



United States Department of Agriculture  
Natural Resources Conservation Service

# ***WESTERN LAKE ERIE BASIN***

## ***RAPID WATERSHED ASSESSMENT CONSERVATION MATRIX SUMMARY***



***OHIO, INDIANA, AND MICHIGAN NRCS***  
**June 2009**



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## INTRODUCTION

The USDA Natural Resources Conservation Service (NRCS) has conducted a Watershed Assessment of USDA Conservation Practice needs IN the eight 8-Digit Hydrologic Units in the Western Lake Erie Basin.

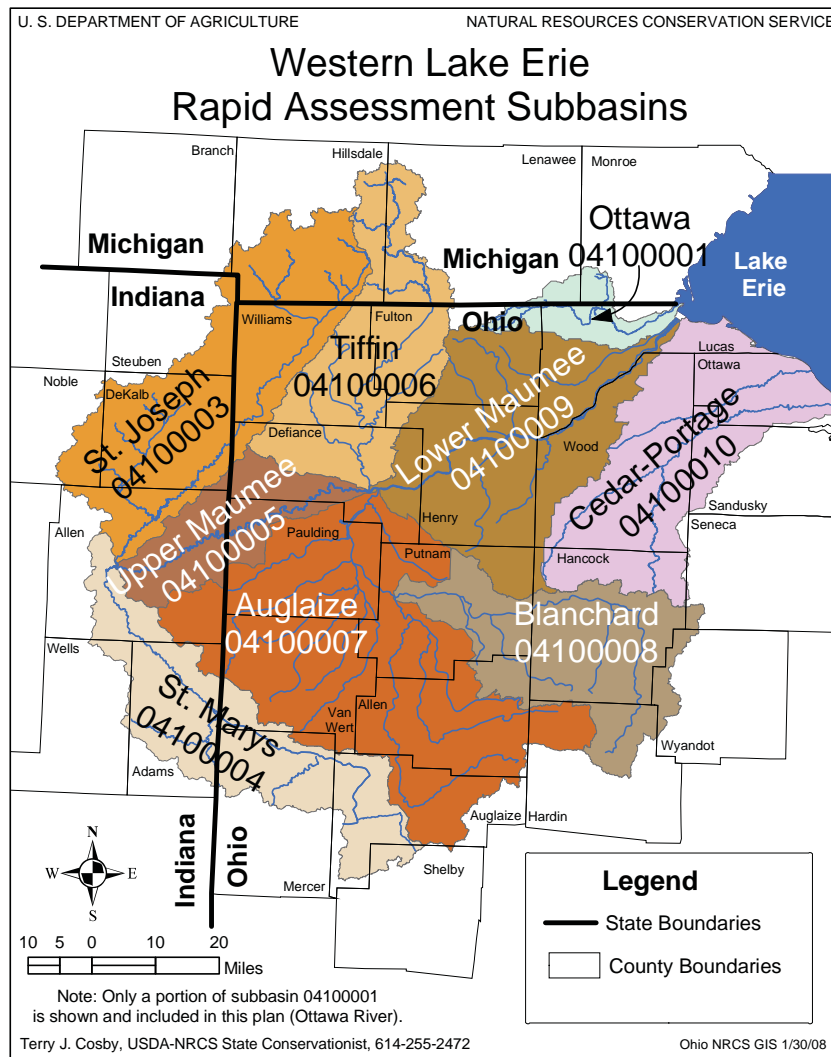
The assessment consists of two parts: 1) A watershed data profile and 2) A matrix projecting the extent of conservation practice needs and USDA program dollars needed to install the needed practices.

The Watershed Data Profiles are currently being published and as they are finalized, they are posted at:

[http://www.oh.nrcs.usda.gov/programs/RWA/rapid\\_watershed\\_assessments.html](http://www.oh.nrcs.usda.gov/programs/RWA/rapid_watershed_assessments.html)

Currently, the Lower Maumee, Blanchard, and Auglaize Hydrologic Unit profiles are posted and the remaining watersheds will soon be added.

The assessment matrixes have been completed for all 8 HUC units. This document summarizes the findings of the assessment and the conservation practice treatment needs for the Western Lake Erie Basin Project area.



## BACKGROUND

In March 2009, the Western Lake Erie Basin (WLEB) Partnership brought together scientists and resource managers for a 3-day conference at Maumee Bay state Park. The conferees identified five broad themes for resource management needs and concerns in the basin. These concerns include:



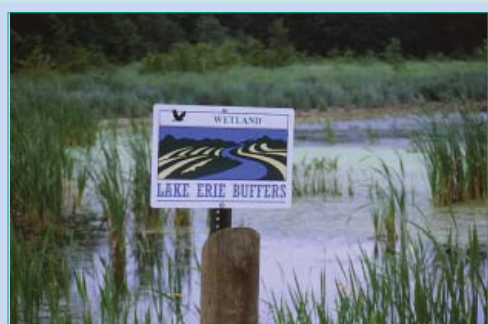
*Reduction in soil erosion in the watershed, reduced sediment delivery to Lake Erie, and lessened impacts from dredging due to sediment deposition in Toledo Harbor*



*Reduction in nutrient loading to the waters of the basin, in particular Dissolved Reactive Phosphorous, and finding of solutions to the resurgence of harmful algal blooms in the basin's streams and in Western Basin of Lake Erie.*



*Reduction of flooding problems and improved water management in the watershed including improved storm water management and improved drainage water management.*



*Protection and restoration of habitat in the Western Lake Erie Basin and the nearshore area, including wetlands, riparian corridors, and the stream system of the basin. And protection from the introduction of invasive species.*

These themes are further reinforced in the priorities, goals, and actions in the State of Ohio *2008 Lake Erie Protection and Restoration Plan*, adopted by the Ohio Lake Erie Commission, as well as the U.S. EPA *2000 Lake Erie Lakewide Management Plan (LaMP)*. These plans are available at: <http://www.lakeerie.ohio.gov/Portals/0/Reports/2008LEPRplan.pdf> and <http://www.epa.gov/glnpo/lakeerie/lamp2000/index.html>



## ASSESSMENT FINDINGS OF NEEDED CONSERVATION PRACTICES

NRCS analysis of the HUC Unit Data Profiles supported the need for conservation practices to address the broad themes above identified in the March 2009 WLEB Conference, and the Goals and Actions of the Lake Erie Protection and Restoration Plan. The assessment identified 14 critical conservation practices that need to be applied in large amounts in the watershed in order to address the resource concerns documented in the WLEB project area and in Lake Erie. *These conservation practices, their purpose, and the derived environmental benefits are:*



### ***Conservation Cropping Systems (Crop Rotations) -***

Conservation crop rotations improve soil structure, soil tilth by incorporating more high residue producing crops in the rotation, use of cover crops, and by minimizing oxidation of crop residue through tillage. Improved crop rotations decrease surface runoff volumes through better infiltrative and water holding capacities of the soil resulting in decreased runoff amounts and reduced soil erosion losses.



### ***Comprehensive Nutrient Management Plans -***

Comprehensive Nutrient Management Plans (CNMPs) incorporate environmentally safe methods of storing, applying, and utilizing animal waste into a comprehensive plan for managing the livestock operation. CNMPs reduce nutrient losses in runoff and improve water quality of receiving waters.



***Cover Crops*** - Cover crops are grasses, small grains, or legumes planted after harvest to protect the soil and hold nutrients until the next crop is planted. Cover crops prevent nutrients from leaching or leaving in runoff waters, improve soil tilth and quality, and reduce erosion. Cover crops work in union with conservation cropping systems and conservation tillage.



***Drainage Water Management*** - Drainage water management utilizes special water control structures in tile drainage systems to raise the water table in crop fields during the noncrop period when improved drainage is not needed. The elevated water table reduces nitrate loss to receiving waters and reduces volumes of runoff water leaving crop fields under certain conditions.



**Field Border Plantings** - Field borders are plantings of perennial grasses, forbs, and legumes around the perimeters of crop fields. These plantings capture and filter nutrients in runoff, provide food and nectar for crop pollinators, and provide habitat and nesting cover. *Field border plantings are generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*



**Filter Strips and Herbaceous Riparian Cover** - Filter strips are plantings of perennial grasses, legumes, and forbs adjacent to watercourses. These areas reduce erosion, trap pollutants and nutrients, improve water quality, and provide habitat. *Filter strips are generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*



**Field Windbreaks** - Field windbreaks are planted rows of trees to reduce wind velocities and wind erosion. Field windbreaks provide improved crop yields, prevent moisture loss, reduce wind erosion, control spray drift, provide habitat and carbon sequestration, and control blowing snow to improve highway visibilities. *Planting field windbreaks is generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*



**Grade Stabilization Structures** - Grade stabilization structures control bank and gully erosion to improve water quality and allow drainage water management.



**Grassed Waterways** - Grassed waterways control ephemeral gully erosion. They reduce sediment delivery to receiving waters and eventually to the harbor and Lake Erie. *Grassed waterways are generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*





**Nutrient Management** - Nutrient management is the use of approved and proper prescriptions for fertilizer amounts and application methods and timing, based on proper soil testing and crop yield goals. Nutrient management is one of the most important practices for reducing the export of dissolved reactive phosphorous from the watershed. Nutrient management takes two forms:



*Traditional nutrient management* involves traditional soil testing methods.

*Precision nutrient management* incorporates Global Positioning (GPS) Technology, combined with yield monitor maps, and Geo-referenced application methods to more precisely apply only what the crop needs and can use and only where it is needed. Precision nutrient management is state of the art conservation.



**Residue Management (Conservation Tillage)** - Residue management/conservation tillage is the use of crop production methods that maintain protective crop residue on the soil surface. The two important methods are mulch till and no-till. *These two practices are the most important conservation practices to control soil erosion in the Western Lake Erie Basin.* Research and modeling conducted in the basin shows that these methods reduce surface runoff volumes and intensities as compared to traditional moldboard plow methods. These practices are also important to climate change mitigation as they sequester carbon in the soil profile. In the winter months, undisturbed cornstalks also provide wildlife food and cover.



**Riparian Forest Buffers** - Riparian forest buffers are strips of native trees maintained along watercourses to control bank erosion, reduce runoff, intercept nutrients, sequester carbon, and provide habitat. Riparian forests are an important practice in buffering and protecting natural streams. *Planting riparian buffers is generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*



**Waste Storage Facilities** - Waste storage facilities include tanks, storage ponds, and stacking facilities that are designed to store animal waste in a safe and environmentally acceptable manner until it can safely be field applied for utilization by crops. Proper planning and design includes geologic foundation investigations, proper location of the facility, and a plan for proper utilization and application of the waste. Storage facilities are important components of the waste utilization system in that they allow waste to be held in winter months and at times of the year when it should not be applied.



**Waste Utilization** - Waste utilization is the planning of a system to store, test, and apply animal waste in a manner that minimizes environmental risks and impacts. A waste utilization plan is a component of a comprehensive nutrient management plan and specifies the time, placement, and amounts of waste applied. It incorporates soil testing, waste testing, nutrient application prescriptions, application setbacks and restrictions, and timing prescriptions.



**Wetland Restoration** - Wetland restoration involves converting cropland and other drained areas into wetlands. Wetlands provide benefits of flow attenuation, reduced runoff, filtering of nutrients, and provide habitat. *Wetland restoration is generally a cropland retirement action which involves a Farm Bill program easement or lease payment to compensate landowners for acres lost to production.*

While there are certainly other needed practices, the above practices are the critical practices in the watershed to address the major resource concerns. The NRCS assessment dealt strictly with cropland agricultural conservation practices and did not include conservation needs for urban land. In these watersheds, only cropland was assessed since that is by far the predominant land use.

## ASSESSMENT PROCESS AND CONSERVATION TREATMENT NEEDS AND ASSUMPTIONS

NRCS determined the needed quantities of each of the above conservation practices by 8-Digit HUC Units. The practice amounts were determined based on knowledge of the watershed, consultations with field personnel, analysis of USDA Agricultural Statistics Publications, NRCS records, and GIS data for the watershed. The quantities were then totaled to provide a project total for the entire WLEB project area. *The needed amounts represent a best professional estimate. For most practices, specific goals were established:*

<b>CNMPs</b>	The number of needed CNMPs was based on field office estimates.
<b>Cover Crops</b>	A goal was adopted to have 1 in 6 acres on participating farms in cover crops.
<b>Drainage Management</b>	For drainage water management, a goal was established of 30-50 acres under drainage water management per each 240-acre treatment unit, depending on the HUC unit topography.
<b>Field Borders</b>	The headwater watersheds were goaled with 1.7 acres of field borders per 240-acre treatment unit.
<b>Filter Strips</b>	Filter strips were goaled at 4.7 -6.6 acres per 240-acre treatment unit depending on watershed slope and existing installations. Amounts were based on the GIS number of miles of 1-3 order streams in each HUC unit.
<b>Erosion Structures</b>	These were goaled at 4-5 per 240-acre treatment unit.
<b>Grassed Waterways</b>	Grassed waterways were goaled at .4 to 1.2 acres per 240-acre treatment unit.
<b>Nutrient Management</b>	Traditional nutrient management was goaled at 180 acres traditional and 60 acres precision per 240 acres RMS treatment unit.
<b>Residue Management</b>	Residue management was calculated at 40 acres mulch till, 120 acres no-till and 40 acres no-till with controlled traffic. Essentially residue management was goaled to cover 75 percent of the watershed with conservation tillage.
<b>Riparian Forests</b>	Riparian forest buffers were goaled based on the GIS miles of 3-7 order streams in each HUC unit and adjusted for existing buffers. Goal ranged from .6 to .9 acres per 240-acre treatment unit.
<b>Waste Storage</b>	Waste structures were calculated at 20 percent of needed CNMPs.
<b>Wetlands</b>	Wetland restorations were calculated at 1.5 to 4 acres per 240-acre treatment unit and adjusted for location of the HUC unit in proximity to Lake Erie and other habitat.
<b>Windbreaks</b>	Windbreaks were calculated at 500-2000 feet per 240-acre treatment unit for the HUC units in the flat open landscapes of the watersheds.



For each practice in each HUC unit, the percent of treatment units needing the practice and percent farmer adoption rate was adjusted based on HUC unit conditions and local knowledge.

NRCS used the Oregon NRCS Assessment Matrix Calculator and modified it with Ohio practice codes and Ohio Fiscal Year 2009 practice costs. All watersheds were calculated using:

- A 5-year program with 15 percent of the watershed landowners participating affecting 22 percent of the non-RMS watershed acres
- 75 percent cost-share rate
- Technical Assistance as 20 percent of Financial Assistance
- 5 percent interest rate
- 240 acres typical treatment unit size



*Panoramic view of the Toussaint River (at flood stage), Western Lake Erie Watershed and Lake Erie*



**ASSESSMENT FINDINGS**  
**NEEDED CONSERVATION PRACTICE TOTALS AND INSTALLATION COSTS**

Practice installation cost-share costs were calculated for all practices using the Oregon RWS Matrix Calculator and the Ohio EQIP practice cost list. The Oregon calculator added technical assistance costs and converted 3-year management practices to present value. For practices typically installed through a land retirement program such as WRP or CRP, Ohio NRCS added an additional cost to include the average land rental payment for that type of practice (for duration of the typical 15-year contract period).

The installation and maintenance costs from the Oregon calculator and the Ohio CRP/WRP easement costs were combined to calculate the total program costs and total staff years needed.

Table 1 contains the resulting composite project area practice needs (in units), USDA program cost, and NRCS staff years for the projected program.

*Table 1- Composite Conservation Treatment Needs for Five-Year Program in Western Lake Erie Basin*

<i>Financial Assistance for Conservation Practice Installation</i>			
<b>Practice</b>	<b>Units</b>	<b>Amount</b>	<b>Cost</b>
Comprehensive Nutrient Management Plan -oh100	Number	171	\$767,896
Conservation Crop Rotation -oh328	Acres	302,884	\$7,045,902
Cover Crop -oh340	Acres	20,131	\$2,027,078
Drainage Water Management -oh554	Acres	5,980	\$140,902
Field Border -oh386	Acres	322	\$90,389
Filter Strip -oh393	Acres	2,528	\$1,012,582
Grade Stabilization Structure -oh410	Acres	6,946	\$16,785,828
Grassed Waterway -oh412	Acres	1,145	\$5,114,224
Nutrient Management - Precision -oh590A	Acres	91,229	\$9,095,337
Nutrient Management - Traditional -oh590	Acres	186,308	\$6,191,489
Residue Management, Mulch Till -oh345	Acres	71,364	\$2,608,755
Residue Management, No-Till/Strip Till w/ Cntrld Traffic Level I-oh	Acres	59,172	\$8,178,348
Residue Management, No-Till/Strip Till -oh329	Acres	118,179	\$5,891,080
Riparian Forest Buffer -oh391	Acres	1,028	\$801,360
Waste Storage Facility -oh313	Number	53	\$3,410,939
Waste Utilization -oh633	Acres	70,462	\$8,235,460
Wetland Restoration -oh657	Acres	2,410	\$722,224
Windbreak/Shelterbelt Establishment -oh380	Feet	92,187	\$29,869
Comprehensive Nutrient Management Plan -oh100	Number	171	\$767,896
<b><i>Subtotal – Conservation Practice Cost Share Incentives</i></b>			<b><i>\$78,149,661</i></b>
<i>Conservation Practice Installation Financial Assistance</i>			
Conservation Reserve Program (CRP) Needs For Land Retirement - Filter Strips, Riparian Forests, Grassed Waterway, and Windbreak Practices	Acres	5087	\$13,734,351
Wetland Reserve Program (WRP) Needs for Land Retirement for Wetland Restoration	Acres	2410	\$7,229,467
<b><i>Subtotal–Conservation Practice Easement and Land Retirement Costs</i></b>			<b><i>\$20,963,818</i></b>
<b><i>Total USDA Financial Assistance and Program Costs</i></b>			<b><i>\$99,113,479</i></b>
<i>Conservation Technical Assistance Needs - Needed Staff Years (Per Year)</i>			
<b>Item</b>			<b># Staff Years</b>
TA Staff Years Per Year for EQIP/WHIP			27.6
TA Staff Years Per Year for CRP			4.6
TA Staff Years Per Year for WRP			2.4
<b><i>Total NRCS Staff Years Per Year</i></b>			<b><i>34.6</i></b>

NRCS also analyzed the applicability of the various USDA Farm Bill programs to provide incentives for the important conservation practices identified. Table 2 identifies the USDA Farm Bill programs and the practices they support.

*Table 2 - Practices Supported By Individual USDA Programs*

	CTA	EQIP	WRP	WHIP	CSP	CRP/ CREP
Comprehensive Nutrient Management Plan-oh100	x	x				
Conservation Crop Rotation -oh328	x	x			x	
Cover Crop -oh340	x	x		x	x	
Drainage Water Management -oh554	x	x				x
Field Border -oh386	x	x	x	x	x	x
Filter Strip -oh393	x	x			x	x
Field Windbreak	x	x		x		x
Grade Stabilization Structure -oh410	x	x				x
Grassed Waterway -oh412	x	x				x
Nutrient Management - Precision -oh590A	x	x			x	
Nutrient Management - Traditional -oh590	x	x			x	
Residue Management, Mulch Till -oh345	x	x				
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	x	x			x	
Residue Management, No-Till/Strip Till -oh329	x	x			x	
Riparian Forest Buffer -oh391	x	x			x	x
Waste Storage Facility -oh313	x	x				
Waste Utilization -oh633	x	x				
Wetland Restoration -oh657	x	x	x	x		x

CTA = Conservation Technical Assistance  
EQIP = Environmental Quality Incentives Program  
WRP = Wetlands Reserve Program  
WHIP = Wildlife Habitat Incentives Program  
CSP = Conservation Security Program  
CRP/CREP = Conservation Reserve Program and Conservation Reserve Enhancement Program

## PROJECT BENEFITS

The rapid watershed assessment process did not quantify the benefits of the applied Conservation Practices as that would require a detailed watershed model and was beyond the scope of this assessment. The benefits of these practices have been well established in the research literature and many of these benefits were modeled and reported in the Upper Auglaize Watershed AGNPS Watershed Modeling project at: [http://www.oh.nrcs.usda.gov/programs/agnps/up\\_auglaize\\_ws\\_agnps\\_final\\_report.html](http://www.oh.nrcs.usda.gov/programs/agnps/up_auglaize_ws_agnps_final_report.html))

However, NRCS did utilize the Field Office Technical Guide Conservation Practical Physical Effects (CPPE) Ratings to identify the benefits of applying the selected conservation practices to the project area. The benefits that would be accrued include:

- ***Reduced sheet and rill soil erosion and reduced sediment delivery to Toledo Harbor and Lake Erie***
- ***Reduced ephemeral gully erosion and reduced sediment delivery to Toledo Harbor and Lake Erie***
- ***Reduced wind erosion***
- ***Improved soil quality to allow greater infiltration of rainfall and reduced flashiness of the streams in the watershed***
- ***An increase in restored wetlands in the watershed and in surface runoff retention on fields in the watershed***
- ***Reduced nutrient exports from the watershed including reduced phosphorous export***
- ***Improved water quality in streams in the project area and in Lake Erie***
- ***Increased plant diversity in the watershed and an increase in restored or improved habit***
- ***Improved management of livestock wastes in the watershed***

## SUMMARY

NRCS analyzed eight 8-digit Hydrologic Units in the Western Lake Erie Basin project area for conservation treatment needs. The assessment identified 17 critical conservation practices. A proposed 5-year program targeting participation of 15 percent of the landowners in the watershed would affect 22 percent of the non-RMS treated areas. The project would require total USDA funding of \$99,113,479 and an additional 34.6 staff years, per year, of technical assistance to service the 30 counties with land in the project area.

The cost of the project would provide protection and environmental improvement to a 4.94 million acre WLEB project area which would equate to approximately \$4.10 per watershed acre per year over the 5-year period. The benefits would accrue not only to the watershed, but to Lake Erie.



## APPENDICES



**APPENDIX 1 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS**

<b>Western Lake Erie Basin Conservation Treatment Needs</b>						
Summary of Needs - 5 Year Treatment Program						
<b>Practices</b>	<b>New RMS Units</b>	<b>New Prog Units</b>	<b>Total New Units</b>	<b>RMS USDA Present Value Cost</b>	<b>Prog USDA Present Value Cost</b>	<b>Total Present Value Cost</b>
Comprehensive Nutrient Management Plan -oh100	45	126	171	\$200,321	\$567,575	\$767,896
Conservation Crop Rotation -oh328	302,884	0	302,884	\$7,045,902	\$0	\$7,045,902
Cover Crop -oh340	12,196	7,935	20,131	\$1,228,030	\$799,049	\$2,027,078
Drainage Water Management -oh554	5,980	0	5,980	\$140,902	\$0	\$140,902
Field Border -oh386	322	0	322	\$90,389	\$0	\$90,389
Filter Strip -oh393	1,405	1,123	2,528	\$562,856	\$449,726	\$1,012,582
Grade Stabilization Structure -oh410	5,669	1,278	6,946	\$13,698,546	\$3,087,282	\$16,785,828
Grassed Waterway -oh412	706	438	1,145	\$3,155,397	\$1,958,828	\$5,114,224
Nutrient Management - Precision -oh590A	72,885	18,345	91,229	\$7,266,416	\$1,828,920	\$9,095,337
Nutrient Management - Traditional -oh590	64,617	121,691	186,308	\$2,147,380	\$4,044,109	\$6,191,489
Residue Management; Mulch Till -oh345	35,490	35,873	71,364	\$1,297,375	\$1,311,380	\$2,608,755
Residue Management; No-Till/Strip Till w/ Controlled Traffic Level I -oh	54,398	4,774	59,172	\$7,518,492	\$659,856	\$8,178,348
Residue Management; No-Till/Strip Till -oh329	76,700	41,480	118,179	\$3,823,378	\$2,067,702	\$5,891,080
Riparian Forest Buffer -oh391	1,028	0	1,028	\$801,360	\$0	\$801,360
Waste Storage Facility -oh313	53	0	53	\$3,410,939	\$0	\$3,410,939
Waste Utilization -oh633	70,462	0	70,462	\$8,235,460	\$0	\$8,235,460
Wetland Restoration -oh657	1,839	571	2,410	\$551,049	\$171,175	\$722,224
Windbreak/Shelterbelt Establishment -oh380	92,187	0	92,187	\$29,869	\$0	\$29,869
<b>Total Practice Installation Cost Share (EQIP/WHIP/CRP Program Cost)</b>				<b>\$61,204,060</b>	<b>\$16,945,600</b>	<b>\$78,149,661</b>
<b>Total Land Rental Needs - CRP Program Cost plus 20% TA</b>						<b>\$13,734,351</b>
<b>Total Land Rental Needs - WRP Program Cost plus 20% TA</b>						<b>\$7,229,467</b>
<b>Total Costs</b>						<b>\$99,113,479</b>
<b>TA Staff Years Per Year for EQIP/WHIP</b>				<b>Staff Years Per Year</b>		<b>27.6</b>
<b>TA Staff Years Per Year for CRP</b>				<b>Staff Years Per Year</b>		<b>4.6</b>
<b>TA Staff Years Per Year for WRP</b>				<b>Staff Years Per Year</b>		<b>2.4</b>
<b>Total Staff Years Per Year</b>				<b>Staff Years Per Year</b>		<b>34.6</b>
<b>Easement and Land Retirement Program Needs</b>						
	<b>Total Acres</b>	<b>Average Rental Rate Per</b>	<b>Total Dollars Per 15 Year</b>			
<b>Conservation Reserve Program (CRP) Needs For Land Retirement - Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices</b>	\$ 5,087	\$ 150	\$ 11,445,292			
<b>Wetlands Reserve Program (WRP) Needs for Land Retirement Wetland Restoration</b>	Total Acres 2,410	Average Easement \$ 2,500	Total of Easement Cost 6,024,556			

**APPENDIX 2 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE AUGLAIZE WATERSHED**

Practices	Auglaize - 5 year projection						Total Present Value Cost
	20% TA		75% Cost Share			Prog USDA Present Value Cost	
	New RMS Units	New Prog Units	Total New Units	RMS USDA Present Value Cost	Prog USDA Present Value Cost		
Comprehensive Nutrient Management Plan -oh100	9	27	36	\$42,409	\$120,160	\$162,569	
Conservation Crop Rotation -oh328	73,099	0	73,099	\$1,700,474	\$0	\$1,700,474	
Cover Crop -oh340	2,943	1,915	4,858	\$296,375	\$192,844	\$489,220	
Drainage Water Management -oh554	1,771	0	1,771	\$41,737	\$0	\$41,737	
Field Border -oh386	152	0	152	\$42,763	\$0	\$42,763	
Filter Strip -oh393	292	245	537	\$116,930	\$98,133	\$215,063	
Grade Stabilization Structure -oh410	1,466	338	1,804	\$3,541,479	\$816,696	\$4,358,175	
Grassed Waterway -oh412	91	56	147	\$405,454	\$251,701	\$657,155	
Nutrient Management - Precision -oh590A	17,434	4,225	21,658	\$1,738,082	\$421,180	\$2,159,262	
Nutrient Management - Traditional -oh590	15,751	29,572	45,323	\$523,457	\$982,753	\$1,506,210	
Residue Management, Mulch Till -oh345	14,171	0	14,171	\$518,036	\$0	\$518,036	
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	11,622	2,816	14,439	\$1,606,374	\$389,264	\$1,995,638	
Residue Management, No-Till/Strip Till -oh329	19,422	9,857	29,279	\$968,142	\$491,377	\$1,459,519	
Riparian Forest Buffer -oh391	213	0	213	\$165,675	\$0	\$165,675	
Waste Storage Facility -oh313	7	0	7	\$429,269	\$0	\$429,269	
Waste Utilization -oh633	17,005	0	17,005	\$1,987,565	\$0	\$1,987,565	
Wetland Restoration -oh657	266	0	266	\$79,633	\$0	\$79,633	
<b>Practice Totals</b>			<b>224,765</b>			<b>\$ 17,967,963</b>	
<b>Estimated Cost Per Year Distributed Over 5 Years</b>						<b>\$ 3,593,593</b>	
<b>Estimated Staff Years Needed</b>	<b>6.3</b>	Estimated FTE Staff Needed Per Year over 5 yrs					
<b>Easement and Land Retirement Program Needs</b>							
	Total Acres		Average Rental Rate Per		Total Dollars Per 15 Year		
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	1,049	\$	150	\$	\$	2,360,250	
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	266	\$	Average Easement	Total of Easement Cost		664,272	



**APPENDIX 3 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE BLANCHARD RIVER WATERSHED**

<b>Blanchard - 5 year projection</b>						
	20% TA		75% Cost Share		Prog USDA Present Value Cost	Total Present Value Cost
	New RMS Units	New Prog Units	Total New Units	RMS USDA Present Value Cost		
<b>Conservation Practice Installations</b>						
Comprehensive Nutrient Management Plan -oh100	5	13	17	\$20,514	\$58,122	\$78,636
Conservation Crop Rotation -oh328	34,160	0	34,160	\$794,650	\$0	\$794,650
Cover Crop -oh340	1,375	895	2,270	\$138,500	\$90,118	\$228,618
Drainage Water Management -oh554	497	0	497	\$11,703	\$0	\$11,703
Filter Strip -oh393	111	93	204	\$44,373	\$37,425	\$81,797
Grade Stabilization Structure -oh410	685	158	843	\$1,654,972	\$381,651	\$2,036,623
Grassed Waterway -oh412	127	79	206	\$568,420	\$352,867	\$921,287
Nutrient Management - Precision -oh590A	8,147	1,974	10,121	\$812,225	\$196,822	\$1,009,047
Nutrient Management - Traditional -oh590	7,361	13,819	21,180	\$244,617	\$459,251	\$703,869
Residue Management, Mulch Till -oh345	1,858	5,923	7,781	\$67,923	\$216,504	\$284,427
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	6,622	0	6,622	\$915,298	\$0	\$915,298
Residue Management, No-Till/Strip Till -oh329	9,076	4,606	13,682	\$452,423	\$229,626	\$682,049
Riparian Forest Buffer -oh391	99	0	99	\$77,422	\$0	\$77,422
Waste Storage Facility -oh313	4	0	4	\$259,551	\$0	\$259,551
Waste Utilization -oh633	7,947	0	7,947	\$928,811	\$0	\$928,811
Wetland Restoration -oh657	88	39	128	\$26,504	\$11,833	\$38,338
Windbreak/Shelterbelt Establishment -oh380	6,622	0	6,622	\$2,146	\$0	\$2,146
<b>Practice Totals</b>			<b>112,385</b>			<b>\$ 9,054,271</b>
<b>Estimated Cost Per Year Distributed Over 5 years</b>						<b>\$ 1,810,854</b>
<b>Estimated Staff Years Needed</b>	<b>3.2</b>	Estimated FTE Staff Needed Per Year over 5 yrs				
<b>Easement and Land Retirement Program Needs</b>						
	Total Acres	Average Rental Rate Per		Total Dollars Per 15 Year		
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	514	\$	150	\$		1,157,192
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	Total Acres	Average Easement		Total of Easement Cost		
	128	\$	2,500	\$		319,801

**APPENDIX 4 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE CEDAR PORTAGE WATERSHED**

<b>Cedar Portage - 5 year projection</b>						
	20% TA		75% Cost Share			
	New RMS Units	New Prog Units	Total New Units	RMS USDA Present Value Cost	Prog USDA Present Value Cost	Total Present Value cost
<b>Conservation Practice Installations</b>						
Comprehensive Nutrient Management Plan -oh100	2	7	9	\$10,664	\$30,215	\$40,878
Conservation Crop Rotation -oh328	38,099	0	38,099	\$886,276	\$0	\$886,276
Cover Crop -oh340	1,534	998	2,532	\$154,469	\$100,509	\$254,978
Drainage Water Management -oh554	923	0	923	\$21,753	\$0	\$21,753
Filter Strip -oh393	511	104	616	\$204,787	\$41,740	\$246,527
Grade Stabilization Structure -oh410	764	176	940	\$1,845,795	\$425,656	\$2,271,452
Grassed Waterway -oh412	47	29	77	\$211,320	\$131,185	\$342,505
Nutrient Management - Precision -oh590A	9,086	2,202	11,288	\$905,876	\$219,516	\$1,125,393
Nutrient Management - Traditional -oh590	8,210	15,413	23,622	\$272,822	\$512,204	\$785,027
Residue Management, Mulch Till -oh345	2,072	6,605	8,678	\$75,755	\$241,468	\$317,222
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	7,386	0	7,386	\$1,020,834	\$0	\$1,020,834
Residue Management, No-Till/Strip Till -oh329	10,122	5,138	15,260	\$504,589	\$256,102	\$760,691
Riparian Forest Buffer -oh391	129	0	129	\$100,740	\$0	\$100,740
Waste Storage Facility -oh313	2	0	2	\$134,926	\$0	\$134,926
Waste Utilization -oh633	8,863	0	8,863	\$1,035,905	\$0	\$1,035,905
Wetland Restoration -oh657	895	235	1,130	\$268,334	\$70,388	\$338,722
Windbreak/Shelterbelt Establishment -oh380	49,855	0	49,855	\$16,153	\$0	\$16,153
<b>Practice Totals</b>			<b>169,409</b>			<b>\$ 9,699,982</b>
<i>Estimated Cost Per Year Distributed Over 5 years</i>						<b>\$ 1,939,996</b>
<b>Estimated Staff Years Needed</b>	<b>3.4</b>	<b>Estimated FTE Staff Needed Per Year over 5 yrs</b>				
<b>Easement and Land Retirement Program Needs</b>						
	<b>Total Acres</b>	<b>Average Rental Rate Per</b>		<b>Total Dollars Per 15 Year</b>		
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	856	\$	150	\$		1,925,515
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	1,130	\$	2,500	\$		2,825,507

**APPENDIX 5 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE LOWER MAUMEE WATERSHED**

<b>Lower Maumee - 5 year projection</b>									
		20% TA		75% Cost Share					
	<b>New RMS Units</b>	<b>New Prog Units</b>	<b>Total New Units</b>	<b>RMS USDA Present Value Cost</b>	<b>Prog USDA Present Value Cost</b>	<b>Total Present Value cost</b>			
<b>Conservation Practice Installations</b>									
Comprehensive Nutrient Management Plan -oh100	11	31	42	\$49,656	\$140,691	\$190,347			
Conservation Crop Rotation -oh328	44,150	0	44,150	\$1,027,050	\$0	\$1,027,050			
Cover Crop -oh340	1,778	1,157	2,934	\$179,004	\$116,474	\$295,478			
Drainage Water Management -oh554	1,070	0	1,070	\$25,208	\$0	\$25,208			
Filter Strip -oh393	201	168	369	\$80,365	\$67,445	\$147,810			
Grade Stabilization Structure -oh410	717	153	870	\$1,733,501	\$369,950	\$2,103,451			
Grassed Waterway -oh412	55	34	89	\$244,886	\$152,022	\$396,907			
Nutrient Management - Precision -oh590A	10,529	2,552	13,081	\$1,049,764	\$254,384	\$1,304,147			
Nutrient Management - Traditional -oh590	9,513	17,861	27,374	\$316,157	\$593,562	\$909,719			
Residue Management, Mulch Till -oh345	2,401	7,655	10,056	\$87,787	\$279,822	\$367,609			
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	8,559	0	8,559	\$1,182,981	\$0	\$1,182,981			
Residue Management, No-Till/Strip Till -oh329	11,730	5,954	17,684	\$584,737	\$296,781	\$881,518			
Riparian Forest Buffer -oh391	193	0	193	\$150,096	\$0	\$150,096			
Waste Storage Facility -oh313	8	0	8	\$502,619	\$0	\$502,619			
Waste Utilization -oh633	10,271	0	10,271	\$1,200,446	\$0	\$1,200,446			
Wetland Restoration -oh657	114	51	165	\$34,256	\$15,294	\$49,550			
Windbreak/Shelterbelt Establishment -oh380	17,118	0	17,118	\$5,546	\$0	\$5,546			
<b>Practice Totals</b>			<b>154,034</b>			<b>\$ 10,740,483</b>			
<b>Estimated Cost Per Year Distributed Over 5 years</b>						<b>\$ 2,148,097</b>			
<b>Estimated Staff Years Needed</b>	<b>3.8</b>	<b>Estimated FTE Staff Needed Per Year over 5 yrs</b>							
<b>Easement and Land Retirement Program Needs</b>									
	<b>Total Acres</b>		<b>Average Rental Rate Per</b>	<b>Total Dollars Per 15 Year</b>					
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	662	\$	150	\$	1,490,074				
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	165	\$	2,500	\$	413,329				

**APPENDIX 6 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE ST. JOSEPH WATERSHED**

<b>St Joseph - 5 year projection</b>									
<b>Practices</b>	<b>20% TA</b>		<b>75% Cost Share</b>			<b>Total Present Value cost</b>			
	<b>New RMS Units</b>	<b>New Prog Units</b>	<b>Total New Units</b>	<b>RMS USDA Present Value Cost</b>	<b>Prog USDA Present Value Cost</b>				
Comprehensive Nutrient Management Plan -oh100	4	12	17	\$19,826	\$56,174	\$76,000			
Conservation Crop Rotation -oh328	33,876	0	33,876	\$788,043	\$0	\$788,043			
Cover Crop -oh340	1,364	888	2,252	\$137,348	\$89,369	\$226,717			
Drainage Water Management -oh554	493	0	493	\$11,605	\$0	\$11,605			
Field Border -oh386	71	0	71	\$19,818	\$0	\$19,818			
Filter Strip -oh393	45	127	172	\$17,988	\$50,966	\$68,954			
Grade Stabilization Structure -oh410	679	157	836	\$1,641,212	\$378,478	\$2,019,689			
Grassed Waterway -oh412	126	78	204	\$563,693	\$349,933	\$913,627			
Nutrient Management - Precision -oh590A	8,079	1,958	10,037	\$805,471	\$195,185	\$1,000,657			
Nutrient Management - Traditional -oh590	7,300	13,704	21,004	\$242,583	\$455,433	\$698,016			
Residue Management, Mulch Till -oh345	6,567	0	6,567	\$240,071	\$0	\$240,071			
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	4,796	1,958	6,753	\$662,808	\$270,592	\$933,400			
Residue Management, No-Till/Strip Till -oh329	9,000	4,568	13,569	\$448,662	\$227,716	\$676,378			
Riparian Forest Buffer -oh391	148	0	148	\$115,167	\$0	\$115,167			
Waste Storage Facility -oh313	8	0	8	\$501,698	\$0	\$501,698			
Waste Utilization -oh633	7,881	0	7,881	\$921,088	\$0	\$921,088			
Wetland Restoration -oh657	139	209	348	\$41,771	\$62,586	\$104,358			
<b>Practice Totals</b>			<b>104,235</b>			<b>\$ 9,315,285</b>			
<b>Estimated Cost Per Year Distributed Over 5 Years</b>						<b>\$ 1,863,057</b>			
<b>Estimated Staff Years Needed</b>	<b>3.3</b>	<b>Estimated FTE Staff Needed Per Year over 5 yrs</b>							
<b>Easement and Land Retirement Program Needs</b>									
	<b>Total Acres</b>	<b>Average Rental Rate Per</b>	<b>Total Dollars Per 15 Year</b>						
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	595	\$ 150	\$	1,338,891					
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	348	Average Easement	Total of Easement Cost						
	\$	2,500	\$	870,517					

**APPENDIX 7 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE ST. MARY'S WATERSHED**

<b>St Mary's - 5 year projection</b>									
<b>Practices</b>	<b>20% TA</b>			<b>75% Cost Share</b>			<b>Prog USDA Present Value Cost</b>	<b>Total Present Value Cost</b>	
	<b>New RMS Units</b>	<b>New Prog Units</b>	<b>Total New Units</b>	<b>RMS USDA Present Value Cost</b>	<b>Total New Units</b>	<b>Prog USDA Present Value Cost</b>			
Comprehensive Nutrient Management Plan -oh100	7	21	29	\$33,585			\$95,157	\$128,742	
Conservation Crop Rotation -oh328	32,996	0	32,996	\$767,585			\$0	\$767,585	
Cover Crop -oh340	1,329	864	2,193	\$133,782			\$87,049	\$220,831	
Drainage Water Management -oh554	480	0	480	\$11,304			\$0	\$11,304	
Field Border -oh386	69	0	69	\$19,303			\$0	\$19,303	
Filter Strip -oh393	71	202	274	\$28,618			\$81,083	\$109,701	
Grade Stabilization Structure -oh410	536	114	651	\$1,295,565			\$276,489	\$1,572,055	
Grassed Waterway -oh412	123	76	199	\$549,060			\$340,849	\$889,909	
Nutrient Management - Precision -oh590A	7,869	1,907	9,776	\$784,561			\$190,118	\$974,679	
Nutrient Management - Traditional -oh590	7,110	13,349	20,459	\$236,286			\$443,610	\$679,896	
Residue Management, Mulch Till -oh345	5,891	7,628	13,518	\$215,334			\$278,840	\$494,174	
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	6,397	0	6,397	\$884,124			\$0	\$884,124	
Residue Management, No-Till/Strip Till -oh329	4,993	5,085	10,078	\$248,903			\$253,491	\$502,394	
Riparian Forest Buffer -oh391	96	0	96	\$74,785			\$0	\$74,785	
Waste Storage Facility -oh313	19	0	19	\$1,189,815			\$0	\$1,189,815	
Waste Utilization -oh633	7,676	0	7,676	\$897,176			\$0	\$897,176	
Wetland Restoration -oh657	200	0	200	\$59,910			\$0	\$59,910	
<b>Practice Totals</b>			<b>105,110</b>					<b>\$ 9,476,383</b>	
<b>Estimated Cost Per Year Distributed Over 5 years</b>								<b>\$ 1,895,277</b>	
<b>Estimated Staff Years Needed</b>	<b>3.3</b>	<b>Estimated FTE Staff Needed Per Year over 5 yrs</b>							
<b>Easement and Land Retirement Program Needs</b>									
	<b>Total Acres</b>			<b>Average Rental Rate Per</b>			<b>Total Dollars Per 15 Year</b>		
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	638	\$	150	\$	1,435,500				
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	200	\$	2,500	\$	499,748				



**APPENDIX 8 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE UPPER MAUMEE WATERSHED**

Upper Maumee - 5 year projection									
Practices	20% TA			75% Cost Share			Total Present Value Cost		
	New RMS Units	New Prog Units	Total New Units	RMS USDA Present Value Cost	Prog USDA Present Value Cost	Total Present Value Cost			
Comprehensive Nutrient Management Plan -oh100	2	5	6	\$7,399	\$20,963	\$28,361			
Conservation Crop Rotation -oh328	14,538	0	14,538	\$338,191	\$0	\$338,191			
Cover Crop -oh340	585	381	966	\$58,943	\$38,353	\$97,296			
Drainage Water Management -oh554	282	0	282	\$6,641	\$0	\$6,641			
Field Border -oh386	30	0	30	\$8,505	\$0	\$8,505			
Filter Strip -oh393	33	95	128	\$13,381	\$37,912	\$51,292			
Grade Stabilization Structure -oh410	181	34	215	\$437,298	\$81,212	\$518,510			
Grassed Waterway -oh412	18	11	29	\$80,637	\$50,058	\$130,695			
Nutrient Management - Precision -oh590A	4,116	1,680	5,796	\$410,357	\$167,529	\$577,886			
Nutrient Management - Traditional -oh590	2,484	5,041	7,525	\$82,543	\$167,529	\$250,072			
Residue Management, Mulch Till -oh345	791	2,521	3,311	\$28,907	\$92,141	\$121,048			
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	2,818	0	2,818	\$389,537	\$0	\$389,537			
Residue Management, No-Till/Strip Till -oh329	3,863	1,960	5,823	\$192,545	\$97,725	\$290,270			
Riparian Forest Buffer -oh391	42	0	42	\$32,949	\$0	\$32,949			
Waste Storage Facility -oh313	3	0	3	\$187,222	\$0	\$187,222			
Waste Utilization -oh633	3,382	0	3,382	\$395,288	\$0	\$395,288			
Wetland Restoration -oh657	53	0	53	\$15,837	\$0	\$15,837			
<b>Practice Totals</b>			<b>44,949</b>			<b>\$ 3,439,602</b>			
<b>Estimated Cost Per Year Distributed Over 5 years</b>						<b>\$ 687,920</b>			
<b>Estimated Staff Years Needed</b>	<b>1.3</b>	Estimated FTE Staff Needed Per Year over 5 yrs							
<b>Easement and Land Retirement Program Needs</b>									
	Total Acres		Average Rental Rate Per		Total Dollars Per 15 Year				
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	230	\$	150	\$	517,500				
	Total Acres		Average Easement		Total of Easement Cost				
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	53	\$	2,500	\$	132,111				

**APPENDIX 9 - WESTERN LAKE ERIE BASIN CONSERVATION TREATMENT NEEDS  
IN THE TIFFIN WATERSHED**

<b>Tiffin - 5 year projection</b>						
	20% TA		75% Cost Share			
	New RMS Units	New Prog Units	Total New Units	RMS USDA Present Value Cost	Prog USDA Present Value Cost	Total Present Value Cost
<b>Conservation Practice Installations</b>						
Comprehensive Nutrient Management Plan -oh100	4	10	14	\$16,268	\$46,094	\$62,362
Conservation Crop Rotation -oh328	31,967	0	31,967	\$743,634	\$0	\$743,634
Cover Crop -oh340	1,287	838	2,125	\$129,608	\$84,333	\$213,940
Drainage Water Management -oh554	465	0	465	\$10,951	\$0	\$10,951
Filter Strip -oh393	141	87	228	\$56,416	\$35,022	\$91,438
Grade Stabilization Structure -oh410	641	148	789	\$1,548,723	\$357,149	\$1,905,872
Grassed Waterway -oh412	119	74	193	\$531,927	\$330,213	\$862,140
Nutrient Management - Precision -oh590A	7,624	1,847	9,471	\$760,080	\$184,186	\$944,266
Nutrient Management - Traditional -oh590	6,888	12,932	19,820	\$228,913	\$429,767	\$658,680
Residue Management, Mulch Till -oh345	1,739	5,542	7,281	\$63,562	\$202,605	\$266,167
Residue Management, No-Till/Strip Till w/ Controlled Traffic Level I -oh	6,197	0	6,197	\$856,536	\$0	\$856,536
Residue Management, No-Till/Strip Till -oh329	8,493	4,311	12,804	\$423,378	\$214,884	\$638,261
Riparian Forest Buffer -oh391	108	0	108	\$84,526	\$0	\$84,526
Waste Storage Facility -oh313	3	0	3	\$205,837	\$0	\$205,837
Waste Utilization -oh633	7,437	0	7,437	\$869,181	\$0	\$869,181
Wetland Restoration -oh657	83	37	120	\$24,803	\$11,074	\$35,876
Windbreak/Shelterbelt Establishment -oh380	18,592	0	18,592	\$6,024	\$0	\$6,024
<i>Practice Totals</i>			117,613			\$ 8,455,692
<i>Estimated Cost Per Year Distributed Over 5 Years</i>						\$ 1,691,138
<i>Estimated Staff Years Needed</i>	3.0	Estimated FTE Staff Needed Per Year over 5 yrs				
<b>Easement and Land Retirement Program Needs</b>						
	Total Acres	Average Rental Rate Per		Total Dollars Per 15 Year		
Conservation Reserve Program (CRP) Needs For Filter Strips, Riparian Forests, Grassed Waterway and Windbreak Practices	543	\$	150	\$		1,220,627
	Total Acres	Average Easement		Total of Easement Cost		
Wetlands Reserve Program (WRP) Needs for Wetland Restoration	120	\$	2,500	\$		299,270