structure would raise commitment level in these issue groups? Could their charge be communicated in a public forum?
- What sources of funding are available to pay staff to lead these issue groups?
- Would targeting of areas (for example those areas near stream de-channelization projects) increase energy and momentum for these issue teams?
- Could one requirement of municipalities wishing to receive credit for MMSD stream projects be a commitment to participate in a workgroup and commit energy to these management issues?

3.4 Implementation strategy #4: Partnering with private sector development

One lens that has been used with some success is partnering with private development to realize larger projects that have significant benefits to watershed health. Although private developers are subject to stormwater regulations and therefore new development will meet these minimum standards, there may be situations where the development can go beyond what is required. Some local examples include the Drexel Town Square in Oak Creek where habitat and recreation aspects were included in the development. Other possibilities include the addition of rainwater harvest and reuse projects that would tie into the water needs of the new tenants. Financial incentives might be part of the project to encourage such beneficial aspects, however this would be determined by the local municipalities.

How could this strategy benefit me?	
Municipalities	Lower administration, wq goals marry up with development/economic goals
Nonprofits	Role TBD
MMSD	Leverages private funds for GI work
Private sector	Projects may be larger/more cohesive
Academic/research	Role TBD

One strategic way to use this lens is to look at areas open to redevelopment and identify incentive packages for practices that would have benefits beyond what is required by regulation. In the dense urban context of Washington, DC that has building height restrictions, allowances such as the ability to build an additional floor were frequently proffered for environmental betterments. In a less restricted environment such as the greater Milwaukee region, other enticements might apply. Identifying and targeting areas that are located in portions of the watershed that are close to attainment could then help with long-term attainment of water quality standards.

Redevelopment of large areas with a high area of impervious surface could be another focus for incentives. There are many vacant parcels that generally do not have stormwater control. Providing incentives to cover a portion of stormwater control on these sites would result in a greater net watershed benefit. This policy also aligns with incentives that the city of Milwaukee offers to redevelop larger vacant sites. A first step would be to understand all existing incentives and look to see what level of support might be needed to motivate developers to take on these sites. Combining these sources

and looking for ways to bring grant funds to these total packages could serve both ecological and economic redevelopment goals.

The Key questions related to this approach are:

- Are there acceptable standards for these types of projects that would exceed existing stormwater requirements? For example, retention of the 1-inch rain event?
- What type of allowances would entice such a development to undertake project items that might raise costs?
- Would it be appropriate to market these types of development as partners in watershed restoration? What sort of designation or recognition would be seen as desirable to a development entity?
- Could grant funds be added to these incentive packages to help subsidize some of these improved stormwater and/or habitat improvements? What funder might be willing to fund a project that showcased a higher bar of stormwater control and realized economic revitalization benefits?

Partnering with private sector developers spotlight: Drexel Town Square

One need not look far to see examples of private sector development helping to fulfill environmental goals. Drexel Town Square is an 85-acre mixed-used development project in Oak Creek, WI built on the site of a former Delphi automotive parts plant. The project is helping the Village of Oak Creek meet its economic development goals but several environmental betterments were included. Approximately 17 acres of the site has been designated for stormwater control, habitat creation, and recreation. 8 acres of that is pond and wetlands that have been designed with flow buffers to better mimic natural wetland systems. Floating islands have been included in the ponds to help break down pollutants. 9 acres has been set aside for the creation of meadows and recreational elements have been included throughout. Additionally, the village managers required that permeable paver systems be included in the parking lots and roadways for treatment of stormwater.

Importantly, this arrangement has placed the responsibility for installation and maintenance of these green infrastructure practices on the private developer. This sped up the design and construction and has addressed maintenance concerns on the part of the village. The Fund for Lake Michigan provided a \$65,000 grant to support the floating island component of the project. The end result of this large, multi-faceted project is inarguably a much better condition for the watershed than the former plant.

This model of working with private development holds potential in this area where there are many large sites that are lying vacant and a strong desire by most communities to see economic development. Finding ways that these environmental betterments fit with the intended use of the site requires careful thought, inspiration, pressure from the community, and perhaps grant funding. The fact that this project was realized in Oak Creek provides a great example of what can be accomplished.

3.5 Implementation strategy #5: Creative repurposing of relic properties

The greater Milwaukee watershed contains many properties that were developed prior to a stormwater retention standard and are currently vacant. Some of these properties occupy a large impervious footprint and prospects for redevelopment are low. Although each situation is unique, in many cases the ownership arrangement is such that very few improvements are possible until the property is sold, if ever. Until this date, the properties can become eyesores for the local community. In some cases, municipalities are not receiving any taxes on these properties, or the properties are in arrears. In others, the owners are using the property as a tax write-off with no real benefit to the municipality or the broader community.

How could this strategy benefit me?	
Municipalities	Address derelict properties, meet residents' desires, novel repurposing
Nonprofits	Unleashed to find new solutions, create new vision for old landscape
MMSD	Low cost impervious surface removal
Private sector	Adjoining property owners may benefit from addressing eyesores
Academic/research	Role TBD

Milwaukee is also full of nonprofit organizations and educational institutions that may appreciate a challenge such as repurposing these properties. To identify uses that would be appropriate for a 5-15 year time horizon, willing municipalities could solicit ideas for a group of properties it would like to improve. Although unexpected solutions might come from this 'design challenge,' some potential uses might be: urban agriculture projects, prairie creation, dog parks, sculpture gardens, or sport fields. By providing benefits such as additional recreation opportunities, highlighting local artists, and or supporting a local urban agriculture network, watershed restoration can be linked to other issues important to the public. Broadening the base of support ensures long term funding and also a greater resonance with the public at large. Partial funding could come from grants that fund certain project elements.

The tax considerations, both from the municipal perspective and the owner's perspective, would need further consideration. Additionally, finding a way to integrate this temporary use into an urban planning framework that typically looks at long-term final build out, would require new ways of looking at development. There may be experts in the legal field who could bring their knowledge of this sector to identify frameworks for this type of "interim" usage that would not negatively affect any party.

Although the use could vary depending upon the interests of local community groups and the broader public, the common denominator would be the removal of impervious surfaces. One could imagine that municipalities might be willing to suspend or forgive property taxes on properties that have fallen into arrears in exchange for property owners allowing the removal of imperviousness and short-term leasing to community groups for beneficial use. If nonprofit groups were able to secure grant funding to assist with some of this programming and repurposing, the cost to the municipality might be minimal and the benefits to the overall community significant. Importantly for the purpose of water quality, the removal of imperviousness on relic properties would also ensure that any future building development would trigger MMSD stormwater regulations for the development of pervious land. The collective challenge of finding low cost short- to mid-term uses for these properties could inform how

municipalities think about these properties. Successful models could potentially be duplicated elsewhere in the greater Milwaukee watershed.

The key questions for this approach are:

- What types of properties would be most amenable to this type of shorter-term usage?
- Would these short term uses aid municipalities in dealing with these sorts of properties?
- Are there sources of funding that would be willing to fund projects that may not be permanent but might lead to water quality benefits as well as assist with these alternate short-term uses?
- Could these types of creative uses be an alternative to tax seizure?
- How can the owner avoid liability for activities that may occur on their land?

Current efforts such as Milwaukee's HomeGROWN program seek to find partners who will adopt and manage vacant lots in Milwaukee. This program has led to some interesting and valuable projects. However, this program interacts only with foreclosed properties (i.e., where the city takes ownership of the land). Could similar arrangements be implemented on land that remains privately owned?

The ideas listed above are specific approaches to how watershed implementation could be altered to maximize water quality results along with greater triple bottom line co-benefits. The exact partners and locations need to be determined of course, but these approaches have the potential bring additional benefits to the watershed.

4. Monitoring Strategies

Water Quality monitoring is a key component of the WQIP. The purpose of monitoring is to both assess and guide implementation efforts. SWWT contracted with Midwest Biodiversity Institute (MBI) to develop a monitoring plan. The MBI analysis and proposal was delivered in November 2018 and shared with relevant stakeholders. Initial feedback has been solicited on this topic in two meetings that were convened in November and December of 2018.

For the WQIP, water quality monitoring will need to serve two related needs. First, the monitoring will identify hotspots of pollution as well as areas that are close to attaining their water quality standards. This can help inform future work to the extent that future efforts can be directed to these areas. An example would be the identification of high phosphorous concentrations in a tributary dominated by agricultural uses. This information could lead to the identification of operations that may be contributing high loads and targeted efforts to mitigate these contributions.

Second, the monitoring will be used to better understand the impacts of the specific implementation strategies pursued. Different implementation strategies would likely lead to different monitoring needs. For example, should watershed stakeholders wish to invest heavily in supporting and advancing management efforts to eliminate illicit sanitary sewer connections or to reduce road salt, then seasonally appropriate monitoring for those particular pollutants would be warranted. If a MMSD watercourse project was expanded to include significant stormwater retrofits, then long-term monitoring of the biological community of that stream section would be necessary to see how this

stream section responds over time. Implicit in these strategies is that implementation may focus in certain areas first and monitoring may need to reflect this reality. Having quantitative data on the effectiveness of these implementation strategies would inform whether these approaches should be replicated in the future.

It is often the case that funding is not sufficient to meet both needs to the same degree. Additionally, an approach that attempts to characterize the entire watershed will by design fail to capture certain potentially important data points (snow runoff quality, spikes in phosphorus due to leaf senescence). Targeted post-restoration monitoring can measure the impact of geographically targeted efforts, but can miss trends in other areas. Determining where to focus limited monitoring resources should be informed by a good sense of how implementation will advance and how existing monitoring might help. Understanding this important fact will ensure that monitoring will provide data that will reflect long-term collective efforts.

Finally, there is strong interest that the monitoring approach will be able identify where water quality is improving and where streams are meeting designated uses and can be considered for delisting. WDNR has set criteria for delisting which are more stringent than the ones for the listing of impaired waters. As such, the monitoring will need to meet these criteria to meet this important goal. However, there is potential to increase monitoring in stream segments where data are indicating improvement. In this way, that stream segment may become delisted faster than if only existing monitoring regimes were used.

The meetings that were held provided important initial feedback. By definition, discussions on monitoring become very granular, very quickly. However, some themes that emerged include:

- A lot of data has been collected through a variety of studies but there hasn't been much effort focused on integrating this data. As such, many studies are siloed.
- The AOC-related monitoring is of a different flavor and scope than monitoring related to the TMDL. Finding linkages would be useful but no one is tasked to do this.
- Stress relationships for urban watersheds have been developed and collectively we understand the nature of these relationships. How can monitoring tell us more than just confirming these relationships related to impervious and biological health of streams?
- There are areas of the watershed with lots of data and others with little to none. Some, like upper reaches of the Milwaukee River watershed, have agricultural producers who might like to better understand the water quality in their reaches.
- The Milwaukee River Basin has many more stations and a longer history of data collection compared to what the Salt Creek/Dupage River (that uses a monitoring approach similar to that recommended by MBI for the WQIP) had prior to its restoration efforts.
- There is a desire to understand the health of a range of aquatic dependent species but stream monitoring focuses on macroinvertebrates and fish to determine whether streams are meeting designated uses.
- There was a desire to target monitoring to where it would be most informative and economize spending on monitoring so that more funding could be directed towards implementation.
- Some nonprofits are spending a lot of energy on monitoring and would like those efforts to be used and directive of future work.

The utility of siloed monitoring studies may need to be more fully assessed, to determine if they can address some of the needs listed above. Issues of data storage and access are also important issues, however the use of the Surface Water Monitoring System (SWMS) facilitated by WDNR by all entities doing water quality monitoring in the watershed, including MMSD, will address many of these data storage and sharing issues.

The MBI monitoring proposal as well as stakeholder feedback received in relation to both the MBI proposal and, more broadly, the potential for existing water quality protocols to meet the needs of the WQIP point to the fact that the final monitoring approach is not complete and will require refining. The outreach plan for the WQIP (to be conducted in the spring and summer of 2019) will be useful in shaping the final structure of the monitoring plan.

5. Preliminary stakeholder analysis

5.1 Municipalities

Over November and December 2018, Sweet Water staff conducted semi-structured interviews with several municipal leaders, building upon the general understanding of stakeholder perceptions, concerns, and priorities developed by Sweet Water over recent years. The goal was to understand the interests and concerns of municipalities specifically related to the implementation of TMDLs and, more broadly, their engagement around watershed improvement actions. These interviews provided some background information that was useful in identifying potential pathways for implementing integrated watershed management in the region, and a foundation for continuing conversations with municipal stakeholders around the WQIP findings, analysis, and recommendations going forward. Sweet Water will be conducting additional outreach to municipal staff (as well as NGOs and other agencies) as the WQIP is being developed. The following observations are thus preliminary but are a starting point for better understanding the perspectives of municipalities.

Types and history of coordination

- The structures for collaboration that currently exist include:
 - Technical Advisory Taskforce
 - Group MS4 permits
 - TMDL monitoring meetings
 - Watershed Advisory Committees
- Many municipalities are open to new collaborative approaches to improve watershed health.
- The format for coordination is slightly different in the Menomonee permit group vs. the North Shore permit group. Although the coordination has been amicable, the north shore group permit essentially functions as individual permits within this group. As such, each municipality within the permit group has its own requirements and workplan. To date, the areas where closer coordination has occurred is in equipment sharing.
- The Menomonee Group has a framework for decision making whereby each municipality reviews the others' workplans.
- Municipalities are at different stages in terms of managing stormwater. Some have detailed stormwater plans already developed, while others are beginning that process. A focus of the

group permits is ensuring that all municipalities have the same level of technical understanding of their options.

Connection to watershed health

- Municipalities range significantly in terms of their general priorities. Some have a strong development focus, while others that are nearly built-out have different priorities.
- Most municipalities see the benefits that cleaner rivers can have for their residents. It is not always clear though how these benefits can be realized, where this fits in relation to other priorities, and how municipalities can best work towards these goals.
- Perhaps the most direct connection that municipalities and their residents have to local waterbodies and the health of those waterbodies is public access and recreation. Nearly all viewed improved access and recreational opportunities as something their municipalities would support.
- For some municipalities, only a small portion of their village may drain to an impaired waterbody. As such, their responsibility and interest may be limited.
- Nearly all municipal staff are busy with a range of obligations, with implementation of the TMDL and MS4 permit being a small component of their overall responsibilities.

TMDL and MS4 compliance

- Nearly all municipalities have concerns about what will be required of them in WPDES MS4 permits going forward. Most appreciate the flexibility that has been provided by WDNR, but many are looking for more clarity regarding what will be required of them in the future, and specific options for compliance.
- Most municipalities have signed the ICA and are willing partners in MMSD's efforts at watershed restoration. Some municipalities have chosen a more self-directed approach to their work and are using their funds for projects they have deemed most important.
- Many municipalities understand that achieving the delisting of streams will require significant coordination on issues that are challenging. Although many municipalities are undertaking important endeavors, it is generally outside of their mandate to facilitate the adoption of these endeavors in other municipalities.

Given these broad observations, what are the implications for the WQIP? How should the WQIP be framed? How should the work be prioritized?

Clearly, the primary motivator for municipalities will be the requirements listed in future MS4 permits towards meeting the TMDL. To the extent that the WQIP helps municipalities meet their MS4 permit requirements, the WQIP will likely be well-received. But just meeting this requirement is only a first step. Future engagement will require that the WQIP can deliver meaningful results. These results certainly include delisting of streams, but can also include benefits such as new or enhanced recreational opportunities, creation of wildlife habitat, or integration of economic opportunities into this broader work.

One limitation of the permit arrangement can be a myopic focus on compliance. As stated earlier, the specific requirements listed in a permit can and should be identified, however this compliance will often not result in delisting in the near term. As such, sustaining interest and good will toward these required

actions can be challenging. The overriding goal of the WQIP should be to structure efforts such that a clear project period is defined (i.e., 5 years), specific project elements are identified, priority management measures are identified and tactics for success are laid out, and all parties have specific and accountable roles in this effort.

This coordination will likely require additional support and assistance because the types of collaboration that have occurred to date are limited. One example of coordination that exists is the sharing of leaf sweeping equipment between Shorewood and Whitefish Bay. This coordination is admirable and a great starting point. Coordination around specific issues that would then lead to delisting of stream segments might include:

- Cost-effective implementation of GI
 - Sharing of cost-information and performance amongst municipalities (e.g., sharing successes and failures)
 - Sharing of resources or information regarding maintenance (how to limit maintenance burden)
 - Identifying areas where larger scale GI can be implemented with greater impact
- Reducing application of road salt
 - Identifying ways to lower expectations of public /effective communication of impact of overapplication of salt
 - Identifying ways to encourage staff to take the issue seriously
 - Identifying ways to limit liability to private sector / pushing for any needed changes in statutes
 - Creating “level-playing” field so no municipality “looks bad”

The above are just two areas where greater coordination is needed to effectively address challenges, and does not comprise an exhaustive list. The current structures of coordination such as the group MS4 permit structures are useful, but actually implementing collaborative efforts around GI and more will require renewed, focused, and on-going coordination efforts.

One major question going forward is how the flexibility that WDNR is allowing will translate into future MS4 permits. WDNR has indicated a willingness to be flexible, however can this flexibility lead to permit language that will encourage municipalities to participate in implementation pathways identified by the WQIP? In many cases, the flexibility allowed by WDNR translates into municipalities identifying and adopting the lowest cost, lowest effort approach to achieving TMDL load reductions. Finding cost-effective approaches is essential when municipal budgets are static or shrinking. Realizing triple bottom line benefits will require tapping additional resources by integrating these watershed efforts into other projects that have the support of the residents.

An example could be drawn from a stream segment that is currently partially channelized in a built-out community. Municipalities might be able to meet interim MS4 permit obligations by cost-sharing in a MMSD-led stream project. This project may greatly improve habitat in a stream segment but may not achieve delisting due to other issues such as high chloride levels. Tackling this issue will require that municipalities engage in planning and management efforts aimed at reducing salt application by parties not necessarily under their control. It is important for all parties to understand that meeting water quality standards will require sustained efforts across a range of actions and management practices.

How can the WQIP provide a supportive framework so that municipalities can make better progress?

Currently there seems to be general willingness on the part of many municipalities to participate in efforts that could lead to delisting of specific stream segments, even if those segments lie outside of their jurisdictional boundaries. However, this willingness going forward will depend upon achievement of clear results. How these specific project areas are identified and agreed will be based upon the planned schedule of capital improvements, understanding of pollutant hot spots from a range of studies and monitoring, and interest levels of municipalities in these specific areas.

5.2 Nonprofit organizations

Sweetwater convened two meetings of nonprofit organizations on December 6th and December 11th to better gauge the interests and concerns of this sector in relation to the WQIP and broader watershed restoration activities. The first meeting was used to introduce the scope and vision of the WQIP as well as present some potential pathways. The second meeting was used to gather more detailed feedback from these organizations. Approximately 18 people attended the meetings in total.

Several comments came back from this sector:

- Many planning efforts already exist and it is challenging to not only stay up to date with all of them but also to understand how they relate.
- Many saw the goals of the WQIP as important and yet reminiscent of prior efforts undertaken by MMSD and other stakeholders. Persistent efforts will be required to make sure the WQIP is fully followed through.
- In order to make the WQIP relevant, it needs to provide some utility to municipalities.
- There is a need for stricter guidelines and a greater level of direction in how municipalities undertake their water quality work.
- There is potential to link up “water related” projects to habitat and/or workforce development goals. This may garner additional attention from some municipalities.
- Would focusing on one thing at a time that is important to municipalities be more effective or take too long?

The comments reflect that this sector has a broad understanding of issues related to watershed restoration. This sector, perhaps more so than any other, is invested and engaged in the variety of efforts underway to advance watershed restoration. They are aware of what funders are interested in and what the public is paying attention to. They are aware of the regulatory environment and are familiar with the perspective of municipal leaders. As such, this sector is oftentimes “in the mix” but doesn’t always have an official role. The level of knowledge and commitment and access to funding makes this sector in some ways an undertapped resource.

The desire to include additional benefits into watershed restoration activities came from both the nonprofit and the municipal sector. In past projects, the nonprofit sector has been able to add some of these benefits but could play a stronger role in incorporating co-benefits. In order to play this role, they must be seen by government entities as trusted and able partners who can deliver things that government entities cannot. There are many ways for this to happen (see sidebar).

Further discussion revolved around roles that nonprofit organizations might play. Roles such as inspection, implementation or monitoring might be key roles that this sector could provide. Additionally, some of these groups might be able to bring in sources of funds that could help incentivize stormwater retrofits. These funds might have a different focus such as habitat or workforce development but if combined with rebates for stormwater control, might create a highly attractive incentive.

Developing predictable funding sources is always a concern of nonprofits. Resource competition is a reality in the Milwaukee area where numerous nonprofits are working towards similar goals. The WQIP has the potential to bring nonprofits into critical roles that can both assist with implementation but also help these nonprofits develop and sustain capacity for these roles.

NGO collaboration spotlight: RiverSmart Programs

Washington, DC has developed a robust program to incentivize stormwater retrofits on single family homes, condominiums and churches, and schools. This program is called RiverSmart and is funded through both federal grants and a stormwater utility. Although each property type had a slightly different incentive, a commonality amongst each was that the District government uses nonprofit watershed groups as key players in the implementation of this work. The District Department of Energy and the Environment worked with five different nonprofit groups who implemented components of the program. Rather than providing the groups with grants that they would then use to develop a program, the DOEE designed a program where nonprofit groups would execute specific tasks. Nonprofits worked on a contractual basis fulfilling specific tasks at set rates (e.g., planting trees, installing raingardens, installing rainbarrels, etc). Through this arrangement, this program implements an average of 1.7 practices on approximately 900 homes annually.

This arrangement provided several advantages. First, nonprofit groups were able to implement the activities that they were already advocating for and this steady work allowed them to train and retain quality staff. Secondly, the inclusion of nonprofits into the broader program brought new voices into the communication of purpose and values. Participants thus were able to hear slightly different communication styles and consequently the program appealed to a wider swath of the public. Thirdly, the involvement of nonprofit groups made liability and access issues much simpler for the government entity. Finally, the financial arrangements incentivized nonprofit organizations to find cost-effective solutions.

An example of how several of these advantages were brought to bear is when the organization tasked with planting trees initially started with planting balled and burlapped (B&B) 2.5 inch caliper trees at a relatively high cost. The group realized after a year that more trees could be planted if large saplings were planted, the survival rate was actually higher, and with proper communication, residents understood that within 10 years, their tree would be as large as if it had been planted as a B&B tree. Given that the mission of the organization was to plant more trees, they were more than willing to find this efficiency which led to a cost-savings for the overall program. Although a seemingly obvious solution, this result is not the norm. In most grant and contracting arrangements, there are frequently few incentives to find these efficiencies. But in this case, the non-profit's incentive to cost-effectively plant as many trees as possible for the benefit of the community and the environment, and the organization's on-going relationship with and communications to local residents to ensure the proper

stewardship of the sapling trees, combined to bring about this optimal result. While private sector contractors will also be incentivized to find and implement efficiencies, the benefit is typically additional profit for the private company. In contrast, non-profit contractors are more likely to return these efficiencies back into the work itself to deliver greater environmental and community benefits. Without discovering and acting on these efficiencies, the ability of these watershed efforts to have larger impact is restrained.

5.3 Private sector – construction and suppliers

The private sector has a large role to play in watershed restoration. Besides bringing significant expertise, this sector is frequently the last in the implementation pathway and thus has major impacts on the outcome of specific projects. As such, these firms work hard to showcase their past work. This sector is competitive and although there are specialized firms that focus on restoration related work, most companies work on a variety of activities in order to round out their business.

One comment frequently heard by companies that install green infrastructure or conduct ecological restoration work is that the amount of work does not match up with the level of discussion about this work. There is interest in building the market for this type of work but currently most is funded through government or grant funded work. As such, the contracts are dictated by funding and grant cycles.

Other feedback includes a frustration with low-bid contracting requirements which by nature force contractors to economize. Creating eye-popping results is challenging in this context.

Still other feedback revolves around how current incentives do not make green infrastructure practices economically attractive to most clients.

One major limitation in the development of this sector is the way these projects are funded. This issuance of grants to fund this work has several impacts:

- Many projects are developed and fed through nonprofit sector involvement. At the initial stage, this was important since nonprofits had the ability and desire to convince landowners to undertake these new green infrastructure strategies. However, now this arrangement means that the full universe of companies that might be able to incorporate GI elements in their projects are not engaged. There are many companies that might be able to grow the adoption of green infrastructure if they had direct access to subsidies.
- Personal relationships between nonprofits and private sector companies often dictate how work is implemented. This situation discourages competition, prevents new parties from entering the market, and doesn't incentivize cost-efficiencies.
- Real construction costs are often not fully transparent because work is done as a project with many extraneous elements. These elements add coordination time and aren't reflective of a mature market.

The fact that this sector spends the greatest amount of time with the public means that this sector could significantly impact attitudes in the general public surrounding watershed restoration activities. Some ways to mobilize this sector were discussed in sections 2.1(c) and 2.4. These strategies might better

harness this sector in ways that did not favor any one company. Each company would be able to develop this aspect of their business as their interest and expertise allowed.

Private sector spotlight: County Materials

County materials is a national company that supplies a range of products for the construction industry. Most products are concrete-based materials that take the form of pipes, bricks, pavers, etc. One small component of their business is selling permeable pavers. Although not a huge revenue source for the company, the company is interested in growing the use of this product. A few motivated company staff have taken several actions to make themselves knowledgeable such as becoming IPCI certified, leading ICPI trainings, and funding research to better understand performance.

Although this company continues to supply pavers, their involvement in shaping the market is limited and is not connected to funders who provide grants for green infrastructure. The private sector is involved only after a grant is awarded and the project has been scoped. A better model would be one where the resources of businesses such as County Materials could be tapped to advertise a set rebate amount for permeable pavers. All aspects of a company's sales staff would be able and incentivized to communicate the benefits of pavers to the range of customers they reach. The company would be incentivized to recommend proper application since poor results would reflect poorly upon them.

The arrangement described above is not common. Funders are generally reluctant to have private companies "sell" the practice they wish to fund. This is the case even if these companies are oftentimes seen as more knowledgeable and trusted experts. The reluctance likely comes from a concern about providing support to a private industry. However, should the subsidy require clear construction standards, the communication of maintenance needs, and an arrangement that doesn't benefit any one particular company, this partnership could yield greater results in a fair and transparent manner.

Conclusion: Putting in all together

This "options paper" has listed several strategies that the WQIP planning team hopes will engage the full watershed community of practice in determining how to more effectively restore our waterbodies. Although much good work has been accomplished to date, there is an understanding that for us to find greater success, we need to look for new ways to both deliver the necessary projects but also to expand the benefits that these investments provide. In order to do this, we need to leverage the strengths of both existing partners and people who have not yet been involved.

The strategies that are selected for application will likely have different scales and timelines. Some projects are construction-focused and, as such, will have discrete beginning, middle and end points. Optimized management efforts, on the other hand, will require ongoing efforts and attention. In this situation, where a range of actions is required, it is important to understand that all efforts are important. It is through this purposeful collaboration that we, as a community, can ultimately reach the lofty goals to which we aspire.