

Social Indicator

A post implementation social indicator survey will be conducted to compare to the Ohio State University study *Farmers, Phosphorus, and Water Quality* to learn the degree to which social changes occurred in the UMRW after implementation of the UMRW WMP. It is expected that at least 50% of the survey respondents will have a better understanding of the water quality issues and land use impacts on water quality in the UMRW than did during the first round of returned surveys. The social indicator study will be disseminated after five years of implementation.

Administrative Indicator

The number of best management practices that can reduce *E. coli* levels that are installed in the watershed will be monitored. Annual milestones for each of the various BMPs that can reduce *E. coli* levels are described in the Action register in Section 6.3.

6.1.6 Increase Knowledge Regarding On-Site Waste Management

Less than 3% of all soils located within the UMRW are considered acceptable for the installation of on-site waste management facilities, however most residents located in the rural areas of the project area have septic systems to manage their waste water. Many homeowners are unaware of the potential risks to surface and ground water, and their property if the system is not properly maintained. Leaking, failing, or straight pipe septic systems pose a threat to water quality by increasing nutrient, sediment and bacteria levels in the water.

Goal Statement

It is the goal of this project to educate home owners about failing, leaking, and straight pipe septic systems by developing and promoting an education and outreach program regarding septic system placement and maintenance by 2016.

Indicator

Water quality, social, and administrative indicators will be used to show the progress toward meeting the goal for developing and promoting an education program regarding septic systems in the UMRW.

Water Quality Indicator

E. coli and nutrients will be measured at a minimum monthly throughout the year at the eleven historic sample sites in Indiana and the eight proposed sample sites in Ohio, ideally samples will be measured weekly during the recreational season. Sampling efforts will begin after three to five years of implementation. To determine if the education and outreach program is effective, it would be expected to see that water quality samples are showing a decreasing trend in *E. coli* and nutrients in on-site waste disposal education and outreach targeted areas with more samples meeting the target level for *E. coli* and nutrients each year of sampling after three to five years of implementation.

Social Indicator

A pre and post indicator survey regarding septic system functionality and maintenance will be conducted at workshops to determine individuals knowledge regarding septic systems and the amount in which that knowledge increases as a result of the workshop. It would be expected that 75% of the attendants of the workshops would have a better understanding of septic systems after the workshop.

Administrative Indicator

The number of people who attend septic system maintenance workshops will be monitored. It is a goal to have 25% of targeted households show representation at the septic tank outreach events.

Administrative Indicator

The number of failing, leaking, or straight pipe septic systems reported to the local health departments will be monitored. It is expected that the education and outreach program will increase the number of reported septic issues to the health departments.

Administrative Indicator

The number of households that enlist septic system companies to provide regular maintenance and/or repair leaking, failed, and straight-piped septic systems will be monitored. It is expected that the education and outreach program will increase the number of households performing regular septic maintenance and repairing improperly functioning systems. The goal is that at least 30% more maintenance and repairs occur after 3 to 5 years of implementation.

6.1.7 Reduce the Amount of Polluted Stormwater Due to Imperviousness

Stormwater is becoming known as nonpoint source pollution itself, due to the risk it poses to the quality of open water as a result of the increase in impervious surfaces over the past several decades. Impervious surfaces pose a threat to water quality as it allows for a direct conduit for stormwater runoff, carrying many urban pollutants including lawn fertilizer, sediment, salt, wildlife and pet waste, oil and grease and many others, to reach open water. Stormwater runoff also increases the potential for CSO events in Fort Wayne and New Haven, IN and Hicksville, OH which allows for raw sewage and stormwater to be discharged directly into open water without processing.

Goal Statement

It is the goal of this project to partner with CSO communities (Fort Wayne, New Haven, and Hicksville) to implement their Long Term Control Plans by providing stormwater education and outreach by 2016 and offering cost-share assistance on stormwater BMPs by 2018.

Indicator

Water quality, social, and administrative indicators will be used to show the progress toward meeting the goal for reducing the impact of stormwater on water quality in CSO communities.

Water Quality Indicator

E. coli, sediment and nutrients will be measured at a minimum monthly throughout the year at the eleven historic sample sites in Indiana and the eight proposed sample sites in Ohio, ideally samples will be measured weekly during the recreational season. There are currently three sample sites that capture the impact of Fort Wayne and New Haven on water quality and one proposed site to capture the impact of Hicksville on water quality. Sampling efforts will begin after three to five years of implementing the urban stormwater management program. To determine if partnering with municipalities to assist with the implementation of their LTCP and offering an urban cost-share program is successful, it would be expected to see that water quality samples are showing a decreasing trend in *E. coli* and nutrients with more samples meeting the target level for each parameter each year of sampling after three to five years of implementation.

Social Indicator

A pre and post social indicator survey will be conducted in the urban areas within the UMRW to learn the degree in which behavioral changes have been made after five years of implementation of the urban stormwater management program. It is expected that the post-implementation survey will show that at least 30% of the respondents are more aware of the impact stormwater has on water quality and how their actions affect water quality.

Administrative Indicator

The load reductions as a result of best management practices that are installed in the CSO communities in the watershed, as determined by load reduction models, will be monitored to determine if the BMPs that are being installed are working effectively to reduce overall nutrient, *E. coli* and sediment loadings from CSO communities.

Administrative Indicator

The number of urban best management practices that can reduce stormwater flow and/or urban pollutants that are installed in the watershed will be monitored. It is a goal to have at least 25% greater enrollment in city stormwater BMP programs after five years of implementation.

Administrative Indicator

The volume of water discharged during CSO events and the number of CSO events that occur each year in Fort Wayne, New Haven, and Hicksville will be monitored to determine if the volume of stormwater discharges and the frequency of events declines at regular intervals after implementation of the urban stormwater management program and the LTCPs (five, ten, and fifteen years).

6.1.8 Mitigate Runoff from Animal Feeding Operations

Both small scale and large animal feeding operations located within the UMRW are a concern as they are a threat to water quality from sediment and fecal runoff, as well as nutrient loads to

surrounding ditches. The windshield survey identified several points of concern where there is the potential for open water to become contaminated due to improper management of livestock and/or livestock waste.

Goal Statement

It is the goal of this project to exclude all current and future livestock from open water and eliminate the potential for polluted runoff from barnyards and pasture fields from reaching open water by 2034.

Indicator

Water quality, social, and administrative indicators will be used to show the progress toward meeting the goal for excluding all livestock from open water and mitigating potential runoff from barnyards and pastures in the UMRW.

Water Quality Indicator

E. coli, sediment and nutrients will be measured at a minimum monthly throughout the year at the eleven historic sample sites in Indiana and the eight proposed sample sites in Ohio, ideally samples will be measured weekly during the recreational season. Sampling efforts will begin after three to five years of implementation. To determine if livestock management techniques are effective it is expected to see that water quality samples are showing a decreasing trend in sediment, *E. coli* and nutrients with more samples meeting the target level for each parameter each year of sampling after three to five years of implementation.

Social Indicator

A post implementation social indicator survey will be conducted to compare to the Ohio State University study *Farmers, Phosphorus, and Water Quality* to learn the degree to which social changes occurred in the UMRW after implementation of the UMRW WMP.

It is expected that at least 50% of the survey respondents will have a better understanding of the water quality issues and land use impacts on water quality in the UMRW than did during the first round of returned surveys. The social indicator study will be disseminated after five years of implementation.

Administrative Indicator

The load reductions as a result of best management practices that are installed in the watershed, as determined by load reduction models, will be monitored to determine if the BMPs that are being installed are working adequately to reduce overall loading of sediment and nutrients to reach the reductions needed to meet the target loads.

Administrative Indicator

The number of livestock exclusion BMPs and other BMPs to reduce the impact of barnyard and pasture runoff, as well as the potential volume of manure being contained at each site in which a livestock BMP is implemented in the watershed will be monitored.

6.1.9 Promoting Recreation and Water Quality on the Maumee River

The safe recreation on the Maumee River and its tributaries is a concern due to the inadequate water quality in the watershed, as well as the fact that there are not well documented water trail maps. A particular concern for recreation on the Maumee River is the 21 CSOs located within the UMRW and the additional 30 CSOs located along the St. Marys and St. Joseph Rivers, upstream of the Maumee River in Fort Wayne as well as structures in the floodplain which can deposit contaminants and dangerous objects in the river during or after major flood events.

Goal Statement

It is the goal of this project to promote an education and outreach program throughout the UMRW regarding safe recreation on the Maumee River that puts emphasis on the water quality and surrounding land uses of the river by 2020. The education and outreach program will focus on issues to be aware of while in the river, how to avoid accidents, when to avoid contact with the water, such as after CSO events and during high water events, and how various land uses effect water quality within the UMRW.

Indicator

Social and administrative indicators will be used to measure the success toward meeting the goal of promoting a safe river recreating education and outreach program.

Social Indicators

A pre and post indicator survey regarding water quality and how land uses effect water quality will be conducted at workshops to determine individuals knowledge regarding the water quality of the river and how individual actions effect water quality and the amount in which that knowledge increases as a result of the workshop. It would be expected that 75% of the attendants of the workshops would have a better understanding of the river and what actions may decrease water quality in the river.

Administrative Indicator

The number of people who attend outreach programs regarding the river will be monitored.

Administrative Indicator

An education brochure regarding river recreation and the water quality of the river will be produced and disseminated by 2020.

6.1.10 Increase the Use of Riparian Buffers/Filter Strips

The land use and riparian buffer inventory performed in 2013 revealed that 70% of the parcels adjacent to open water have a riparian buffer of less than 60 feet wide with 57% of those parcels having less than a 10 foot buffer. The buffer inventory could not verify if the buffers were woody or not. However, it is known that riparian buffers have the ability to slow the velocity of stormwater runoff thus allowing time for the water, and the pollutants it carries to absorb into the soil or settle out prior to reaching open water. Forested riparian buffers can

provide more storm flow absorption as a medium sized tree is estimated to soak up over 2,300 gallons of water annually.

Goal Statement

It is the goal of this project to have at least 20% of parcels adjacent to open water at headwater stream to have a minimum of a 20 foot riparian buffer by 2020, 50% of parcels have a minimum of a 20 foot buffer by 2035, and 75% of parcels have a minimum of a 20 foot buffer by 2044. Five percent of the buffers will be forested riparian buffers.

Indicator

Administrative indicators will be used to measure the success toward meeting the goal of increasing the installation and usage of riparian buffers at headwater streams.

Administrative Indicator

The number of landowners who install a minimum of a 20 foot riparian buffer will be measured. It is expected that the installation of riparian buffers will increase annually to meet the goal set by this project.

Administrative Indicator

The total acreage draining into a 20 foot riparian buffer and the percentage of forested riparian buffer that is installed each year will be measured. Annual milestones for the installation of riparian buffers is described in the Action Register in Section 6.3.

Administrative Indicator

A revised desktop buffer inventory will be conducted in 2030, halfway through the implementation phase on the UMRW project, to determine if the project is nearing the goal of 50% of parcels adjacent to a headwater streams having a minimum of a 20 foot riparian buffer.

6.1.11 Waste Water Treatment Plants that Exceed NPDES Permit Targets

There are currently six Municipal WWTPs located within the UMRW including those located in Antwerp, Cecil, Hicksville, and Sherwood, Ohio, and Fort Wayne and Woodburn, Indiana. There are also three WWTPs belonging to residential subdivisions or truck stops located within the UMRW including those at Brentwood mobile home park, Middle Gordon Creek subdivision, and Vagabond Village truck stop. Many of these entities have reported discharge exceedances beyond the allowable amount outlined in their NPDES permits. Of significant note are Cecil WWTP which has exceeded 60 times in the past three years, Vegabond Village which has exceeded 109 times in the past three years, Sherwood which is exceeded 62 times in the past three years, and Woodburn which has exceeded 39 times in the past three years. A spike in nutrient, bacteria, and sediment levels is typically observed downstream when WWTPs discharge in excess of the allowable amount per their NPDES permit. This is of significant concern not only for aquatic life and recreational purposes, but there is a community located downstream from each of these facilities that acquire their drinking water from the river.

Goal Statement

It is the goal of this project to work with WWTP operators within the UMRW to ensure exceedances of permitted amounts of effluent are not discharged into open water and reduce permit exceedances by 15% by 2020, 50% by 2030, and completely by 2044.

Indicator

Administrative indicators will be used to measure the success toward meeting the goal of working with WWTP operators within the UMRW to ensure future effluent exceedances do not occur.

Administrative Indicator

The number of WWTP operators and community leaders reached to discuss options to prevent future exceedances will be monitored. It is expected that contact with each WWTP representative will be made within 12 months and meetings will take place biennially.

Administrative Indicator

The total number of exceedances at each WWTP, each year will be monitored with the expectation that the number of exceedances will decline annually to meet the goals for WWTPs.

6.2 Management Practices to Address Critical Areas and Accomplish Goals

In order to address the concerns leading to the designation of the above mentioned critical areas, best management practices and conservation measures will need to be taken. The UMRW Steering Committee considered the plethora of management practices and measures available to address the critical area concerns and determined that certain practices will have the greatest impact on the water quality in the critical areas and will be the focus of phase two of the UMRW project. In the table below, several practices and measures are outlined, and the predicted load reduction is presented for each BMP. Load reduction estimates were determined using either the Region 5, STEP-L or SWAT models and assumptions that were used to determine the load reductions in each of the models is outlined in the table as well. It should be noted that load reductions for DRP can only be predicted by the SWAP model therefore, the load reductions estimated using the Region 5 and STEP-L models do not have load reductions listed for DRP. The model that was used to determine load reductions for each practice is identified in the table below, and an more in depth explanation of the BMPs and assumptions used in each model is presented in Section 7 of this WMP. The following list is not all inclusive and other practices and management measures may be added to the list in the future.

Table 6.1: Management Measures to Address Critical Areas and Project Goals

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
<p><u>Priority 1</u> Trier Ditch, Sixmile Creek, Black Creek, Marsh Ditch, Platter Creek, Sulphur Creek, Snooks Run</p> <p><u>Priority 2</u> Zuber Cutoff, North Chaney Ditch, Marie DeLarme Creek, Gordon Creek, Sixmile Cutoff</p>	DRP and Sediment	Agriculture, Urban, and Septic System Education Program		N/A	N/A	N/A	N/A
		Septic System Workshop		N/A	N/A	N/A	N/A
		Nutrient / Pesticide Management	Estimated 20% reduction of fertilizer and pesticides provided by Purdue University on a per acre basis	0.614 ton/yr	1.10 lbs/yr	+ 0.029 lbs/yr	6.67 lbs/yr
		Cover Crops (Cereal Rye) ³	Planted a day after harvest. Cover crop killed and left as residue on field, one week prior to next crop planting	1.41 ton/yr	2.39 lbs/yr	+ 0.06 lbs/yr	13.23 lbs/yr
		Two-stage ditch ¹	1000 linear foot with a depth of 10'	80 ton/yr	80 lbs/yr	***	160 lbs/yr
		Conservation Tillage/Mulch Till ³	Presented on a per acre basis	0.30 ton/yr	0 lbs/yr	+ 0.21 lbs/yr	1.61 lbs/yr
		Conservation Tillage/No-Till ³	Presented on a per acre basis	0.49 ton/yr	0.51 lbs/yr	+ 0.04 lbs/yr	2.99 lbs/yr
		Blind Inlets		***	***	***	***
		Wetland (Restoration/Creation)	100 acres contributing area/BMP	5.93 ton/yr	8 lbs/yr	***	48 lbs/yr
		Drainage Water Management		***	***	***	***
		Soil Amendments (Gypsum) ^{5,6}	Presented on a per acre basis	0.47 ton/yr	1.49 lbs/yr	0.44 lbs/yr	***
		Grassed Waterway ¹	Used LR model for gully stabilization, 300 linear feet with a depth of 1'	14.4 ton/yr	8 lbs/yr	***	48 lbs/yr

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
<u>Priority 1</u> Trier Ditch, Sixmile Creek, Black Creek, Marsh Ditch, Platter Creek, Sulphur Creek, Snooks Run <u>Priority 2</u> Zuber Cutoff, North Chaney Ditch, Marie DeLarme Creek, Gordon Creek, Sixmile Cutoff	DRP and Sediment	Native Vegetation Planting (Switch Grass) ³	Continuously grown, with one time planting. 75% is harvested and urea is applied annually at 122 kg/ha	2.3 ton/yr	5.50 lbs/yr	1.0 lbs/yr	24.87 lbs/yr
		Repair/replace Leaking On-Site Waste Disposal Systems	4 people per household who use 60 gallons of water per day	248.2 lbs/yr	6.5 lbs/yr	***	55 lbs/yr
		Filter Strip/Saturated Buffer ³	1 acre of contributing area/BMP	1.75 ton/yr	2.17 ton/yr	0.196 lbs/yr	10.35 lbs/yr
		Remove In-water Nonfunctional Structures		***	***	***	***
		Annual Ag. And Urban Workshops/Field Days		N/A	N/A	N/A	N/A
<u>Priority 1</u> Trier Ditch, Zuber Cutoff, Gordon Creek, Platter Creek, Bottern Ditch <u>Priority 2</u> Black Creek, Sixmile Creek, Marie DeLarme Creek, Marsh Ditch <u>Priority 3</u>	Headwater Riparian Buffers and Streambank Erosion (Nitrogen, Phosphorus, Sediment)	Riparian Buffers ¹	LR model for streambank protection was used for 1000 linear feet on both banks of the stream	190 ton/yr	190 lbs/yr	***	320 lbs/yr
		Streambank Stabilization ¹	1000 linear feet of stabilization on both banks	160 ton/yr	160 lbs/yr	***	320 lbs/yr
		Grade Stabilization Structure ¹	Gully Stabilization LR model was used assuming a 300 linear foot structure	32.4 ton/yr	32.4 lbs/yr	***	64.8 lbs/yr
		Drainage Water Management		***	***	***	***
		Blind Inlets		***	***	***	***

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
Bullerman Ditch, Sulphur Creek, Snooks Run		Filter Strip ³	1 acre of contributing area/BMP	1.75 ton/yr	2.17 lbs/yr	0.196 lbs/yr	10.35 lbs/yr
		Two-stage ditch ¹	1000 linear feet with a depth of 10'	80 ton/yr	80 lbs/yr	***	160 lbs/yr
Fort Wayne, New Haven, and Hicksville	Urban Landuses and CSOs (Nitrogen, Phosphorus, <i>E. coli</i> , and Sediment)	Riparian Buffer (Commercial) ²	LR model for Vegetated Filter Strip was used with 10 acres of contributing land	0.1 ton/yr	0.5 lbs/yr	***	4.0 lbs/yr
		Riparian Buffer (Residential) ²	LR model for Vegetated Filter Strip was used with 1 acre of contributing land	0.1 ton/yr	0.1 lbs/yr	***	0.3 lbs/yr
		Two-stage ditch		***	***	***	***
		Streambank Stabilization		***	***	***	***
		Education Program on Benefits of Riparian Buffers		N/A	N/A	N/A	N/A
		Rain Barrels ²	1 Acre contributing area to a 50 gallon rain barrel	0.2 ton/yr	0.15 lbs/yr	***	0.81 lbs/yr
		Cisterns (Commercial) ²	15 acre contributing area to a 300 gallon cistern	0.2 ton/yr	1 lbs/yr	***	1.0 lbs/yr
		Monthly Street Sweeping ²	Monthly in all urban areas	399 ton/yr	1014.7 lbs/yr	***	0
		Rain Gardens (Residential) ²	1 acre of contributing area/BMP	0.18 ton/yr	0.1 lbs/yr	***	2 lbs/yr
		Rain Gardens (Commercial) ²	10 acres of contributing area/BMP	4.63 ton/yr	6 lbs/yr	***	42 lbs/yr
		Green Roof ⁷		***	***	***	***
		Blue Roofs		***	***	***	***
		Wetland	10 acres of contributing	4.86	7 lbs/yr	***	28 lbs/yr

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
Fort Wayne, New Haven, and Hicksville	Urban Landuses and CSOs (Nitrogen, Phosphorus, <i>E. coli</i> , and Sediment)	Restoration/Creation ¹	area/BMP	ton/yr			
		Curb Cuts (In combination with other LID practices)		***	***	***	***
		Bioswale ²	10 acres of contributing area/BMP	0.1 ton/yr	0.3 lbs/yr	***	0.6 lbs/yr
		Extended Wet Detention ²	10 acres of contributing area/BMP	0.12 ton/yr	0.59 lbs/yr	***	5.56 lbs/yr
		Infiltration Trench ²	10 acres of contributing area/BMP	0.2 ton/yr	0.7 lbs/yr	***	4.0 lbs/yr
		Pervious Pavement ² (Residential)	10 acres of contributing area/BMP	1.13 ton/y	4.35 lbs/yr	***	56.9 lbs/yr
		Pervious Pavement ² (Commercial)	10 acre of contributing area/BMP	1.68 ton/yr	7.54 lbs/yr	***	79.86
		Native Vegetation Planting		***	***	***	***
		Pet Waste Disposal Receptacle		***	***	***	***
		Structural Storm Water Quality Unit		***	***	***	***
		Wildlife Exclusion at Stormwater Basins		***	***	***	***
		Encourage the Sale of Phosphorus Free Fertilizers at Local Retailers		N/A	N/A	***	N/A
		Urban Fertilizer Education Program		N/A	N/A	***	N/A
		Tree Planting ⁴		N/A	N/A	***	N/A

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
Bottern Ditch and Black Creek	Livestock Operations (Nitrogen, TP, DRP, E. coli, and Turbidity/Sediment)	Education Program Geared Toward Livestock Operators		N/A	N/A	***	N/A
		Limited Access Stream Crossing/Exclusion Fencing (along with Streambank Erosion Practices and/or Alternative Watering Facility) ²	30 head of dairy and/or beef cattle and 10 horses present on 50 acres of agriculture land	9.7 ton/yr	24.1 lbs/yr	***	194.2 lbs/yr
		Rotational Grazing		***	***	***	***
		Manure Holding Facilities / Dry Stack Areas ¹	40 head of dairy cows, 10 young heifers, and 10 horses and <24% paved/BMP	***	129 lbs/yr	***	1,426 lbs/yr
		Comprehensive Nutrient Management		***	***	***	***
		Runoff Management System ¹	40 head of dairy cows, 10 young heifers, and 10 horses and <24% paved/BMP	***	284 lbs/yr	***	***
		Riparian Buffers of at least 20' adjacent to Barnyards and Pasture Fields ¹	LR model for filter strip on the Feedlot worksheet of the Region 5 LR model was used assuming 40 dairy cows, 10 young heifers, and 10 horses were present with <24% paved	***	183 lbs/yr	***	***

Critical Area	Reason for Being Critical	BMP or Management Measure	Assumptions Used	Estimated Load Reduction per BMP			
				Sediment	Total Phosphorus	DRP	Nitrogen
<u>Priority 1</u> Trier Ditch, Sixmile Creek, Black Creek, Marsh Ditch, Platter Creek, Sulphur Creek, Snooks Run <u>Priority 2</u> Bullerman Ditch, Marsh Ditch, Gordon Creek	Septic System Failures (Nitrogen, TP, DRP, Sediment, <i>E. coli</i>)	Repair/replace Leaking On-Site Waste Disposal Systems ⁸	4 people per household who use 60 gallons of water per day	248.2 lbs/yr	6.5 lbs/yr	***	55 lbs/yr
		Septic System Education and Outreach		N/A	N/A	N/A	N/A

¹Region 5 Load Reduction Model; ²STEP-L Load Reduction Model; ***Too many variables, too new of a technology to estimate, or a model does not exist to estimate load reductions; ³SWAT Load Reduction Model, ⁴A medium sized tree is estimated to uptake 2380 gallons of water annually (Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service, Davis, California. July 2002); ⁵TP loss estimated to be cut by 57% according to a study in the periodical Agricultural and Food Science, ⁶DRP loss is estimated to be cut by 66% and sediment by 56% compared to controls fields reported in the National Soil Erosion Research Laboratory, ⁷Extensive Green Roofs have the capacity to absorb 50% of rainfall, ⁸Estimates found in the Onsite Wastewater Treatment Systems Manual, US EPA, 2002.

6.3 Action Register to Accomplish Goals

The goals set by the UMRW Steering Committee are ambitious; therefore the steering committee determined objectives to help the project reach the goals set by the steering committee. Each objective has milestones to reach within a certain timeframe to determine the progress toward achieving each of the goals. The following tables are Action Registers which outline the management measures that will need to be implemented in order to reach the goals set for this project. The first Table is a general Action Register for the project as a whole, identifying specific tasks that need to be accomplished to implement the entire WMP including hiring personnel and acquiring funding, providing education and outreach, acquiring necessary partnerships, and developing and promoting a cost-share program. The following Tables are Action Registers for each individual subwatershed to address the critical areas within the subwatershed as identified in Section 5. The Action Registers addressing each of the critical areas outline the number of BMPs that will need to be installed within that subwatershed to reach the necessary load reductions to meet target levels. Milestones are set for each of the BMPs stating how many, and/or what size of BMP will be installed to meet the goals set by this project.

6.3.1 General Action Register to Implement the Watershed Management Plan (Goals 1 – 11)

The following table consists of general objectives that are needed to implement the Upper Maumee River Watershed Management Plan and reach all goals outlined in the WMP including reducing nutrient, sediment, and E. coli loading, increase knowledge regarding on-site waste disposal, reduce the amount of polluted stormwater discharging into the rivers, mitigate runoff from animal feeding operations, promote safe recreation and water quality within the UMRW, increase the use of riparian buffers, and reduce permit exceedances from WWTPs.

Hire Personnel and Acquire Necessary Funding					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Implement the Upper Maumee River Watershed Management Plan	Upper Maumee River Watershed Stakeholders	Within the First Three Years after WMP Approval then ongoing	Hire personnel to implement the WMP (6 months)	\$60,000/year	Allen, DeKalb, Defiance, Paulding SWCD and NRCS offices, Purdue and OSU Extensions, IDEM, IN DNR and ODNR, OEPA (P and TA), Federal Grants such as Great Lakes Commission and Great Lakes Restoration Initiative (P, TA)
			Secure Funding to Implement the WMP including any office overhead and salaries (6 months)	\$1,500	
			Secure funding to promote education and outreach programs (6 months)	***	
			Secure Funding to Begin Water Quality Sampling Efforts (3 years)	***	

*** Cost included in salary.

Provide Education and Outreach in Critical Areas					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Develop and Implement an Agriculture Education and Outreach Program	Upper Maumee River Watershed Stakeholders Located within Critical Areas	Within the First 12 Months after WMP Approval then ongoing	Compile an ag. Education/Outreach Plan (6 months)	***	Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS offices (P, TA) Purdue and Ohio State Extensions (P, TA), The Nature Conservancy (P, TA)
			Develop and Disseminate an Ag. Education Brochure (8 months)	\$4,000	
			Hold First Annual Ag. BMP Workshop/Field Day (12 months)	\$1,500 / year	
			Purchase two billboards/County advertising stream buffers (12 mos)	\$7,500/BMP	

Provide Education and Outreach in Critical Areas					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Develop and Implement an Agriculture Education and Outreach Program Specific to Livestock Operators	Upper Maumee River Watershed Livestock Operators	Within the First 12 Months after WMP Approval then ongoing	Compile a livestock education/outreach plan (4 months)	***	Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS offices (P, TA) Purdue and Ohio State Extensions (P, TA)
			Develop and disseminate a livestock education brochure (6 months)	\$2,000	
			Hold first annual pasture walk (12 months)	\$500 / year	
			Compile an urban education and outreach plan (12 months)	\$4,000	
			Install a Demonstration Limited Access Stream Crossing in an Underserved Community in the Watershed (12 months)	\$7,500	
Develop and Implement an Urban Education and Outreach Program	Upper Maumee River Watershed Stakeholders in Critical Areas (Fort Wayne, New Haven, and Hicksville)	Within the First 24 Months after WMP Approval then ongoing	Compile an urban education and outreach plan (12 months)	***	Allen, Defiance, DeKalb and Paulding County Planning Commissions (P) Fort Wayne, New Haven, and Hicksville, Administrators, MS4 coordinators and Decision Makers (P), WLEB Commission (P)
			Develop and disseminate an urban education brochure (12 months)	\$4,000	
			Hold first Annual urban BMP Workshop (18 months)	\$1,000 / year	
			Install a Demonstration Urban BMP in the Watershed (18 months)	\$500 / year	

Provide Education and Outreach in Critical Areas					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Develop and Implement a Septic System Educational Program	Upper Maumee River Watershed Stakeholders who Utilize Septic Systems	Within the First 18 Months after WMP Approval then ongoing	Develop and/or Disseminate a Septic System Maintenance Brochure (18 months)	\$4,000	Allen, DeKalb, Defiance, and Paulding County Health Departments and SWCDs (P,TA) Septic Issues, Collaborative Solutions working group (P)
			Hold First Annual Septic System Workshop for homeowners and one for on-site waste disposal installers (18 months)	\$1,000/year	
Implement an Education and Outreach Program Regarding Safe Recreating on the River and General Water Quality	Upper Maumee River Watershed Stakeholders	Within the First 48 Months after WMP Approval then ongoing	Place 15 interpretive signs along the Maumee River Corridor regarding water quality and safe recreating (36 months)	\$10,000	Save Maumee Grassroots Organization (P), Maumee Valley Heritage Corridor (P), IN DNR and ODNR (P), NW Ohio River Runners (P), River Greenway Consortium (P), City and County Park Departments (P), Maumee River Basin Commission (P), MRBPLG (P)
			Develop and disseminate brochures regarding recreational opportunities and potential obstacles or threats along the River (36 months)	\$4,000	
			Work with Partners to develop a map of recreational opportunities and potential obstacle or threats along the river (36 - 48 months)	\$7,500	

Provide Education and Outreach in Critical Areas					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Educate the Public on the Causes of WWTP Exceedances	Upper Maumee River Watershed Stakeholders within a Sewer District	Within the First 18 Months after WMP Approval then ongoing	Work with partners of local WWTPs to provide public tours of the WWT facilities (18 months)	\$100/year	IDEM and OEPA (P, TA), Rural Community Assistance Partnership (RCAP) (P, TA), State and County Health Departments (P, TA), Local WWTP Owners and Operators (P, TA), Urban Waters Initiative (P, TA)
			Develop and disseminate brochures explaining how WWTPs operate (12 months)	\$1000/year	
			Develop and publish two press releases annually explaining WWTP operations and reasons for exceedances of permit limits (12 months)	\$100/year	

*** Cost included in salary.

Partner with Key Organizations to Assist with WMP Implementation					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Partner with Organizations who are Providing Education/Outreach or cost assistance with Septic Issues Partner with Organizations who are Providing Education/Outreach or cost assistance with Septic Issues	Upper Maumee River Watershed Septic System Stakeholders	Within the First 12 Months after WMP Approval	Meet with County Health Departments Annually to Discuss Septic Issues (6 months)	\$500/year	Allen, DeKalb, Defiance, and Paulding County Health Departments and SWCDs (P,TA) <i>Septic Issues, Collaborative Solutions working group (P)</i>
			Meet with Other organizations addressing septic issues biannually (6 months)	\$500/year	
			Work with Local Septic System Businesses to offer discounts to stakeholders who sign up for regular septic maintenance including pump-outs and inspections. (12 months)	\$500/year	
Partner with Municipalities and other Organizations who are Providing Education and Outreach or Cost Assistance with Urban Stormwater Issues	Upper Maumee River Watershed Urban Stormwater Stakeholders	Within the First 18 Months after WMP Approval	Make contact with City and County Planners / MS4 Coordinators (6 months)	\$300 / year	Allen, Defiance, DeKalb and Paulding County Planning Commissions (P) Fort Wayne, New Haven, and Hicksville, Administrators, MS4 coordinators and Decision Makers (P), WLEB Commission (P)
			Meet with City and County Decision Makers Bi-monthly (8 months)	\$300 / year	
			Work with City and County Planners to Encourage Low Impact Design for New Developments (18 months)	\$500/year	
			Partner with organizations that currently provide urban education and outreach (12 months)	\$300/year	

Partner with Key Organizations to Assist with WMP Implementation					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
			Partner with the MRBC and Black Swamp Conservancy to offer assistance promoting their Purchase of Easements and Acquisition of Structures in the Floodplain Programs (12 months)	\$1,500/year	Maumee River Basin Commission and the Black Swamp Conservancy (P, TA)
Partner with Other Organizations Who Encourage Recreating on the Maumee River	Upper Maumee River Watershed Recreation Stakeholders	Within the First 24 Months after WMP approval then ongoing	Make contact with one local organization monthly until all have been reached (24 months)	\$400 / year	Save Maumee Grassroots Organization (P), Maumee Valley Heritage Corridor (P), IN DNR and O DNR (P), NW Ohio River Runners (P), River Greenway Consortium (P), City and County Park Departments (P), IN and OH DNR (P), Maumee River Basin Commission (P), MRBPLG (P)
			Meet with Organizations who have agreed to be partners on a quarterly basis (24 months)	\$400 / year	
Partner WWTP Owners/ Operators Acquire Funding to Make Necessary Upgrades to the Systems	Upper Maumee River Watershed WWTP Owners/ Operators	Within the First 12 Months after WMP Approval and Ongoing	Make Contact with All Operators of WWTPs with Effluent Exceedances (6 months)	\$400/year	IDEM and OEPA (P, TA), Rural Community Assistance Partnership (RCAP) (P, TA), State and County Health Departments (P, TA), Local WWTP Owners and Operators (P, TA), Urban Waters Initiative (P, TA)
			Meet with WWTP Owners/Operators, and Engineers Biannually to discuss funding options and progress (12 months)	\$400/year	
			Work with WWTP operators to Identify cause of exceedance and possible solutions (12 months)	\$1,000/year	

Develop and Promote Cost-share Programs					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Develop, and Promote a Cost-share Program on BMPs to Reduce Pollutant Loadings	Upper Maumee River Watershed Stakeholders	Within the First 18 Months after WMP Approval	Secure Funding to Implement the Cost-share Program (12 months)	***	Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS Offices and Health Departments (P) Allen County Partnership for Water Quality (P) City and County Parks Departments (P) MS4 Coordinators and LTCP Implementers (P), The Nature Conservancy, MRBC and Black Swamp Conservancy (P, TA), Purdue and Ohio State Extensions (P, TA), Farm Service Agency (P), Tri-State Watershed Partnership (P), Maumee River Watershed Partnership (P), IDEM, INDNR, OEPA, ODNR (P, TA)
			Program Developed for Agriculture Cost Share Opportunities (6 months)	***	
			Develop and disseminate a Ag. Cost-share Brochure (8 months)	\$1,500 / year	
			Program Developed for Urban Cost Share Opportunities (12 months)	***	
			Develop and disseminate an Urban Cost-share Brochure (18 months)	\$1,500/ year	
			Program Developed for Septic System Repair and Replace Cost-share Opportunities (12 months)	***	
			Develop and disseminate a Septic System Cost-share Brochure (18 months)	\$1,500/ year	

*** Cost included in salary.

Milestones for Indicators of Reaching Goals (not covered elsewhere)					
Objective	Target Audience	Implementation Timeframe	Milestone	Estimated Cost	Partners (P) / Technical Assistance (TA)
Disseminate and Analyze Social Indicator Study for Producers	Upper Maumee River Watershed Producers	Within 6 Years after WMP Approval	Social Indicator Study Developed and Disseminated (5 years)	\$10,000	Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS Offices (P), Ohio State University (P, TA)
			Social Indicator Study Analyzed (6 years)		
Disseminate and Analyze Social Indicator Study for Septic Systems	Upper Maumee River Watershed Stakeholders who Utilize Septic Systems	Within 2 Years after WMP Approval	Social Indicator Study for Septic Systems Developed and Disseminated at Workshops (18 months)	\$1,000	Allen, DeKalb, Defiance, and Paulding County SWCDs and Health Departments (P, TA)
			Social Indicator Study Analyzed (24 months)		
Water Quality Sampling	Upper Maumee River Watershed Stakeholders	Within 5 Years after WMP Approval	Water Quality Sampling Begins at 17 Sites for Turbidity, TDS, TSS, Nitrate+Nitrite, TP, DRP, and E. coli at a minimum	\$21,000/year	Allen, DeKalb, Defiance, and Paulding County SWCDs (P), Heidelberg University and Indiana-Purdue University Fort Wayne (P, TA), City of Fort Wayne (P)
Conduct a Desktop Survey of Riparian Buffers	Upper Maumee River Watershed Stakeholders	Within 16 Years of WMP Approval	Desktop Survey of Riparian Buffers within the Upper Maumee River Watershed Completed (15 years)	\$6,000	Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS Offices (P), Indiana and Ohio DNR (P, TA)
			Riparian Buffer Survey Analyzed and Compared to the 2012 Survey (16 years)		

6.3.2 Action Registers to Implement Cost-share Program in Each Sub-watershed

The following sub-sections include action registers for the implementation of a cost-share program in each of the 14 HUC 12s located within the Upper Maumee River Watershed. The Action Registers include information regarding the number of BMPs that will be installed annually, the total that will be installed over the next 30 years, the total cost of implementation, as well as the total load reduction that will be achieved should all the BMPs be installed over the next 30 years. It is important to note that only the SWAT model will provide load reductions for DRP, so the expected reduction of DRP after implementation is much greater than what can be determined at this time. Additionally, not all the BMPs that will be implemented within each subwatershed can be modeled in one of the available load reduction models, and therefore, not all BMPs listed in the following Action Registers will have load reductions associated with them.

6.3.2.1 Action Register for Trier Ditch Subwatershed

Trier Ditch Critical For: Riparian Buffers-Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Office (P, TA), Purdue Extension Office (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs)	Load Reduction-Phosphorus (lbs)	Load Reduction - DRP (lbs)	Load Reduction -Sediment (ton)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	Within 30 years after WMP approval	Riparian Buffer	700 lf/year for 30 years	20,000 lf	6400	3,800		3800	\$400,000.00
Implement programs to reduce P & Sediment to target loads	Upper Maumee River Watershed landowners and operators		Cover Crops	1000 new acres/year	9000 acres	119070	21510	0	12690	\$360,000.00
			Nutrient Management	1000 new acres/year	6000 acres	23568	4152	540	0	\$120,000.00
			Gypsum-soil amendments	1000 new acres/year	7000 acres	-	10430	3080	3290	\$280,000.00
			Blind Inlets	2-4 structures/year	10 structures	-				\$12,000.00

Trier Ditch Critical For: Riparian Buffers-Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Office (P, TA), Purdue Extension Office (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs)	Load Reduction-Phosphorus (lbs)	Load Reduction - DRP (lbs)	Load Reduction -Sediment (ton)	Estimated Cost
Implement programs to reduce P & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres each)	9427	1661	216	540	\$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			2-stage ditch	1 project every two years	2 projects (1000 lf on each side or 800 acres)	3728	784		192	\$80,000.00
			Livestock Exclusion/pasture project	1 project within the first 3 years	1 project- 20 acres	3880	6880		194	\$13,000.00
			Wetlands (Restoration/Creation	10 acres/year for 10 years	100 acres	4800	800		593	\$300,000.00
			No Till	1000 acres/year	8000 acres	21120	3870		1710	\$200,000.00
			Native Plantings, Conservation Cover	100 aces/year for 6 years	600 acres	14922	3300	600	1380	\$210,000.00
			Grassed waterways	1 waterway per year for 9 years	9 grassed waterways	432	72		130	\$45,000.00
			Stream bank Stabilization	1 project every two years	3 projects-1000 lf on each side	960	480		480	\$100,000.00
			Grade Stabilization Structures	5 structures/year for 4 years	20 (300 lf structure)	1296	648		648	\$30,000.00

Trier Ditch Critical For: Riparian Buffers-Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Office (P, TA), Purdue Extension Office (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs)	Load Reduction-Phosphorus (lbs)	Load Reduction - DRP (lbs)	Load Reduction -Sediment (ton)	Estimated Cost
Implement Urban Practices	Upper Maumee River Watershed stakeholders in Fort Wayne and New Haven	Begin within 2 years after WMP approval then ongoing	Rain Gardens (Residential)	Install 10 gardens/year for 15 years	150 gardens	60	3		6	\$30,000.00
			Rain Gardens (Commercial)	Install 1 garden/year for 10 years	10 gardens	126	18		14	\$20,000.00
			Rain Barrels (Residential)	Install 5 rain barrels/year	150 rain barrels	121	22		30	\$1,500.00
			Rain Barrels/Cisterns (Commercial)	Install 1 rain barrel/cistern biennially	15 rain barrels/cisterns	15	15		3	\$7,500.00
			Green Roofs	1 roof every 3 years for 15 years	5 roofs					\$125,000.00
			Blue Roof	1 roof every 5 years	5 roofs					\$60,000.00
			Curb Cuts (in combination with other LID practices)	1 project every year for 5 years	5 projects					\$40,000.00
			Wildlife Exclusion at Stormwater Basins	2 exclusion within 3 years/ then 1 biennially	15 exclusion					\$200,000.00
			Infiltration Trench	1 trench within 3 years then biennially	14 trench	56	9.8		2.8	\$70,000.00

Trier Ditch Critical For: Riparian Buffers-Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Office (P, TA), Purdue Extension Office (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs)	Load Reduction-Phosphorus (lbs)	Load Reduction - DRP (lbs)	Load Reduction -Sediment (ton)	Estimated Cost	
Implement Urban Practices	Upper Maumee River Watershed stakeholders in Fort Wayne and New Haven	Begin within 2 years after WMP approval then ongoing	Extended Wet Detention	1 project every 5 years	6 project	33.36	3.54		0.72	\$35,000.00	
			Pervious Pavement	1 project every 5 years	6 projects- 10 acres each	479.16	45.24		10.08	\$45,000.00	
			Pet Waste Disposal Receptacles	2 installed in each park	20 receptacles						\$4,000.00
			Encourage sale of P Free Fertilizer at Local Retailers								\$3,000.00
			Monthly Street Sweeping	Monthly		0	6,088		2,394	\$50,000.00	
Implement a program to replace and repair septic systems	Homeowners Utilizing Septic Systems	Begin within 2 years after WMP approval	Repair/replace failing septics	Repair/replace 15 septic systems/year for 20 years	Repair/replace 425 failing septics	23375	2763		53	\$4,250,000.0	
			TOTAL			247841.52	70284.58	4701	30523.6		
			Required Load reduction (from UM Watershed Action Plan)			0	57420	19900	26362	\$7,247,000.00	

6.3.2.2 Action Register for Bullerman Ditch Subwatershed

Bullerman Ditch Critical For: Riparian Buffer - Priority 3, Urban Landuses and CSOs, Septic Tank Failures - Priority 2										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	Begin after implementation of Priority 1 and 2 areas then ongoing	Riparian Buffer	500 lf/year for 30 years	15,000 lf	4800	2850		2850	\$300,000.00
			Grade Stabilization Structures	5 structures/year for 4 years	20 (300 lf structure)	1296	648		648	\$50,000.00
Implement Urban Stormwater Program	Upper Maumee River Watershed landowners in Fort Wayne and New Haven	Begin within 2 years of WMP approval	Rain Gardens (Residential)	Install 10 gardens/year	300 gardens	600	30		54	\$60,000.00
			Rain Gardens (Commercial)	Install 1 garden/year	30 gardens	1260	180		138.9	\$60,000.00
			Rain Barrels (Residential)	Install 10 rain barrels/year	300 rain barrels	243	45		60	\$30,000.00
			Rain Barrels/Cisterns (Commercial)	Install 1 rain barrel/cistern annually	30 rain barrels/cisterns	30	30		6	\$15,000.00
			Green Roofs	1 roof every 2 years	15 roofs					\$375,000.00
			Blue Roof	1 roof every 2 years	15 roofs					\$300,000.00
			Curb Cuts (in combination with other LID practices)	1 within 2 years then 1 project annually for 15 years	16 projects					\$75,000.00

Bullerman Ditch Critical For: Riparian Buffer - Priority 3, Urban Landuses and CSOs, Septic Tank Failures - Priority 2

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
			Wildlife Exclusion at Stormwater Basins	2 exclusion within 3 years/ then 1 annually	29 exclusions					\$400,000.00
			Infiltration Trench	1 trench biennially	15 trench	60	10.5		3	\$75,000.00
			Extended Wet Detention	1 project with 5 years then 1 project biennially	13 project	72.28	1.56		1.56	\$75,000.00
			Pervious Pavement	1 project every 3 years	10 projects- 10 acres contributing area each	798.6	754		168	\$75,000.00
			Pet Waste Disposal Receptacles	2 installed in each park	20 receptacles					\$4,000.00
			Encourage sale of Phosphorus Free Fertilizer at Local Retailers							\$3,000.00
			Monthly Street Sweeping	Monthly	N/A	0	12,176		4,788	\$50,000.00

Bullerman Ditch Critical For: Riparian Buffer - Priority 3, Urban Landuses and CSOs, Septic Tank Failures - Priority 2

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction -Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement a program to replace and repair septic systems	Upper Maumee River Watershed Homeowners Utilizing Septic Systems	Begin within 2 years of WMP approval	Repair/replace failing septics	Repair/replace 10 septic systems/year for 30 years	Repair/replace 300 failing septics	16500	1950		37	\$3,000,000.00
			TOTAL			25659.88	18675.06	0	8754.46	
			Required Load reduction (from UM Watershed Action Plan)			0	15880	3060	5634	\$4,947,000.00

6.3.2.3 Action Register for Sixmile Creek Subwatershed

Sixmile Creek Critical For: Riparian Buffers - Priority 2, Urban Landuse and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), City of Fort Wayne (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	After Implementation of Priority 1 areas	Riparian Buffer	600 lf/year for 30 years	18,000 lf	5760	3420		3240	\$360,000.00
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	Cover Crops	1000 new acres/year	5000 acres	66150	11950	0	7050	\$200,000.00
			Nutrient Management	1000 new acres/year	6000 acres		8940	2640	2820	\$120,000.00
			Gypsum-soil amendments	1000 new acres/year	7000 acres	-	5950	3080	3290	\$280,000.00
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres each)	6341	888	325	169	\$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			No Till	1000 acres/year	8000 acres	23920	4080		3920	\$200,000.00
			Native Plantings, Conservation Cover	100 aces/year for 6 years	600 acres	14922	3300	600	1380	\$210,000.00
Implement Urban Stormwater Program	Upper Maumee River Watershed Landowners in Fort Wayne	Within 30 years after WMP approval	Rain Gardens (Residential)	Install 10 gardens/year for 3 years	30 gardens	60	3		6	\$6,000.00
			Rain Gardens (Commercial)	Install 1 garden/year for 5 years	5 gardens	126	18		14	\$10,000.00

Sixmile Creek Critical For: Riparian Buffers - Priority 2, Urban Landuse and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), City of Fort Wayne (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement Urban Stormwater Program	Upper Maumee River Watershed Landowners in Fort Wayne	Within 30 years after WMP approval	Rain Barrels (Residential)	Install 10 rain barrels for 10 years	30 rain barrels	24.3	4.5		6	\$3,000.00
			Rain Barrels/Cisterns (Commercial)	Install 1 rain barrel/cistern a year for 10 years	10 rain barrels/cisterns	10	10		2	\$5,000.00
			Curb Cuts (in combination with other LID practices)	1 project within 5 years	1 project					\$15,000.00
			Curb Cuts (in combination with other LID practices)	1 project within 5 years	1 project					\$15,000.00
			Wildlife Exclusion at Stormwater Basins	1 exclusion within 2 years	1 exclusion					\$15,000.00
			Infiltration Trench	1 trench within 5 years	1 trench	4	0.7		0.2	\$15,000.00
			Extended Wet Detention	1 project within 5 years	1 project	5.56	0.12		0.12	\$7,500.00
			Pervious Pavement	1 project every 5 years for 10 years	2 projects- 10 acres each	159.72	15.08		3.36	\$15,000.00
			Pet Waste Disposal Receptacles	2 installed in each park	2 receptacles					\$400.00

Sixmile Creek Critical For: Riparian Buffers - Priority 2, Urban Landuse and CSOs, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), City of Fort Wayne (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement Urban Stormwater Program	Upper Maumee River Watershed Landowners in Fort Wayne	Within 30 years after WMP approval	Encourage sale of Phosphorus Free Fertilizer at Local Retailers							\$3,000.00
			Monthly Street Sweeping	Monthly		0	6088.2		2394	\$50,000.00
Implement a program to replace and repair septic systems	Homeowners with failing septics	Within 30 years after WMP approval	Repair/replace failing septics	Repair/replace 15 septic systems/year for 20 years	Repair/replace 532 failing septics	15895	1878		36	\$5,320,000.00
			TOTAL			147350.58	49,476	6910	26693.68	
			Required Load reduction (from UM Watershed Action Plan)			0	24180	15560	6497	\$7,005,900.00

6.3.2.4 Action Register for Bottern Ditch Subwatershed

Bottern Ditch Critical For: Riparian Buffer - Priority 1, Livestock Operations, Septic Tank Failures - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to Headwater streams	Within the first 6 months after WMP approval then ongoing	Riparian Buffer	700 lf/year for 30 years	20,000 lf	6400	3,800		3800	\$400,000.00
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators		Cover Crops	1000 new acres/year	15000 acres	198450	35850	0	21150	\$600,000.00
			Nutrient Management	1000 new acres/year	6000 acres	11664	1548	528	0	\$120,000.00
			Gypsum-soil amendmets	1000 new acres/year	7000 acres	-	10430	3080	3290	\$280,000.00
			Blind Inlets	2-4 structures/year	10 structures	-				\$12,000.00
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres)	4666	619	211	108	\$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			Comprehensive Nutrient Management Plan	4 plans every year for 5 years	19 Plans					\$0.00
			Runoff Management System	2 projects every year for 4 years	8 projects		2272			\$0.00
			Livestock Exclusion	4 projects every year for 5 years	19 project- 20 acres	3690	460		184	\$247,000.00

Bottern Ditch Critical For: Riparian Buffer - Priority 1, Livestock Operations, Septic Tank Failures - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within the first 6 months after WMP approval then ongoing	Wetlands (Restoration/Creation)	10 acres/year for 10 years	100 acres	4800	800		593	\$300,000.00
			No Till	1000 acres/year	8000 acres	23920	4080		3920	\$200,000.00
			Grassed waterways	1 waterway per year for 9 years	9 grassed waterways	432	72		130	\$45,000.00
			Stream bank Stabilization	1 project every two years	3 projects-1000 lf on each side	960	480		480	\$100,000.00
			Grade Stabilization Structures	5 structures/year for 4 years	20 (300 lf structure)	1296	648		648	\$50,000.00
Implement a program to replace and repair septic systems	Homeowners with failing septic	Within 30 years after WMP approval	Repair/replace failing septic	Repair/Replace 40 septic systems/year for 20 years	Repair/Replace 784 failing septic	43120	5096		97	\$7,840,000.00
			TOTAL			313371	69085	4084	36763	
			Required Load reduction (from UM Watershed Action Plan)			0	21420	3600	5440	\$10,350,000.00

6.3.2.5 Action Register for Black Creek

Black Creek Critical For: Riparian Buffer - Priority 2, Livestock Operations, Septic Tank Failures - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), City of Fort Wayne and New Haven (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	Begin after Implementation in Priority 1 areas then ongoing	Riparian Buffer	600 lf/year for 30 years	18,000 lf	5760	3420		3240	\$360,000.00
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	Cover Crops	1000 new acres/year	3000 acres	39960	7170	0	4230	\$120,000.00
			Nutrient Management	1000 new acres/year	3000 acres	9318	1518	318	0	\$60,000.00
			Gypsum-soil amendments	1000 new acres/year	4000 acres	-	5950	1760	1880	\$160,000.00
			Blind Inlets	2-4 structures/year	10 structures	-			\$12,000.00	
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres)	7454	1214	254	256	\$120,000.00
			Native Plantings, Conservation Cover	100 acres/year for 6 years	600 acres	14922	3300	600	1380	\$360,000.00
			Wetlands (Restoration/Creation)	10 acres/year for 10 years	100 acres	4800	800		593	\$300,000.00
			Comprehensive Nutrient Management Plan	2 plans every year for 5 years	10 Plans					

Black Creek Critical For: Riparian Buffer - Priority 2, Livestock Operations, Septic Tank Failures - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), City of Fort Wayne and New Haven (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	2-stage ditch	1 project every two years	2 projects (1000 lf)	320	160		160	\$80,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			Livestock Exclusion/barnyard project	2 projects every year for 5 years	10 projects- 20 acres	38800	4800		1940	\$130,000.00
			No Till	1000 acres/year	8000 acres	23920	4080		3920	\$300,000.00
Implement a program to replace and repair septic systems	Homeowners Utilizing Septic Systems	Within 30 years after WMP approval	Repair/replace failing septics	Repair/replace 21 septic systems/year for 20 years	Repair/replace 414 failing septics	22770	2691		51	\$4,140,000.00
			TOTAL			181997	38033	3197	20013	
			Required Load reduction (from UM Watershed Action Plan)			0	27360	21900	8055	\$6,178,000.00

6.3.2.6 Action Register for Marsh Ditch Subwatershed

Marsh Ditch Critical For: Riparian Buffer - Priority 2, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	After implementation in Priority 1 areas then ongoing	Riparian Buffer	600 lf/year for 30 years	18,000 lf	5760	3420		3240	\$360,000.00
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	Cover Crops	1000 new acres/year	3000 acres	39960	7170	0	4230	\$120,000.00
			Nutrient Management	1000 new acres/year	3000 acres	7620	644	432	204	\$60,000.00
			Gypsum-soil amendments	1000 new acres/year	4000 acres	-	5950	1760	1880	\$160,000.00
			Blind Inlets	2-4 structures/year	10 structures	-			\$12,000.00	
			Tile Control Structures)	10 structures/year for 6 years	60 structures (20 acres)	6096	773	346	122	\$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			No Till	1000 acres/year	4000 acres	11960	2040		1960	\$100,000.00
			Native Plantings, Conservation Cover	100 aces/year for 6 years	600 acres	14922	3300	600	1380	\$210,000.00
			Stream bank Stabilization	1 project within 3 years	1 project-1000 lf on each side	320	160		160	\$100,000.00
Grade Stabilization Structures	5 structures/year for 4 years	20 (300 lf structure)	1296	648		648	\$30,000.00			

Marsh Ditch Critical For: Riparian Buffer - Priority 2, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 1

Partners (P) and Technical Assistance (TA): Allen County SWCD and NRCS Offices (P, TA), Purdue Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P)

Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement a program to replace and repair septic systems	Homeowners with failing septics	Within 30 years after WMP approval	Repair/replace failing septics	Repair 14 septic systems/year for 20 years	Repair 277 failing septics	15235	1801		43	\$5,540,000.00
			TOTAL			117142	28836	3403	16230	
			Required Load reduction (from UM Watershed Action Plan)			26120	16740	4160	3716	\$6,848,000.00

6.3.2.7 Action Register for Marie DeLarme Subwatershed

Marie DeLarme Creek Critical For: Riparian Buffer - Priority 2, Septic Tank Failures - Priority 1, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Allen, DeKalb, Defiance, and Paulding County SWCD and NRCS Offices (P, TA), Purdue and Ohio Extensions (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), Maumee River Basin Commission (P), The Black Swamp Conservancy (P)										
Objective	Target Audience	Implementation Timeframe	Action	Milestone	Quantity	Load Reduction-Nitrogen (lbs/yr)	Load Reduction-Phosphorus (lbs/yr)	Load Reduction-DRP (lbs/yr)	Load Reduction-Sediment (ton/yr)	Estimated Cost
Implement riparian buffer installation	Upper Maumee River Watershed landowners adjacent to headwater streams	After Implementation in Priority 1 areas then ongoing	Riparian Buffer	600 lf/year for 30 years	18,000 lf	5760	3420		3240	\$360,000.00
Implement programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval and after implementation of Priority 1 areas	Cover Crops	1000 new acres/year	15000 acres	64980	35850	0	2160	\$600,000.00
			Nutrient Management	1000 new acres/year	6000 acres	20904	2832	708	0	\$120,000.00
			Gypsum-soil amendmets	1000 new acres/year	7000 acres	-	10430	3080	3290	\$280,000.00
			Blind Inlets	2-4 structures/year	10 structures	-				\$12,000.00
			Tile Control Structures	10 structures/year for 6 years	60 structures (20 acres each)	8362	1133	283	245	\$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	2363	\$36,000.00
			2-stage ditch	1 project every two years	2 projects (1000 lf on each side or 800 acres)	320	160		160	\$80,000.00
			Livestock Exclusion/barnyard project	2 projects every 3 years	2 projects- 20 acres	7760	13760		388	\$26,000.00
			Wetlands (Restoration/Creation)	10 acres/year for 10 years	100 acres	4800	800		593	\$300,000.00