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 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	No Till	1000 acres/year	8000 acres	23920	4080		3920	$2,000,000.00
			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 year for 10 years	10 projects-1000 lf on each side	3,200	1,600		1,600	$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 septics	Within 30 years after WMP approval	Repair/replace failing septics	Repair/replace 22 septic systems/year for 20 years	Repair/replace 435 failing septics	23925	2828		54	$4,350,000.00
			TOTAL			**194554**	**83843**	**4936**	**20171**	
			Required Load reduction (from UM Watershed Action Plan)			7620	63420	3200	19443	$8,689,000.00

6.3.2.8 Action Register for North Chaney Ditch Subwatershed

North Chaney Ditch Critical For: DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Allen, 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 programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Begin after WMP approval and after implementation of Priority 1 areas then ongoing	Cover Crops	1000 new acres/year	5000 acres	66150	11950	0	7050	$200,000.00
			Nutrient Management	500 new acres/year	3000 acres	5406	636	594	0	$60,000.00
			Gypsum-soil amendments	1000 new acres/year	3000 acres	-	4470	1320	1410	$120,000.00
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres each)	4325	509	475	50	$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
			Stream bank Stabilization	1 project every two years	3 projects-1000 lf on each side	960	480		480	$100,000.00
			TOTAL			**129656**	**28355**	**3254**	**16653**	
			Required Load reduction (from UM Watershed Action Plan)			8760	9320	4380	1137	$1,046,000.00

6.3.2.9 Action Register for Zuber Cutoff Subwatershed

Zuber Cutoff Critical For: Riparian Buffer - Priority 1, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Allen 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	Within 30 years after WMP approval and after implementation of Priority 1 areas	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	64980	35850	0	2160	$600,000.00
			Nutrient Management	1000 new acres/year	6000 acres	23436	3204	1044	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
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres each)	9374	1282	418	191	$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	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

Zuber Cutoff Critical For: Riparian Buffer - Priority 1, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Allen 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 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	No Till	200 acres/year for 30 years	6000	17940	3060		2940	$150,000.00
			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 5 years	5 grassed waterways	240	40		72	$45,000.00
			Stream bank Stabilization	1 project every year for nine years	9 projects-1000 lf on each side	2880	1440		1440	$100,000.00
			Grade Stabilization Structures	5 structures/year for 4 years	20 (300 lf structure)	1296	648		648	$5,000.00
			TOTAL			**164441**	**73824**	**5407**	**19231**	
			Required Load reduction (from UM Watershed Action Plan)			91080	56200	2920	11391	$2,471,000.00

6.3.2.10 Action Register for Gordon Creek Subwatershed

Gordon Creek Critical For: Riparian Buffer - Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): DeKalb and Defiance 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 and promote riparian buffer installation	Upper Maumee River Watershed landowners adjacent to flowing water	Begin after WMP approval then ongoing	Riparian Buffer	2,000 lf/year for 10 years	20,000 lf	6400	3800		3800	$400,000.00
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	198450	35850	0	21150	$600,000.00
			Nutrient Management	1000 new acres/year	6000 acres	21204	3768	1044	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
			Tile Control Structures	10 structures/year for 6 years	60 structures (20 acres each)	8482	1507	418	277	$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	1 project within the first 3 years	1 project- 20 acres	3880	6880		194	$13,000.00

Gordon Creek Critical For: Riparian Buffer - Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): DeKalb and Defiance 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 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	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
			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	$50,000.00
Implement Urban Stormwater Program	Upper Maumee River Watershed Stakeholders in Hicksville	Begin within 2 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 3 years	3 gardens	126	18		14	$6,000.00
			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	3	3		0.6	$5,000.00
			Green Roofs	1 roof within 5 years	1 roof					$15,000.00

Gordon Creek Critical For: Riparian Buffer - Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): DeKalb and Defiance 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 Urban Stormwater Program	Upper Maumee River Watershed Stakeholders in Hicksville	Begin within 2 years after WMP approval	Blue Roof	1 roof within 7 years	1 roofs					$20,000.00
			Curb Cuts (in combination with other LID practices)	1 project within 5 years	1 projects					$15,000.00
			Wildlife Exclusion at Stormwater Basins	1 exclusion every 2 years for 10 years	5 exclusion					$75,000.00
			Infiltration Trench	1 trench within 5 years	1 trench	4	0.7		0.2	$15,000.00
			Extended Wet Detention	1 project with 5 years	1 project	5.56	0.12		0.12	$7,500.00
			Pervious Pavement	1 project every 5 years	2 projects- 10 acres each	113.8	8.7		2.26	$15,000.00
			Pet Waste Disposal Receptacles	2 installed in each park	6 receptacles					$1,200.00
			Encourage sale of Phosphorus Free Fertilizer at Local Retailers							$3,000.00
			Monthly Street Sweeping	Monthly		0	6088.2		2394	$50,000.00

Gordon Creek Critical For: Riparian Buffer - Priority 1, Urban Landuses and CSOs, Septic Tank Failures - Priority 2, DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): DeKalb and Defiance 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 a program to replace and repair septic systems	Homeowners Utilizing Septic Systems	Within 30 years after WMP approval	Repair/replace failing septics	Repair/replace 15 septic systems/year for 20 years	Repair/replace 289 failing septics	15895	1878		36	$2,890,000.00
			TOTAL			**315270.66**	**82709.22**	**5407**	**40844.18**	
			Required Load reduction (from UM Watershed Action Plan)			0	78440	3040	19902	$5,692,700.00

6.3.2.11 Action Register for Sixmile Cutoff Subwatershed

Sixmile Cutoff Critical For: DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Paulding County SWCD and NRCS Offices (P, TA), Ohio Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), 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 programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	After implementation in Priority 1 areas	Cover Crops	1000 new acres/year	5000 acres	66150	11950	0	7050	$200,000.00
			Nutrient Management	1000 new acres/year	2000 acres	8836	1332	300	0	$40,000.00
			Gypsum-soil amendments	1000 new acres/year	3000 acres	-	4470	1320	1410	$40,000.00
			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)	10603	1598	360	382	$120,000.00
			Filter Strip/Saturated Buffers	3 sites/year for 3 years	9 sites- 1350 acres/5400 lf	13973	2930	265	324	$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
			Wetlands (Restoration/Creation)	10 acres/year for 10 years	100 acres	4800	800		593	$300,000.00
			No Till	1000 acres/year	2000 acres	5980	1020		980	$200,000.00
			Native Plantings, Conservation Cover	100 acres/year for 6 years	600 acres	14922	3300	600	1380	$210,000.00
			Grassed waterways	1 waterway per year for 20 years	20 grassed waterways	960	160		288	$100,000.00

Sixmile Cutoff Critical For: DRP and Sediment - Priority 2										
Partners (P) and Technical Assistance (TA): Paulding County SWCD and NRCS Offices (P, TA), Ohio Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), 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 programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	After implementation in Priority 1 areas	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
			TOTAL			**128800**	**28848**	**2845**	**13695**	
			Required Load reduction (from UM Watershed Action Plan)			17260	30000	5280	33145	$1,488,000.00

6.3.2.12 Action Register for Platter Creek Subwatershed

Platter Creek Critical For: Riparian Buffer - Priority 1 and DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Defiance 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), 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	Within 30 years after WMP approval	Riparian Buffer	2,000 lf/year for 10 years	20,000 lf	6400	3800		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	5000 acres	66150	11950	0	7050	$200,000.00
			Nutrient Management	1000 new acres/year	6000 acres	23844	4488	1536	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
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures (20 acres each)	9538	1795	614	284	$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	1 project within the first 3 years	1 project- 20 acres	3880	6880		194	$13,000.00

Platter Creek Critical For: Riparian Buffer - Priority 1 and DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Defiance 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), 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 programs to reduce Phosphorus & Sediment to target loads	Upper Maumee River Watershed landowners and operators	Within 30 years after WMP approval	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
			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	$50,000.00
			TOTAL			**170435**	**51813**	**6095**	**24292**	**$2,166,000.00**
			Required Load reduction (from UM Watershed Action Plan)			17740	46920	14520	10071	

6.3.2.13 Action Register for Sulphur Creek Subwatershed

Sulphur Creek Critical For: Riparian Buffer - Priority 3 and DRP and Sediment - Priority 3										
Partners (P) and Technical Assistance (TA): Defiance and Paulding County SWCD and NRCS Offices (P, TA), Ohio Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), The Black Swamp Conservancy (P), ODNR and OEPA (P, TA)										
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 Watershed landowners adjacent to headwater streams	After implementation of Priority 1 and 2 areas	Riparian Buffer	500 lf/year for 30 years	15,000 lf	4800	2850		2850	$300,000.00
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	7000 acres	92610	16730	0	9870	$280,000.00
			Nutrient Management	1000 new acres/year	4000 acres	22864	4048	600	0	$80,000.00
			Gypsum-soil amendments	1000 new acres/year	7000 acres	-	10430	3080	3290	$280,000.00
			Tile Control Structures	10 structures/year for 6 years	60 structures (20 acres each)	13718	2429	360	1051	$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	3000 acres	8970	1530		1470	$200,000.00
			Native Plantings, Conservation Cover	100 aces/year for 10 years	1000 acres	24870	5500	1000	2300	$350,000.00
			Grassed waterways	300 lf per year for 10 years	10 grassed waterways	480	80		144	$50,000.00
			Stream bank Stabilization	1 project every two years	3 projects-1000 lf on each side	960	480		480	$100,000.00
			TOTAL			**183245**	**47007**	**5305**	**23818**	**$1,796,000.00**
			Required Load reduction (from UM Watershed Action Plan)			12900	55000	6240	33145	

6.3.2.14 Action Register for Snooks Run Subwatershed

Snooks Run Critical For: Riparian Buffer - Priority 3 and DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Defiance and Paulding County SWCD and NRCS Offices (P, TA), Ohio Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), The Black Swamp Conservancy (P), ODNR and OEPA (P, TA)										
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 Watershed landowners adjacent to headwater streams	After Implementation of Priority 1 and 2 areas	Riparian Buffer	500 lf/year for 30 years	15,000 lf	4800	2850		2850	$300,000.00
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	4000 acres	16800	2672	496	0	$80,000.00
			Gypsum-soil amendments	1000 new acres/year	7000 acres	-	10430	3080	3290	$280,000.00
			Tile Control Structures (each controlling 20 acres)	10 structures/year for 6 years	60 structures60 structures (20 acres each)	10080	1603	298	421	$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
			Livestock Exclusion	1 project within the first 3 years	1 project- 20 acres	3880	6880		194	$13,000.00
			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

Snooks Run Critical For: Riparian Buffer - Priority 3 and DRP and Sediment - Priority 1										
Partners (P) and Technical Assistance (TA): Defiance and Paulding County SWCD and NRCS Offices (P, TA), Ohio Extension (P, TA), Farm Bureau (P), The Nature Conservancy (P, TA) Tri-State Watershed Alliance (P), Upper Maumee Watershed Partnership (P, TA), The Black Swamp Conservancy (P), ODNR and OEPA (P, TA)										
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	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
			TOTAL			**155917**	**47247**	**4739**	**22078**	$1,584,000.00
			Required Load reduction (from UM Watershed Action Plan)			0	48820	6320	18183	

7.0 Potential Annual Load Reductions after Implementation

Actions outlined in Section 6 were determined by taking a combination of aspects of watershed management including how likely it is to get landowners willing to participate in a cost-share program to implement BMPs and the potential load reductions that would result from their implementation. Using the Spreadsheet Tool for Estimating Pollution Load (STEPL), the Region 5 load reduction model, which both can be found at http://it.tetratech-ffx.com/steplweb/, and the recalibrated SWAT model provided by Purdue University, potential load reductions were determined for nitrogen, phosphorus, and sediment on a per BMP per sub-watershed scale.

The two load reduction models available for public use at this time do have some limitations in that not all BMPs can be modeled and as stated earlier in this WMP, estimates for *E. coli* cannot be determined accurately. Therefore, narrative assumptions for the benefit of certain BMPs and possible load reductions will be provided.

It is important to note that assumptions were made for the model inputs as exact acreage of implementation is dependent on the support for participation that is received by landowners in the project area. The load reductions presented in this document are derived from a model and are best guess scenarios only, and only account for the BMPs planned to be installed as part of this project, assuming that no BMPs were in the past, or are currently being used. It is understood throughout the conservation community that load reductions from BMPs have a cumulative effect and that the reductions in pollutant loads will increase exponentially as they are implemented year after year or in combination with multiple BMPs. Accurate load reductions will be determined when the UMRW performs water quality analysis on the 17 proposed sample sites in the UMRW after three to five years of implementation. Table 7.1 shows the estimated load reduction after implementation of the UMRW Action Registers for each of the subwatersheds. As can be seen in Table 7.1, according to estimated load reductions from various models the sediment, total phosphorus and nitrogen target load reductions will be exceeded by the end of the 30 year UMRW Management Plan implementation plan. While the modeled load reductions for DRP do not add up to the necessary reduction, that is likely due to the lack of load reductions for DRP provided by models and it is assumed that the DRP load reduction will also be met.

Table 7.1 Estimated Load Reductions after One Year of Implementation

	Sediment (Tons)	Total Phosphorus (tons)	Nitrogen (tons)	DRP (tons)
Needed	**178,943.97**	**275.55**	**90.74**	**57.02**
Estimate	**319,759.92**	**359.02**	**1237.84**	**30.14**
Delta	**+140,815.95**	**+83.47**	**+1147.10**	**-26.88**

Un-Modeled BMPs Listed in the Action Register

As stated above, not all BMPs that are listed in the UMRW Action Register can be modeled to determine pollutant load reductions as they are either new technologies or there are too many variables involved to give an accurate estimate. Those BMPs are listed below.

Blind Inlets

The UMRW steering committee plans to promote the implementation of blind inlets on crop land with unmanaged tile inlets in those areas deemed critical for nutrients and sediment. Blind inlets are a relatively new technology and research continues to determine how effective the technology is in lessening the pollutant load through tile inlets in crop land. One such study, conducted by the USDA Agriculture Research Service (ARS) in the St. Joseph River Watershed in 2010 indicates that blind inlets do in fact, have a significant impact on the amount of sediment and nutrients released to open water through field tiles. A copy of the study can be found at http://www.ars.usda.gov/research/publications/publications.htm?seq_no_115=267832.

Comprehensive Nutrient Management Plan

The UMRW steering committee plans to promote the use of Comprehensive Nutrient Management Planning (CNMP) in the areas of the UMRW deemed critical for livestock and DRP. A CNMP is a document that explains the current nutrient output of animals on a farm and how to best utilize those nutrients on crop land to promote healthy soils and increase yield while preventing manure runoff from the farm. Since the CNMP will only produce a load reduction if implemented, and each implementation plan in the CNMP is different, load reductions could not be determined.

Drainage Water Management

The UMRW steering committee plans to promote the use of drainage water management in areas deemed critical for nutrients and turbidity throughout the watershed. Drainage Water Management allows landowners to manage the water table under their crop fields to be higher in the summer when water is scarce and lower in the spring when there is an abundance of water. This practice is known to keep nutrients on the fields and can increase crop production as much as 25 bushels of soybeans, and 70 bushels of corn per acre annually, according to the NRCS, National Water Ag Water Management Team. However, this practice is relatively new in comparison to other BMPs, and an accurate model to predict pollutant load reductions is not available at this time. For more information on this practice, visit www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/manage/.

Rotational Grazing

The UMRW steering committee plans to promote the use of rotational grazing in areas of the UMRW that are deemed critical for livestock and DRP. Rotational Grazing is a practice used to improve the health of the livestock, pasture plant and soil health, fish and wildlife habitat, as well as water quality. The University of Illinois Extension Office lists several studies which identify pastures as one of the best options for reducing runoff, erosion, and phosphorus pollution

(http://www.livestocktrail.illinois.edu/pasturenet/paperDisplay.cfm?ContentID=6618). The Extension also refers to another study conducted by the Agricultural Research Service (ARS) which showed rainfall better infiltrated pasture land than adjacent wooded areas that were considered "pristine". For those reasons, it can be expected that implementing rotational grazing at the sites identified as posing a potential threat to water quality within the watershed, and any other sites that are noted in the future, would have a significant impact on the amount of runoff, which has the potential to carry fecal coliform and nutrients, reaching open water sources. Another benefit of rotational grazing is that plants have time to recover between grazing periods, thus increases plant and soil health and decreasing the potential for erosion.

Urban Best Management Practices

Many management practices for urban areas cannot be modeled for potential load reductions due to them being a new technology and the variability between implementation sites. EPA has released a new load reduction model that may determine the best location to put urban BMPs within a critical area, and potential load reductions. However, until a more detailed evaluation of the implementation area for urban pollutants is done, the model will not be useful. However, it may be used during the implementation phase of the UMRW project to determine where the "biggest bang for the buck" will occur when placing BMPs.

8.0 Ohio Coastal Nonpoint Pollution Control Program

This chapter contains the wording from "Guidance for Watershed Projects to address Ohio's Coastal Nonpoint Pollution Control Program" (CNPCP) and specifies how the Upper Maumee River Watershed Management Plan and entities within the Upper Maumee Watershed address the CNPCP management measures.

Per the Coastal Zone Act of 1990, each coastal state is required to submit for approval a Coastal Nonpoint Pollution Control Program to the US EPA and the National Oceanic and Atmospheric Administration (NOAA) with the purpose "to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other State and local authorities."

Ohio was granted conditional approval of their CNPCP, administered by the ODNR, in 2004. Ohio therefore, requires all WMPs compiled for watersheds located within the Lake Erie Basin to describe how the NPS management measures outlined in the CNPCP will be addressed.

Two of the management measures outlined in the Ohio CNPCP are not applicable to the UMRW. Those measures not applicable are listed below.

Non-applicable Management Measures

1. Roads, Highways, and Bridge Operation and Maintenance (Inter and Intrastate Only)
2. Roads, Highways, and Bridge Runoff Systems (Inter and Intrastate Only)

Inter and Intrastate operated roads, highways and bridges are subject to state rules and regulations. Those transportation corridors that are in development are subject to Rule 5 permitting and those corridors that are already in existence are subject to State's NPDES Stormwater Pollution Prevention Plans and are considered exempt from the CNPCP. Information pertaining to Ohio Department of Transportation's (ODOT) Stormwater Management Plan can be found at http://www.dot.state.oh.us/stormwater/Pages/default.aspx and information pertaining to Indiana Department of Transportation's (INDOT) can be found at http://www.in.gov/indot/2892.htm.

All other management measures outlined in the Ohio CNPCP are applicable to the Upper Maumee River Watershed Management Plan and are listed below.

Applicable Management Measures

1. New Development
2. Watershed Protection
3. Site Development
4. Existing Development
5. New On-Site Disposal Systems
6. Operating On-Site Disposal Systems
7. Planning, Siting, and Developing Roads and Highways

8. Bridge Management (Local Only)
9. Operation and Maintenance of Roads, Highways, and Bridge (Local Only)
10. Runoff Systems for Roads, Highways, and Bridges (Local Only)
11. Channelization and Channel Modification (Physical & Chemical Characteristics of Surface Waters)
12. Channelization and Channel Modification (Instream and Riparian Habitat Restoration)
13. Dams-Protection of Surface Water Quality and In-Stream and Riparian Habitat
14. Streambanks and Shorelines (Note: there are no shore lines in the watershed)

The applicable management measures listed in the Ohio CNPCP are addressed in Section 6 of this WMP entitled: Goals, Objectives and Management Measures. A summary of how those management measures are addressed (or plan to be addressed) within the UMRW is provided below.

8.1 New Development

This management measure is intended to accomplish the following:

1. Decrease the erosive potential of increased runoff volumes and velocities associated with development-induced changes in hydrology.
2. Remove suspended solids and associated pollutants entrained in runoff that results from activities occurring during and after development.
3. Retain hydrological conditions to closely resemble those of the pre-disturbance conditions. (For design purposes, post development peak runoff rate and average volume should be based on a 2yr/24 hour storm.)
4. Preserve natural systems, including in-stream habitat.

Applicability to the Upper Maumee River Watershed

Within the UMRW, the incorporated areas designated as MS4 communities are Fort Wayne and New Haven, Indiana, and Defiance, Ohio as well as the Allen County. These communities are required to develop a Storm Water Quality Management Plan (SWQMP). These plans address new development and stormwater. Although Hicksville is not an MS4 Community, they are proactive in requiring erosion and sediment control and stormwater runoff control in their stormwater rules and regulations.

Storm Water Quality Management Plans can be accessed at:

- City of Defiance, OH: www.cityofdefiance.com/main/images/pdfs/engineering/stormwater/SWMP_6.2009.pdf
- Allen County, IN: www.allencounty.us/images/stories/surveyor/pdfs/Stormwater_Technical_Standards_Manual.pdf

- New Haven, IN: www.cityofnewhaven.com/PublicWorks/TPFiles/Stormwater%20Pollution%20Prevention%20Plan%20Part%201.pdf
- Ft. Wayne, IN: www.in.gov/idem/nps/files/wmp_stmarys_7-184_attch_7_ft_wayne_swqmp.pdf
- Hicksville, OH: www.villageofhicksville.com/infrastructure/wastewater.php

Section 2.6.1 of this WMP outlines local planning documents for Allen County, the City of Defiance, Defiance County, the City of Woodburn and DeKalb County. These plans mandate setbacks from environmentally sensitive areas, as well as require development activities to minimally disturb natural ecosystems.

It is an objective of the UMRW project to work with City and County Planners to address the increase in stormwater and encourage low impact design for new developments. An urban education program is also proposed by the UMRW project to encourage low impact development and demonstrate urban BMPs.

8.2 Watershed Protection

This management measure of the CNPCP is intended to guide development of a watershed protection program to incorporate these practices:

1. Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss.
2. Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota.
3. Site development, including roads, highways, and bridges, to protect, to the extent practicable, the natural integrity of waterbodies and natural drainage systems.

Applicability to the Upper Maumee River Watershed

As stated above, Section 2.6.1 of this WMP outlines local planning documents which begin to lay the foundation for watershed protection by suggesting protection of sensitive areas and encouraging sustainable growth.

Within the UMR WMP, this measure is addressed with objectives to provide education and cost share dollars to implement urban and agricultural BMPs such as low impact development, riparian buffer installation, wetland restoration, native vegetation plantings, and conservation tillage, among many other BMPs outlined in Section 6.3.

8.3 Site Development

This management measure of the CNPCP is intended to guide the planning, designing, and development of sites to:

1. Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss.
2. Limit increase of impervious areas except where necessary.

3. Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss.
4. Limit disturbance of natural drainage features and vegetation.

Applicability to the Upper Maumee River Watershed

There are eight population centers located within the UMRW. While growth trends in Ohio counties is on the decline, trends in Allen County show that the population is slated to increase by 20% between 2000 and 2025, according to documentation in *Plan-it Allen*. That amount of population increase would require a 5% increase in housing units between 2000 and 2025. *Plan-it Allen* also projects an increase in the workforce by 36% which would require nearly 70% more work space than was available in 2000 and an additional 8000 acres of land to accommodate the additional work space needed by 2025. Therefore, continued growth in Allen County puts pressure on land resources and has the potential to impact the natural resources of the watershed.

The planning documents outlined in Section 2.6.1 of this WMP will help to protect sensitive areas and existing natural resources by requiring setbacks, easements, and minimize impacts on disturbances of the natural areas during development.

As stated above, the SWQMP for incorporated areas of the UMRW will address stormwater regulations for pre-construction and post-construction. Section 6.3.4 of this WMP Outlines several specific activities that the UMRW project plans to promote as a means to lower the impact of storm flow from urbanized areas and work with local governments to encourage low impact design practices. The UMRW project also has an objective to develop and promote an urban education brochure to encourage best management practices to limit polluted stormflow from urban areas from reaching open water.

8.4 Existing Development

This management measure of the CNPCP is intended to guide communities to:

1. Reduce surface water runoff pollution loadings from areas where development has already occurred.
2. Limit surface water runoff volumes in order to minimize sediment loadings resulting from the erosion of streambanks and other natural conveyance systems.
3. Preserve, enhance or establish buffers that provide water quality benefits along waterbodies and their tributaries.

Applicability to the Upper Maumee River Watershed

There are three incorporated areas in the UMRW that utilize CSOs; Fort Wayne, New Haven, and Hicksville. All three communities currently follow a LTCP to help minimize the number of CSO events that occur each year. The towns of Woodburn, Antwerp, Sherwood, Cecil and the small portion of City of Defiance located in the UMRW do not have CSOs, however stormwater from these areas can directly affect water quality in the Maumee River as the river or a

tributary of the river run through or adjacent to the populated area. Therefore, it is important to try to limit the amount of polluted stormwater discharge or runoff from those towns.

Section 6.3 outlines several objectives and specific actions to reduce stormwater runoff from urban areas, as well as outlines objectives and actions to reduce polluted runoff from agricultural areas.

Specific actions in the UMR WMP to address Watershed Protection management measures in the CNPCP include:

- Meet with City and County Decision Makers to address stormwater and encourage LID practices.
- Provide education and outreach regarding BMPs for urban and agricultural areas.
- Install a Demonstration Urban and Agricultural BMP in the Watershed
- Partner With the MRBC and Black Swamp Conservancy to Purchase Easements
- Install Rain Barrels/Cisterns and rain gardens in urban areas
- Monthly Street Sweeping Program in urban areas of the watershed
- Implement Tree Planting Program
- Implement Wetland Restoration/Creation Projects
- Install Pervious Pavement
- Install Native Vegetation in urban and agricultural areas
- Install a Minimum of a 10 ft Riparian Buffer in urban areas and a 20 ft riparian buffer in agricultural areas
- Install One Green and Blue Roofs
- Install Pet Waste and Trash Receptacles At Parks and/or Along Public Walking Paths
- Install Structural Storm Water Quality Units at High Traffic Areas
- Install Wildlife Exclusion Practices in Stormwater Basins That Drain to Open Water Annually
- Install Cover Crops
- Implement Conservation Tillage
- Install Blind Inlets on 8 Properties Annually
- Enlist Landowners to Implement Nutrient/Pesticide Management
- Enlist landowners to implement soil amendments to improve nutrient uptake
- Install Drainage Water Management Practices
- Install or Repair Grassed Waterways
- Install Streambank Stabilization Practices
- Install Grade Stabilization Structures

8.5 New On-Site Disposal Systems (OSDS)

The management measure of the CNPCP requires that OSDS be sited, designed, and installed so that impacts to waterbodies will be reduced, to the extent practicable. Factors such as soil type,

soil depth, depth to water table, rate of sea level rise, and topography must be considered in siting and installing conventional OSDS. The management measure is to:

1. Ensure that new Onsite Disposal Systems are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25 percent. Implement OSDS inspection schedules for preconstruction, construction, and post-construction.
2. Direct placement of OSDS away from unsuitable areas. Where OSDS placement in unsuitable areas is not practical, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas within floodplains; or areas where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;
3. Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance;
4. Establish protective separation distances between OSDS system components and groundwater which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS;
5. Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50 percent to ground water that is closely hydrologically connected to surface water.

Applicability to the Upper Maumee River Watershed

The majority of the rural community in the UMRW utilizes an OSDS to dispose of their household effluent. However, less than 3% of the soils in the UMRW are considered suitable for an OSDS since 96.4% of the soils are considered to be very limited for OSDS and 1% of the soils are considered to be somewhat limited, requiring significant soil amendment to make them suitable for an OSDS. For that reason, the UMRW project has a goal, outlined in Section 6.1.6 to increase knowledge regarding OSDS, and objectives outlined in Section 6.3.2 to partner

with local agencies and organizations to provide education on septic maintenance and placement.

The County Health Departments in Allen, Defiance, Paulding, and DeKalb counties hold data on existing septic systems and review/approve installation of new septic systems. Their requirements for maintenance and approval can be found at their websites:

Defiance: http://www.defiancecohealth.org/Septic_Systems.htm
Allen: http://www.allencountyhealth.com/divisions/pollution?ID=articles1225478688
DeKalb: http://www.dekalbhealth.net/envhealth/septic-systems/
Paulding: http://www.pauldingcountyhealth.com/environmental.html#SewageSeptic

8.6 Operating On-Site Disposal Systems

The purpose of this management measure of the CNPCP is to minimize pollutant loadings from operating OSDS. This management measure requires that OSDS be modified, operated, repaired, and maintained to reduce nutrient and pathogen loadings in order to protect and enhance surface waters. In the past, it has been a common practice to site conventional OSDS in coastal areas that have inadequate separation distances to ground water, fractured bedrock, sandy soils, or other conditions that prevent or do not allow adequate treatment of OSDS-generated pollutants. Eutrophication in surface waters has also been attributed to the low nitrogen reductions provided by conventional OSDS designs.

1. Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15 percent (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters;
2. Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing;
3. Consider replacing or upgrading OSDS to treat effluent so that total nitrogen loadings in the effluent are reduced by 50 percent. This provision applies only:
    - where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant ground water nitrogen loadings from OSDS, and
    - where nitrogen loadings from OSDS are delivered to ground water that is closely hydrologically connected to surface water.

Applicability to the Upper Maumee River Watershed

As stated above, very few soils in the UMRW are suitable for septic placement, however most of the rural community utilizes an OSDS so the UMRW project specifies specific objectives to address leaking, failing, and straight-piped OSDS. Those objectives include:

- Develop and Implement a Septic System Educational Program

- Partner With Local Agencies and Organizations to Provide Education on Septic Maintenance and Placement
- Offer Cost-share Assistance for Septic System Repair/ Replacement/ Elimination
- Develop and Promote a Septic System Maintenance Program, by:
    - Working with Local Septic System Businesses to Offer Discounts to Stakeholders Who Sign up for Regular Septic Maintenance

8.7 Planning, Siting, and Developing Roads and Highways (local only)

The best time to address control of NPS pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls will be needed to minimize the impacts of NPS runoff on surface waters.

Plan, site, and develop roads and highways to**:**

1. Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;
2. Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and
3. Limit disturbance of natural drainage features and vegetation.

Applicability to the Upper Maumee River Watershed

The development of new roads can cause a significant risk to surface waters and sensitive areas as heavy equipment is used which has the potential to leak gas and oil, and soil disturbances can increase sedimentation of surrounding water resources. The best time to address these concerns is during the planning phase of the new road at which time, siting and development of the road should be considered to limit any detrimental effects on surrounding sensitive areas and water resources. Environmental impact assessments (EIA) are often required before construction of the new road can take place which will identify any potential harm to the surrounding environment. If, during the EIA, it is found that building a road in a particular location will cause harm to the environment, measures will need to be taken to minimize the impact of the road to the highest degree possible, or the road will need to be sited elsewhere. The use of BMPs during road construction is also very important as it will minimize the effects on water resources by minimizing land disturbances.

8.8 Bridges (local only)

This management measure of the CNPCP requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges should be a coordinated effort among the States, the FHWA, the U.S. Coast Guard, and the Army Corps of Engineers. Locating bridges in coastal areas can cause significant erosion and sedimentation, resulting in the loss of wetlands and riparian areas. Additionally, since bridge pavements are extensions of the connecting highway, runoff waters from bridge decks also deliver loadings of heavy metals, hydrocarbons, toxic substances, and deicing

chemicals to surface waters as a result of discharge through scupper drains with no overland buffering. Bridge maintenance can also contribute heavy loads of lead, rust particles, paint, abrasive, solvents, and cleaners into surface waters. Protection against possible pollutant overloads can be afforded by minimizing the use of scuppers on bridges traversing very sensitive waters and conveying deck drainage to land for treatment. Whenever practical, bridge structures should be located to avoid crossing over sensitive fisheries and shellfish-harvesting areas to prevent washing polluted runoff through scuppers into the waters below. Also, bridge design should account for potential scour and erosion, which may affect shellfish beds and bottom sediments.

Applicability to the Upper Maumee River Watershed

Pollution from bridge decks can have an impact on water resources. Therefore, the CNPCP requires that bridge maintenance and design be considered to limit the impact on critical habitat, fisheries, shellfish beds, wetlands, and domestic water supplies.

Bridge maintenance is on a regular rotating schedule with the Indiana and Ohio Departments of Transportation for inspection and repair as needed. There are no plans in the near term for bridge development within the UMRW. However, it was noted during the windshield survey conducted in 2012 that the Maplecrest Rd extension bridge connecting Fort Wayne to Lincoln Highway on the western edge of New Haven, IN was nearing completion and many of the sediment control measures that were in place were failing. In 2013, construction began on the Anthony Blvd. bridge crossing the Maumee River east of downtown Fort Wayne. Sediment control measures were in place; however it is common practice to build a "land bridge" crossing the river for heavy equipment to utilize for the destruction and construction of the bridge. This practice aims to decrease scouring of the river bottom by keeping heavy machinery out of the river, but it may increase sedimentation.

Many bridges have surface drains that allow stormwater to drain directly through, or around, the bridge to the open water below. To decrease the amount of sediment reaching open water through bridge drains, the UMRW project has actions outlined in Section 6.3.4 to implement a monthly street sweeping program in all urban areas located within the UMRW.

8.9 Operation and Maintenance of Roads, Highways, and Bridges (local)

This management measure of the CNPCP requires the incorporation of pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair coastal surface waters. The program to be developed, using the practices

described in this management measure, should consist of and identify standard operating procedures for nutrient and pesticide management, road salt use minimization, and maintenance guidelines (e.g., capture and contain paint chips and other particulates from bridge maintenance operations, resurfacing, and pothole repairs).

Applicability to the Upper Maumee River Watershed

Operation and maintenance of roads, highways, and bridges is performed by the Indiana or Ohio Department of Transportation, local county, or township. Each entity must follow the good housekeeping rules laid out in their NPDES permit, if one exists. The UMRW project plans to meet with local city and county planners to improve road, highway, and bridge housekeeping and, as mentioned above, and will work with local entities to incorporate a regular street sweeping program.

8.10 Runoff Systems for Roads, Highways, and Bridges (local only)

This management measure of the CNPCP requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries. In areas where such adverse impacts to surface waters can be attributed to adjacent roads or bridges, retrofit management projects to protect these waters may be needed (e.g., installation of structural or nonstructural pollution controls). Retrofit projects can be located in existing rights-of-way, within interchange loops, or on adjacent land areas. Areas with severe erosion and pollution runoff problems may require relocation or reconstruction to mitigate these impacts.

Runoff management systems are a combination of nonstructural and structural practices selected to reduce nonpoint source loadings from roads, highways, and bridges. These systems are expected to include structural improvements to existing runoff control structures for water quality purposes; construction of new runoff control devices, where necessary to protect water quality; and scheduled operation and maintenance activities for these runoff control practices. Typical runoff controls for roads, highways, and bridges include vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

1. Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and
2. Establish schedules for implementing appropriate controls.

Applicability to the Upper Maumee River Watershed

While the majority of the UMRW is agricultural, over 14% of the watershed developed and there are many areas where improvement can be made to mitigate the impact of excessive stormflow. As stated Section 8.4 above, there are 21 CSO outfalls located within the UMRW, with an additional 30 outfalls directly upstream of the Maumee River in major tributaries. Each CSO community has LTCPs to guide implementation efforts to limit the number of annual CSO

events. The UMRW project has objectives and specific actions outlined in Section 6.3.4 to reduce the amount of stormwater entering combined sewer systems and to filter pollutants from stormwater prior to it reaching combined sewers. Pollution and excessive storm flow will be reduced by installing the most practical and effective BMPs for any given situation which may include the installation of wetlands, native vegetation, riparian buffers and others. These actions, after implementation, will help the UMRW project meet the milestones of lowering the number of CSO events in Fort Wayne by 48% in ten years, and lowering the number of events in Hicksville and New Haven to no more than one annual event within 10 years.

It should be noted that the City of Defiance, while only a very small portion is located within the UMRW, is currently undertaking a comprehensive review of the sewer collection system and treatment plant in order to determine a more cost-effective approach to implementation. It is anticipated that this plan will incorporate many modifications including the use of green infrastructure in selected areas and will be submitted to the Ohio EPA for approval in 2015.

8.11 Channelization and Channel Modification

8.11.1 Physical & Chemical Characteristics of Surface Waters

The purpose of this management measure in the CNPCP is to ensure that the planning process for new hydromodification projects addresses changes to physical and chemical characteristics of surface waters that may occur as a result of the proposed work. Implementation of this management measure is intended to occur concurrently with the implementation of 8.12 Channelization and Channel Modification (Instream and Riparian Habitat Restoration) Management Measure. For existing projects, the purpose of this management measure is to ensure that the operation and maintenance program uses any opportunities available to improve the physical and chemical characteristics of the surface waters. Changes created by channelization and channel modification activities are problematic if they unexpectedly alter environmental parameters to levels outside normal or desired ranges. The physical and chemical characteristics of surface waters that may be influenced by channelization and channel modification include sediment, turbidity, salinity, temperature, nutrients, dissolved oxygen, oxygen demand, and contaminants.

Implementation of this management measure in the planning process for new projects will require a two-pronged approach:

1. Evaluate, with numerical models for some situations, the types of NPS pollution related to instream changes and watershed development.
2. Address some types of NPS problems stemming from instream changes or watershed development with a combination of nonstructural and structural practices.

8.11.2 Instream and Riparian Habitat Restoration

The purpose of this management measure is to correct or prevent detrimental changes to instream and riparian habitat from the impacts of channelization and channel modification

projects. Implementation of this management measure is intended to occur concurrently with the implementation of Section 8.11 Channelization and Channel Modification (Physical & Chemical Characteristics of Surface Waters).

Contact between floodwaters and overbank soil and vegetation can be increased by a combination of setback levees and use of compound-channel designs. Levees set back away from the streambank (setback levees) can be constructed to allow for overbank flooding, which provides surface water contact to important streamside areas (including wetlands and riparian areas). Additionally, setback levees still function to protect adjacent property from flood damage. Compound-channel designs consist of an incised, narrow channel to carry surface water during low (base)-flow periods, a staged overbank area into which the flow can expand during design flow events, and an extended overbank area, sometimes with meanders, for high-flow events. Planting of the extended overbank with suitable vegetation completes the design.

8.11.3 Applicability of Channelization Management Measures to the UMRW

Changes made to existing channels, or channel construction, can impact the integrity of the water system as a whole and may alter wildlife and aquatic habitat and can alter the chemical and physical integrity of the stream channel including, sediment, turbidity, salinity, temperature, nutrients, dissolved oxygen, and other contaminants. For these reasons, the UMRW project plans to work with City and County Planners and County Surveyors and Engineers to implement a method that will maintain the integrity of the stream system, while serving the purpose of moving water from property and farm fields which is typically accomplished by stream channel modification. The UMWP project will also encourage the use of a two-stage ditch design which will limit sedimentation and help to mediate increased nutrients in the stream channel, as well as offer cost-share dollars when possible to implement the two-stage stream design.

Stream buffer width has been determined as a Critical Area in the UMRW as described in Section 5.1 of this WMP. Section 6.3 outlines several objectives and actions to address the issue of inadequate stream buffers in the UMRW including implementing an education program regarding the importance of riparian buffers for water quality and wildlife habitat purposes, offer assistance to purchase conservation easements, and offing cost share dollars to increase stream buffers in agricultural areas to a minimum of 20 feet in width. Section 6.3 of this WMP also outlines actions to increase the riparian buffer width in urban areas to a minimum of 10 feet in width.

8.13 Dams

The purpose of this management measure in the CNPCP is to protect the quality of surface waters and aquatic habitat in reservoirs and in the downstream portions of rivers and streams that are influenced by the quality of water contained in the releases (tailwaters) from reservoir impoundments. Impacts from the operation of dams to surface water quality and aquatic and riparian habitat should be assessed and the potential for improvement evaluated. Additionally, new upstream and downstream impacts to surface water quality and aquatic and riparian habitat caused by the implementation of practices should also be considered in the assessment. The overall program approach is to evaluate a set of practices that can be applied individually

or in combination to protect and improve surface water quality and aquatic habitat in reservoirs, as well as in areas downstream of dams. Then, the program should implement the most cost-effective operations to protect surface water quality and aquatic and riparian habitat and to improve the water quality and aquatic and riparian habitat where economically feasible.

Applicability to the Upper Maumee River Watershed

There are two dams located within the Upper Maumee River Watershed and their impact on water quality has not been assessed. Since both dams are at the end of their excepted life span, their relevance and contribution to water quality will be evaluated before they are repaired or replaced.

8.14 Streambanks and Shorelines

Several streambank and shoreline stabilization techniques will be effective in controlling coastal erosion wherever it is a source of nonpoint pollution. Techniques involving marsh creation and vegetative bank stabilization ("soil bioengineering") will usually be effective at sites with limited exposure to strong currents or wind-generated waves. In other cases, the use of engineering approaches, including beach nourishment or coastal structures, may need to be considered. In addition to controlling those sources of sediment input to surface waters which are causing NPS pollution, these techniques can halt the destruction of wetlands and riparian areas located along the shorelines of surface waters. Once these features are protected, they can serve as a filter for surface water runoff from upland areas, or as a sink for nutrients, contaminants, or sediment already present as NPS pollution in surface waters.

Applicability to the Upper Maumee River Watershed

The windshield survey conducted in 2012 in the UMRW revealed 88,436 linear feet of stream bank erosion along streams within the agricultural and urban landscapes. The UMRW project has a goal to WMP specifies to increase riparian buffers by offering cost share to have at least 75% of parcels adjacent to open water to have a minimum of a 20 foot riparian buffer by 2044, with 5% of the buffers being forested riparian buffers. This goal, if accomplished, will help to decrease the amount of streambank erosion in the UMRW.

Additionally, the UMRW project has objectives and other actions outlined in Sections 6.3.1, 6.3.3, 6.3.4, and 6.3.6 to address streambank stabilization issues in the watershed including, remove non-functional in-stream structures, encourage the use of drainage water management, and install grade stabilization structures, among other practices.

9.0 Future Activities

After extensive research conducted over two and a half years in the UMRW, the resulting Watershed Management Plan is full of information regarding common land uses and practices, as well as historic and present day water quality issues found in each subwatershed located within the greater UMRW. However, this information is not common knowledge. The UMRW project will introduce key findings in the WMP and the cost-share program to the public through at least one annual public meeting held in Indiana and Ohio, within months of the final WMP approval by the IDEM, OEPA, ODNR, and US EPA. The meetings will be advertised through local media outlets including newspapers, SWCD, NRCS, and FSA offices. Other means of advertisement will be pursued as well. Letting the UMRW stakeholders know the extent of the water quality problem within the watershed, as well as the watershed's contribution to the algal blooms in the Western Lake Erie Basin, will hopefully illicit concern as well as a willingness to change behaviors to have a positive impact on water quality.

Next steps in the UMRW project is for the Steering Committee to develop cost-share program that will include, at a minimum, those management measures outlined in the Action Register in Section 6.3 of this WMP, and the various incentive levels that will be used to encourage the adoption of those management measures. The Steering Committee will work closely with all Conservation Districts located within the project area, as well as the partners outlined in the Action Register to make sure their cost-share recommendations are realistic for the demographic of the area, and to utilize their help for promoting the cost share program. A key component of the cost-share programs success is the education and outreach aspect of the UMRW project. Field days and workshops regarding agricultural and urban land uses and BMPs will be held annually, as part of this project, however, partnering with other organizations such as other county SWCD and NRCS offices, The Nature Conservancy, the IN and OH DNR, Save Maumee, and smaller non-profit groups that focus on water quality and sustainable land uses, will prove to be integral in promoting practices to improve the health of the UMRW. To help gauge the project's success of the education and outreach program, a follow-up social indicator study will be conducted after five years of implementation and compared to the 2013 study conducted by the Ohio State University College of Food, Agriculture, and Environmental Sciences. Comparing the results of the two studies will help the UMRW project determine if a true impact is being made through the education and outreach program and more producers are aware of their individual impact on water quality or if revisions to the outreach program need to be made to have a greater impact.

It is the goal of the UMRW project that this WMP will be reviewed and utilized by other organizations within the Upper Maumee River Watershed including the Upper Maumee Watershed Partnership, Allen, DeKalb, Defiance, and Paulding County SWCDs, The Nature Conservancy's Western Lake Erie Basin Project, County Drainage Boards, Surveyors and Engineers, City and County Planning Departments, Save Maumee and other organizations concerned about the water quality of the Upper Maumee River Watershed. The UMRW project's first priority will be to obtain funding to pursue the objectives outlined in the Action Register; however we hope to work with other organizations that plan to do the same. As the

points of contact for this WMP, the Allen and Defiance County SWCDs will distribute the document to all stakeholder organizations (a distribution list is located at the end of this document), as well as have hard copies of the document available to borrow, or purchase at the SWCD offices located in Fort Wayne, Indiana at 3718 New Vision Drive and Defiance, Ohio at 6879 Evansport Road.

A watershed is continually changing as land uses change, towns begin to expand, new businesses organize in the area, farmland is converted to other uses, or wetlands are drained or moved to accommodate development or farming. These changes in the UMRW particularly have continued to have an enormous impact on the Western Lake Erie Basin. During the writing of this document a massive algal bloom formed in Lake Erie at the mouth of the Maumee River which left nearly 400,000 residents of Toledo without drinking water for two days. The algal bloom in Lake Erie in 2011 was the largest on record and reached from Toledo nearly 100 miles east to Cleveland and was at depths up to 60 feet. Annual harmful algal blooms in Lake Erie could cause catastrophic deaths of aquatic life, seriously impact Toledo's drinking water, and have a major impact of the local economy surrounding Lake Erie. The Maumee River is the largest contributor of sediment and nutrients to Lake Erie, and much of that is coming from the Upper Maumee River Watershed.

As the watershed continues to change so must the actions taken to maintain and/or improve the integrity of the water quality. Therefore, the Upper Maumee River Watershed Management Plan must remain a 'living document' and be updated by the Upper Maumee Watershed Partnership, or its partners, at a minimum, every five years.

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Endorsements and Distribution List

We, the undersigned, agree to support the implementation of the Upper Maumee River Watershed Management Plan by partnering with the Upper Maumee River project, offering technical assistance, or pursuing funding of our own to implement the WMP.

Organization	Signature	Title
DeKalb County Soil and Water Conservation District		
Paulding County Soil and Water Conservation District		
Allen County Natural Resource Conservation Service		
DeKalb County Natural Resource Conservation Service		
Defiance County Natural Resource Conservation Service		
Paulding County Natural Resource Conservation Service		
Allen County Surveyors Office		
DeKalb County Surveyor Office		
Defiance County Engineers Office		
Paulding County Engineers Office		
Purdue University Extension		
Ohio State University Extension		
The Nature Conservancy		
Black Swamp Conservancy		
The Maumee River Basin Commission		
Western Lake Erie Basin Commission		
Tri-State Watershed Alliance		
Upper Maumee Watershed Partnership		
City of Fort Wayne		

City of Defiance
City of Woodburn
City of New Haven
Village of Hicksville
Village of Antwerp
Village of Cecil
Village of Sherwood
Allen County Health Department
DeKalb County Health Department
Defiance County Health Department
Paulding County Health Department
The Maumee River Basin Partnership of Local Governments
Save Maumee Grassroots Organization
Maumee Valley Heritage Corridor
Northwest Ohio River Runners
River Greenway Consortium
Allen County Commissioner
DeKalb County Commissioner
Defiance County Commissioner
Paulding County Commissioner
Allen County Parks Department
DeKalb County Parks Department
Defiance County Parks Department

Paulding County Parks Department
Defiance College
Indiana University-Purdue University; Fort Wayne
Heidelberg University
Andersons
Indiana Department of Environmental Management – Office of Water
Ohio EPA – Division of Surface Water
Ohio DNR – Division of Soil Resources