8.0 MANAGEMENT MEASURES ACTION PLAN

Earlier sections of this plan summarized Pike River watershed's characteristics and identified causes and sources of watershed impairment. This section includes an "Action Plan" developed to provide stakeholders with recommended "Management Measures" (Best Management Practices) to specifically address objectives related to each plan goal at general and site specific scales. The Action Plan is divided into two subsections:

- *Programmatic Measures*: general remedial, preventive, and regulatory watershed-wide Management Measures that can be applied across the watershed by various stakeholders.

- *Site Specific Measures:* actual locations where Management Measure projects can be implemented to improve surface and groundwater quality, green infrastructure, and aquatic and terrestrial habitat.

The recommended programmatic and site specific Management Measures provide a solid foundation for protecting and improving watershed conditions but should be updated as projects are completed or other opportunities arise. Lead implementation stakeholders are encouraged to organize partnerships with key stakeholders and develop various funding arrangements to help delegate and implement the recommended actions. The key stakeholders in the watershed are listed in Table 37. Detailed descriptions and responsibilities of each stakeholder are found in Appendix D.

Table 37. Key Pike River watershed stakeholders/partners.

Watershed Stakeholder/Partner	Acronym/Abbreviation
Businesses	Business
City of Kenosha	Kenosha
City of Racine	Racine
College Campuses (Carthage, Gateway and UW Parkside)	Campuses
Developers	Developer
Ecological or Engineering Consultants	Consultant
Farming Community	Farm
Golf Courses	GC
Hawthorn Hollow Nature Sanctuary & Arboretum	HH
Kenosha County Planning & Development Department	KCPDD
Park Departments (Kenosha, Racine, Somers, Elmwood Park, Mount Pleasant, Pleasant Prairie, Sturtevant)	Parks
Racine County Planning and Development Department	RCPDD
Residents or Owners	Resident/Owner
Root-Pike Watershed Initiative Network	Root-Pike WIN
School Districts	School
Southeastern Wisconsin Regional Planning Commission	SEWRPC
Town of Somers	Somers
US Army Corps of Engineers	USACE
USDA Natural Resource Conservation Service	NRCS
US Fish & Wildlife Service	USFWS
University of Wisconsin Extension	UWEX

Village of Elmwood Park	Elmwood
Village of Mount Pleasant	MP
Village of Pleasant Prairie	PP
Village of Sturtevant	Sturtevant
Wisconsin Department of Natural Resources	WDNR
Wisconsin, Kenosha, and Racine County Dept. of Transportation	DOTs

8.1 Programmatic Management Measures Action Plan

Numerous types of programmatic Management Measures are recommended to address watershed objectives for each plan goal. Table 38 includes recommended measures that are applicable throughout the watershed and information needed to facilitate implementation of specific actions. This information includes the "Priority", "Objective Addressed", "Responsible Stakeholder(s)", and the recommended "Technical Support" that will likely be responsible for issuing appropriate permits or providing technical, regulatory, or funding assistance. Note: estimated costs and pollutant load reductions are not included for programmatic measures due to the general nature of the recommendations.

Priority is assigned to each action item and classified as "High", "Medium", or "Low" based on several factors such as importance, ownership type, potential cost, technical assistance and financial needs, and potential shortcomings. Implementation schedule varies greatly with each project but is generally based on the short term of 1-10 years, 10-25 years for the medium term, and 25+ years for long term projects.

Noteworthy- Programmatic Management Measure Categories

Non-Structural: Broad group of practices that prevent impairment through maintenance and management of Management Measures or performance of stewardship tasks that are ongoing in nature and designed to control pollutants at their source.

Educational: Outreach to educate the public related to environmental impacts of daily activities and to build support for watershed planning and projects. Topics typically addressed include land management, pet waste management, lawn fertilizer use, good housekeeping, etc.

Policy: Local, state, and federal government can help prevent watershed impairments in various ways through policy but specifically related to controlling pollutants and reducing stormwater runoff from new developments and protecting floodplain and natural resources.

Project Coordination: Successful watershed plan implementation depends on coordination and cooperation between the Root-Pike Watershed Initiative Network and all other pertinent stakeholders.

Structural: Watershed impairments and pollutant load reduction targets may not be met with recommended site specific Management Measures and therefore will require a more comprehensive use of smaller structural measures such as buffers, vegetated swales, rain gardens, narrower roads, etc.

Table 38. Programmatic Management Measures to address objectives for plan goals A-F.

Goal A: Foster engagement and provide opportunities for stewardship of our watershed.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Inform stakeholders that a Watershed-Based Plan has been developed for Pike River Watershed then educate stakeholders on the beneficial uses of the plan.	High	A1, A2	All Stakeholders	WIN
2	Watershed Partners prepare annual budgets to hold educational workshops and other events recommended in the Education Plan (see Section 9.0).	High	A1-8, F1-3	Municipalities, Schools, Campuses	WIN
3	Implement the Education Plan section of the Watershed-Based Plan (see Section 9.0). The Plan includes the following key topics: • Plan adoption by municipalities • Education of farmland owners and renters on agricultural management practices • Education of the general public on watershed issues • Education of professional landscapers about green practices • Continuing work with local schools on the Respect Our Waters campaign • Increase number of volunteer days in the watershed	High	A1-8, F1-3	See Section 9.0	See Section 9.0
4	Recruit volunteers and stewards interested in restoring and monitoring natural areas in the watershed.	Medium	A3	All municipalities, WIN	WIN
5	Train local government planners and engineers on how to use and implement the Pike River Watershed-Based Plan.	Medium	A3, A7, A8	WIN	Consultant
6	Install educational/environmental signage at key green infrastructure access points and where appropriate within watershed.	Medium	A6	WIN, Parks, WDNR, DOTs	WIN, UWEX, WDNR, Parks, Consultant

Goal B: Improve surface water quality and groundwater resources to achieve DNR/EPA water quality standards.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Watershed Partners prepare annual budgets to implement and monitor recommended water quality Management Measures.	High	B1-8	All Stakeholders	WIN
2	Watershed municipalities and counties adopt the Pike River Watershed-Based Plan and incorporate plan goals, objectives, and recommended actions into comprehensive plans and ordinances.	High	B1, B6	All municipalities, KCPDD, RCPDD	WIN
3	Identify "Champions" to assemble at future Pike River Education Public Outreach Committee (PREPOC) meetings to actively implement the Watershed-Based Plan and conduct progress evaluations.	High	B1, B6	WIN	Consultant
4	Update stormwater ordinances to incorporate appropriate BMP's in all new or refurbished retail, commercial and residential locations. Ordinance language should address appropriate locations for BMPs, ownership, maintenance and monitoring. BMP's should include raingardens, filter strips, bioswales in parking lots and along roadways, curb cuts, naturalized detention basin, green roofs, infiltration basin, infiltration trench, stormwater wetland and porous paving.	High	B1, B4,B8	All municipalities,	KCPDD, RCPDD, WIN, Consultant, SEWRPC
5	Adopt best management practices when selecting and applying deicers, including road salt, during winter months.	Medium	B5	All Municipalities; DOT, Campuses	UWEX, WDNR
6	Develop a plan and implement weekly street cleaning and stormsewer cleaning as needed.	High	B4, B5	All Municipalities;; DOT, Campuses	UWEX, WIN
7	Implement the Water Quality Monitoring Plan section of the Pike River Watershed-Based Plan.	High	B8	WDNR, Racine, Campuses, WIN	Consultant
8	Provide additional monetary incentives for agricultural parcels over 35 acres to meet conservation practices established by Natural Resources Conservation Service, including Environmental Quality Incentives (EQIP), Conservation Reserve Enhancement Programs (CRP/CREP) and Wildlife Habitat Incentive Program (WHIP). Possible model programs include Dodge County, Wisconsin Farmland Preservation (tax incentives), American Farmland Trust BMP Challenge (paid for lost revenues for BMP) or Lancaster Farmland Trust (nutrient trading).	High	B1, B6, B7	NRCS, Farm	WIN
9	Implement monitoring and maintenance plans that identify responsibilities, schedule, budget and funding source for all water quality Management Measures.	Medium	B1, B8	WIN	WDNR, Racine, Campuses

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
10	Work with farmers and NRCS to ensure compliance or exceeding standards outlined within NR151 (soil loss, tillage setbacks and phosphorus and nutrient standards) and ATCP50 (Wisconsin based nutrient management standard for farms regarding the application and location of fertilizers and nutrients).	Medium	B1, B6, B7	NRCS, Farm	WIN
11	In critical areas consider fee simple purchase or drainage easements in stream corridors and associated buffers.	Medium	B6	All Municipalities, KCPDD, RCPDD, Campuses, Farm, Resident	WIN
12	As roadways are rebuilt in the Direct Drainage area, develop alternative street drainage and parking patterns as a model. This could be similar to Portland's Green Streets Program.	Medium	B1, B3	Racine	WIN, Consultant, SEWRPC
13	Update development ordinances to incorporate Low Impact Development design standards.	Low	B2	All municipalities, KCPDD, RCPDD	WIN, Consultant, SEWRPC
14	Update ordinances to reduce street widths and parking lots to expected average volumes instead of maximum.	Low	B1, B2	All municipalities	KCPDD, RCPDD, WIN, Consultant
15	Require mitigation for all wetland losses to occur within Pike River watershed. If possible, mitigation locations should happen in the same subwatershed.	Low	B2, B7	All Municipalities	KCPDD; RCPDD; USACE
16	Install rain gardens to capture, clean, and infiltrate rooftop and sump pump runoff.	Low	B2	Resident; Business; Campuses, All Municipalities	WIN, UWEX
17	Implement stream maintenance programs to identify and remove problematic debris jams from culverts, road crossing, etc. and fix problematic discharge/hydraulic structures.	Low	E1	All Municipalities; Farms, Business, Campuses, Resident	Consultant; NRCS; USACE

Goal C: Identify, enhance and protect important natural areas and provide open space for appropriate recreational benefits.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Watershed Partners prepare annual budgets for protecting, restoring, enhancing and managing natural areas and recreational opportunities.	High	C1-7	All Municipalities; Parks, GC	Consultant
2	Identify and designate a lead Pike River watershed stakeholder to serve as a "coordinator" and meet with other stakeholders to plan for future green infrastructure. See Section 3.2 for a summary and map of the Green Infrastructure Network and Section 8.3 for GIN Priority Protection Areas.	High	C1-7	All Stakeholders	WIN
3	Each municipality incorporates the identified Green Infrastructure Network (see Section 3.2) into comprehensive plans and development review maps.	High	C1-4	All municipalities, KCPDD, RCPDD	Consultant
4	Create zoning overlay and update development ordinances to require Conservation Development design standards on all Green Infrastructure Network parcels (see Section 3.2) where development is planned.	High	C4	All municipalities, KCPDD, RCPDD	SEWRPC, Consultant
5	Require Development Impact Fees and/or Special Service Area taxes for all new development and redevelopment to help fund future management and monitoring of green infrastructure.	High	C2-3	All municipalities, KCPDD, RCPDD	Consultant
6	Incorporate green infrastructure amenities such as trails, fishing access, interpretive signage, wildlife habitat, and other features when creating new recreational areas or enhancing existing areas.	High	C6, C5, C1	All Municipalities; Parks, GC	Consultant
7	Amend municipal comprehensive plans and zoning ordinances to include Conservation Design standards for all development located on identified Green Infrastructure Network parcels (see Section 3.2) using the "SEWRPC Model Ordinance-Conservation and Design Standards and Procedures" adopted in May 2008 as a minimum standard/guideline.	High	C2- C4	All municipalities, KCPDD, RCPDD	SEWRPC, Consultant
8	Identify and protect green infrastructure parcels harboring high quality natural areas or T&E species that are currently not protected.	Medium	C2	Parks, All Municipalities, GC	WDNR, Consultant
9	Private land owners with parcels in the Green Infrastructure Network (see Section 3.2) along stream/tributary corridors manage their land for green infrastructure benefits.	Medium	C3	Resident; Farm, Business	NRCS; Consultant; WIN
10	Require developers to identify and protect sensitive natural areas, restore degraded natural areas and streams, then donate all natural areas and naturalized stormwater management systems to a public agency or conservation organization for long term management with dedicated funding.	Medium	C2-4, E6	Developer	All municipalities, KCPDD, RCPDD

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
11	Provide incentives or priority review status for developers who are required to implement Conservation Design standards on Green Infrastructure Network parcels. Incentives might include a density bonus or reduced fees for reducing impervious surface, reduced detention requirements for using permeable surfaces, preservation of existing natural areas, or reduced landscape requirements when using native vegetation.	Medium	C4	All municipalities, KCPDD, RCPDD	SEWRPC, Consultant, WIN
12	Use Green Infrastructure Network (see Section 3.2) to identify and create new foot and bike trails and trail connections and other recreational opportunities between communities.	Medium	C1, C3	All municipalities, KCPDD, RCPDD	WIN
13	Prepare and implement Natural Resource Inventory (NRI)/management plans for all protected natural area parcels within the Green Infrastructure Network (see Section 3.2).	Medium	D1,C2, C3	All municipalities, KCPDD, RCPDD	Consultant
14	Identify opportunities for agencies to provide economic incentives to developers that encourage the preservation of green infrastructure in developments.	Low	C3	All municipalities, KCPDD, RCPDD	UWEX, NRCS, WIN
15	Limit subdivision of large Green Infrastructure Network parcels.	Low	C3	All municipalities, KCPDD, RCPDD	-

Goal D: Reduce existing structural flood damage and ameliorate potential flooding where flooding threatens structures and infrastructure.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Coordinate and implement stormsewer cleaning as needed.	High	D4	All municipalities, KCPDD, RCPDD, DOT, Campuses	N/A
2	Mitigate for all identified structural flood problem areas identified in Section 5.6.	Medium	D2-3	Sturtevant	FEMA; USACE
3	Restore historical floodplain function by breaking or removing spoil piles along channelized stream reaches.	Medium	D2	Campuses, Resident, All Municipalities, Farms, Developer, GC, Parks	FEMA; USACE; USDA
4	Conduct sediment transport models prior to any stream restoration related project.	Medium	D5	Consultant	USACE
5	Assess dams, bridges, weirs, online impoundments, and streamside floodplains for potential increased stormwater storage or floodplain.	Medium	D2, D3	All Municipalities, DOTs	Consultant
6	Implement impervious reduction stormwater measures as development occurs within Subwatershed Management Units 1, 6, 9, 10, 11, 12, 13, 17, and 18 that are ranked as "Highly Vulnerable" to future development and associated impervious cover (see Section 4.4).	Medium	D3, D5	All municipalities, KCPDD, RCPDD, Campuses	KCPDD, RCPDD, Consultant
7	Restore wetlands to promote storage and infiltration of stormwater (see Section 8.2.4).	Medium	D5	All Municipalities; Developer; Farmer, Parks, GC,Owner	Consultant
8	Implement detention basin outlet monitoring to remove trash and other debris.	Medium	D4	All Municipalities; DOT	N/A
9	Install rain gardens to capture and infiltrate rooftop runoff.	Low	D4	Resident; All Municipalities	WIN
10	Implement stream maintenance programs to identify and remove debris jams that lead to flooding, especially at culvert and bridge locations.	Low	D4	All Municipalities; DOTs	Consultant; NRCS USACE

Goal E: Improve aquatic and terrestrial habitat to encourage diverse, resilient ecosystems.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Prepare and implement Natural Resource Inventory (NRI)/management plans for all protected natural area parcels within the Green Infrastructure Network.	High	D1, E5	All Municipalities, Parks, Campuses, WDNR, GC	Consultant
2	Follow standard short term and long term maintenance recommendations for naturalized detention basins (see Section 8.2.3).	High	E6	All Municipalities; Developers	Consultant
3	Reintroduce fire as a management tool into natural areas where feasible via controlled burns.	High	E4, E5	All Municipalities, Parks, Campuses, WDNR, GC	Consultant
4	Control existing invasive populations and prevent the spread of non-native/invasive plant species within natural areas and replace with native vegetation.	High	E4	All Stakeholders	Consultant
5	Apply natural pool/riffle habitat and bank stabilization designs to all stream restoration and detention retrofit projects.	High	E1-3	All Municipalities, Parks, Campuses, WDNR, GC	USACE; Consultant
6	Restore wetlands using an ecological restoration approach.	Medium	E2-4	All Municipalities; Owner, Farmer, Campuses, GC, Parks	Consultant
7	Restore stream and terrestrial habitat and corridors in conjunction with construction of road and bridge crossings.	Medium	E1	DOT	USACE
8	Golf Courses enroll in Audubon Cooperative Sanctuary Program (ACSP) then naturalize ponds/buffers and rough areas.	Low	E1,E4	GC, Parks	Consultant

Goal F: Increase communication and coordination among municipal decision-makers, business and agricultural communities and other stakeholders within the watershed.

	Management Measure	Priority	Primary Objective	Responsible Stakeholder(s)	Technical Assistance
1	Following Watershed-Based Plan final approval, meet with each applicable community leader to adopt the Plan.	High	F1, A1, A2	All Stakeholders	WIN
2	Form a multijurisdictional partnership to develop funding packages and grant proposals to implement recommendations in the Watershed-Based Plan	High	F3	All Stakeholders	WIN
3	Continue to recruit additional municipalities and other stakeholders to participate in the Pike River Education Public Outreach Committee using the Pike River Watershed-Based Plan as a means to get involved.	High	F1	All Stakeholders	WIN
4	Assemble a team of representatives from agricultural and business communities and each municipality, township, and county agency to form a Watershed Council (Plan Implementation Committee) that actively implements the Watershed-Based Plan and conducts progress evaluations. Review Madison Metropolitan Sewerage District pilot project, "Adaptive Management Pilot Project" to use as a possible model.	High	F2, B1	All Stakeholders	WIN
5	Incorporate watershed plan goals, objectives, and recommended actions into municipal comprehensive plans, codes, and ordinances.	High	F2	All municipalities, KCPDD, RCPDD	WIN
6	Jurisdictional bodies in the watershed prepare annual budgets for implementing recommendations in the Watershed-Based Plan	High	E3	All municipalities, KCPDD, RCPDD	WIN
7	Multiple jurisdictions share the cost of protection, restoration, and maintenance of open space when applicable.	Medium	E1	All municipalities	Consultant
8	Hire a Watershed Implementation Manager to follow through on plan implementation and evaluation across various jurisdictions.	Medium	E1-3, C5	WIN	N/A

8.2 Site Specific Management Measures Action Plan

Site Specific Management Measure (Best Management Practices [BMPs]) recommendations made in this section of the report are backed by findings from the watershed field inventory, overall watershed characteristics assessment, and input from watershed stakeholders. In general, the recommendations address sites where watershed problems and opportunities can best be addressed to achieve watershed goals and objectives. The Site Specific Management Measures Action Plan is organized by jurisdiction in which recommendations are located making it easy for users to identify the location of project sites and corresponding project details. Site Specific Management Measures were identified within the following jurisdictions and are included in the Action Plan:

- *Elmwood Park*
- *Kenosha*
- *Mount Pleasant*
- *Pleasant Prairie*
- *Racine*
- *Somers*
- *Sturtevant*

Management Measure categories in Site Specific Management Measures Action Plan include:

- *Streambank & Channel Restoration*
- *Ravine Restorations*
- *Brownfield Restorations*
- *Detention Basin Retrofits and Maintenance*
- *Wetland Restoration*
- *Riparian Area Restoration & Maintenance*
- *Agricultural Land Management Practices*
- *Other Management Measures*
- *Priority Green Infrastructure Protection Areas (see Section 8.3)*

Descriptions and location maps (Figures 60-67) for each Management Measure category follow. Table 42 includes useful project details such as site ID#, Location, Units (size/length), Owner, Existing Condition, Management Measure Recommendation, Pollutant Load Reduction Efficiency, Responsible Entity, Sources of Technical Assistance, Cost Estimate, and Implementation Schedule. The tables contain over 200 potential projects.

Many facets such as importance, technical and financial needs, cost, feasibility, and ownership type were taken into consideration when prioritizing and scheduling Management Measures for implementation. Critical Area and High Priority were assigned to each recommendation and directly correlates to reducing pollutant loads as described in Section 7.3. Due to the need for water quality improvements, watershed size and quantity of potential projects in the Pike River watershed, medium and low priority management measures were not included in the project lists. Many medium and low priority areas have been generally discussed in previous chapters and are included in each of the maps identifying projects. Critical Areas are the highest priority and are discussed in Section 7.3 and highlighted in red on project category maps and the Action Plan table. Implementation schedule varies greatly with each project but is generally based on the short term of 1-10 years, 10-25 years for the medium term, and 25+ years for long term projects. In addition, many projects such as maintenance are ongoing.

The Site Specific Management Measures Action Plan is designed to be used in one of two ways.

Method 1: The user should find the respective jurisdiction (listed alphabetically in Table 42) then identify the Management Measure category of interest. A site ID# can be found in the first column under each recommendation that corresponds to the site ID# on a map (Figures 60-67) associated with each category.

Method 2: The user should go to the page(s) summarizing the appropriate Management Measure category of interest then locate the corresponding map and ID# of the site specific recommendations for that category (Figures 60-67). Next, the user should go to Table 42 and locate the jurisdiction, project category, and ID# for details about the project.

Pollutant Load Reduction Estimates

Where applicable, pollutant load reductions and/or estimates for Nitrogen (TN), Phosphorus (TP), and Total Suspended Solids (TSS) were evaluated for each recommended Management Measure based on efficiency calculations developed for the USEPA's Region 5 Model (STEPL). This model uses "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" (MDEQ, 1999) to provide estimates of sediment and nutrient load reductions from the implementation of *agricultural* Management Measures. Estimate of sediment and nutrient load reduction from implementation of *urban* Management Measures is based on efficiency calculations developed by Illinois EPA, which were used in the Region 5 model.

Estimates of pollutant load reduction using the Region 5 Model are measured in weight/year (lbs/yr for Nitrogen and Phosphorus and tons/yr for Total Suspended Solids). The Model was generally used to calculate weight of pollutant reductions for all recommended Critical Area and High Priority projects where calculation of such data is applicable. In summary, pollutant reductions were calculated for 13 streambank & channel restoration projects, 5 ravine restoration projects, 4 brownfield restoration projects, 20 detention basin retrofit & maintenance projects, 29 wetland restoration projects, 15 riparian area restoration & maintenance projects, 104 agricultural land management projects, and 5 projects types included under other measures. Spreadsheets used to determine pollutant load reductions can be found in Appendix C.

Summary of Watershed-Wide Action Recommendations

All Site Specific Management Measures (Table 42) and Education Plan (Section 9.0) recommendation information is condensed by Management Measure Category in Table 39. This information provides a watershed-wide summary of the "Total Units" (size/length), "Total Cost", and "Total Estimate of Pollutant Load Reduction" if all the recommendations in the Site Specific Management Measures Action Plan and Education Plan are implemented. Key points include:

- 93,112 linear feet of stream and channel needing restoration costing $6,165,000.
- 3,255 linear feet of ravine restoration costing $910,000.
- 116.3 acres of brownfield restoration costing $254,400.
- 95.7 acres of detention basin retrofits costing $972,500.
- 1,315.7 acres of wetland restoration costing $16,109,500.
- 25,945 pounds/year of Phosphorus (TP) would potentially be reduced, exceeding the 25,133 pounds/year Reduction Target identified in Section 7.4.
- 19,853 tons/year of Total Suspended Solids (TSS) would potentially be reduced, exceeding the 10,018.3 tons/year Reduction Target identified in Section 7.4.
- 60,350 pounds/year of Nitrogen (TN) would potentially be reduced.
- Education and Monitoring programs will cost $99,130 + $32,000/yr (see Sections 9.0 and 11.0).

Table 39. Watershed-wide summary of Management Measures recommended for implementation.

Management Measure Category	Total Units (size/length)	Total Cost	Estimated Load Reduction		
			TN (lbs/yr)	TP (lbs/yr)	TSS (t/yr)
Streambank & Channel Restoration	93,112 lf	$6,165,000	12,102	6,052	6,052
Ravine Restoration & Maintenance	3,255 lf	$910,000	2,627	1,313	1,313
Brownfield Restoration & Maintenance	116.3 acres	$254,400	2,104	279	140
Detention Basin Retrofits & Maintenance					
Retrofits (prairie buffers, plantings, etc.)	72.4 acres	$972,500	2,876	712	397
Maintenance (burning, invasive control, brushing, etc.)	107.9 acres	$52,000/yr	n/a	n/a	n/a
Wetland Restoration	1,315.7 acres	$16,109,500	10,179	2,151	1,470
Riparian Area Restoration & Maintenance					
Restoration (clearing, prairie buffers, plantings, etc.)	164.9 acres	$756,500	209	23	15
Maintenance (burning, invasive control, brushing, etc.)	164.9 acres	$77,000/yr	n/a	n/a	n/a
Agricultural Retrofits & Management	7,427.7 acres	n/a	30,224	15,407	10,462
Priority Green Infrastructure Protection Areas*	3,343.3 acres	n/a	n/a	n/a	n/a
Other Management Measures					
Sam Poerio Demonstration Prairie & Rain Gardens	0.9 acres	$10,000	2	2	0
Case-Harmon Field Depressional Area Retrofit	1.5 acres	$8K + $2K/yr	1	1	0
Monitoring & Maintenance west of S. Memorial Dr.	15.7 acres	$20,000	n/a	n/a	n/a
Savanna Restoration just north of Hawthorn Hollow	11 acres	$82,500	n/a	n/a	n/a
Existing Agricultural Wetland Management	3.4 acres	$10K + $3K/yr	26	5	4
Information & Education & Monitoring	n/a	$99,130 + $32K/yr	n/a	n/a	n/a
TOTALS	**12,443.3 acres**	$18,092,900	**60,350 lbs/yr**	**25,945 lbs/yr**	**19,853 tons/yr**
	272.8 acres maintenance	$129,000/yr			
	96,367 lf	$7,075,000			
	Other	$130,500 + $5K/yr			
	I & E & M	$99,130 + $32K/yr			

Pollutant load reduction calculated for applicable Critical Areas and High Priority projects only.
* Pollutant load reductions could not be calculated using STEPL model.

8.2.1 Streambank and Channel Restoration

Applied Ecological Services, Inc. (AES) completed a general inventory of Pike River and its tributaries in early 2012. All streams and tributaries were assessed based on divisions into "Stream Reaches". Fifty-four (54) stream reaches were assessed accounting for 328,548 linear feet or 62.2 linear miles. Detailed notes were recorded for each stream reach related to potential Management Measure recommendations such as improving streambank and channel conditions and maintaining improvements long term. Site specific improvements and maintenance for culverts, road crossing, etc. are not included in this section but is a recommended action in the Programmatic Action Plan. The results of the stream inventory are summarized in Section 5.1; detailed field investigation datasheets can be found in Appendix B.

The condition of stream reaches in the watershed varies. According to the stream inventory, 20% of stream and tributary length is naturally meandering; 43% is moderately channelized; 37% is highly channelized. Approximately 40% of stream and tributary length exhibits no or minimal bank erosion; moderate erosion is occurring along 55% of streambanks; 5% of streambanks are highly eroded.

Most stream restoration projects include at least one of the following three water quality and habitat improvement components: 1) stabilized streambanks using bioengineering and regraded banks or channel; 2) restored riffles/grade controls in the stream channel to simulate conditions found in naturally meandering streams; and 3) removal of existing invasive vegetation including trees and shrubs from the streambanks and immediate buffer and installation of native vegetation. For some of the larger recommended restoration projects, completing the restoration in phases may make implementation easier.

Figure 60 shows the location of all potential streambank/channel restoration projects by reach ID# and priority while Table 42 lists project details about each recommendation within the appropriate jurisdiction. Potential streambank and channel restoration projects on reaches exhibiting severe erosion and channelization issues are generally assigned a higher priority for implementation. Medium and Low priority was generally assigned to stream reaches exhibiting only minor problems. Recommendations are not made for stream reaches categorized as medium or low priority.

Critical Area stream/channel restoration opportunity along North Branch (PR10) [LEFT] and along South Branch (PC04) [RIGHT].

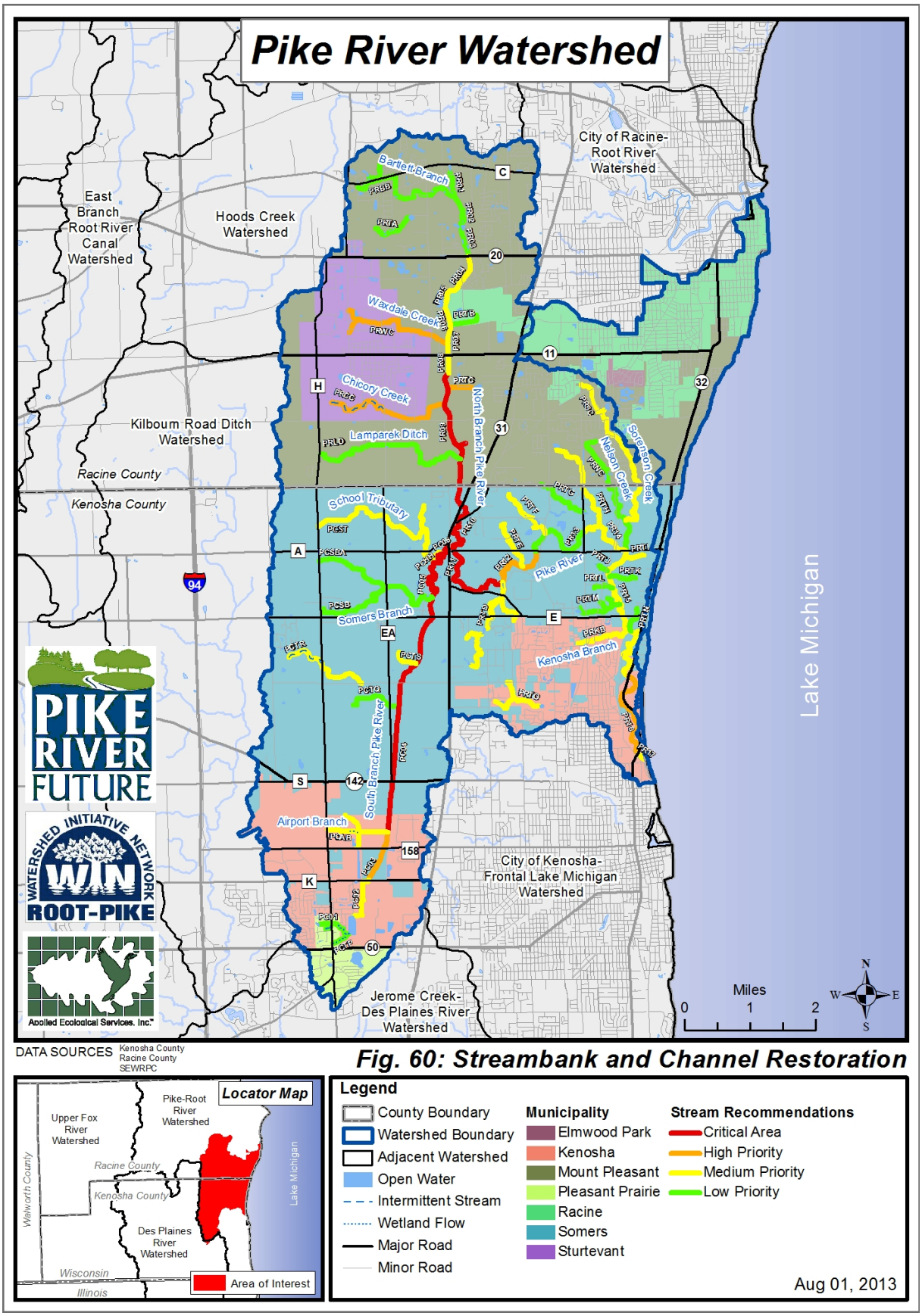


Fig. 60: Streambank and Channel Restoration

8.2.2 Ravine & Brownfield Restorations

Applied Ecological Services, Inc. conducted an inventory of 5 potential ravine restoration projects and 4 potential brownfield restoration projects in early 2012 (Figure 61). The results of the ravine and brownfield inventory are summarized in Section 5.5; detailed field investigation datasheets can be found in Appendix B.

Ravine south of Hawthorn Hollow (42H)

Ravines are created as part of the natural forces of erosion as running water carves away sediment to form a small canyon or crevice with a stream channel at the bottom. Over time, urban development and the increase in impermeable surfaces over much of the Pike River watershed has increased both the amount and force of water being released into many of these ravines. Unless stabilized, ravines will continue to eroded and deepen over time, causing additional damage. Ravine restorations generally involve bank stabilization and have similar water quality benefits to stream channel restorations – reducing nutrient and sediment loading to receiving waters.

Brownfield sites are sections of lands that once housed industrial or commercial uses but have since been vacated. These sites often contain remnants of infrastructure and may have contaminated soils depending on what was located there previously and can be difficult to appropriately reuse. Nevertheless, the conversion of former brownfield sites into natural areas, parks, or open space can be a great way to reintroduce green spaces into highly urbanized areas. Brownfield restorations are a great opportunity to not only reduce impervious cover, but to increase habitat and nutrient removal by naturalizing larger pieces of land that were once reserved for industrial use. Details about each ravine and brownfield recommendation can be found in the Action Plan Table (Table 42) within the appropriate jurisdiction.

Remnant infrastructure at Case Brownfield Site (25A)

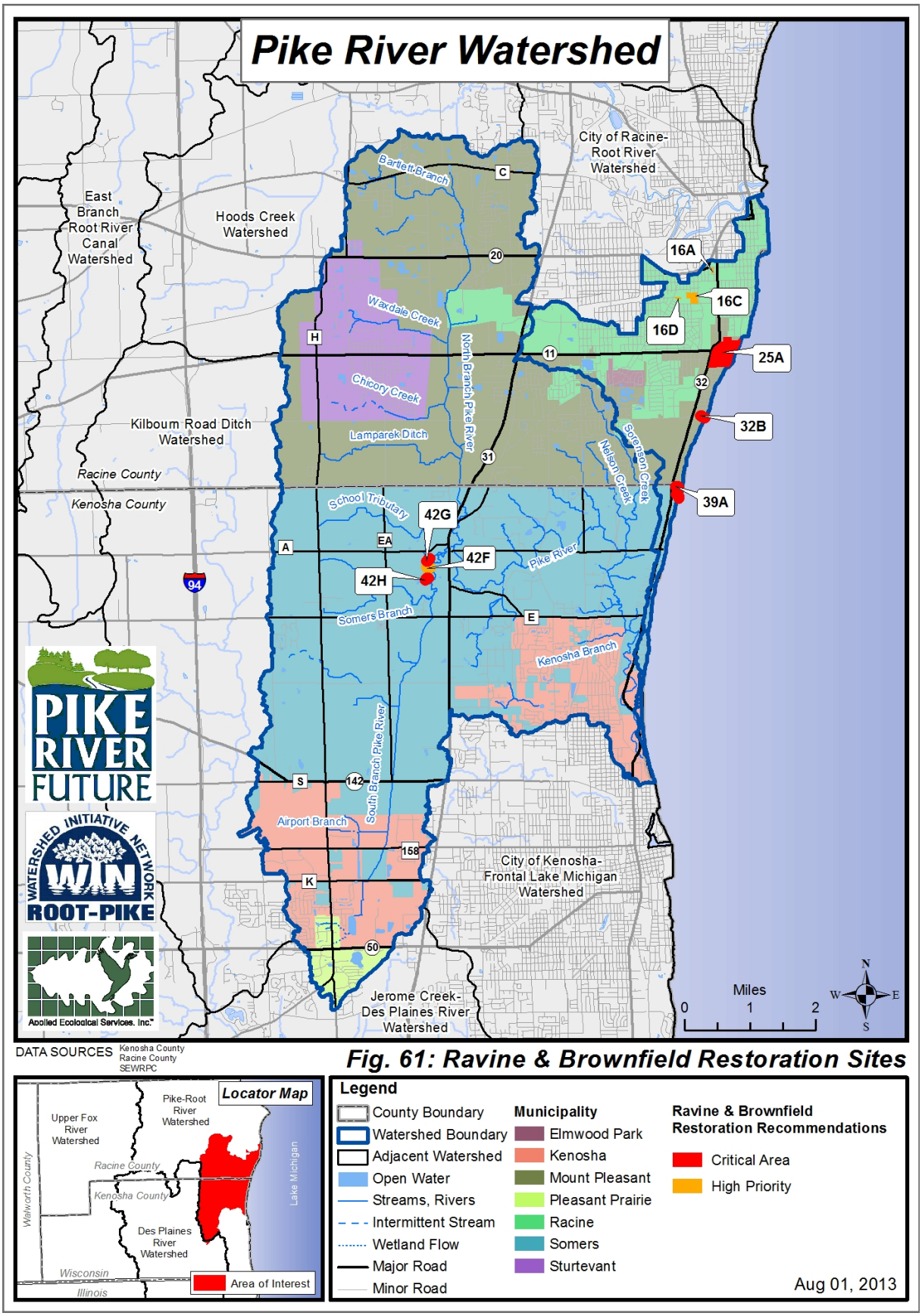


Fig. 61: Ravine & Brownfield Restoration Sites

8.2.3 Detention Basin Retrofits & Maintenance

Applied Ecological Services, Inc. (AES) conducted an inventory of 197 detention basins in early 2012. The results of the detention basin inventory are summarized in Section 5.2; detailed field investigation datasheets can be found in Appendix B. The benefits of storing stormwater runoff in detention basins and releasing water slowly are well documented. More recently, the benefits of proper slope and depth design for detention basins and introducing native vegetation to improve water quality and provide wildlife habitat is becoming the new standard and is required in some local ordinances.

The condition of detention basins in the Pike River watershed varies. One hundred twenty (120) wet bottom, 16 wetland bottom, and 8 dry bottom turf grass basins as well as 48 ponds, 4 wetland/marsh areas, and 1 agricultural swale sites were assessed.

When naturalized, basins do a better job of cleaning stormwater, provide wildlife habitat, and add to green infrastructure. Wet and wetland bottom detention basins are the most common in the watershed. Those with turf grass on the side slopes present excellent naturalization opportunities.

All recommended detention basin retrofits and/or maintenance projects are shown by site ID# and priority on Figure 63. Details about each recommendation can be found in the Action Plan Table (Table 42) within the appropriate jurisdiction. Critical Area basins are the highest priority. Basins assigned as Critical Areas or High Priority usually included basins showing signs of erosion, those well-located as to remove agricultural pollutants, or those draining a significant land area. Medium priority is given to most basins where naturalization of side slopes and buffer areas is needed. Low priority is generally assigned to small private basins, those with few problems, or those requiring only maintenance to prevent degradation. Recommendations are not made for medium and low priority basins.

Critical Area detention basin retrofit opportunity (20D) in Kirkoria Nature Preserve

Critical Area detention basin retrofit opportunity (57G) at 18th St & 27th Ave in Kenosha

Naturalized Wetland Detention Basin Design, Establishment, & Maintenance Recommendations

Future wetland detention basin design within the watershed should consist of naturalized basins that serve multiple functions including appropriate water storage, water quality improvement, natural aesthetics, and wildlife habitat. Native vegetation planted in a properly designed basin provides excellent water quality benefits through nutrient uptake, filtering, and by gravitational settling. Recommendations below include schematics and seed/plant lists for the design of naturalized wetland detention basins. These recommendations do not necessarily apply to dry bottom basins. Note: all local and county ordinance requirements will also apply.

Properly designed wet bottom naturalized detention

Location & Siting Recommendations

- Naturalized detention basins should be restricted to natural depressions or drained hydric soil areas and adjacent to other existing natural green infrastructure in an attempt to aesthetically fit and blend into the landscape. Use of existing isolated wetlands for detention should be evaluated on a case by case basis.
- Basins should not be constructed in any average to high quality ecological community.
- Outlets from detentions should not enter sensitive ecological areas.

General Design Recommendations

- One appropriately sized large detention basin should be constructed across multiple development sites rather than constructing several smaller basins.
- Side slopes should be no steeper than 4H:1V, at least 25 feet wide, planted to native mesic prairie, and stabilized with erosion control blanket. Native oak trees *(Quercus sp.*) should be the only tree species planted on the side slopes.
- A 5-foot wide (at a minimum) shelf planted to native wet prairie and stabilized with erosion control blanket should be constructed above the normal water level. This area should be designed to inundate after every 0.5 inch rain event or greater.
- A 10-foot wide (at a minimum) shelf planted with native emergent plugs should extend from the normal water level to 2 feet below normal water level.
- Permanent pools should be at least 4 feet deep.
- Irregular islands and peninsulas should be constructed to slow the movement of water through the basin. They should be planted to native mesic or wet prairie depending on elevation above normal water level.
- A 4-6 foot deep forebay should be constructed at the inlet(s) to capture sediment; a 4-6 foot deep micropool should be constructed at the outlet to prevent clogging.

Short Term (3 Years) Establishment Recommendations

The developer in new developments should be responsible for implementing short term management of detention basins and other natural areas to meet performance standards. Generally speaking, three years of management is needed to establish native plant communities. Measures needed include mowing during the first two growing seasons following seeding to reduce annual and

biennial weeds. Spot herbiciding is also required to eliminate problematic non-native/invasive species such as thistle, reed canary grass, common reed, cattail, purple loosestrife, and emerging cottonwood, willow, buckthorn, and box elder saplings. In addition, the inlet and outlet structures should be checked for erosion and clogging during every site visit. Table 40 includes a three year schedule appropriate to establish native plantings around naturalized detention basins.

Table 40. 3-year establishment schedule for naturalized detention basins.

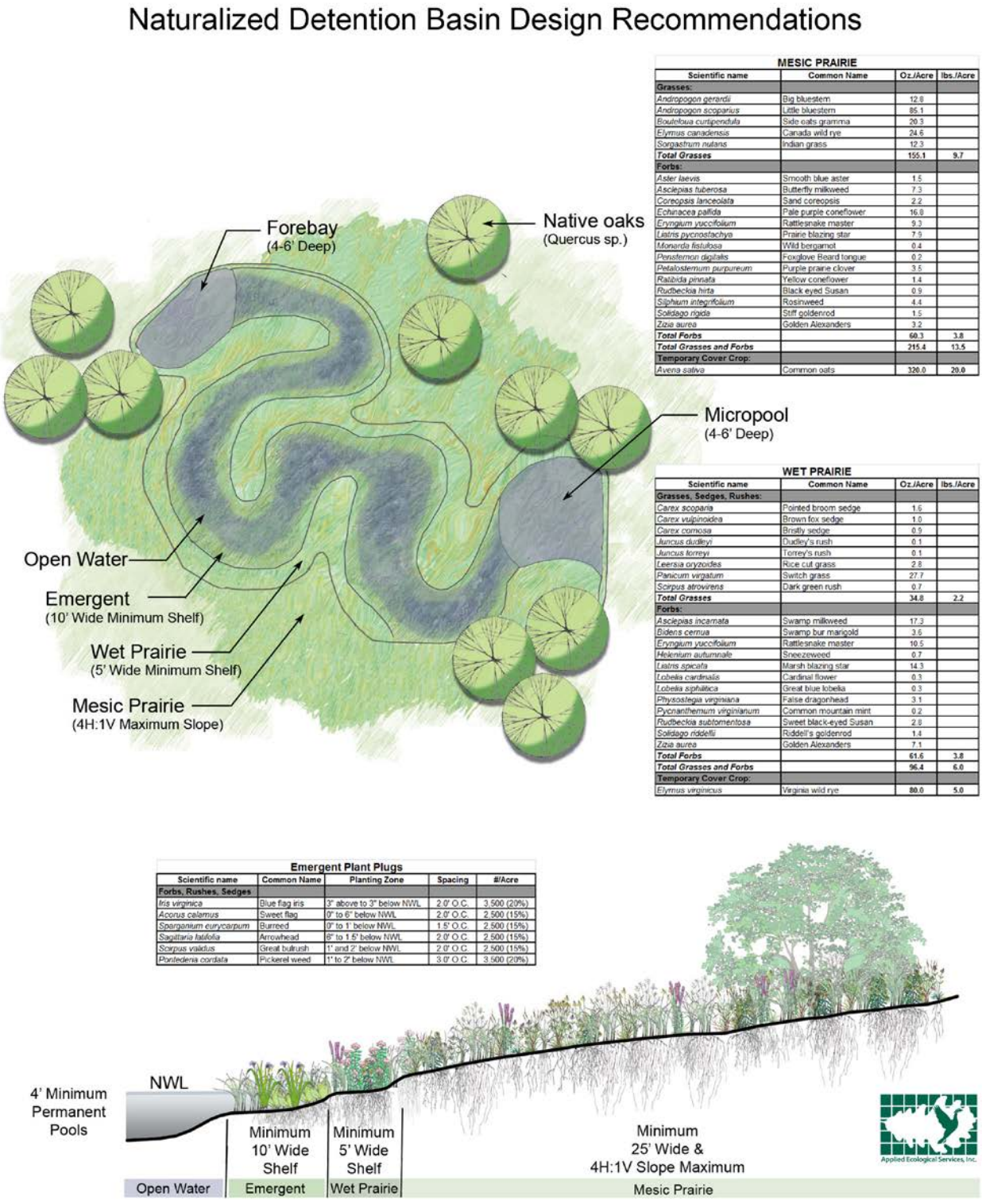
Year 1 Establishment Recommendations
Mow mesic prairie buffer and wet prairie shelf to a height of 6-12 inches in late June, August, & September.
Spot herbicide non-native/invasive species throughout site in early June and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, cattail, and all emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during every site visit.
Year 2 Establishment Recommendations
Mow mesic prairie buffer and wet prairie shelf when dry to a height of 12 inches in late June and early August.
Spot herbicide non-native/invasive species throughout site in early June and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, cattail, and all emerging woody saplings.
Plant additional emergent plugs if needed and reseed any failed areas in fall.
Check for clogging and erosion control at inlet and outlet structures during every site visit.
Year 3 Establishment Recommendations
Spot herbicide non-native/invasive species throughout site in early June and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, cattail, and all emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during every site visit.

Long Term (3 Years +) Maintenance Recommendations

Long term management of most detention basins and other natural areas associated with development is the responsibility of the homeowner or business association or local municipality. Often, these groups lack the knowledge and funding to implement long term management of natural areas resulting in the decline of these areas over time. Future developers should be encouraged to donate naturalized detention basins and other natural areas to a local municipality or conservation organization for long term management who receive funding via a Special Service Area (SSA) tax or other means such as a watershed protection fee. Table 41 includes a cyclical long term schedule appropriate to maintain native vegetation around detention basins and other natural areas.

Table 41. Three year cyclical long term maintenance schedule for naturalized detention basins.

Year 1 of 3 Year Maintenance Cycle
Conduct controlled burn in early spring. Mow to height of 12 inches in November if burning is restricted.
Spot herbicide problematic non-native/invasive species throughout site in mid August. Specifically target thistle, reed canary grass, common reed, cattail, and emerging woody saplings such as willow, cottonwood, buckthorn, and box elder.
Check for clogging and erosion control at inlet and outlet structures during every site visit.
Year 2 of 3 Year Maintenance Cycle
Spot herbicide problematic non-native/invasive species throughout site in August. Specifically target thistle, reed canary grass, common reed, cattail, and emerging woody saplings such as willow, cottonwood, buckthorn, and box elder.
Mow mesic prairie buffer and wet prairie shelf to a height of 6-12 inches in November.
Check for clogging and erosion control at inlet and outlet structures during every site visit.
Year 3 of 3 Year Maintenance Cycle
Spot herbicide problematic non-native/invasive species in August. Specifically target thistle, reed canary grass, common reed, and emerging woody saplings. Cutting & herbiciding stumps of some woody saplings may also be needed.
Check for clogging and erosion control at inlet and outlet structures during every site visit.



MESIC PRAIRIE

Scientific name	Common Name	Oz./Acre	lbs./Acre
Grasses:			
Andropogon gerardii	Big bluestem	12.8	
Andropogon scoparius	Little bluestem	85.1	
Bouteloua curtipendula	Side oats gramma	20.3	
Elymus canadensis	Canada wild rye	24.6	
Sorgastrum nutans	Indian grass	12.3	
Total Grasses		155.1	9.7
Forbs:			
Aster laevis	Smooth blue aster	1.5	
Asclepias tuberosa	Butterfly milkweed	7.3	
Coreopsis lanceolata	Sand coreopsis	2.2	
Echinacea pallida	Pale purple coneflower	16.8	
Eryngium yuccifolium	Rattlesnake master	9.3	
Liatris pycnostachya	Prairie blazing star	7.9	
Monarda fistulosa	Wild bergamot	0.4	
Penstemon digitalis	Foxglove Beard tongue	0.2	
Petalostemum purpureum	Purple prairie clover	3.5	
Ratibida pinnata	Yellow coneflower	1.4	
Rudbeckia hirta	Black eyed Susan	0.9	
Silphium integrifolium	Rosinweed	4.4	
Solidago rigida	Stiff goldenrod	1.5	
Zizia aurea	Golden Alexanders	3.2	
Total Forbs		60.3	3.8
Total Grasses and Forbs		215.4	13.5
Temporary Cover Crop:			
Avena sativa	Common oats	320.0	20.0

WET PRAIRIE

Scientific name	Common Name	Oz./Acre	lbs./Acre
Grasses, Sedges, Rushes:			
Carex scoparia	Pointed broom sedge	1.6	
Carex vulpinoidea	Brown fox sedge	1.0	
Carex comosa	Bristly sedge	0.9	
Juncus dudleyi	Dudley's rush	0.1	
Juncus torreyi	Torrey's rush	0.1	
Leersia oryzoides	Rice cut grass	2.8	
Panicum virgatum	Switch grass	27.7	
Scirpus atrovirens	Dark green rush	0.7	
Total Grasses		34.8	2.2
Forbs:			
Asclepias incarnata	Swamp milkweed	17.3	
Bidens cernua	Swamp bur marigold	3.6	
Eryngium yuccifolium	Rattlesnake master	10.5	
Helenium autumnale	Sneezeweed	0.7	
Liatris spicata	Marsh blazing star	14.3	
Lobelia cardinalis	Cardinal flower	0.3	
Lobelia siphilitica	Great blue lobelia	0.3	
Physostegia virginiana	False dragonhead	3.1	
Pycnanthemum virginianum	Common mountain mint	0.2	
Rudbeckia subtomentosa	Sweet black-eyed Susan	2.8	
Solidago riddellii	Riddell's goldenrod	1.4	
Zizia aurea	Golden Alexanders	7.1	
Total Forbs		61.6	3.8
Total Grasses and Forbs		96.4	6.0
Temporary Cover Crop:			
Elymus virginicus	Virginia wild rye	80.0	5.0

Emergent Plant Plugs

Scientific name	Common Name	Planting Zone	Spacing	#/Acre
Forbs, Rushes, Sedges				
Iris virginica	Blue flag iris	3" above to 3" below NWL	2.0' O.C.	3,500 (20%)
Acorus calamus	Sweet flag	0" to 6" below NWL	2.0' O.C.	2,500 (15%)
Sparganium eurycarpum	Burreed	0" to 1' below NWL	1.5' O.C.	2,500 (15%)
Sagittaria falifolia	Arrowhead	6" to 1.5' below NWL	2.0' O.C.	2,500 (15%)
Scirpus validus	Great bulrush	1' and 2' below NWL	2.0' O.C.	2,500 (15%)
Pontederia cordata	Pickerel weed	1' to 2' below NWL	3.0' O.C.	3,500 (20%)

Figure 62. Naturalized detention basin design recommendations.

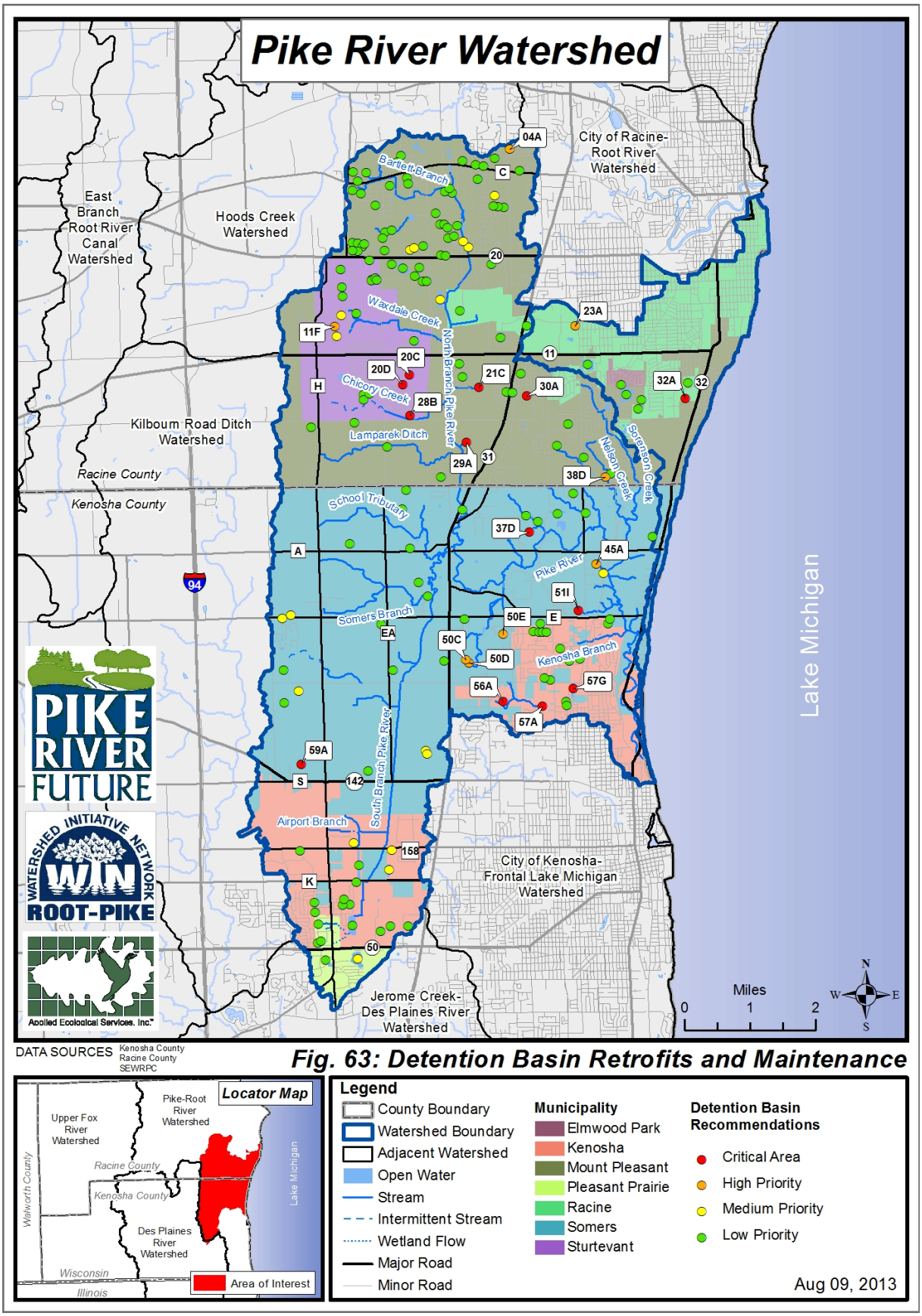


Fig. 63: Detention Basin Retrofits and Maintenance

8.2.4 Wetland Restoration

Critical Area wetland restoration site (W18) located along Somers Branch Tributary A

Wetland restoration is the process of bringing back historic wetlands in areas where they have been drained. This section does not include enhancement and maintenance for existing wetlands. Restoration can be important for mitigation purposes or done simply to benefit basic environmental functions that historic wetlands once served. Improvement in water quality is the greatest benefit provided by wetland restoration. Other benefits include reducing flood volumes/ rates and improved habitat to increase plant and wildlife biodiversity. The wetland restoration process is generally the same for all sites. First a study must be completed to determine if restoration at the site is actually feasible. If it is, a design plan is developed, permits obtained, then the project is implemented by breaking existing drain tiles and/or regrading soils to attain proper hydrology to support wetland hydrology and vegetation. Seeding and plugging with native plant species is the next step followed by short and long term maintenance and monitoring to ensure establishment.

Example wetland restoration site

Wetland restoration sites were identified in Section 5.4 using GIS data and specific criteria determined to be essential for restoration of a functional and beneficial wetland. The initial analysis resulted in 80 sites meeting criteria. However, only 37 of these sites were determined to be "potentially feasible" or have at least "limited feasibility" based on careful review of each site using 2010 aerial photography, open space inventory results, existing land use, and field visits where appropriate.

Figure 64 includes the location of all "potentially feasible" wetland restoration sites by site ID# and priority while wetland restoration sites that were determined to have only "limited feasibility" are not included in the Action Plan. Table 42 includes action related information for each recommendation listed within the appropriate jurisdiction. In general, large sites on agricultural land, sites on public land, and sites within the identified Green Infrastructure Network are Critical Areas or High priority.

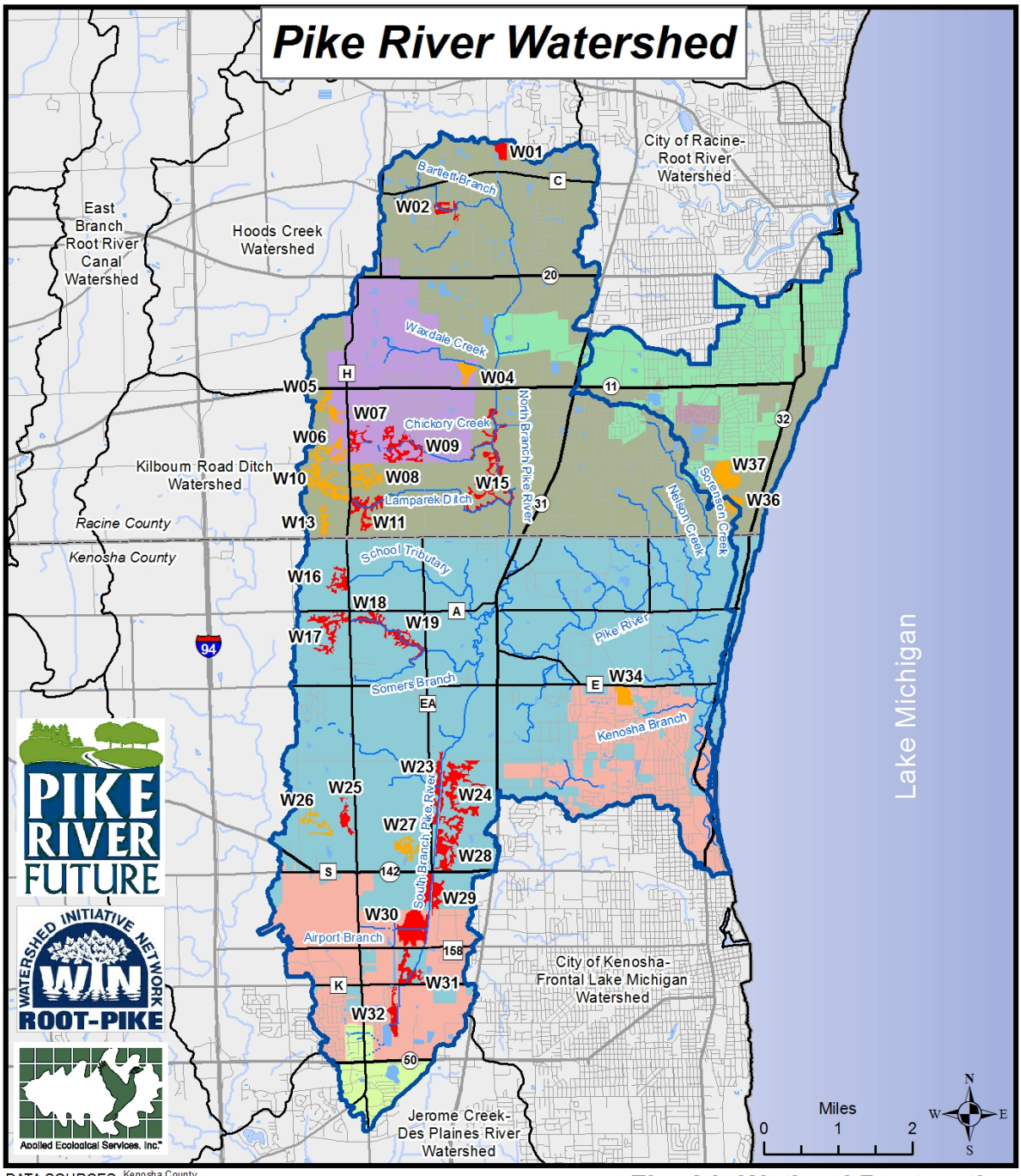


Fig. 64: Wetland Restoration

8.2.5 Riparian Area Restoration & Maintenance

Applied Ecological Services, Inc. (AES) completed a general inventory of the riparian areas along the stream reaches comprising Pike River and its tributaries in early 2012. Field notes included the general condition and quality of the riparian area as well as potential recommendations such as need for management plans, ecological restoration, and general maintenance needs such as controlled burning. The results of the inventory are summarized in Section 5.1; detailed field investigation datasheets can be found in Appendix B.

The riparian zone within roughly 100 feet of each streambank along the streams and tributaries in the watershed were assessed (Figure 65). Of the 332,191.2 linear feet of stream for which the riparian area was assessed, 166,922.8 lf (50%) is considered "Poor" ecological quality, 148,445.2 lf (45%) of the riparian area is "Average" ecological quality, and the remaining 16,823.2 lf (5%) is "Good" ecological quality (Figure 44, in Section 5.1). The majority of poor quality areas are located along the western half of the watershed in areas that have experienced the most human alteration of stream tributaries due to agricultural uses. Average quality riparian areas are located within the central and eastern portions of the watershed where the land directly adjacent to the stream has been less heavily manipulated by humans, but the plant communities remaining have been degraded to some extent, most typically by invasive species. Riparian areas in good condition are all located north of State Highway 11 in areas where ecological restoration has occurred.

In many cases, particularly in the areas dominated by agriculture, riparian buffers are missing entirely or are in need of enlargement. Because of the extent of development throughout the watershed, expanding buffers to 100 feet along streambanks is generally not feasible. In these instances, buffers were added or expanded to 30 feet along the streams and tributaries.

Critical riparian area restoration along Pike River Tributary C in Mount Pleasant

Critical riparian area restoration along Pike River Tributary B in Racine

Riparian area restoration and/or maintenance projects generally focus on increasing riparian buffers where appropriate and converting degraded ecological communities into higher quality communities that function to store and filter stormwater while also providing excellent wildlife habitat. First, it is recommended that a management plan be in place for larger riparian areas. The restoration process usually includes removal of invasive trees, shrubs, and herbaceous vegetation followed by seeding in areas where the native seed bank has been lost. Short and long term maintenance then follows and is

critically important to maintain restored conditions. The most common maintenance tasks include ongoing removal of invasive species and controlled burning.

Figure 65 shows the location of all recommended riparian area restoration and maintenance projects by ID# and priority while Table 42 lists project details related to each recommendation within the appropriate jurisdiction. Areas where riparian areas are non-existent or need enlarging are generally assigned as critical areas or higher priority for implementation whereas those needing typical maintenance or those already restored are Medium and Low priority.

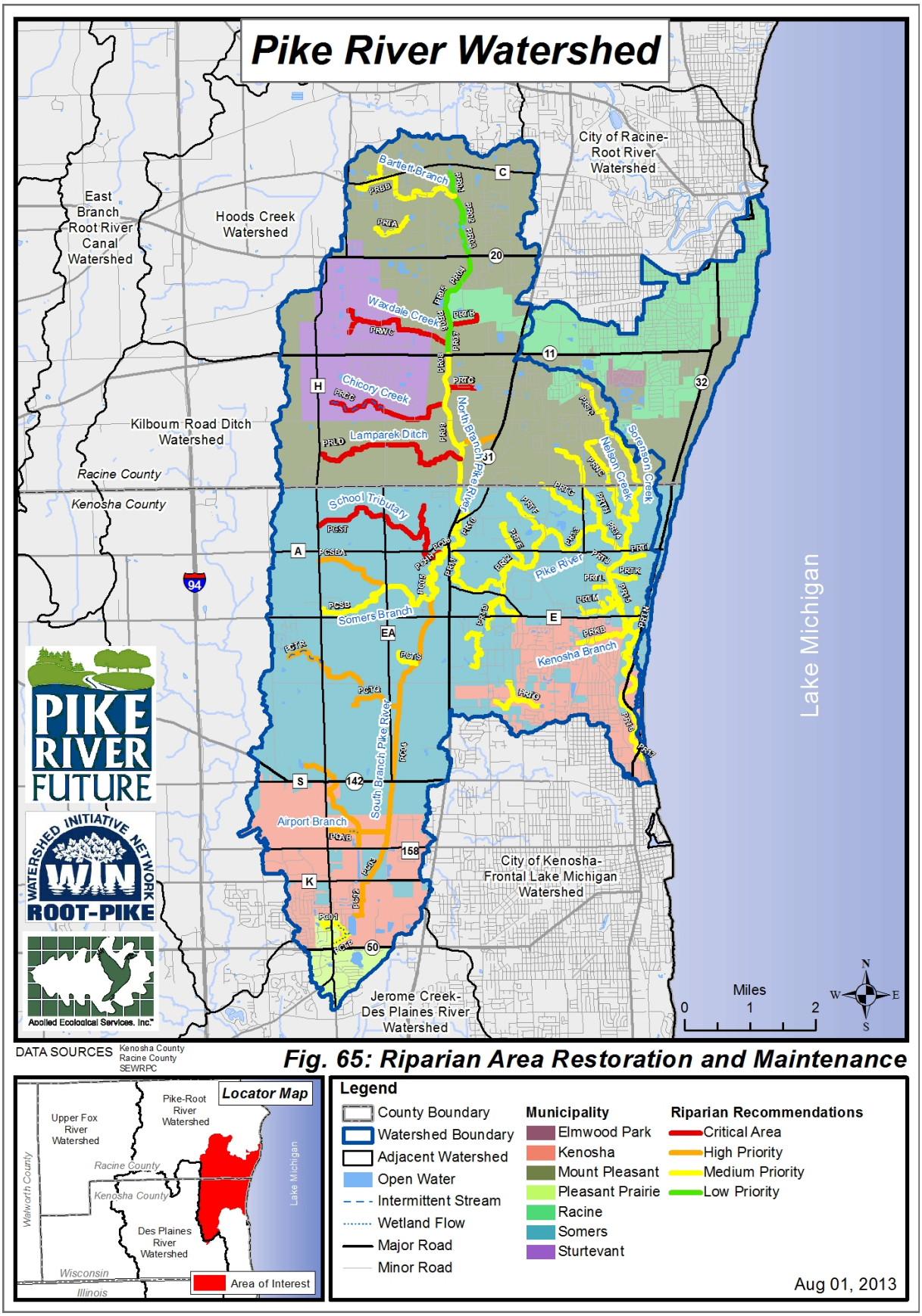


Fig. 65: Riparian Area Restoration and Maintenance

8.2.6 Agricultural Land Management Practices

According to the Environmental Protection Agency's 2000 National Water Quality Inventory, "agricultural nonpoint source (NPS) pollution was the leading source of water quality impacts on surveyed rivers (EPA, 2012)." Nearly forty percent of the land that makes up Pike River watershed is devoted to agriculture. Adoption of agricultural land management practices that encourage the soil's ability to hold water and reduce overall erosion is crucial to improving the water quality of Pike River. While there are many potential agricultural practices that can accomplish these goals, Applied Ecological Services recommends the widespread adoption of two in particular: no-till farming and filter strips.

Tilling farm fields is typically done to prepare the soil for planting and as a means of removing and controlling weeds. This disruption of the topsoil leads to erosion as well soil compaction and a reduction in the amount of beneficial organisms and microbes present in the soil. Every time the soil is tilled, additional sediment and nutrients are eventually washed into adjacent water bodies so reducing or eliminating tillage increases water quality.

No-till farming eliminates the practice of tilling and alters the overall management and maintenance of the farm. While less labor is involved in managing a no-till farm, other costs such as for herbicides tend to increase. Farmers may see a small reduction in productivity in the first few years of adoption of no-till practices, but generally see an increase in productivity over conventional tillage in the long-term as the health and quality of the soil improves. The conversion to no-till farming needs to be carefully managed by the farmer, but can significantly improve water quality.

No-till farming in action. Source: NRCS.

Filter strips are vegetative buffers typically installed between a pollutant source and a stream or other waterbody, along the edges of fields, or within fields along drainage tiles. They slow and trap runoff while filtering nutrients, sediment, and other pollutants and can also provide additional habitat.

The implementation of both no-till farming and filter strips together also seems to improve the water quality benefits of both. "Though there are no data linking no-till and conservation buffers, the two practices represent a natural fit. No-till lowers pressure on buffers and reduces maintenance

demands. In turn, buffers serve as a backup to no-till, or a last line of defense… No-till fields — especially continuous no-till fields — have demonstrated better infiltration and lower runoff rates, leaving less water for buffers to process. Runoff from no-till fields also contains less suspended sediment, which can seal the soil surface within buffers and reduce their ability to trap herbicides. (CTIC, 2002)"

Subsurface (tile) drainage best management practices stand as another possible option in reducing nutrient loss on farmland where drainage is necessary. Managing the placement of drain tiles, timing of fertilizers in relation to water table management, and monitoring outflow during fertilizer application are all methods of reducing nutrient loss to water ways (Lawrence, 2011 and Frankenberger 2006). US Fish and Wildlife Service and the Natural Resources Conservation Service are both able to provide additional technical/financial assistance in implementing such strategies where appropriate.

Sites for which agricultural land management practice reforms were identified using GIS data, 2010 aerial photography, and the results of the physical inventory conducted early in 2012. While a complete inventory of all of the agricultural parcels within the Pike River watershed is beyond the scope of this watershed plan, participation in local no-till and conservation buffer programs is generally poor in the area. Significantly more widespread adoption of both practices needs to be implemented throughout the watershed in order to see meaningful changes in water quality. AES has identified 45 agricultural parcels (totaling 4,318 acres) as Critical Areas and another 59 parcels (totaling 3,110 acres) as High Priority.

Critical Area agricultural land (AG08) where County Line Rd crosses the western watershed boundary.

A summary of agricultural land within Pike River can be found in Section 5.3. Figure 66 shows the location of all Critical Area and High Priority agricultural land management reforms recommended. Table 42 lists project details related to each recommendation.

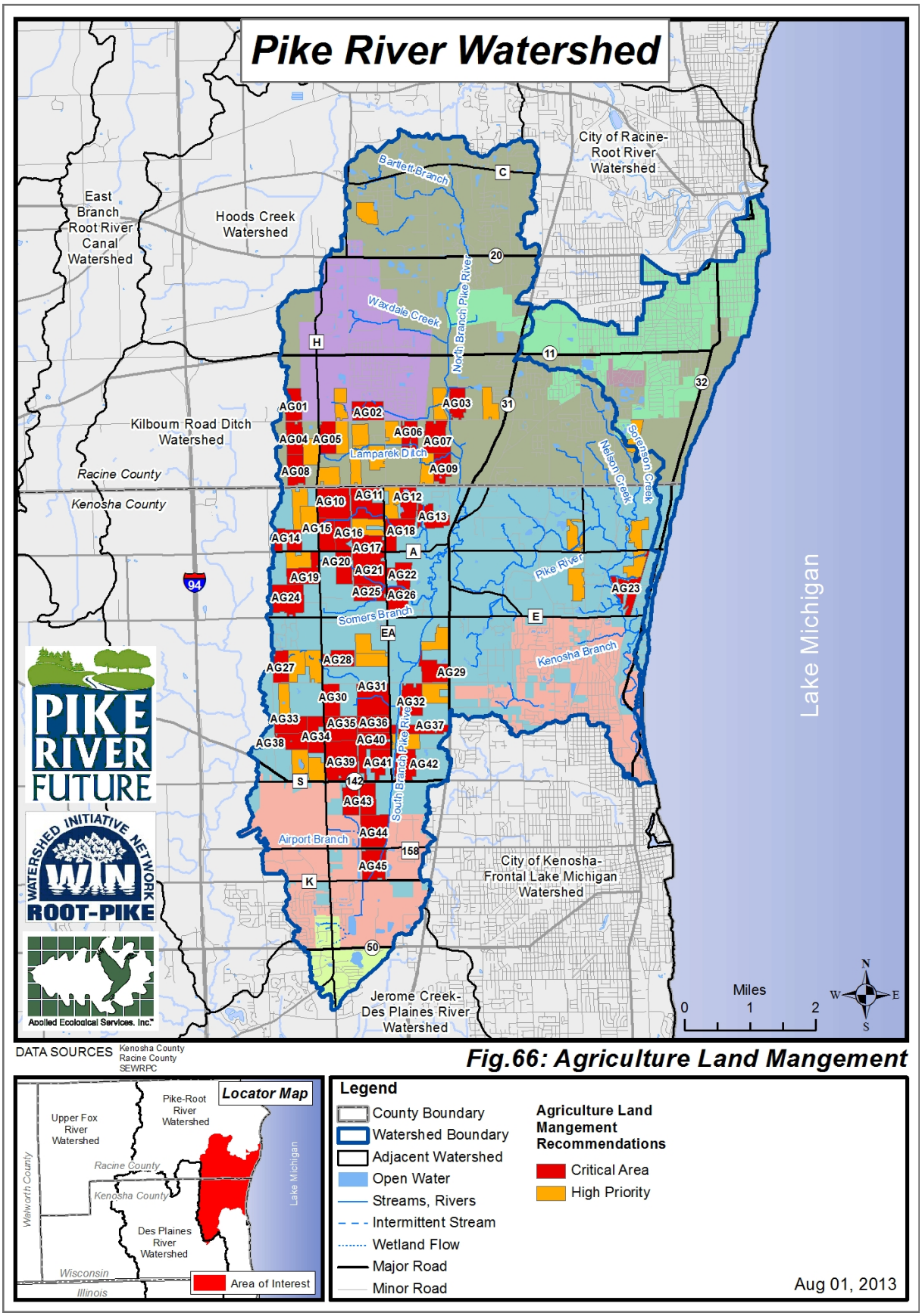


Fig.66: Agriculture Land Mangement

8.2.7 Other Management Measures

While completing the general inventory of Pike River watershed, Applied Ecological Services, Inc. (AES) noted potential Management Measure projects that fit under miscellaneous categories including:

- 1 demonstration prairie and rain garden site at Sam Poerio Park
- 1 monitoring and maintenance plan at wetland along S Memorial Dr in Racine
- 1 savanna restoration just northwest of Hawthorn Hollow Nature Sanctuary
- 1 depressional area retrofit in Case-Harmon Field at James Blvd and Hamilton Ave in Racine
- 1 wetland management and buffer installation on agricultural wetland at end of 10th Pl off of Co Hwy H in Somers

The location of other stormwater practices such as green roofs, permeable pavement, decreased road widths, curb cuts, etc. are not included in this section but are recommended in the Programmatic Action Plan.

Figure 67 shows the location of all "Other Management Measures" by ID# while Table 42 lists details about each recommendation within the appropriate jurisdiction.

Monitoring and maintenance plan for wetland along S Memorial Dr

Savanna restoration northwest of Hawthorn Hollow Nature Sanctuary

Potential rain garden site at Sam Poerio Park

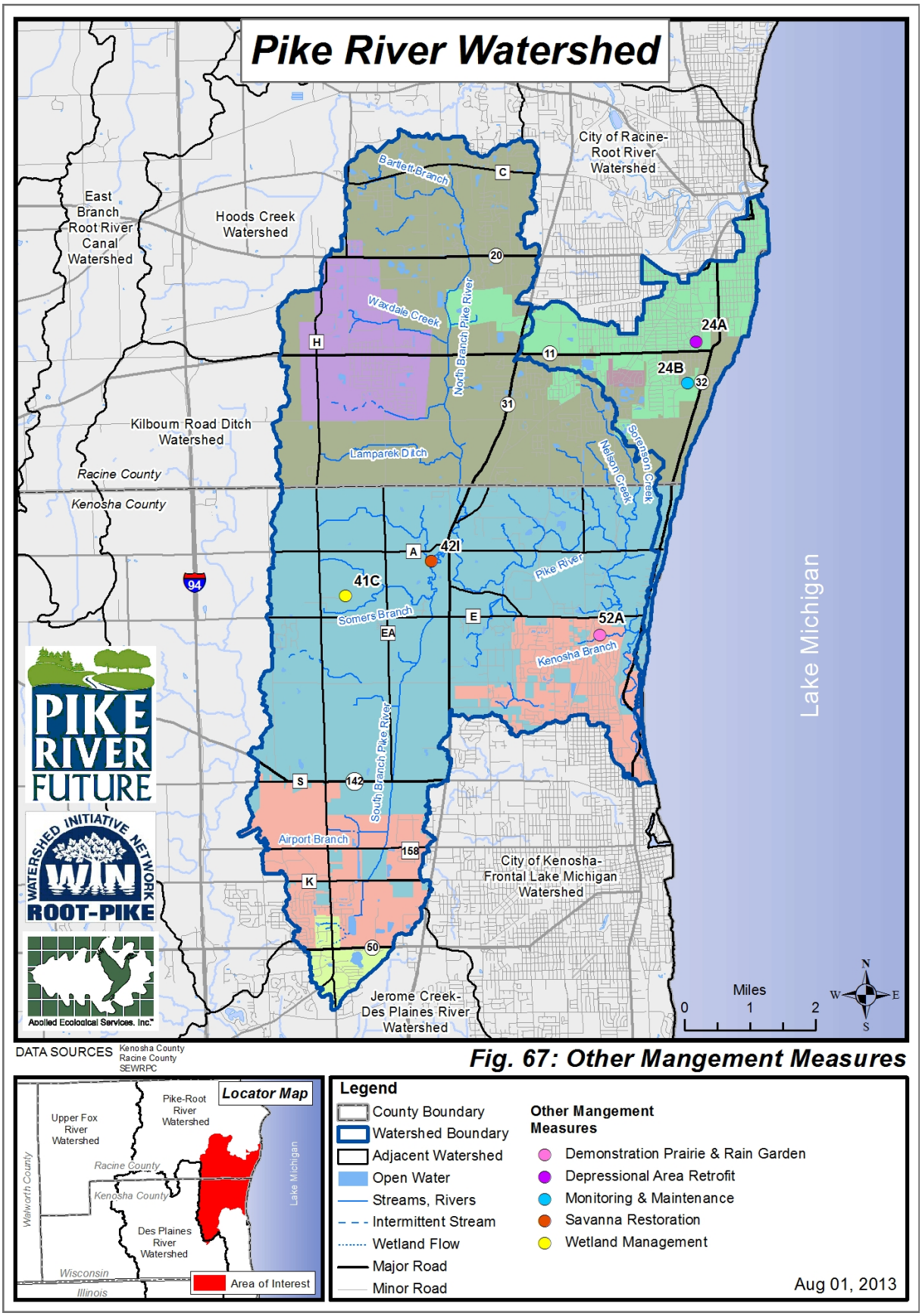


Fig. 67: Other Mangement Measures

Table 42. Site Specific Management Measures Action Plan.

KENOSHA

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
STREAMBANK & CHANNEL RESTORATION (see Figure 60)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
Pike River Reach 16 (PR16)	Pike River within Carthage College boundaries	8,361 lf	Carthage College, Kenosha	8,361 lf of moderately channelized and moderately eroded stream with adjacent spoil piles/berms on both sides of channel; invasive shrubs and tress are abundant in immediate riparian corridor	Improve channel using riffles and grade controls. Design, permit, and construct breaks in spoil pile/berm in appropriate areas to allow for additional flood storage and water quality improvement. Remove invasive trees and shrubs.	TN = 665 lbs/yr, TP = 333 lbs/yr, TSS = 333 tons/yr	High	Campus (Carthage), Kenosha	USACE, Consultant, WDNR	Cost for breaking berms and connecting to floodplain areas is to be determined. $25,000 to install 5 artificial riffles; $45,000 invasive tree and shrub removal	10-25 Years (2024-2039)
South Branch Pike River Reach 4 (PC04)	South Branch Pike River from just north of State Highway 158 at junction of Airport Branch, north to junction of South Branch Pike River and Somers Branch	20,004 lf	Owners (mostly private)	20,004 lf of stream south of County Highway E to Airport Branch with highly channelized and moderately eroded streambanks, moderate debris jams and spoil piles/berms prevent floodplain connection	Design, permit, and construct breaks along west spoil pile/berm to allow for additional flood storage and water quality improvement. Note: these should be done in conjunction with adjacent recommended wetland restoration sites. Selectively restore highly eroded streambanks using combination of hard armoring and bioengineering techniques and improve channel using riffles; selectively remove invasive trees and shrubs from floodplain areas	TN = 2,387 lbs/yr, TP = 1,194 lbs/yr, TSS = 1,194 tons/yr	Critical Area	Owner, Somers, Kenosha	USACE, Consultant, WDNR, NRCS	Cost for breaking berms and connecting to wetland restorationa areas is to be determined. $100,000 design/permit; $2,000,000 install and debris jam removal; $100,000 tree removal	1-10 Years (2014-2024)
South Branch Pike River Reach 3 (PC03)	South Branch Pike River from County Trunk Highway K north to Airport Branch	4,245 lf	Owners (private)	4,245 lf of highly channelized and moderately eroded stream with many fallen trees in channel; spoil piles/berms present on both sides of channel, blocking floodplain connection	Improve channel using riffles and grade controls. Design, permit, and construct breaks in spoil pile/berm at upper end of reach to allow for additional flood storage and water quality improvement. Note: these should be done in conjunction with adjacent recommended wetland restoration site.	TN = 464 lbs/yr, TP = 232 lbs/yr, TSS = 232 tons/yr	High	Somers, Kenosha	USACE, Consultant, WDNR	Cost for breaking berms and connecting to wetland restorationa areas is to be determined. $15,000 to install 5 artificial riffles	25 Years + (2039+)
DETENTION BASIN RETROFITS & MAINTENANCE (see Figure 63)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will require the greatest assistance.											
56A	South of potential residential units on 20th Place	1.0 acres	Owner (private)	Existing detention basin servicing new/defunct subdivision to north; pond is buffered by mowed turf grass; pond is turbid due to lack of erosion control measures in development	Design and implement project to install a native prairie vegetation buffer and plant emegents along shoreline, and maintain for three years to establish	TN= 23 lbs/yr, TP = 6 lbs/yr, TSS = 3 tons/yr	Critical Area	Developer, Owner	Kenosha, Consultant	$9,500 to design & install prairie buffer & emergent plants; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
57A	West of Wood Road and north of 34th Avenue	11.0 acres	Kenosha	Large regional detention area online with Tributary O; slopes are mowed turf grass	Design and implent project to install native prairie and wetland buffer and maintain for three years to establish	TN= 254 lbs/yr, TP = 64 lbs/yr, TSS = 32 tons/yr	Critical Area	Kenosha	Kenosha, Consultant	$50,000 to design & install prairie and wetland buffer; $5,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
57G	North west of the corner of 22nd St and 38th Ave.	7.0 acres	Kenosha	Large regional detention area with low-flow concrete channel; slopes are mowed turf grass	Design and implement project to alter concrete channel and install native prairie and maintain for three years to establish	TN= 161 lbs/yr, TP = 40 lbs/yr, TSS = 20 tons/yr	Critical Area	Kenosha	Kenosha, Consultant	$70,000 to alther channel and design & install prairie; $5,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
WETLAND RESTORATION (see Figure 64)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
W30	North of Co Hwy 158, west of railroad tracks and west of industrial development alon Co Hwy H	127.8 acres	Owners (private)	127.8 acres of dreained weltand on private agricultural along South Branch Pike River; future land use predicted to be industrial	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=1,732 lbs/yr, TP = 398 lbs/yr, TSS = 276 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$1,275,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W32	East of residential development along 82nd Avenue	31.0 acres	Owner (private), HOA	93.1 acres of dreained weltand on private agricultural along South Branch Pike River; future land use predicted to be open space	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 420 lbs/yr, TP = 96 lbs/yr, TSS = 67 tons/yr	Critical Area	Owner, HOA, Developer	USACE, WDNR, NRCS, WIN, Consultant	$930,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W34	South of Co Hwy E, east of 30th Ave (Wood Rd) and west of 25th Ave	31.3 acres	Owners (private)	31.3 acres of drained wetland on private agriculatural land along Kenosha Branch; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 108 lbs/yr, TP = 28 lbs/yr, TSS = 22 tons/yr	High	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$469,500 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
RIPARIAN AREA & AGRICULTURAL SWALE RESTORATION & MAINTENANCE (see Figure 65)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will require the greatest assistance.											
PC02	South Branch Pike River between County Hwy K and detention basin 67E	5.6 acres	Owners (private)	5.6 degraded riparian acres along both banks of South Branch Pike River Reach 2	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 10 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	High	Owner	Consultant, WIN, Kenosha	$16,800 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	25 Years + (2039+)
PCAB	Tributary to South Branch Pike River from Kenosha Regional Airport	3.7 acres	Kenosha County, Owners (private)	3.7 acres degraded riparian acres along both banks of lower third of Airport Branch of South Branch Pike River	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 38 lbs/yr, TP = 5 lbs/yr, TSS = 4 tons/yr	High	Kenosha County, Owner	Consultant, WIN, Kenosha	$11,100 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	25 Years + (2039+)
PC03	South Branch Pike River from County Trunk Highway K north to Airport Branch	5.8 acres	Owners (private)	5.8 degraded riparian acres along both banks of South Branch Pike River Reach 3	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach; remove woodie invasives	TN= 6 lbs/yr, TP = 0 lbs/yr, TSS = 0 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN, Kenosha, Somers	$34,800 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PC04	South Branch Pike River from just north of State Highway 158 at junction of Airport Branch, north to junction of South Branch Pike River and Somers Branch	27.6 acres	Somers, Owners (private)	27.6 degraded riparian acres along both banks of South Branch Pike River Reach 4	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 29 lbs/yr, TP = 3 lbs/yr, TSS = 2 tons/yr	High	Somers, Owner, Farm	NRCS, Consultant, WIN, Kenosha, Somers	$193,200 to expand and restore buffer; $10,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
60B	Agricultural swale from pond 59A to Airport Branch	9.6 acres	Owner (private)	9.6 acres of non-existent riparian area along agricultural swale	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 9 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN	$29,000 to expand and restore buffer; $5,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
AGRICULTURAL LAND MANAGEMENT (see Figure 66)											
Technical and Financial Assistance Needs: Technical assistance needed to implement agricultural land management projects is moderate while existing financial incentives need to be leveraged. Farmers renting from absentee landlords will require the greatest assistance.											
AG44	north off of St Hwy 158 and west of Canadian Pacific North Railway	129.5 acres	Owner (Private)	129.5 acres of privately owned cropland located along Airport Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 510 lbs/yr, TP = 260 lbs/yr, TSS = 175 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
PRIORITY GREEN INFRASTRUCTURE PROTECTION AREAS (see Figure 72)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to acquire open space or implement conservation design is high because of land, design/permitting, and construction costs.											
GI17	east of Kenosha Regional Airport and west of South Branch Pike River between Co Hwy S and K	532.1 acres	Owner (Private)	532.1 acres (7 parcels) of private cropland within Green Infrastructure Network along South Branch Pike River south of Cty Hwy S; future land use predicted to change to more intense land uses	Incorporate Conservation Design standards into future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers, Kenosha	10% less than traditional*	When development resumes
OTHER MANAGEMENT MEASURES (see Figure 67)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
52A	1401 16th Ave, Kenosha	0.8 acres pond; 0.05 acres rain garden	Kenosha (public)	Sam Poerio Park - pond was recently filled, adjacent areas to west would be good rain garden site	Plant demonstration prairie where pond used to be located and a rain garden south of parking lot along swale	TN= 2 lbs/yr, TP = 2 lbs/yr, TSS = 0 tons/yr	High	Kenosha	Consultant, WIN	$3,000 to design and install prairie; $7,000 for rain garden design and install	1-10 Years (2014-2024)

MOUNT PLEASANT

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
STREAMBANK & CHANNEL RESTORATION (see Figure 60)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
Pike River Trib. C (PRTC)	Tributary to Pike River that lies south of Oakes Rd.	2,473 lf	Owners (mostly private)	2,473 lf of stream that is highly channelized and moderately eroded with moderate sediment accumulation	Install grade controls	TN = 98 lbs/yr, TP = 49 lbs/yr, TSS= 49 tons/yr	High	Owner, MP	USACE, Consultant, WDNR, NRCS	$10,000 to install 5 grade controls	25 Years + (2039+)
North Branch Reach 9 (PR09)	North Branch from just south of State Highway 11, south to State Highway 31	12,024 lf	Owners (mostly private)	12,024 lf of stream with moderate erosion, high channelization, and poor riparian area adjacent to cropland	Remeander stream channel where possible, restore streambanks using bioengineering techniques, improve channel using riffles, and restore existing riparian area	TN= 2,989 lbs/yr, TP = 1,495 lbs/yr, TSS = 1.495 tons/yr	Critical Area	MP, Somers, Farm, Owner	USACE, Consultant, WDNR, NRCS	$180,000 design/permit; $1,800,000 install; $85,000 riparian area	25 Years + (2039+)
Chicory Creek (PRCC)	Tributary to North Branch north of Braun Road	5,517 lf	Owners (private), Sturtevant	5,517 lf of highly channelized and moderately eroded stream with no floodplain connection	Improve channel using riffles	TN = 192 lbs/yr, TP = 96 lbs/yr, TSS = 96 tons/yr	High	MP, Sturtevant	USACE, Consultant, WDNR, NRCS	$15,000 to install 5 artificial riffles	25 Years + (2039+)
Waxdale Creek (PRWC)	Tributary to North Branch just north of State Highway 11	11,371 lf	Owners (private), Mount Pleasant, Sturtevant, SC Johnson	11,371 lf of moderately channelized and moderately eroded stream with abundant debris jams and no floodplain connection	Remove debris jams and improve channel using riffles at downstream half	TN = 396 lbs/yr, TP = 198 lbs/yr, TSS = 198 tons/yr	High	MP, Sturtevant	USACE, Consultant, WDNR, NRCS	$10,000 to remove debris jams; $15,000 to install 5 artificial riffles	10-25 Years (2024-2039)
RAVINE RESTORATION (see Figure 61)											
Technical and Financial Assistance Needs: Ravine restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with ravine maintenance is generally low for minor tasks such as removing debris.											
Ravine just east of RCOC Park (32B)	east of RCOC Park and Sheridan Rd between Derby Ave and Chicory Rd	440 lf	Owners (Private)	440 lf of heavily eroded ravine east of RCOC Park and draining directly into Lake Michigan; ravine buffer is dominated by invasive shrubs	Design, permit, and implement ravine stabilization project	TN= 438 lbs/yr, TP = 219 lbs/yr, TSS = 219 tons/yr	Critical Area	Owner, MP	USACE, Consultant, WDNR	$25,000 to design and permit; $130,000 to install	10-25 Years (2024-2039)
BROWNFIELD RESTORATION (see Figure 61)											
Technical and Financial Assistance Needs: Brownfield restorations are complex and require high technical and financial assistance needs to conduct feasibility studies, ecotoxicology studies, protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences.											
Case Brownfield Site (25A)	east of Sheridan Rd and Durand Ave	97 acres	Business (Private, currently for sale)	97 acre former Case site located along Lake Michigan and draining approximately 500 acres; site covered in old paved surfaces	Conduct feasibility study to determine nature of contaminants in soil and water; if feasible, remove asphalt cap and contain underlying contaminated material; naturalize site and restore to native prairie	TN= 1,728 lbs/yr, TP = 235 lbs/yr, TSS = 112 tons/yr	Critical Area	Business, MP	USACE, WDNR, WIN, Consultant	$100,000 to conduct feasibility study to determine necessary remediation and potential uses; Additional costs dependent on results of feasibility study	1-10 Years (2014-2024)
DETENTION BASIN & POND RETROFITS & MAINTENANCE (see Figure 63)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will require the greatest assistance.											
21C	East of Oakes Road and West of Bradley Road	5.9 acres	Owner (private)	Planned but unbuilt detention basin at headwaters of Tributary C; area is currently dominated by invasive wetland species	Create wetland detention basin and maintain for three years to establish	TN= 298 lbs/yr, TP = 73 lbs/yr, TSS = 42 tons/yr	Critical Area	Owner, Mount Pleasant	Consultant	$40,000 for design; $200,000 to construct and plant; $5,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
29A	West of S. Green Bay Rd and South of Braun Road	0.3 acres	Owner (private)	Existing agricultural pond; ag swale flows north around pond and eventually to PR09	Design and implement project to reroute swale to ag pond as a sediment & nutrient trap	TN= 16 lbs/yr, TP = 4 lbs/yr, TSS = 2 tons/yr	Critical Area	Owner, Farm	NRCS	$40,000 to design, install, and vegetate new swale	1-10 Years (2014-2024)
30A	East of Biscanyne Avenue and Northwest of Royal Oaks Drive	1.8 acres	Mount Pleasant	Existing dry bottom detention basin with wetland area to south; dry area of basin is turf grass; turf swale enters from west side; basin services subdivision to north and ag area to south	Design and implement project to plant native prairire vegetation around existing wetland area and swale, then maintain for three years to establish	TN= 91 lbs/yr, TP = 22 lbs/yr, TSS = 13 tons/yr	Critical Area	Mount Pleasant, Owner	Consultant	$35,000 to design and implement project to remove turf grass and revegetate with native prairie vegetation; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
4A	Northeast of intersection of Emmertsen Rd and Independence Rd	1.9 acres	Heritage Heights HOA	Existing wet bottom detention basin, mowed turf grass to edges	Design and implement project to install a native prairie vegetation buffer and plant emegents along shoreline, and maintain for three years to establish	TN= 48 lbs/yr, TP = 14 lbs/yr, TSS = 5 tons/yr	High	HOA	Mount Pleasant, Consultant	$17,500 to design & install prairie buffer & emergent plants; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
38D	Northwest corner of Lathrop Ave. and County Line Road, west of Tributary N	2.3 acres	Owner (private)	Existing residential pond with rock toe and turf slopes adjacent to Nelson Creek	Design and implement project to extend green infrastructure adjacent to Nelson Creek by naturalizing the pond buffer	TN= 10 lbs/yr, TP = 2 lbs/yr, TSS = 1 tons/yr	High	Owner	Mount Pleasant, Consultant	$9,000 to design & install prairie buffer; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
WETLAND RESTORATION (see Figure 64)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
W01	East of the intersection of Airline and Gittings Roads	22.3 acres	Owner (private)	22.3 acres of drained wetland on private agricultural land at headwaters of Pike River, draining roughly 78 acres; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 76 lbs/yr, TP = 19 lbs/yr, TSS = 13 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$334,500 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W02	Southwest of where Melanie Ln dead ends	23.2 acres	Mount Pleasant, Owners (private)	23.2 acres of drained wetland on agricultural land surrounding headwaters of Bartlett Branch, draining approximately 256 acres; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 130 lbs/yr, TP = 31 lbs/yr, TSS = 14 tons/yr	Critical Area	Mount Pleasant, Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$348,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W11	West of Co. Rd H and Braun Rd	50.3 acres	Owners (private)	50.3 acres of drained wetland on private agricultural land along Lamparek Ditch; future land use not predicted to change, therefore site could potentially be a wetland mitigation bank opportunity	Design, permit, and implement wetland mitigation bank	TN= 435 lbs/yr, TP = 78 lbs/yr, TSS = 50 tons/yr	Critical Area	Owner, MP	USACE, WDNR, Consultant	$500,000 to design/permit/install/maintain wetland bank; fair market value for purchase land if required	10-25 Years (2024-2039)
W15	South of Hw 11 along Pike River to just south of Braun Rd	113.5 acres	Mount Pleasant, Owners (private)	113.5 acres of drained wetland on private agricultural along Pike River Reach 9; future land use not predicted to change, therefore site could potentially be acquired by the Village of Mount Pleasant in conjunction with ongoing restoration	Incorporate wetland restoration into furture stream restoration work along Pike River	TN= 982 lbs/yr, TP = 175 lbs/yr, TSS = 113 tons/yr	Critical Area	Owner, MP	USACE, WDNR, NRCS, Consultant	$900,000 to design/permit/install/maintain wetland bank; fair market value for purchase land if required	10-25 Years (2024-2039)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
W05	South of St Hwy 11, west of Co Rd. H	33.7 acres	Owners (private)	33.7 acres of drained wetlands on private agricultural land situated at headwaters of Chicory Creek; future land use predicted to be commercial/retail and industrial/business park	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 73 lbs/yr, TP = 12 lbs/yr, 9 tons/yr	High	Owner, Developer, Business	USACE, WDNR, NRCS, WIN, Consultant	$505,000 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
W06	Northwest corner of Braun Rd and 105th St.	39.2 acres	Owners (private)	39.2 acres of drained wetlands on private agricultural land situated at headwaters of Chicory Creek; future land use predicted to be industrial/business park	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 84 lbs/yr, TP = 14 lbs/yr, TSS = 10 tons/yr	High	Owner, Developer, Business	USACE, WDNR, NRCS, WIN, Consultant	$588,000 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
W08	Southest of the intersection of Braun Rd and 105th St	44.2 acres	Owners (private)	44.2 acres of drained wetlands on private agricultural land at headwaters of Lamparek Ditch; future land use not predicted to change, therefore site could potentially be a wetland mitigation bank opportunity	Design, permit, and implement wetland mitigation bank	TN= 72 lbs/yr, TP = 12 lbs/yr, TSS = 9 tons/yr	High	Owner, MP	USACE, WDNR, Consultant	$663,000 to design/permit/install/maintain wetland; fair market value for purchase land if required	25 Years + (2039+)
W10	Southwest of the intersection of Braun Rd and 105th St, north of Prairie View Dr	67.7 acres	Owners (private)	67.7 acres of drained wetlands on private agricultural land at headwaters of Lamparek Ditch; future land use not predicted to change, therefore site could potentially be a wetland mitigation bank opportunity	Design, permit, and implement wetland mitigation bank	TN= 111 lbs/yr, TP = 20 lbs/yr, TSS = 13 tons/yr	High	Owner, MP	USACE, WDNR, Consultant	$677,000 to design/permit/install/maintain wetland; fair market value for purchase land if required	25 Years + (2039+)
W13	Northwest of the intersection of County Line Road and Co Hwy H	19.3 acres	Owner (private)	19.3 acres of drained wetlands on private agricultural land at headwaters of Lamparek Ditch; future land use not predicted to change, therefore site could potentially be a wetland mitigation bank opportunity	Design, permit, and implement wetland mitigation bank	TN= 32 lbs/yr, TP = 5 lbs/yr, TSS = 4 tons/yr	High	Owner, MP	USACE, WDNR, Consultant	$289,500 to design/permit/install/maintain wetland; fair market value for purchase land if required	25 Years + (2039+)
W36	Northwest of County Line Rd and St Hwy 32	31.1 acres	Owners (private)	31.1 acres of drained wetlands on private agricultural land in the Direct Drainage area; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 78 lbs/yr, TP = 16 lbs/yr, TSS = 11 tons/yr	High	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$466,500 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
W37	Southwest of Chicory Rd and St Hwy 33	61.0 acres	Owners (private)	61.0 acres of drained wetlands on private agricultural land in the Direct Drainage area; future land use predicted to be industrial	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 154 lbs/yr, TP = 30 lbs/yr, TSS = 22 tons/yr	High	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$610,000 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
RIPARIAN AREA & AGRICULTURAL SWALE RESTORATION & MAINTENANCE (see Figure 65)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will require the greatest assistance.											
PRTC	Tributary to Pike River from east, between State Hwy 11 and Braun Rd	3.4 acres	Owners (private)	3.4 degraded riparian acres along both banks of Pike River Tributary C (PRTC); buffer along agriculture is nonexistent, the other has riparian area dominated by invasive shrubs and trees	Remove invasive shrubs and trees from existing buffer; install 30 foot wide buffer minumum adjacent to ag field.	TN= 3 lbs/yr, TP = 0 lbs/yr, TSS = 0 tons/yr	Critical Area	Owner, MP	NRCS, Consultant	$17,000 to remove invasive trees and shrubs and restore buffer; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PRLD	Tributary to North Branch north of County Line Rd between County Trunk Hwy H and Pike River	19.9 acres	Mount Pleasant, Owners (private)	19.9 degraded riparian acres along both banks of Lamparek Ditch (PRLD)	Improve and expand buffer to 30 feet minimum in agricultural areas; restore degraded riparian area using a natural ecological restoration approach	TN= 19 lbs/yr, TP = 2 lbs/yr, TSS = 1 tons/yr	Critical Area	Owner, Farm	NRCS, Consultant, WIN, MP	$100,000 to expand and restore buffer; $7,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
29B	Agricultural swale from St Hwy 31 to pond 29A	3.4 acres	Owner (private)	3.4 acres of non-existent riparian area along agricultural swale	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 3 lbs/yr, TP = 0 lbs/yr, TSS = 0 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN	$10,200 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PRWC	Tributary to North Branch just north of State Highway 11	15.7 acres	Owners (private), Mount Pleasant, Sturtevant, SC Johnson	15.7 degraded riparian acres along both banks of Waxdale Creek (PRWC)	Remove invasive shrubs and trees from existing buffer; restore degraded riparian area using a natural ecological restoration approach	TN= 13 lbs/yr, TP = 2 lbs/yr, TSS = 1 tons/yr	Critical Area	Owner, MP, Sturtevant	NRCS, Consultant	$125,600 to install and restore buffer; $7,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)
PRCC	Tributary to North Branch north of Braun Road	15.6 acres	Owners (private), Sturtevant	15.6 degraded riparian acres along both banks of Chicory Creek (PRCC)	Improve and expand buffer to 30 feet minimum in agricultural areas; restore degraded riparian area using a natural ecological restoration approach	TN= 22 lbs/yr, TP = 3 lbs/yr, TSS = 1 tons/yr	Critical Area	Owner, Farm, HOA	NRCS, Consultant, WIN, Sturtevant, MP	$46,800 to expand and restore buffer; $7,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)
AGRICULTURAL LAND MANAGEMENT (see Figure 66)											
Technical and Financial Assistance Needs: Technical assistance needed to implement agricultural land management projects is moderate while existing financial incentives need to be leveraged. Farmers renting from absentee landlords will require the greatest assistance.											
AG01	north of Braun Rd and west of Co Hwy H	71.6 acres	Owner (Private)	71.6 acres of privately owned cropland located at headwaters of Chicory Creek	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 365 lbs/yr, TP = 186 lbs/yr, TSS = 133 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG03	north of Braun Rd and south of end of Oakes Rd (east of Pike)	72.0 acres	Owner (Private)	72.0 acres of privately owned cropland located off of Pike River near junction of Chicory Creek	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 367 lbs/yr, TP = 187 lbs/yr, TSS = 134 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG04	south of Braun Rd and west of Co Hwy H	79.6 acres	Owner (Private)	79.6 acres of privately owned cropland located at headwaters of Lamparek Ditch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 405 lbs/yr, TP = 207 lbs/yr, TSS = 148 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG05	south of Braun Rd and east of Co Hwy H	76.2 acres	Owner (Private)	76.2 acres of privately owned cropland located at headwaters of Lamparek Ditch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 388 lbs/yr, TP = 198 lbs/yr, TSS = 142 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG06	south of Braun Rd and east of 90th St	75.5 acres	Owner (Private)	75.5 acres of privately owned cropland located along Lamparek Ditch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 384 lbs/yr, TP = 196 lbs/yr, TSS = 140 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG07	south of Braun Rd and east of Canadian Pacific North Railway	115.9 acres	Owner (Private)	115.9 acres of privately owned cropland located along Lamparek Ditch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 590 lbs/yr, TP = 301 lbs/yr, TSS = 216 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG08	north of Kr County Line Rd and west of Co Hwy H	81.2 acres	Owner (Private)	81.2 acres of privately owned cropland located at headwaters of Lamparek Ditch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 414 lbs/yr, TP = 211 lbs/yr, TSS = 151 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG09	north of intersection of Kr County Line Rd and 56th Ave	73.4 acres	Village of Mount Pleasant (Public)	73.4 acres of publicly owned cropland located along Lamparek Ditch	Utilize no-till soil conservation practice	TN= 374 lbs/yr, TP = 191 lbs/yr, TSS = 137 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
N/A	throughout the watershed	3109.9 acres	Owner (Private)	All other cropland parcels of 40 acres or larger in size (59 parcels) located throughout the watershed	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN=11,672 lbs/yr, TP = 5,950 lbs/yr, TSS = 3,953 tons/yr	High	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
PRIORITY GREEN INFRASTRUCTURE PROTECTION AREAS (see Figure 72)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to acquire open space or implement conservation design is high because of land, design/permitting, and construction costs.											
GI01	northeast of intersection of Airline Rd and Spring St	49.4 acres	Owner (Private)	49.4 acres of private cropland within unprotected Green Infrastructure Network	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	MP, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase
GI02	southeast of intersection of Old Spring Rd and Globe Heights Dr; adjacent to Smolenski Park	50.8 acres	Owner (Private)	50.8 acres (8 parcels) of mostly private cropland within unprotected Green Infrastructure Network	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	MP, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase
GI03	east of Sheridan Rd and Durand Ave	97 acres	Owner (Private)	(also, Brownfield 25A) 97 acre former Case site located along Lake Michigan and draining approximately 500 acres	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Owner, MP, Parks	USACE, WDNR, WIN, Consultant	Not Applicable	1-10 Years (2014-2024)
GI06	northwest of intersection of Old Green Bay Rd and Braun Rd	34.4 acres	Owner (Private)	34.4 acres currently in private use as cropland located northeast of the intersection of Old Green Bay Rd and County Highway X	Aquire and restore prairire with trails adjacent to James Turck Park and protect parcel as natural area/open space	Pollutant reduction cannot be assessed via modeling	Critical Area	Owner, MP, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase
GI07	east of Co Hwy H between Braun Rd and KR County Line Rd	284.2 acres	Owner (Private)	284.2 acres (5 parcels) of private cropland in unprotected Green Infrastructure Network	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	Owner, MP, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase

RACINE

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
BROWNFIELD RESTORATION (see Figure 61)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
Clark Street Brownfield (16A)	west side of Clark Street between 14th St and 15th St	2.3 acres	Business (private)	Vacant lot along west side of Clark Street between 14th St and 15th St in Racine; abuts railroad tracks and consists of spotty areas of turf grass and bare dirt	Enhance existing soil as needed; restore to native prairie	TN= 87 lbs/yr, TP = 8 lbs/yr, TSS = 6 tons/yr	High	Business, Racine	USACE, WDNR, WIN, Consultant	$18,400 to amend and add to soil and restore to prairie	10-25 Years (2024-2039)
Phillips Ave Brownfield (16C)	intersection of 18th St and Phillips Ave	15.3 acres	Racine, Developer (Private)	At intersection of 18th St and Phillips Ave in Racine; spotty grass, bare dirt and depressional area	Enhance existing soil as needed; restore to native prairie	TN= 218 lbs/yr, TP = 27 lbs/yr, TSS = 16 tons/yr	High	Developer, Racine	USACE, WDNR, WIN, Consultant	$122,400 to amend and add to soil and restore to prairie	1-10 Years (2014-2024)
18th Street Brownfield (16D)	Northeast of intersection of Taylor Ave and 18th St	1.7 acres	Racine County, Developer (Private)	Northeast of intersection of Taylor Ave and 18th St; bare grass and areas of old concrete	Enhance existing soil as needed; restore to native prairie	TN= 71 lbs/yr, TP = 9 lbs/yr, TSS = 6 tons/yr	High	Developer, Racine County	USACE, WDNR, WIN, Consultant	$13,600 to amend and add to soil and restore to prairie	10-25 Years (2024-2039)
DETENTION BASIN & POND RETROFITS & MAINTENANCE (see Figure 63)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will require the greatest assistance.											
32A	Stephen F Olsen Industrial Park	8.0 acres	Business (private)	Large industrial area lacking detention but with ample space to accommodate a large wetland detention basin	Create wetland detention basin and maintain for three years to establish	TN= 550 lbs/yr, TP = 130 lbs/yr, TSS = 94 tons/yr	Critical Area	Business, Developer	Racine, Consultant	$30,000 for design; $150,000 to construct and plant; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
23A	Southwest corner of Ohio St. and 21st St.	1.8 acres	Racine County	Existing wet bottom detention basin with gravel side slopes and no water quality function	Design and implement project to remove gravel install a native prairie vegetation buffer and plant emegents along shoreline, and maintain for three years to establish	TN= 29 lbs/yr, TP = 7 lbs/yr, TSS = 5 tons/yr	High	Racine County	Racine, Consultant	$30,000 to design & install prairie buffer & emergent plants; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
RIPARIAN AREA & AGRICULTURAL SWALE RESTORATION & MAINTENANCE (see Figure 65)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will require the greatest assistance.											
PRTB	Tributary to Pike River, north of State Highway 11 and west of Oakes Rd	3.6 acres	American Transmission Co., Republic Services of WI	3.6 degraded riparian acres along both banks of Pike River Tributary B (PRTB)	Increase buffer to 30 feet where appropriate and restore degraded riparian area using a natural ecological restoration approach	TN= 9 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	Critical Area	American Transmission Co., Republic Services of WI	NRCS	$18,000 to install and restore buffer; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
OTHER MANAGEMENT MEASURES (see Figure 67)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
24B	west of South Memorial Dr (and south of Sheridan Woods Park)	15.7 acres	Racine (public)	prairie restoration with inter-mixed wetland communities	Prepare monitoring, maintenance, and possible over-seeding plan	N/A	High	Racine	Consultant	$20,000 for five year maintenance and monitoring plan and implementation	1-10 Years (2014-2024)
24A	Case-Harmon Field at intersection of James Blvd and Hamilton Ave	1.5 acres	Racine (public)	Park with unused depressional area on south end	Depressional area could potentially store stormwater runoff and be naturalized with prairie and wetland vegetation	TN= 1 lbs/yr, TP = 1 lbs/yr, TSS = 0 tons/yr	High	Racine	Consultant, WIN	$8,000 to restore vegetation; $2,000/yr maintenance for 3 years to establish	1-10 Years (2014-2024)

SOMERS

STREAMBANK & CHANNEL RESTORATION (see Figure 60)

Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
North Branch Reach 10 (PR10)	North Branch from State Highway 31 to County Trunk Highway A	6,277 lf	Owners (private)	6,277 lf of stream with sporadic areas of highly eroded streambanks and heavy debris jams; riparian area is dominated by invasive trees	Selectively restore streambanks using bioengineering techniques and improve channel using riffles; remove problematic debris jams; selectively remove invasive trees	TN= 1,537 lbs/yr, TP = 768 lbs/yr, TSS = 768 tons/yr	Critical Area	Somers, Farm, Owner	USACE, Consultant, WDNR, NRCS	$30,000 design/permit; $160,000 install and debris jam removal; $35,000 tree removal	10-25 Years (2024-2039)
Pike River Reach 11 (PR11)	Pike River within Petrifying Springs Park from County Trunk Highway A to park boundary or junction of Pike River Tributary D	8,154 lf	Petrifying Springs Park (public)	8,154 lf of stream with moderately eroded banks within Petrifying Springs Park; riparian area dominated by many invasive trees	Selectively restore streambanks using bioengineering techniques; remove problematic debris jams; selectively remove invasive trees	TN= 1,054 lbs/yr, TP = 527 lbs/yr, TSS = 527 tons/yr	Critical Area	Parks	USACE, Consultant, WDNR	$35,000 design/permit; $200,000 install and debris jam removal; $30,000 tree removal	10-25 Years (2024-2039)
South Branch Pike River Reach 5 (PC05)	South Branch Pike River from junction of Somers Branch tributary north to boundary of Hawthorn Hollow	4,010 lf	Owners (private)	4,010 lf of stream just south of Hawthorn Hollow with isolated highly eroded streambanks, moderate debris jams and abundance of invasive trees in floodplain	Selectively restore highly eroded streambanks using combination of hard armoring and bioengineering techniques and improve channel using riffles; selectively remove invasive trees and shrubs from floodplain areas	TN= 859 lbs/yr, TP = 429 lbs/yr, TSS = 429 tons/yr	Critical Area	Somers, Owner	USACE, Consultant, WDNR	$60,000 design/permit; $400,000 install and debris jam removal; $50,000 tree removal	10-25 Years (2024-2039)
South Branch Pike River Reach 6 (PC06)	South Branch Pike River from northern boundary to Hawthorn Hollow north to junction of South Branch Pike River and Pike River	2,843 lf	Owners (private)	2,843 lf of stream just north of Hawthorn Hollow with isolated highly eroded streambanks, moderate debris jams and abundance of invasive trees and shrubs in floodplain.	Selectively restore highly eroded streambanks using combination of hard armoring and bioengineering techniques; selectively remove invasive trees and shrubs from floodplain areas	TN= 532 lbs/yr, TP = 266 lbs/yr, TSS = 266 tons/yr	Critical Area	Owner, Hawthorn Hollow, Somers	USACE, Consultant, WDNR	$30,000 design/permit; $175,000 install and debris jam removal; $35,000 tree removal	1-10 Years (2014-2024)
South Branch Pike River Hawthorn Hollow Reach (PCHH)	South Branch Pike River within Hawthorn Hollow Nature Sanctuary	2,276 lf	Hawthorn Hollow	2,276 lf of stream within Hawthorn Hollow with highly eroded streambanks, moderate debris jams and some floodplain connection	Selectively restore highly eroded streambanks using combination of hard armoring and bioengineering techniques and improve channel using riffles; selectively remove invasive trees and shrubs from floodplain areas	TN= 487 lbs/yr, TP = 244 lbs/yr, TSS = 244 tons/yr	Critical Area	Hawthorn Hollow, Somers	USACE, Consultant, WDNR	$35,000 design/permit; $250,000 install and debris jam removal; $40,000 tree removal	1-10 Years (2014-2024)
Pike River Reach 12 (PR12)	Pike River from Petrifying Springs to 7th Street	5,557 lf	University of Wisconsin	5,557 lf of with isolated highly eroded streambanks; riparian area dominated by many invasive trees	Selectively restore streambanks using bioengineering techniques; selectively remove invasive trees	TN = 442 lbs/yr, TP = 221 lbs/yr, TSS = 221 tons/yr	High	University of Wisconsin, Somers	USACE, Consultant, WDNR, NRCS	$30,000 design/permit; $140,000 install; $30,000 tree removal	25 Years + (2039+)
South Branch Pike River Reach 4 (PC04)	South Branch Pike River from just north of State Highway 158 at junction of Airport Branch, north to junction of South Branch Pike River and Somers Branch	20,004 lf	Owners (mostly private)	20,004 lf of stream south of County Highway E to Airport Branch with highly channelized and moderately eroded streambanks, moderate debris jams and spoil piles/berms prevent floodplain connection	Design, permit, and construct breaks along west spoil pile/berm to allow for additional flood storage and water quality improvement. Note: these should be done in conjunction with adjacent recommended wetland restoration sites. Selectively restore highly eroded streambanks using combination of hard armoring and bioengineering techniques and improve channel using riffles; selectively remove invasive trees and shrubs from floodplain areas	TN = 2,387 lbs/yr, TP = 1,194 lbs/yr, TSS = 1,194 tons/yr	Critical Area	Owner, Somers, Kenosha	USACE, Consultant, WDNR, NRCS	Cost for breaking berms and connecting to wetland restorationa areas is to be determined. $100,000 design/permit; $2,000,000 install and debris jam removal; $100,000 tree removal	1-10 Years (2014-2024)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
South Branch Pike River Reach 3 (PC03)	South Branch Pike River from County Trunk Highway K north to Airport Branch	4,245 lf	Owners (private)	4,245 lf of highly channelized and moderately eroded stream with many fallen trees in channel; spoil piles/berms present on both sides of channel, blocking floodplain connection	Improve channel using riffles and grade controls. Design, permit, and construct breaks in spoil pile/berm at upper end of reach to allow for additional flood storage and water quality improvement. Note: these should be done in conjunction with adjacent recommended wetland restoration site.	TN = 464 lbs/yr, TP = 232 lbs/yr, TSS = 232 tons/yr	High	Somers, Kenosha	USACE, Consultant, WDNR	Cost for breaking berms and connecting to wetland restorationa areas is to be determined. $15,000 to install 5 artificial riffles	25 Years + (2039+)
North Branch Reach 9 (PR09)	North Branch from just south of State Highway 11, south to State Highway 31	12,024 lf	Owners (mostly private)	12,024 lf of stream with moderate erosion, high channelization, and poor riparian area adjacent to cropland	Remeander stream channel where possible, restore streambanks using bioengineering techniques, improve channel using riffles, and restore existing riparian area	TN= 2,989 lbs/yr, TP = 1,495 lbs/yr, TSS = 1.495 tons/yr	Critical Area	MP, Somers, Farm, Owner	USACE, Consultant, WDNR, NRCS	$180,000 design/permit; $1,800,000 install; $85,000 riparian area	25 Years + (2039+)
RAVINE RESTORATION (see Figure 61)											
Technical and Financial Assistance Needs: Ravine restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with ravine maintenance is generally low for minor tasks such as removing debris.											
Ravine east of Lakeshore Dr (39A)	southeast of County Line Rd and State Highway 32	1,359 lf	Owners (Private)	1,359 lf of heavily eroded ravine east of Lakeshore Dr and draining directly into Lake Michigan; ravine buffer is dominated by invasive shrubs	Design, permit, and implement ravine stabilization project	TN= 1,334 lbs/yr, TP = 667 lbs/yr, TSS = 667 tons/yr	Critical Area	Owner, Somers	USACE, Consultant, WDNR	$50,000 to design and permit; $350,000 to install	1-10 Years (2014-2024)
South Branch Pike River Reach 5 Ravine (42H)	south of Hawthorn Hollow Nature Sanctuary west of South Branch Pike River Reach 5	394 lf	Owner (Private)	394 lf of steep and heavily eroded ravine draining a wetland west of Hawthorn Hollow into South Branch Pike River	Design, permit, and implement ravine stabilization project	TN= 422 lbs/yr, TP = 211 lbs/yr, TSS = 211 tons/yr	Critical Area	Owner, Somers	USACE, Consultant, WDNR	$15,000 to design and permit; $75,000 to install	10-25 Years (2024-2039)
School Tributary Ravine (42G)	north of Hawthorn Hollow Nature Sanctuary west of the mouth of School Tributary	423 lf	Owners (Private)	423 lf of heavily eroded ravine north of Hawthorn Hollow draining cropland into School Tributary	Design, permit, and implement ravine stabilization project	TN= 324 lbs/yr, TP = 162 lbs/yr, TSS = 162 tons/yr	Critical Area	Owner, Somers	USACE, Consultant, WDNR	$30,000 to design and permit; $150,000 to install	25 Years + (2039+)
Hawthorn Hollow Ravine (42F)	within Hawthorn Hollow Nature Sanctuary west of PCHH	639 lf	Hawthorn Hollow	639 lf of moderately eroded ravine located off the west bank of South Branch Pike River Hawthorn Hollow reach (PCHH) and drains an adjacent agricultural field	Design, permit, and implement ravine stabilization project	TN = 109 lbs/yr, TP = 54 lbs/yr, TSS = 54 tons/yr	High	Hawthorn Hollow	USACE, Consultant, WDNR	$15,000 to design and permit; $70,000 to install	10-25 Years (2024-2039)
DETENTION BASIN & POND RETROFITS & MAINTENANCE (see Figure 63)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will require the greatest assistance.											
37D	Northeast of 39th Avenue and South of 38th Avenue	5.0 acres	Owner (private)	Large residential pond that likely functions as a detention basin for surrounding upper-scale development; most of surrounding buffer is mowed turf	Design and implement project to install a native prairie vegetation buffer, and maintain for three years to establish	TN= 172 lbs/yr, TP = 50 lbs/yr, TSS = 18 tons/yr	Critical Area	Owner	Somers, Consultant	$16,500 to design & install prairie buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
51I	Corner of 22nd Avenue and Co. Hwy E	3.6 acres	Carrington Court HOA	Existing detention basin at headwaters of Tributary M; slopes are mowed turf grass; goose dropping abundant; erosion is beginning at toe of slope	Design and implement project to install a native prairie vegetation buffer, regrade eroded toe, and plant emegents along shoreline, and maintain for three years to establish	TN= 124 lbs/yr, TP = 36 lbs/yr, TSS = 13 tons/yr	Critical Area	HOA	Somers, Consultant	$60,000 to design, regrade, install and vegetate; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
59A	Northeast of intersection of 38th St and 96th Ave	5.3 acres	Owner (private)	Large pond in cropland draining surrounding cropland and residential areas; non-existent buffer width and quality	Design and implement project to extend the buffer around the pond and surrounding swales	TN= 143 lbs/yr, TP = 26 lbs/yr, TSS = 17 tons/yr	Critical Area	Owner, Somers	NRCS	$25,000 to design & install prairie buffers	10-25 Years (2024-2039)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
45A	Within defunct development Southeast of the intersection of Co. Hwy A nad Co. Hwy Y	0.3 acres	Golf Glen Estates HOA	Existing wet bottom detention basin, mowed turf grass to edges; at headwater of Tributary J	Design and implement project to install a native prairie vegetation buffer and plant emegents along shoreline, and maintain for three years to establish	TN= 40 lbs/yr, TP = 12 lbs/yr, TSS = 4 tons/yr	High	HOA	Somers, Consultant	$5,000 to design & install prairie buffer & emergent plants; $1,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
50C, D	East of State Hwy 31 and at the end of 16th Place dead end road	2 @ 1.3 acres	Owner (private)	Existing ponds at headwater of Tributary D; buffer is mostly mowed turf grass	Design and implement project to extend green infrastructure by naturalizing the pond buffer and emergent areas	TN= 18 lbs/yr, TP = 5 lbs/yr, TSS = 2 tons/yr	High	Owner	Somers, Consultant	$22,000 to design, install prairie buffer and emergents; $2,000/year maintenance for 3 year establishment period	25 Years + (2039+)
50E	West of residential units along 48th Ct.	0.9 acres	Owner (private)	Existing wet bottom detention basin adjacent to oak woodland; some erosion at toe; slopes mowed turf grass	Design and implement project to extend green infrastructure by naturalizing the pond buffer and emergent areas	TN= 23 lbs/yr, TP = 7 lbs/yr, TSS = 2 tons/yr	High	Owner	Somers, Consultant	$9,500 to design, install prairie buffer and emergents; $2,000/year maintenance for 3 year establishment period	25 Years + (2039+)
WETLAND RESTORATION (see Figure 64)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
W16	South of County Line Road, West of 100th Ave and north of Co. Hwy A	27.7 acres	Owners (private)	27.7 acres of drained wetland on private agricultural land at headwaters of School Tributary draining approximately 288 acres; future land use not predicted to change, therefore site could potentially be a wetland mitigation bank opportunity	Design, permit, and implement wetland mitigation bank	TN= 138 lbs/yr, TP = 23 lbs/yr, TSS = 17 tons/yr	Critical Area	Owner, Somers	USACE, WDNR, Consultant	$415,500 to design/permit/install/maintain wetland; fair market value for purchase land if required	10-25 Years (2024-2039)
W17	South of Co. Hwy A, West of H and north of E	52.0 acres	Owners (private)	52.0 acres of drained weltand on private agricultural along Somers Branch Tributary A; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 203 lbs/yr, TP = 35 lbs/yr, TSS = 24 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$520,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W18	South of Co Hwy A and approximatey 300' west of railroad tracks	29.9 acres	Owners (private)	29.9 acres of drained weltand on private agricultural along Somers Branch Tributary A; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 117 lbs/yr, TP = 20 lbs/yr, TSS = 14 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$300,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W19	East of railroad tracks, south of Co Hwy A and west of Co Hwy Ea (72nd Ave)	39.8 acres	Owners (private)	39.8 acres of drained weltand on private agricultural along Somers Branch Tributary A; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 156 lbs/yr, TP = 27 lbs/yr, TSS = 18 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$400,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W23	West of railroad tracks and south of Lichter Road (18th St)	38.7 acres	Owners (private)	38.7 acres of drained weltand on private agricultural along South Branch Pike River; future land use predicted to be residential and open space	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 524 lbs/yr, TP = 120 lbs/yr, TSS = 83 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$580,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W24	East of railroad tracks and south of Lichter Road (18th St), north of 31st St	93.1 acres	Owners (private)	93.1 acres of drained weltand on private agricultural along South Branch Pike River; future land use predicted to be open space and industrial/business park	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=1,264 lbs/yr, TP = 291 lbs/yr, TSS = 202 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$930,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W25	West of Highway H and North of St Hwy 142	21.0 acres	Owners (private)	21.0 acres of drained weltand on private agricultural along South Branch Pike River; future land use predicted to be industrial/business park	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=284 lbs/yr, TP = 65 lbs/yr, TSS = 45 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$315,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
W28	West of railroad tracks, north of St Hwy 142 and outh of 31st St	74.9 acres	Owners (private)	74.9 acres of drained weltand on private agricultural along South Branch Pike River; future land use predicted to be open space and industrial/business park	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=1,018 lbs/yr, TP = 234 lbs/yr, TSS = 162 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$750,000 to design/permit/install/maintai n wetland	10-25 Years (2024-2039), or as development resumes
W29	On either side of railroad tracks south of St Hwy 142	27.0 acres	Owners (private), Kenosha	27.0 acres of drained weltand on private agricultural along South Branch Pike River; future land use predicted to be industrial	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=364 lbs/yr, TP = 83 lbs/yr, TSS = 58 tons/yr	Critical Area	Owner, Kenosha, Developer	USACE, WDNR, NRCS, WIN, Consultant	$405,000 to design/permit/install/maintai n wetland	10-25 Years (2024-2039), or as development resumes
W31	North of St Hwy K, south of Co Hwy 158 and adjacent to South Branch Pike River	40.6 acres	Owner (private)	40.6 acres of dreained weltand on private agricultural along South Branch Pike River; future land use predicted to be industrial	Incorporate wetland restoration into future development plans by using area as wetland detention	TN=550 lbs/yr, TP = 126 lbs/yr, TSS = 87 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$609,000 to design/permit/install/maintai n wetland	10-25 Years (2024-2039), or as development resumes
W26	Southwest of Lichter Rd and 100th Ave	24.5 acres	Owners (private)	24.5 acres of drained weltand on private agricultural land west of South Branch Pike River; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 120 lbs/yr, TP = 22 lbs/yr, TSS = 14 tons/yr	High	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$367,500 to design/permit/install/maintai n wetland	25 Years + (2039+), or as development resumes
W27	Northwest of the intersection of Co Hwy S and Co Hwy Ea	42.1 acres	Owners (private)	42.1 acres of drained weltand on private agricultural land west of South Branch Pike River; future land use predicted to be industrial	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 206 lbs/yr, TP = 37 lbs/yr, TSS = 25 tons/yr	High	Owner, Business	USACE, WDNR, NRCS, WIN, Consultant	$631,500 to design/permit/install/maintai n wetland	25 Years + (2039+), or as development resumes
RIPARIAN AREA & AGRICULTURAL SWALE RESTORATION & MAINTENANCE (see Figure 65)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will require the greatest assistance.											
PCST	Tributary to Pike River north of CountyTrunk Hwy A between County Trunk Hwy H and Pike River	25.0 acres	Owners (private)	25.0 degraded riparian acres along both banks of School Tributary (PCST)	Improve and expand buffer to 30 feet minimum in agricultural areas; restore degraded riparian area using a natural ecological restoration approach	TN= 23 lbs/yr, TP = 2 lbs/yr, TSS = 1 tons/yr	Critical Area	Owner, Farm	NRCS, Consultant, WIN, Somers	$75,000 to expand and restore buffer; $10,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)
PCTR	Tributary to South Branch Pike River from 100th Ave to County Trunk Hwy L	10.9 acres	Owners (private)	10.9 degraded riparian acres along both banks of South Branch Pike River Tributary R	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 11 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN, Somers	$33,000 to expand and restore buffer; $7,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PCTQ	Tributary to South Branch Pike River just south of intersection of County Trunk Hwy L and EA	6.4 acres	Owners (private)	6.4 degraded riparian acres along both banks of Pike River Tributary Q	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 6 lbs/yr, TP = 1 lbs/yr, TSS = 0 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN, Somers	$20,000 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PCSBA	Tributary to Somers Branch south of Co Hwy A between Co Hwy H and EA	8.7 acres	Owners (private)	8.7 degraded riparian acres along both banks of Somers Branch Tributary A	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 8 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN, Somers	$26,000 to expand and restore buffer; $5,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
PC03	South Branch Pike River from County Trunk Highway K north to Airport Branch	5.8 acres	Owners (private)	5.8 degraded riparian acres along both banks of South Branch Pike River Reach 3	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach; remove woodie invasives	TN= 6 lbs/yr, TP = 0 lbs/yr, TSS = 0 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN, Kenosha, Somers	$34,800 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
PC04	South Branch Pike River from just north of State Highway 158 at junction of Airport Branch, north to junction of South Branch Pike River and Somers Branch	27.6 acres	Somers, Owners (private)	27.6 degraded riparian acres along both banks of South Branch Pike River Reach 4	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 29 lbs/yr, TP = 3 lbs/yr, TSS = 2 tons/yr	High	Somers, Owner, Farm	NRCS, Consultant, WIN, Kenosha, Somers	$193,200 to expand and restore buffer; $10,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
60B	Agricultural swale from pond 59A to Airport Branch	9.6 acres	Owner (private)	9.6 acres of non-existent riparian area along agricultural swale	Improve and expand buffer to 30 feet minimum where possible; restore degraded riparian area using a natural ecological restoration approach	TN= 9 lbs/yr, TP = 1 lbs/yr, TSS = 1 tons/yr	High	Owner, Farm	NRCS, Consultant, WIN	$29,000 to expand and restore buffer; $5,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
AGRICULTURAL LAND MANAGEMENT (see Figure 66)											
Technical and Financial Assistance Needs: Technical assistance needed to implement agricultural land management projects is moderate while existing financial incentives need to be leveraged. Farmers renting from absentee landlords will require the greatest assistance.											
AG10	southeast of intersection of Kr County Line Rd and Co Hwy H	151.5 acres	Owner (Private)	151.5 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 647 lbs/yr, TP = 330 lbs/yr, TSS = 226 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG11	southwest of intersection of Kr County Line Rd and 72nd Ave	135.2 acres	Owner (Private)	135.2 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 577 lbs/yr, TP = 294 lbs/yr, TSS = 202 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG12	southwest of intersection of Kr County Line Rd and Canadian Pacific North Railway	74.3 acres	Owner (Private)	74.3 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 317 lbs/yr, TP = 162 lbs/yr, TSS = 111 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG13	southwest of intersection of Kr County Line Rd and 56th Ave	78.6 acres	Owner (Private)	78.6 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 336 lbs/yr, TP = 171 lbs/yr, TSS = 117 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG14	northeast of intersection of Co Hwy A and 100th Ave	84.3 acres	Owner (Private)	84.3 acres of privately owned cropland located at headwaters of School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 360 lbs/yr, TP = 184 lbs/yr, TSS = 126 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG15	northeast of intersection of Co Hwy A and 88th Ave	78.2 acres	Owner (Private)	78.2 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 334 lbs/yr, TP = 170 lbs/yr, TSS = 117 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG16	northwest of intersection of Co Hwy A and Canadian Pacific North Railway	74.4 acres	Owner (Private)	74.4 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 318 lbs/yr, TP = 162 lbs/yr, TSS = 111 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG17	northwest of intersection of Co Hwy A and EA	75.3 acres	Owner (Private)	75.3 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 321 lbs/yr, TP = 164 lbs/yr, TSS = 112 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG18	northeast of intersection of Co Hwy A and EA	99.5 acres	Owner (Private)	99.5 acres of privately owned cropland located along School Tributary	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 425 lbs/yr, TP = 217 lbs/yr, TSS = 149 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
AG19	southwest of intersection of Co Hwy A and H	98.5 acres	Owner (Private)	98.5 acres of privately owned cropland situated at headwaters of Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 428 lbs/yr, TP = 218 lbs/yr, TSS = 151 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG20	southwest of intersection of Co Hwy A and Canadian Pacific North Railway	77.7 acres	Owner (Private)	77.7 acres of privately owned cropland situated along Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 338 lbs/yr, TP = 172 lbs/yr, TSS = 119 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG21	southwest of intersection of Co Hwy A and 72nd Ave	154.7 acres	Owner (Private)	154.7 acres of privately owned cropland situated along Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 673 lbs/yr, TP = 343 lbs/yr, TSS = 236 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG22	off of Co Hwy EA, south of Co Hwy A	73.9 acres	Owner (Private)	73.9 acres of privately owned cropland situated along Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 322 lbs/yr, TP = 164 lbs/yr, TSS = 113 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG23	west of Union Pacific North Railway and north of Co Hwy E	89.4 acres	Owner (Private)	89.4 acres of privately owned cropland located east of the main stem of Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 479 lbs/yr, TP = 244 lbs/yr, TSS = 177 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG24	northeast of intersection of Co Hwy E and 100th Ave	140.3 acres	Owner (Private)	140.3 acres of privately owned cropland situated at headwaters of Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 611 lbs/yr, TP = 311 lbs/yr, TSS = 215 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG25	northwest of intersection of Co Hwy E and EA	77.5 acres	Owner (Private)	77.5 acres of privately owned cropland situated along Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 337 lbs/yr, TP = 172 lbs/yr, TSS = 118 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG26	northeast of intersection of Co Hwy E and EA	88.4 acres	Owner (Private)	88.4 acres of privately owned cropland situated along Somers Branch	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 385 lbs/yr, TP = 196 lbs/yr, TSS = 135 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG27	northeast of intersection of Lichter Rd and 100th Ave	75.6 acres	Owner (Private)	75.6 acres of privately owned cropland located at headwaters of South Branch Pike River Tributary R (PCTR)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 298 lbs/yr, TP = 152 lbs/yr, TSS = 102 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG28	northeast of intersection of Lichter Rd and Co Hwy H	74.8 acres	Owner (Private)	74.8 acres of privately owned cropland located along South Branch Pike River Tributary R (PCTR)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 295 lbs/yr, TP = 150 lbs/yr, TSS = 101 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG29	northwest of intersection of Lichter Rd and St Hwy 31	86.9 acres	Owner (Private)	86.9 acres of privately owned cropland located east of South Branch Pike River, near junction of South Branch Pike River Tributary S (PCTS)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 342 lbs/yr, TP = 174 lbs/yr, TSS = 117 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG30	southeast of intersection of Lichter Rd and Co Hwy H	77.4 acres	Owner (Private)	77.4 acres of privately owned cropland located at headwaters of South Branch Pike River Tributary Q (PCTQ)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 305 lbs/yr, TP = 155 lbs/yr, TSS = 104 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG31	southwest of intersection of Lichter Rd and Co Hwy EA	155.1 acres	Owner (Private)	155.1 acres of privately owned cropland located along South Branch Pike River Tributary Q (PCTQ)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 610 lbs/yr, TP = 311 lbs/yr, TSS = 209 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
AG32	southeast of intersection of Lichter Rd and Canadian Pacific North Railway	100.0 acres	Owner (Private)	100.0 acres of privately owned cropland located east of South Branch Pike River, near junction of South Branch Pike River Tributary Q (PCTQ)	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 394 lbs/yr, TP = 201 lbs/yr, TSS = 135 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG33	south of Lichter Rd and east of 100th Ave	80.3 acres	Owner (Private)	80.3 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 316 lbs/yr, TP = 161 lbs/yr, TSS = 108 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG34	west off of Co Hwy H, south of Lichter Rd	83.8 acres	Owner (Private)	83.8 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 330 lbs/yr, TP = 168 lbs/yr, TSS = 113 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG35	east off of Co Hwy H, south of Lichter Rd	117.7 acres	Owner (Private)	117.7 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 463 lbs/yr, TP = 236 lbs/yr, TSS = 159 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG36	east off of Co Hwy EA, south of Lichter Rd	79.6 acres	Owner (Private)	79.6 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 313 lbs/yr, TP = 160 lbs/yr, TSS = 107 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG37	south of Lichter Rd, between 72nd Ave and St Hwy 31	75.3 acres	Owner (Private)	75.3 acres of privately owned cropland located mostly east of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 297 lbs/yr, TP = 151 lbs/yr, TSS = 102 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG38	south of Lichter Rd and east of 100th Ave	74.4 acres	Owner (Private)	74.4 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 293 lbs/yr, TP = 149 lbs/yr, TSS = 100 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG39	northeast of intersection of Co Hwy H and S	189.9 acres	Owner (Private)	189.9 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 748 lbs/yr, TP = 381 lbs/yr, TSS = 256 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG40	east off of Co Hwy EA, south of Lichter Rd	108.0 acres	Owner (Private)	108.0 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 425 lbs/yr, TP = 217 lbs/yr, TSS = 146 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG41	northwest of intersection Co Hwy S and EA	73.9 acres	Owner (Private)	73.9 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 291 lbs/yr, TP = 148 lbs/yr, TSS = 100 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG42	northeast of intersection Co Hwy S and EA	96.1 acres	Owner (Private)	96.1 acres of privately owned cropland located east of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 378 lbs/yr, TP = 193 lbs/yr, TSS = 130 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG43	southeast of intersection Co Hwy S and H	148.2 acres	Owner (Private)	148.2 acres of privately owned cropland located west of South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 583 lbs/yr, TP = 297 lbs/yr, TSS = 200 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
AG45	north off of Co Hwy K and west of Canadian Pacific North Railway	105.2 acres	Owner (Private)	105.2 acres of privately owned cropland located along South Branch Pike River	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 414 lbs/yr, TP = 211 lbs/yr, TSS = 142 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
PRIORITY GREEN INFRASTRUCTURE PROTECTION AREAS (see Figure 72)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to acquire open space or implement conservation design is high because of land, design/permitting, and construction costs.											
GI08	between KR County Line Rd and 7th St and from the western watershed border and South Branch Pike River	802 acres	Owner (Private)	802 acres (9 parcels) of private cropland within Green Infrastructure Network along School Tributary; future land use predicted to change to more intense land uses	Incorporate Conservation Design standards into future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers	10% less than traditional*	When development resumes
GI09	south of 7th St from the western watershed border and South Branch Pike River	668.9 acres	Owner (Private)	668.9 acres (13 parcels) of private cropland within Green Infrastructure Network along Somers Branch; future land use predicted to change to more intense land uses	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers	10% less than traditional*	When development resumes
GI10	southeast of intersection of 7th St and of Canadian Pacific North Railway	40.4 acres	Owner (Private)	40.4 acres of private cropland immediately west of Hawthorn Hollow	Acquire, naturalize, and protect parcel as natural area/open space	Pollutant reduction cannot be assessed via modeling	Critical Area	Owner, Hawthorn Hollow	Consultant, WDNR, Somers	Not Applicable	When parcel(s) become available for purchase
GI11	northeast of intersection of 7th St and 13th Ave	11.3 acres	Owner (Private)	11.3 acres of private land owned by the HoChunk Nation within the Green Infrastructure Network	Acquire (in process of being acquired and will be doing a wetland restoration and naturalize and and recreational trails etc)	Pollutant reduction cannot be assessed via modeling	High	Owner, Somers	Consultant, USACE, WDNR, Somers	Not Applicable	When parcel(s) become available for purchase
GI12	west of Union Pacific North Railway and north of Co Hwy E	255.4 acres	Owner (Private)	4 agricultural parcels to the east of the main branch of Pike River between County Highways A and E	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	Owner, Somers	Consultant, USACE, WDNR, Somers	Not Applicable	When parcel(s) become available for purchase
GI13	just north of intersection of Co Hwy E and 80th Ave	7.9 acres	Somers	Neumiller Woods - 7.9 acre site within the Green Infrastructure Network recently acquired by the Town of Somers	Naturalize and protect parcel as natural area/open space	Pollutant reduction cannot be assessed via modeling	High	Somers	Consultant, WDNR, Parks	Not Applicable	When parcel(s) become available for purchase
GI14	just northeast of intersection of Co Hwy E and 80th Ave	23.9 acres	Somers	Gitzlaff - 23.9 acre site within the Green Infrastructure Network recently acquired by the Town of Somers	Naturalize and protect parcel as natural area/open space	Pollutant reduction cannot be assessed via modeling	High	Somers	Consultant, WDNR, Parks	Not Applicable	When parcel(s) become available for purchase
GI15	roughly along Lichter Rd between the western watershed border and South Branch Pike River	669.7 acres	Owner (Private)	669.7 acres (13 parcels) of private cropland within Green Infrastructure Network along PCTR & PCTQ west of Cty Hwy EA; future land use predicted to change to more intense land uses	Incorporate Conservation Design standards into future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers	10% less than traditional*	When development resumes
GI116	east of South Branch Pike River between Lichter Rd and Co Hwy S	431.7 acres	Owner (Private)	431.7 acres (7 parcels) of private cropland within Green Infrastructure Network along South Branch between 18th St & Cty Hwy S; future land use predicted to change to more intense uses	Incorporate Conservation Design standards into future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers	10% less than traditional*	When development resumes
GI17	east of Kenosha Regional Airport and west of South Branch Pike River between Co Hwy S and K	532.1 acres	Owner (Private)	532.1 acres (7 parcels) of private cropland within Green Infrastructure Network along South Branch Pike River south of Cty Hwy S; future land use predicted to change to more intense land uses	Incorporate Conservation Design standards into future development plans	Pollutant reduction cannot be assessed via modeling	Critical Area	Developer	Consultant, WDNR, Somers, Kenosha	10% less than traditional*	When development resumes

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
OTHER MANAGEMENT MEASURES (see Figure 67)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
42I	southwest of Co Hwy A and St Hwy 31 (just north of Hawthorn Hollow)	11.0 acres	Owner (private)	Remnant but degraded oak savanna with abundance of young sugar maple	Restore savanna community by removing young maples and seeding understory	N/A	High	Owner	Consultant	$66,000 to remove invasive trees; $16,500 for seeding	1-10 Years (2014-2024)
41C	north of Co Hwy E at end of 10th Pl	3.4 acres	Owner (private)	Existing wetland in agricultural field that is draining adjacent non-sewered subdivision	Manage existing wetland and install buffer	TN= 26 lbs/yr, TP = 5 lbs/yr, TSS = 4 tons/yr	High	Owner	NRCS, Consultant	$10,000 to expand and restore buffer; $3,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)

STURTEVANT

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN & POND RETROFITS & MAINTENANCE (see Figure 63)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will require the greatest assistance.											
20C, 20D	South of residential units on Westminster Drive and North of Broadway	5.1 total acres	Sturtevant	Two existing wet bottom detention basins in Kirkoria Nature Preserve in Sturtevant; basin 20C is buffered by turf grass; basin 20D buffered by unkept turf/old field vegetation	Design and implement project to install a native prairie vegetation buffer, install native emergent plants along shoreline, and maintain for three years to establish	TN= 257 lbs/yr, TP = 63 lbs/yr, TSS = 36 tons/yr	Critical Area	Parks, Sturtevant	Consultant	$42,300 to design & install prairie buffer & emergent plants; $3,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)
28B	South of residential units on Majestic Hills Drive and West of Willow Road	0.9 acres	Sturtevant	Existing wet bottom detention basin adjacent to Chicory Creek servicing large residential area; most of buffer is unkept turf grass with heavy willow sprouting	Design and implement project to install a native prairie vegetation buffer, and maintain for three years to establish	TN= 45 lbs/yr, TP = 11 lbs/yr, TSS = 6 tons/yr	Critical Area	Sturtevant	Consultant	$4,200 to design & install prairie buffer & emergent plants; $2,000/year maintenance for 3 year establishment period	25 Years + (2039+)
11F	Adjacent to Industrial Building on Enterprise Drive	1.0 acres	Business (private)	Existing wet bottom detention basin, mowed turf grass and bare dirt to edges	Design and implement project to install a native prairie vegetation buffer and plant emegents along shoreline, and maintain for three years to establish	TN= 84 lbs/yr, TP = 20 lbs/yr, TSS = 14 tons/yr	High	Business	Sturtevant, Consultant	$9,500 to design & install prairie buffer & emergent plants; $2,000/year maintenance for 3 year establishment period	10-25 Years (2024-2039)
WETLAND RESTORATION (see Figure 64)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
W07	East of Co Rd H and South of State Hwy 11	21.3 acres	Owners (private)	21.3 acres of drained wetland on private agricultural land at headwaters of Chicory Creek; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 187 lbs/yr, TP = 33 lbs/yr, TSS = 22 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$320,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W09	Northwest of the interstection of Braun Road and 90th St	60.9 acres	Owners (private)	60.9 acres of drained wetland on private agricultural along Chicory Creek; future land use predicted to be residential	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 526 lbs/yr, TP = 94 lbs/yr, TSS = 61 tons/yr	Critical Area	Owner, Developer	USACE, WDNR, NRCS, WIN, Consultant	$610,000 to design/permit/install/maintain wetland	10-25 Years (2024-2039), or as development resumes
W04	Northwest corner of Willow Rd and Durand Avenue	26.6 acres	SC Johnson, WE Energies	26.6 acres of drained wetland along Waxdale Creek, draining approximately 52 acres; future land use predicted to be commercial/retail	Incorporate wetland restoration into future development plans by using area as wetland detention	TN= 35 lbs/yr, TP = 7 lbs/yr, 5 tons/yr	High	SC Johnson, WE Energies	USACE, WDNR, NRCS, WIN, Consultant	$400,000 to design/permit/install/maintain wetland	25 Years + (2039+), or as development resumes
RIPARIAN AREA & AGRICULTURAL SWALE RESTORATION & MAINTENANCE (see Figure 65)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will require the greatest assistance.											
PRWC	Tributary to North Branch just north of State Highway 11	15.7 acres	Owners (private), Mount Pleasant, Sturtevant, SC Johnson	15.7 degraded riparian acres along both banks of Waxdale Creek (PRWC)	Remove invasive shrubs and trees from existing buffer; restore degraded riparian area using a natural ecological restoration approach	TN= 13 lbs/yr, TP = 2 lbs/yr, TSS = 1 tons/yr	Critical Area	Owner, MP, Sturtevant	NRCS, Consultant	$125,600 to install and restore buffer; $7,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)
PRCC	Tributary to North Branch north of Braun Road	15.6 acres	Owners (private), Sturtevant	15.6 degraded riparian acres along both banks of Chicory Creek (PRCC)	Improve and expand buffer to 30 feet minimum in agricultural areas; restore degraded riparian area using a natural ecological restoration approach	TN= 22 lbs/yr, TP = 3 lbs/yr, 1 tons/yr	Critical Area	Owner, Farm, HOA	NRCS, Consultant, WIN, Sturtevant, MP	$46,800 to expand and restore buffer; $7,000/year maintenance for 3 year establishment period	1-10 Years (2014-2024)

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
AGRICULTURAL LAND MANAGEMENT (see Figure 66)											
Technical and Financial Assistance Needs: Technical assistance needed to implement agricultural land management projects is moderate while existing financial incentives need to be leveraged. Farmers renting from absentee landlords will require the greatest assistance.											
AG02	northwest of intersection of Braun Rd and 90th St	89.0 acres	Owner (Private)	89.0 acres of privately owned cropland located along Chicory Creek	Utilize no-till soil conservation practice and install agricultural filter strips on private cropland	TN= 453 lbs/yr, TP = 231 lbs/yr, TSS = 166 tons/yr	Critical Area	Owner, Farm	NRCS, WIN	Not Applicable	25 Years + (2039+)
PRIORITY GREEN INFRASTRUCTURE PROTECTION AREAS (see Figure 72)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to acquire open space or implement conservation design is high because of land, design/permitting, and construction costs.											
GI04	northeast of intersection of 105th St and Braun Rd	127.4 acres	Owner (Private)	127.4 acres (5 parcels) of private cropland in unprotected Green Infrastructure Network	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	Owner, Sturtevant, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase
GI05	northwest of intersection of 90th St and Braun Rd	91.7 acres	Owner (Private)	91.7 acres of private cropland in unprotected Green Infrastructure Network	Acquire, naturalize, and protect parcel as natural area/open space or incorporate conservation design standards in future development plans	Pollutant reduction cannot be assessed via modeling	High	Owner, Sturtevant, Parks	WIN, Consultant, WDNR	Not Applicable	When parcel(s) become available for purchase

8.3 Green Infrastructure Plan Recommendations

Green Infrastructure Network

Green Infrastructure is the natural or open space links within and surrounding the built environment and typically has multiple functions. Green infrastructure is most commonly defined as a structure of interconnected greenways (trails, stream corridors) and green hubs (forests, farms, parks) located throughout a region to protect wildlife diversity, ecological processes, air and water quality and recreation opportunities (Benedict and McMahon 2002, 2006) The benefits of a good Green Infrastructure network cannot be undervalued. Integrating stormwater systems into the built environment allows water quantity and quality to be improved. Stormwater from urbanized areas is released into nearby green parcels to be stored, infiltrated, cooled and used by plants for evapotranspiration as water moves downstream to tributaries and stream corridors. The closer and more integrated green infrastructure can be with built areas, the less negative impact the urban areas will have on water quality, flashy flooding in nearby tributaries and stream health. The larger in width that this structure has within stream corridors, the more functionality they will have for wildlife, ecology, water quality and recreation. SEWRPC recommends that stream buffers be 75 feet from the top of each stream bank (SEWRPC, 2007), but describes that in order to achieve maximum ecological diversity buffers should be larger in width (SEWRPC, 2010).

Improving green infrastructure - rain garden at Gateway Technical College in Racine. Source: Root-Pike WIN.

Open space and greenway planning were terms used for Green Infrastructure planning prior to the late 1990's. As this type of planning started to integrate ecological and stormwater infrastructure, it was renamed Green Infrastructure. There are many benefits associated with this type of planning and design, including ecological, social and financial benefits. Many studies have been and are being conducted documenting these benefits including increased property values associated with greenspace, reduced costs for stormwater infrastructure and maintenance of these facilities in Green Infrastructure, direct use value in recreational trails and tourism and indirect economic value in goods associated with using Green Infrastructure.

The Green Infrastructure Network for Pike River watershed was created using the inventory and analysis outlined in the Open Space Planning Chapter. The network was created using prioritized open space overlain with all High Priority and most Medium Priority parcels. As discussed in the

Open Space Chapter, parcels were given points associated with different criteria such as parcels within a flood plain, parcels within SEWRPC environmental corridors or within a certain distance to open water (the full criteria list can be found in Chapter 3). The open space parcel prioritization assigned parcels with high point values (6-9), high priority and those with point values of 4-5 a medium priority and the remainder low priority. All high and most medium priority parcels were included in the Green Infrastructure network. Additionally, low Priority and many developed parcels were also included if they provided links, expanded existing green infrastructure, or were simply large isolated sites with possible environmental importance. It is also important to note that the Green Infrastructure Network includes nearly all SEWRPC identified primary and secondary environmental corridors. SEWRPC primary environmental corridors are at least 200 acres, 2 miles in length and 200 feet wide; secondary corridors are 100 acres, 1 mile in length and 100 feet wide. County and region wide green infrastructure plans generally focus on natural features such as stream corridors, wetlands, floodplain, buffers, and other natural components. The Green Infrastructure Network created for Pike River watershed captures all the natural components aforementioned and other green infrastructure such as recreational parks, large residential lots, schools, and golf courses at the parcel level. Parcel level green infrastructure planning is important because land purchases, acquisitions, and land use changes almost always occur at the parcel level.

Perhaps the most important aspect of green infrastructure planning is that it helps communities identify and prioritize conservation opportunities and plan development in ways that optimize the use of land to meet the needs of people and nature (Benedict, 2006). This is of particular importance in the Pike River watershed due to the rapid development that occurred prior in the late 1990's and early 2000's and the development outlined in the 2035 Comprehensive plans for Kenosha and Racine Counties. Green infrastructure provides a framework for both conservation areas and potential areas for development. Green infrastructure planning provides a framework for future growth that identifies areas not suitable for development, areas suitable for development but that should incorporate conservation design standards, and areas that do not affect green infrastructure.

Green Infrastructure Network *implementation* has several actions:

- Protect specific unprotected green infrastructure parcels through acquisition, regulation, and/or incentives.
- Incorporate conservation design standards on green infrastructure parcels where development is planned.
- Limit future subdivision or building of smaller green infrastructure parcels.
- Implement long term management of green infrastructure.

The existing Green Infrastructure Network for Pike River watershed is shown on Figure 28, in Section 3.2. The network is a system of *Hubs*, *Links*, and *Sites,* as schematically seen in Figure 68. Hubs generally consist of the largest and least fragmented areas. Hubs typically promote biodiversity, carbon and other air pollutant sequestration, water infiltration and urban forestry. (Benedict, 2006) Areas of the watershed such as The University of Wisconsin-Parkside and Petrifying Springs Park that are currently owned by state or local governments/park district and other school campuses are considered hubs. Links are generally formed by smaller private/unprotected parcels around Pike River and its tributaries. These links are extremely important because they help protect water quality and provide biological and recreational conduits between hubs. However, most of the linking parcels are not ideal green infrastructure until residents embrace the idea of naturalizing streambank, wetlands, floodplains and shoreline property. Some

sites may not be connected to the larger green infrastructure network but can still provide important water quality, ecological and social values. Some of the recreational parks in the watershed serve this purpose while many others do not and therefore are not included in the network. Any open space within more urban portion of the Direct Drainage area was mapped as green infrastructure due to the limited open space available.

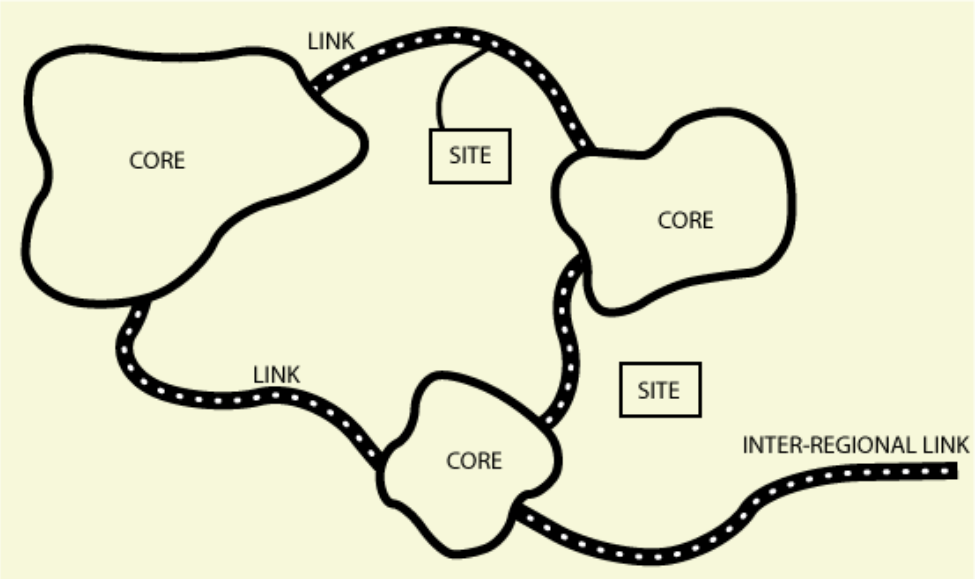


Figure 68: Green Infrastructure Design. Source: Green Infrastructure Center, 2009.

"Other Green Infrastructure" was mapped that provided connections or links in the watershed, or are larger outlining parcels that don't provide a connection to the network. One of the most important aspects of this other green infrastructure network that does not necessary fall into the outlined planning process is the shoreline of Lake Michigan, especially the large frontage located in the Direct Drainage area. There are few parks along the lakefront outside of the City of Racine. The immediate shoreline is almost solely privately owned, increasing public access to Lake Michigan should be a high priority to enhance the biological connection with the upland portions of the watershed, providing spaces for water quality improvements prior to water out-letting to the lake and public access. Additional connections to Lake Michigan within the Direct Drainage were considered.

Most of the green infrastructure parcels that may become available for purchase in the future are located in the central and western portion of the watershed and will likely be developed. Parcels or hydrologically or environmentally sensitive portions of the parcels within these green infrastructure network or adjacent to existing protected corridors may be better utilized as protected natural open space via several potential tools; 1) acquisition, 2) regulation, 3) incentives, and/or conservation development. The simplest form of acquisition is through outright purchase or donation of land but can also occur through conservation easements and land trusts. Protection of land through state and federal regulation covers natural features such as wetlands or threatened and endangered species/important habitat. Local regulation protection occurs by enforcing stormwater, zoning, comprehensive plans, and subdivision ordinances. Regulatory action can also come in the form of Special Service Area assessments and Development Impact Fees. Land protection through incentives usually occurs on smaller private lands. Some incentives include landowner recognition, tax incentives, or benefits for farms through a Conservation Reserve Program. A more detailed list of the tools and methods for protecting green infrastructure are included in Table 43.

Table 43. Tools for protection of green infrastructure.

Tool	Method of Implementation
Land Acquisition	Outright purchase Conservation easements Land donations Land trusts
Regulation	Buffer or landscape ordinance Comprehensive plans Development Impact Fee Mitigation and mitigation banking Special Service Area taxes Stormwater regulations Subdivision ordinances Zoning Wetland permitting T&E species and habitats
Incentives	Management agreements Landowner recognition and rewards Tax incentives Technical assistance from local agencies Natural Resource Conservation Service (NRCS) Program incentives

Source: Benedict, 2006.

It is important to note that a Green Infrastructure plan is strongest when it functions holistically, as a network. It is a network just as our vehicular transportation systems are connected, green infrastructure should be connected. Therefore, a Green Infrastructure Network can only be realized by coordinated planning efforts of local municipalities, park districts, developers, and private land owners. Elmwood Park, Kenosha, Mount Pleasant, Pleasant Prairie, Racine, Somers, and Sturtevant should follow the recommended process below to initiate and implement the Green Infrastructure Network for Pike River watershed.

1) Identify and designate a lead Pike River watershed stakeholder to serve as a "coordinator" and meet with other stakeholders to plan for future green infrastructure.
2) Include all green infrastructure parcels in updated community comprehensive plans and development review maps.
3) Create zoning overlay and update development ordinances to require conservation development design on all green infrastructure parcels.
4) Require Development Impact Fees and/or Special Service Area taxes for all new development and redevelopment to help fund future management of green infrastructure.
5) Identify important unprotected green infrastructure parcels not suited for development then protect and implement long term management.
6) Work with private land owners along Pike River stream/tributary corridors to manage their land for green infrastructure benefits.
7) Identify new trails and trail connections within the Green Infrastructure Network.

Green Infrastructure Priority Protection Areas

Green Infrastructure Priority Protection Areas are best described as large unprotected parcels of land that are currently undeveloped with no plans for future development or similar parcels where future development is planned. The significance is that these parcels are situated in environmentally sensitive or important green infrastructure areas where acquiring, protecting, and restoring or developing in keeping with Conservation Design standards would be most beneficial for enhancing water quality. Information obtained from the watershed characteristics inventory, existing and predicted future land use data (Sections 4.1 and 4.2), and green infrastructure sections (Section 3.2) of this report led to identification of seventeen Green Infrastructure Priority Protection Areas totaling 3,343.3 acres.

Green Infrastructure Protection Areas 1 through 7 and 10 through 12 are areas that should be acquired and restored to natural vegetation in order to augment and protect the Green Infrastructure Network and represent a total of 207.1 acres. Green Infrastructure Protection Area 11 is already in the process of being acquired by Somers and plans to protect and naturalize the site are underway. Green Infrastructure Network areas 13-14, Neumiller Woods and Gitzlaff respectively, represent areas already owned by Somers and are in the process of being naturalized and protected, representing 31.8 acres. Green Infrastructure Protection Areas 8, 9 and 15 through 17 are larger corridors of land that are currently under agricultural production, but are slated for more intense land uses and future development; they represent a total of 3,104.4 acres. Conservation Design standards are recommended for five of the Green Infrastructure Protection Areas, however if possible, area 9 could be purchased and restored. This area is on the Somers branch and feeds directly into the area of the Pike that is critical.

Figure 69: Aerial view of Green Infrastructure Priority Protection Area 8. Source: Google Earth, 2012.

Figure 72 shows the location of all Priority Green Infrastructure Protection Areas by site ID# while action recommendations for each location are included in the Site-Specific Management Measures Action Plan Table, Table 40. All five sites are considered "Critical Areas". Cost estimates and schedules for implementing recommendations for these areas is not included due to the difficulty in determining how or if each site will be acquired or developed. In addition, pollutant reduction estimates cannot be determined for these areas.

Figure 70: Aerial view of Green Infrastructure Priority Area 9. Source: Google Earth, 2012. Note adjacency of existing development and flow to wooded, sinuous area of South Branch to the East.

Figure 71: Aerial view of Green Infrastructure Priority Area 10. Source: Google Earth, 2012. Note adjacency of existing development to the north and a channelized section of South Branch to the East.

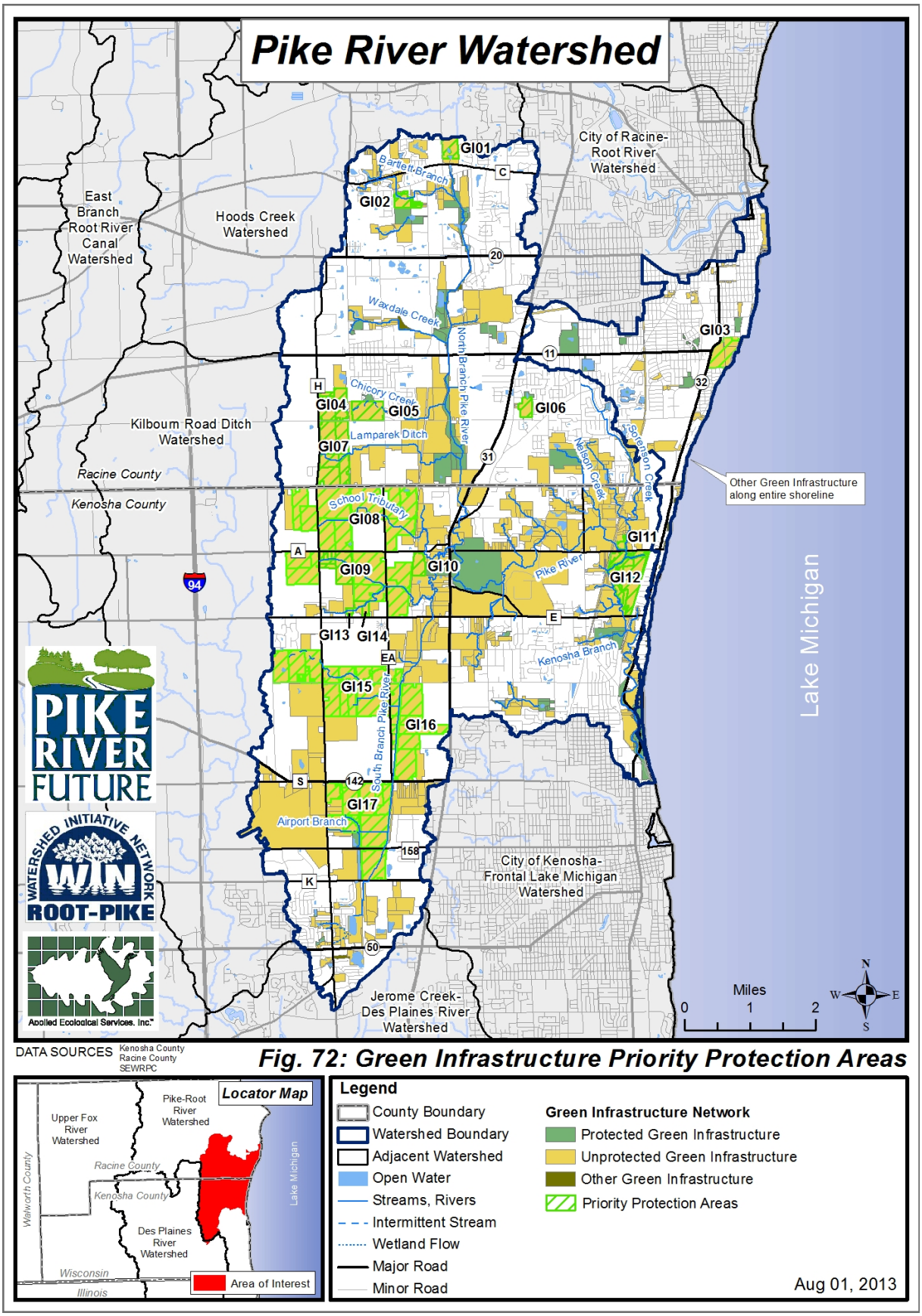


Fig. 72: Green Infrastructure Priority Protection Areas

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