9 Goals and Objectives

Successful implementation of a watershed management plan is more likely to occur when the objectives are based on clearly defined goals. Goals can represent a long-term vision and also serve as guideposts established to keep everyone moving in the same direction and assess progress. Objectives are more specific actions that need to occur to achieve the stated goal. The goals and objectives for the PPRW address both water quality concerns and desired uses.

Successful implementation of a watershed management plan is more likely to occur when the objectives are based on clearly defined goals.

9.1 Goals for Designated Uses

The following two goals are related to restoring and protecting the designated uses of water bodies in the PPRW. Objectives for these goals are listed in the Action Plan (Table 16) as tasks to be implemented.

1. Prevent or reduce pollutants threatening or impairing water quality by sufficiently preserving or managing protection areas to meet designated uses.

2. Reduce pollutants threatening or impairing water quality in agricultural and urban management areas to meet designated uses.

9.2 Goals for Desired Uses

In addition to the Designated Uses established by state and federal water quality programs, stakeholders identified several Desired Uses for the PPRW. Desired uses are based on factors important to the watershed community. Desired uses may or may not have a direct impact on water quality. Table 15 lists the Desired Uses identified through public meetings, surveys and discussions with watershed stakeholders. The desired uses listed in Table 15 all have a direct or indirect impact on water quality.

Table 15. Paw Paw River Watershed Desired Uses

PPRW Desired Use	General Definition
Coordinated development	Promote and achieve the environmental and economic benefits of planned communities through coordinated land use planning and low impact development
Intact habitat for native and aquatic and terrestrial wildlife	Protect and enhance the habitats on which indigenous, threatened, and endangered species depend
Open Space and Agricultural Land	Develop a green infrastructure network consisting of natural, open and working lands to maintain a viable farming economy, maintain the rural character of communities, and maintain the natural ecosystem functions provided by woodlands, wetlands, and other natural areas
Groundwater Resources Protection	Protect groundwater recharge and wellhead areas from contamination and overdrafting

PPRW Desired Use	General Definition
Appropriate recreational use and infrastructure	Establish water and non-motorized trails on or along appropriate sections of the Paw Paw River and its tributaries where desired and feasible while protecting natural features
Watershed monitoring efforts	Continue and increase monitoring efforts to better understand issues in the PPRW and to create baselines for future reference
Watershed Organization	Develop an organization to coordinate implementation of the watershed management plan

The following goals were developed to address the desired uses identified by stakeholders. Objectives for these goals are listed below.

1. Coordinated land use planning in the PPRW.

- Review local plans, ordinances and regulations addressing stormwater management, non-point source pollution and related water quality and natural resource issues
- Promote uniform set back requirements along lakes, streams, rivers and wetlands
- Develop model language for development standards and ordinances
- Develop resource maps for planning officials
- Gain local commitments to consider the watershed context in planning efforts and to recognize stormwater planning early in site planning and evaluation
- Conduct technical workshops and provide technical assistance throughout the watershed regarding the importance of coordinated watershed and land use planning
- Develop a communication plan targeting mayors, city managers, county administrators, governing bodies, planning commissioners, community development corporations, and neighborhoods about the importance of watershed and land use planning

2. Protected habitat for native aquatic and terrestrial wildlife

- Build support to include the Paw Paw River in Michigan's Natural Rivers Program
- Develop a community supported green infrastructure vision for the PPRW that includes natural and working lands
- Assist conservation organizations, local governments and landowners to preserve and manage wildlife habitat
- Minimize modification of sensitive habitat areas such as stream corridors
- Conduct on the ground habitat evaluations in high priority protection areas and in high quality water bodies

3. Protected groundwater resources

- Develop and implement community well head protection programs
- Continue to close abandoned wells

- Determine current and future amount of groundwater withdrawal and its potential impacts
- Develop strategies to prevent increased impervious surfaces in high recharge areas and to restore areas with high recharge potential, as appropriate

4. Improved recreation infrastructure along river while respecting natural features

- Encourage coordinated recreation planning that promotes sustainable uses of natural resources and protects the unique natural features of PPRW communities
- Incorporate bank stabilization efforts and BMPs at access sites to minimize the impact of foot traffic and erosion
- Educate private and commercial river users on the proper management of woody debris to improve navigability without impacting fish habitat or hydrology
- Build and maintain a trail/boardwalk system along appropriate sections of the river
- Remove litter and trash along banks
- Educate boaters about limiting the movement of invasive species

5. Continued/increased watershed monitoring efforts

- Partner with Drain Commissioners, MDEQ, MDNR, tribal and federal agencies to develop and implement a monitoring strategy to examine the current quality of the river as well as to monitor changes over time
- Coordinate volunteer road/stream crossing riparian surveys to assess current conditions and monitor changes over time as well identify problem sites
- Develop a program for testing of private drinking water wells
- Encourage monitoring and potential regulation of commercial groundwater withdrawals

6. A sustainable organization to coordinate and implement the watershed management plan and to instill a sense of stewardship

- Partner with the Black River Watershed to build an organization for coordinating and implementing watershed efforts
- Identify a funding strategy that includes membership, governmental units, foundations and business support
- Hire staff to secure funding and implement the watershed management plan
- Develop a work plan for the organization

10 Implementation Strategies

This chapter provides a management strategy to protect and improve water quality in the PPRW. The management strategy prioritizes tasks to be implemented, identifies specific problem sites and lays out a detailed action plan for implementation. The strategy also includes an information and education plan and describes current efforts.

10.1 Action Plan by Priority Area

Table 16 is a detailed action plan with structural, vegetative and managerial tasks, which address priority pollutants and their sources. This action plan should serve as a starting point for effective implementation. The items in the action plan should be reviewed annually and updated as conditions change in the watershed.

Table 16 is divided into three priority areas (protection, agricultural and urban) and specific sites, which are detailed later in this chapter and identified in Figure 26. For each priority area, specific tasks are listed. Each task addresses specific pollutants and sources as indicated. Since resources will probably not be available to implement all of the tasks at once, Table 16 provides a suggested timeframe for beginning implementation of each task. The implementation timeframe was based on the ranking of pollutants and sources for each priority area in Chapter 8. Prioritizing the tasks will allow resources to be allocated to the tasks that address the most important pollutants and sources first. The timeframe may be changed if resources or opportunities become available for earlier implementation. Table 16 also provides a cost estimate for each task and identifies the potential lead agency or individuals that need to take action. Potential partners, funding sources and programs are listed, which could assist with task implementation. Lastly, milestones and proposed evaluation methods are listed for each task.

Below is a list of structural, vegetative and managerial tasks to be implemented in the PPRW by priority area. The priority areas are meant to target implementation efforts where the most benefit can be achieved. However, implementing these tasks in other parts of the watershed may be necessary to achieve long-term water quality improvement and protection. The priority areas are based on the watershed protection and management area maps described in Chapter 8 (Figures 23-25).

<u>Protection Area Tasks</u>

The following tasks should be focused in the high and medium priority protection areas as indicated in Figure 23.

Tasks to begin within 1-5 years:

- Enact/improve water quality protection related ordinances (see Chapter 4.3 of this plan for recommendations on ordinances)
- Protect wetlands (see Landscape Level Wetland Functional Assessment report to determine priority sites for protection)
- Enact ordinances protecting riparian buffers
- Develop and enact design and maintenance standards for road stream crossings

- Enact a septic system time of sale inspection ordinance
- Identify and correct problem road/stream crossing sites (see Figure 26)

Tasks to begin within 6-10 years:

- Protect sensitive lands (see Figure 20 for further refinement of priority lands by quarter-quarter section)
- Improve soil erosion and sedimentation practices and regulations (building construction site practices and regulations)

Tasks to begin within 11-15 years:

- Improve zoning maps to locate high density or intensive uses in appropriate areas
- Identify and correct failing septic systems

Agricultural Area Tasks

The following tasks should be focused in the high and medium priority agricultural management areas as indicated in Figure 24.

Tasks to begin within 1-5 years:

- Utilize alternative drain maintenance/ construction techniques (such as two stage ditch design, natural river restoration techniques - j-hooks, cross vanes, etc)
- Restore riparian buffers and stabilize eroding streambanks
- Restore wetlands (see Landscape Level Wetland Functional Assessment to determine priority sites for restoration)
- Prevent/limit livestock access (fencing, crossings structures, alternative water sources) (see Figure 26)
- Install agricultural BMPs (filter strips, no-till, cover crops, grassed waterways, etc)
- Protect wetlands (see Landscape Level Wetland Functional Assessment report rto determine priority sites for protection)
- Expand disposal options for agricultural chemicals

Tasks to begin within 6-10 years:

- Develop and implement manure management plans

Tasks to begin within 11-15 years:

- Utilize soil testing to determine appropriate application rates for fertilizers and pesticides
- Utilize integrated pest management
- Construct secondary containment facilities for chemical/fuel handling areas
- Improve and/or enforce septage waste disposal regulations

Urban Area Tasks

The following tasks should be focused in the high and medium priority urban management areas as indicated in Figure 25.

Tasks to begin within 1-5 years:

- Utilize stormwater best management practices (road/parking lot sweeping, stormceptors, rain gardens, constructed wetlands, vegetated swales, etc)
- Enact stormwater and post construction control ordinances (see Low Impact Development for Michigan: A Design Guide for Implementers and Reviewers at

www.swmpc.org/downloads/lidmanual.pdf or see model stormwater ordinance at www.swmpc.org/ordinances.asp)

- Identify and correct illicit connections or discharges to stormwater system
- Utilize best management practices for road maintenance (such as alternative de-icing methods)
- Enact a phosphorus lawn fertilizer ban

Tasks to begin within 6-10 years:

- Increase or expand household hazardous waste disposal options
- Distribute spill kits

Tasks to begin within 11-15 years:

- Properly maintain and design municipal sewer system infrastructure

10.2 Information and Education

The structural, vegetative and managerial tasks listed in the action plan (Table 16) are voluntary. Therefore, individuals, before they are motivated to action, will need to understand the watershed concerns and how their actions can play a role in protecting water quality. An Information and Education (I&E) plan was developed to offer a strategy for informing and motivating responsible parties to implement the tasks listed Table 16. The I&E plan provides goals and outlines the relationship between target audiences, watershed issues and outreach activities. The I&E plan was developed in cooperation with the Black River Watershed Project because both watersheds have similar issues. The benefits of partnering and sharing resources are clear with outreach activities. The Black and Paw Paw River Watershed Information and Education Plan can be found in Appendix 10.

10.3 Planning and Studies

In some areas, further study and investigation, as well as subwatershed planning may be needed before more specific recommendations can be made. For example, hydro geomorphology studies in the Ox Creek, West Branch/Eagle Lake Drain and Branch/Derby Drain subwatersheds would provide specific direction as to which BMPs would be best suited to improve water quality and hydrology problems in these water bodies. In the North and East Branch subwatersheds, an on the ground habitat evaluation of the land and waterbodies would be beneficial for targeting protection efforts.

Wetland restoration and protection activities are listed for both protection and agricultural management areas, therefore the implementation of these tasks could have a substantial effect on the long-term improvement and protection of water quality in the watershed. A targeted wetland restoration and protection project based on the Landscape Level Wetland Functional Assessment in conjunction with an educational campaign to landowners and municipal officials would be extremely helpful in advancing the wetland related tasks in the action plan. A few demonstration projects would be beneficial even in lower priority areas, because there has not been much wetland restoration work in the watershed.

10.4 Current Efforts

There are several opportunities to coordinate with and build upon existing local programs and projects. Below is a description of some key local initiatives that have developed during the planning phase of the PPRW project. Information on several other organizations and agencies working to improve and protect water quality in the PPRW can be found in Appendix 11.

The Southwest Michigan Land Conservancy and The Nature Conservancy are coordinating protection efforts in the headwaters and along the mainstem. Sarett Nature Center is continuing to purchase lands along the mainstem and Blue Creek in the Benton Harbor area. After conducting a study to determine priority sources of sediment and nutrients, the Paw Paw Lake Foundation is working to develop implementation strategies. The Village of Paw Paw in partnership with the Van Buren County Drain Commissioner and the Maple Lake Association are coordinating efforts to better understand pollutant sources and causes in the Maple Lake Watershed.

The Black River and Paw Paw River Watershed steering committees hosted sustainability workshops in May and June of 2008. At these workshops, the participants explored options available to ensure the watershed management plans are being implemented by a sustainable watershed organization. As a result of these meetings, a transition team formed to develop a new watershed organization to protect and improve the Paw Paw and Black River Watersheds called the Two Rivers Coalition: An alliance of the Black and Paw Paw River Watersheds. Over the next year, the group hopes to incorporate as a 501(c)3. Meanwhile the group will focus on a few efforts to protect and improve water quality such as promoting a phosphorus ban for lawn fertilizer in Allegan, Van Buren and Berrien Counties and attending township board and planning commission meetings to talk about water quality issues. The next step will be for the Two Rivers Coalition to partner with another organization such as the Van Buren Conservation District or the Southwest Michigan Land Conservancy to assist with watershed plan implementation.

Table 16. Paw Paw River Watershed Action Plan

Protection Areas (See Figure 23)	**High priority waterbodies – Paw Paw River mainstem, North Branch, East Branch, Hayden Creek, Campbell Creek** **Medium priority waterbodies - Blue Creek, Brush Creek, Carter Creek, South Branch**								
Task	**Pollutant**	**Source**	**Cause**	**Begin Implementation**	**Potential Lead (Partners)**	**Estimated Cost**	**Potential Funding or Partner Programs**	**Milestones (after implementation begins)**	**Proposed Evaluation Method**
Enact/improve water quality protection related ordinances	Sediment	Streambanks	Increased flow fluctuations	2009-2013	Municipalities (SWMPC, MTA, MML)	$10,000/municipality	Municipalities, MDEQ 319	By 2015: 3 municipalities By 2018: 7 municipalities By 2023: 13 municipalities	Number of ordinances enacted; Number of municipalities with ordinances
	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Insufficient land use planning						
Protect wetlands	Sediment	Streambanks	Increased flow fluctuations	2009-2013	Landowners (SWMLC, TNC, Sarett Nature Center, DU)	$3,000-6,000/acre for purchase $3,000/conservation easement	MDEQ 319, NAWCA grant, Ducks Unlimited	By 2015: 120 acres By 2018: 320 acres By 2023: 720 acres	Number of acres protected; Number of landowners protecting wetlands; Estimate pollutant loading reduction
Enact ordinances protecting riparian buffers	Sediment	Streambanks	Lack of riparian buffers	2009-2013	Municipalities (SWMPC, MTA, MML)	$2,500/municipality	Municipalities, MDEQ 319	By 2015: 2 municipalities By 2018: 5 municipalities By 2023: 11 municipalities	Number of municipalities with ordinances
	Nutrients, pesticides	Stormwater runoff - lawns, parks, golf courses, agricultural lands							
Develop and enact design and maintenance standards for road stream crossings	Sediment	Streambanks	Lack of riparian buffers	2009-2013	Road Commission (Municipalities, SWMPC)	$5,000/agency	Road Commissions, Municipalities	By 2015: 2 road agencies By 2018: 5 road agencies By 2023: 8 road agencies	Number of road commissions and municipalities (road agencies) with improved standards enacted
Enact a septic inspection time of sale ordinance	Nutrients, bacteria/ pathogens	Septage waste	Improper design or maintenance of septic systems	2009-2013	Counties (Health Department, SWMPC)	$2,000/county	Counties	By 2015: 1 county By 2018: 3 counties	Number of counties with ordinance enacted
Improve soil erosion and sedimentation practices and regulations	Sediment	Stormwater runoff- road and building construction sites	Lack of soil erosion and sedimentation practices	2014-2018	Road Commission, Drain Commission	$5,000/agency	Road Commission, Drain Commissioner	By 2020: 1 agency By 2023: 3 agencies By 2028: 5 agencies	Number of agencies with improved practices and regulations adopted
Protect sensitive lands	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Insufficient land use planning	2014-2018	SWMLC, TNC, Sarett Nature Center	$3,000-6,000/acre for purchase $3,000/conservation easement	Land Trusts, MDEQ 319, private foundations	By 2020: 200 acres By 2023: 600 acres By 2028: 1400 acres	Number of acres protected; Estimate pollutant loading reduction
Improve zoning maps to locate high density or intensive uses in appropriate areas	Nutrients, bacteria/ pathogens	Septage waste	Insufficient site planning for locating septic systems	2014-2018	Municipalities (SWMPC)	$5,000/municipality	Municipalities	By 2020: 2 municipalities By 2023: 5 municipalities By 2028: 11 municipalities	Number of municipalities with improved zoning maps
Identify and correct failing septic systems	Nutrients, bacteria/ pathogens	Septage waste	Improper design or maintenance of septic systems	2019-2023	Landowners (Health Department)	$200-6,000/system	USDA Rural Development	By 2025: 5 systems By 2028: 13 systems By 2033: 28 systems	Number of systems identified and corrected; Estimate nutrient loading reduction

Agricultural Management Areas (See Figure 24)	High priority waterbodies- Eagle Lake Drain, Mill Creek, Pine Creek, Red Creek, Brandywine Creek, West Branch, North Branch headwaters Medium priority waterbodies - Branch & Derby Drain, Mud Lake Drain, Hog Creek, upstream portion of Ox Creek								
Task	**Pollutant**	**Source**	**Cause**	**Begin Implementation**	**Potential Lead (Partners)**	**Estimated Cost**	**Potential Funding or Partner Programs**	**Milestones (after implementation begins)**	**Proposed Evaluation Method**
Utilize alternative drain maintenance/ construction techniques	Sediment	Streambanks	Increased flow fluctuations	2009-2013	Drain Commissioner (TNC)	$20/linear foot for tree revetments $7/lineal foot for woody debris mgt. $20/linear foot for 2 stage ditch $100-500/linear foot for jhooks and cross vanes	Drain Assessments, MDEQ 319	By 2015: 2 projects By 2018: 3 projects By 2023: 5 projects	Number of miles of drain maintained or constructed with alternative techniques
Restore wetlands	Sediment	Streambanks	Increased flow fluctuations	2009-2013	Landowners (NRCS, USFWS)	$1,000 – 2,000/acre	WRP. Partners for Wildlife, NAWCA, DU, National Fish and Wildlife Foundation, MDEQ 319, Continuous CRP	By 2015: 80 acres By 2018: 180 acres By 2023: 240 acres	Number of acres restored; Number of landowners restoring wetlands; Estimate loading reduction
Install agricultural BMPs (filter strips, no-till, cover crops, grassed waterways, nutrient mgt, etc)	Sediment,	Streambanks	Increased flow fluctuations	2009-2013	Landowners (NRCS, Conservation Districts, TNC)	25% coverage in watershed with filter strips and conservation tillage $139,000	Farm Bill Programs, MDEQ 319, Carbon Credit Program	By 2015: 5 landowners By 2018: 10 landowners By 2023: 15 landowners	Number of acres; Estimate sediment/nutrient loading reduction; Number of landowners
	Sediment, nutrients, temperature	Stormwater runoff -agricultural lands	Lack of BMPs						
Restore riparian buffers and stabilize eroding streambanks	Sediment	Streambanks	Lack of riparian buffers	2009-2013	Landowners (Drain Comm., Conservation Districts, NRCS)	$200-500/acre for restoration $200/ft for stabilization	Drain Assessments, MDEQ 319, Farm Bill Programs, Carbon Credit Program	By 2015: 200 feet By 2018: 600 feet By 2023: 1400 feet	Linear feet of restoration/stabilization; Estimate pollutant loading reduction
	Nutrients, pesticides	Stormwater runoff - lawns, parks, golf courses, agricultural lands							
Protect wetlands	Sediment, nutrients, temperature	Stormwater runoff -agricultural lands	Loss of wetlands	2009-2013	Landowners (NRCS, USFWS, SWMLC, TNC, Sarett Nature Center)	$3,000-$6,000/acre for purchase $3,000 /conservation easement	MDEQ 319, NAWCA grant, Ducks Unlimited, Wetland Reserve Program. Partners for Wildlife, Continuous CRP	By 2015: 20 acres By 2018: 80 acres By 2023: 180 acres	Number of acres protected; Number of landowners protecting wetlands; Estimate pollutant loading reduction
Expand disposal options for agricultural chemicals	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper storage/disposal of fertilizers and pesticides	2009-2013	MSUE	$15,000/year	MSUE, Michigan Dept of Agriculture	By 2015: increase by 2 days/sites By 2018: increase by 3 days/sites By 2023: increase by 5 days/sites	Number of disposal sites/days; Amount of chemicals collected
Develop and implement manure management plans	Nutrients	Livestock waste	Improper manure management	2014-2018	Landowners (NRCS, Conservation Districts)	$4,000- $10,000/plan (depends on the number of livestock)	Farm Bill Programs, Michigan Environmental Assurance Program	By 2020: 2 plans By 2023: 5 plans By 2028: 8 plans	Number of plans developed E.coli monitoring program
Utilize soil testing to determine appropriate application rates for fertilizers and pesticides	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper application or overuse of fertilizers and pesticides	2019-2023	Landowners (MSUE)	$3.85/acre/year for field crops $13.30/acre/year for specialty crops	Unknown	By 2025: 20 tests By 2028: 30 tests By 2033: 50 tests	Number of soil tests performed
Utilize integrated pest management	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper application or overuse of fertilizers and pesticides	2019-2023	Landowners (MSUE, NRCS)	$30/acre/year for field crops $120/acre/year for orchards $80/acre/year for vegetables	Unknown	By 2025: 5 landowners By 2028: 7 landowners By 2033: 10 landowners	Number of landowners utilizing IPM
Improve and/or enforce septage waste disposal regulations	Nutrients, bacteria/ pathogens	Septage waste	Improper disposal by waste haulers/ wastewater treatment plants	2019-2023	MDEQ (MLSA, Tip of Mitt, MI Environmental Council)	N/A	MDEQ	Unknown	Improved regulations enacted and enforced
Construct secondary containment facilities	Oil, grease, fuel	Stormwater runoff	Spills and leaks	2019-2023	Landowners (NRCS, Conservation Districts)	$4,000-32,000/facility	Groundwater Program	By 2025: 1 facility By 2028: 3 facilities By 2033: 5 facilities	Number of secondary containment facilities installed

Urban Management Areas (See Figure 25)	High priority waterbodies –Sand Creek, Paw Paw Lake, Maple Lake, downstream portions of Paw Paw River mainstem, East Branch, Mill Creek, Ox Creek, West Branch Medium priority waterbodies –Eagle Lake, Three Mile Lake, Cora Lake, Reynolds Lake and Christie Lake, Mattawan Creek, Lawton Drain, downstream portion of Brush Creek								
Task	**Pollutant**	**Source**	**Cause**	**Begin Implementation**	**Potential Lead (Partners)**	**Estimated Cost**	**Potential Funding or Partner Programs**	**Milestones (after implementation begins)**	**Proposed Evaluation Method**
Utilize stormwater best management practices (road/parking lot sweeping, stormceptors, rain gardens, vegetated swales, constructed wetlands, wet/dry ponds, etc)	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Lack of stormwater management	2009-2013	Municipalities, Drain Commissioner, Road Commission (SWMPC, MTA, MML)	Depends on practice Rain Garden - $5-40/ft2 Rain Barrel - $75 each Green Roof - $12-24/ft2 Bioswales – $0.05-2.50/ft2 Permeable paving- $1-5/ft2	Municipalities, MDEQ 319	By 2015: 2 municipalities By 2018: 4 municipalities By 2023: 8 municipalities	Number of municipalities sweeping streets/parking lots and using other practices; Estimate pollutant loading reduction
	Sediment	Streambanks	Increased flow fluctuations						
Enact stormwater and post construction control ordinances	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Lack of stormwater management	2009-2013	Municipalities, Drain Commissioner, Road Commission (SWMPC, MTA, MML)	$5,000/municipality	Municipalities, MDEQ 319	By 2015 – 2 municipalities By 2018 – 4 municipalities By 2023 – 8 municiplalities	Number of municipalities with ordinances enacted
Identify and correct illicit discharges or connections	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Illicit connections or discharges	2009-2013	Drain Commissioner, Municipalities, Road Commission	$500 - $5,000/site	Drain Commissioner, Municipalities, Road Commission	By 2015: 3 sites By 2018: 5 sites By 2023: 8 sites	Number of connections or discharges identified and corrected
Utilize best management practices for road maintenance	Sediment, salt	Stormwater runoff – roads and parking lots	Improper road salt/sand application and snow disposal	2009-2013	Road Commission, Municipalities	$50-$1,000/practice	Road Commission, Municipalities	By 2015: 2 road agencies By 2018: 3 road agencies By 2023: 5 road agencies	Number of road agencies adopting improved practices; Estimate sediment loading reduction
Enact county –wide phosphorus fertilizer ban	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper application or overuse of fertilizers and pesticides	2009-2013	Counties (SWMPC, Conservation Districts, Health Department, Drain Commissioner, Two Rivers Coalition)	$2,000/county	Unknown	By 2015: 2 counties By 2018: 3 counties	Number of counties with bans
Increase or expand household hazardous waste disposal options	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper storage/disposal of hazardous materials	2014-2018	VB MSUE, Berrien County Resource Recovery, Kalamazoo County	$10,000/year	Counties, Municipalities, Private Sector	By 2020: increase by 2 days/sites By 2023: increase by 3 days/sites By 2028: increase by 5 days/sites	Number of disposal sites/days; Amount of waste collected
	Oil, grease, fuel	Stormwater runoff – impervious surfaces and storm drains							
Distribute spill kits	Oil, grease, fuel	Stormwater runoff – impervious surfaces and storm drains	Spills and leaks	2014-2018	Businesses (MSUE, Conservation Districts)	$200/kit	Groundwater Program	By 2020: 8 kits By 2023: 16 kits By 2028: 30 kits	Number of spill kits distributed
Proper maintenance and design of sewer system infrastructure	Nutrients, bacteria/ pathogens	Septage waste	Sewer system/ infrastructure failure	2019-2023	Municipalities	Depends on system needs	Municipalities, MDEQ state revolving loans, USDA Rural Development	By 2025: 2 municipalities By 2028: 4 municipalities By 2033: 5 municipalities	Number of system improvements; Number of municipalities with regular system inspection
Specific Sites (See Figure 26)									
Prevent/limit livestock access (fencing, crossings structures, alternative water source)	Sediment	Streambanks	Lack of riparian buffers	2009-2013	Landowners (NRCS, Conservation Districts)	$2/ft for fencing $1,200 –3,600/crossing structure $500/water source	Farm Bill Programs, MDEQ 319	By 2015: 2 sites By 2018: 4 sites By 2023: 8 sites	Number of sites corrected; Estimate sediment and nutrient loading reduction
	Nutrients	Livestock waste	Unrestricted livestock access						
Identify and correct problem road/stream crossing sites	Sediment	Streambanks	Improper design or maintenance of road/stream crossings	2009-2013	Road Commission	$5,000 - $15,000/site	Road Commission, MDEQ 319, MDNR Inland Fisheries Grant	By 2015: 1 site By 2018: 3 sites By 2023: 6 sites	Number of sites corrected; Estimate sediment loading reduction