

***DRAFT***  
***7/30/08***



## **RAPID WATERSHED ASSESSMENT - DATA PROFILE**

### **HURON-VERMILION WATERSHED**

Rapid watershed assessments provide initial estimates of where conservation investments will best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.

This assessment for the Huron-Vermilion Watershed was completed by NRCS with input from our conservation partners and other local entities.

“The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual’s income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA’s TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.”

## TABLE OF CONTENTS

Introduction.....	1
Physical Information.....	4
Physical Description.....	4
Land Use and Land Cover.....	6
Information and Trends.....	6
A View of the Huron-Vermilion Watershed.....	8
Riparian Zone Protected and Unprotected.....	12
Water Quality Assessment Data.....	15
Huron River Watershed Water Quality Assessment.....	15
Vermilion River Watershed Water Quality Assessment.....	15
Water Resources Information.....	16
Drinking Water Source Protection Area.....	20
Old Woman Creek Freshwater Estuary.....	21
Soil Resource Information.....	22
Soil Resources.....	22
Land Capability System.....	22
Prime Farmland Classification.....	25
The “Salad Bowl” of Ohio.....	27
Hydric Soil Distribution.....	28
Soil Loss.....	29
Analysis of Soil Erosion Potential Within the Watershed.....	31
Flood Plain Soils.....	33
Flooding in the Huron-Vermilion Watershed.....	34
Norwalk Flood, 2006.....	34
Air Resources Information.....	36
Wind Erosion.....	36
Plant and Animal Resources.....	37
Livestock Resources Information.....	37
Wildlife and Endangered Species.....	39
Conservation Systems and Practice Application Data.....	41
Watershed Projects and Planning Information.....	44
Summary and Observations of Watershed Resource Concerns.....	46
Next Steps.....	47
Needed Conservation Practices.....	47
Applicable USDA Farm Bill Programs.....	47
References and Citations.....	48

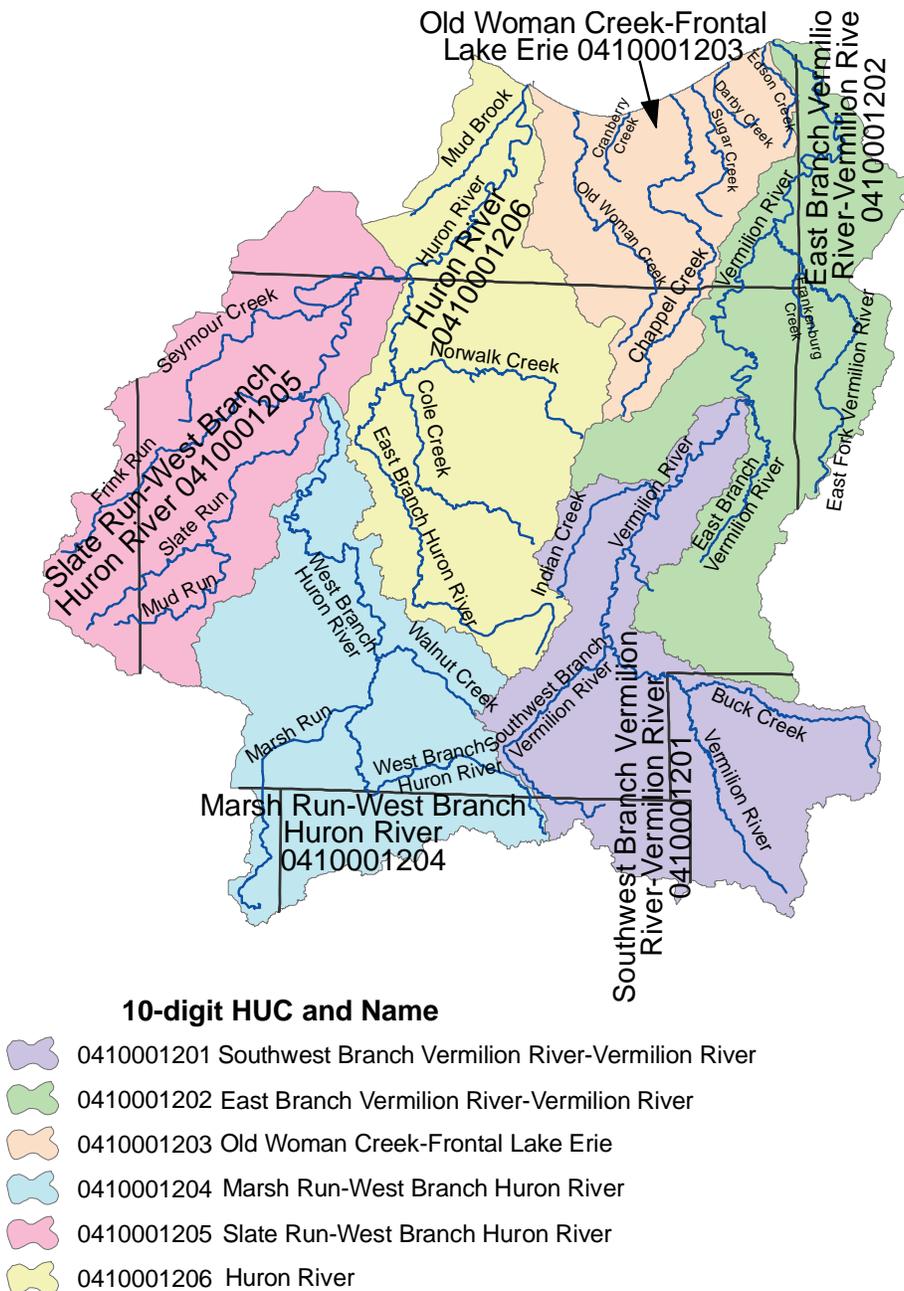
## TABLES AND FIGURES

Table 1 -	Counties Located in the Huron-Vermilion Watershed . . . . .	2
Table 2 -	2000 Census Data Summary . . . . .	2
Table 3 -	Watershed Slope. . . . .	5
Table 4 -	Cropland and Crop Types in the Watershed. . . . .	7
Table 5 -	Stream Miles By Order . . . . .	12
Table 6 -	Riparian Zone Protected and Unprotected. . . . .	12
Table 7 -	Huron Watershed Water Quality Assessment Data . . . . .	16
Table 8 -	Vermilion Watershed Water Quality Assessment Data. . . . .	17
Table 9 -	Percentage Reductions Needed to Meet Water Quality Targets in the Huron-Vermilion Watershed	18
Table 10 -	TMDL's and Total Phosphorus Allocations for the Huron-Vermilion River Watershed . . . . .	18
Table 11 -	Major Water Bodies in the Watershed . . . . .	19
Table 12 -	Land Capability Subclasses . . . . .	23
Table 13 -	Average Annual Soil Erosion Rates on Cropland . . . . .	29
Table 14 -	Estimated 1997 Gross Soil Loss from Cultivated Cropland by Land Capability Subclass . . . . .	30
Table 15 -	Flood Prone Soils Data . . . . .	33
Table 16 -	Huron-Vermilion Flood Discharges . . . . .	35
Table 17 -	Air Resource Concerns Table. . . . .	36
Table 18 -	Livestock Operations Data. . . . .	37
Table 19 -	Estimated Livestock Animal Units, Manure and Nutrient Production . . . . .	38
Table 20 -	Habitat Reference Information. . . . .	40
Table 21 -	Rare or Endangered Species Information. . . . .	40
Table 22 -	NRCS Conservation Progress Performance Measures . . . . .	41
Table 23 -	Agricultural Census Data and Economic Information . . . . .	43
Table 24 -	Local Watershed Related Organizations Identified in the Watershed . . . . .	44
Table 25 -	List of Relevant Published Watershed Plans, Studies, Reports . . . . .	45
Figure 1 -	Watershed Map. . . . .	1
Figure 2 -	Huron-Vermilion Watershed Map . . . . .	3
Figure 3 -	10-Meter Digital Elevation Model . . . . .	5
Figure 5 -	Land Use Map . . . . .	6
Figure 6 -	Broad Land Use - 1982 - 1997. . . . .	7
Figure 7 -	Average Annual Precipitation. . . . .	19
Figure 8 -	Water Withdrawal in the Huron-Vermilion Watershed . . . . .	10
Figure 9 -	Stream Orders for the Huron-Vermilion Watershed. . . . .	11
Figure 10 -	Riparian Zone Analysis Map . . . . .	13
Figure 11 -	Primary Soil Management Concern within 120 feet of Streams . . . . .	14
Figure 12 -	Land Capability Subclasses . . . . .	24
Figure 13 -	Prime Farmland . . . . .	26
Figure 14 -	Hydric Soil . . . . .	28
Figure 15 -	1997 Cropland Soil Loss By Land Capability Subclass . . . . .	29
Figure 16 -	Soil Erosion Potential (R x K x LS). . . . .	31
Figure 17 -	Percent of Cultivated Cropland Soil Erosion Rates as a Multiple of "T" . . . . .	32
Figure 18 -	Flood Prone Soils . . . . .	33
Figure 19 -	Soils Subject to Severe Wind Erosion . . . . .	36
Figure 20 -	Conservation Tillage Trends . . . . .	42

## INTRODUCTION

The Huron-Vermilion hydrologic unit (subbasin) is located in Ashland, Crawford, Erie, Huron, Lorain, Richland, and Seneca Counties in northcentral Ohio. The watershed is delineated by the United States Geological Survey as an 8-digit hydrologic unit number 04100012. The 488,610-acre (763.5 square mile) watershed of the Huron and Vermilion Rivers drains into the central basin of Lake Erie. Over 48 percent of the watershed is cropland and over 67 percent of the watershed has a 2 percent slope or less. The largest city in the watershed is Norwalk, population 16,238 (2000 census). The total population in the Huron-Vermilion Watershed is estimated at 94,432 (2000 census).

**FIGURE 1 - WATERSHED MAP**



**TABLE 1 - COUNTIES LOCATED IN THE HURON-VERMILION WATERSHED**

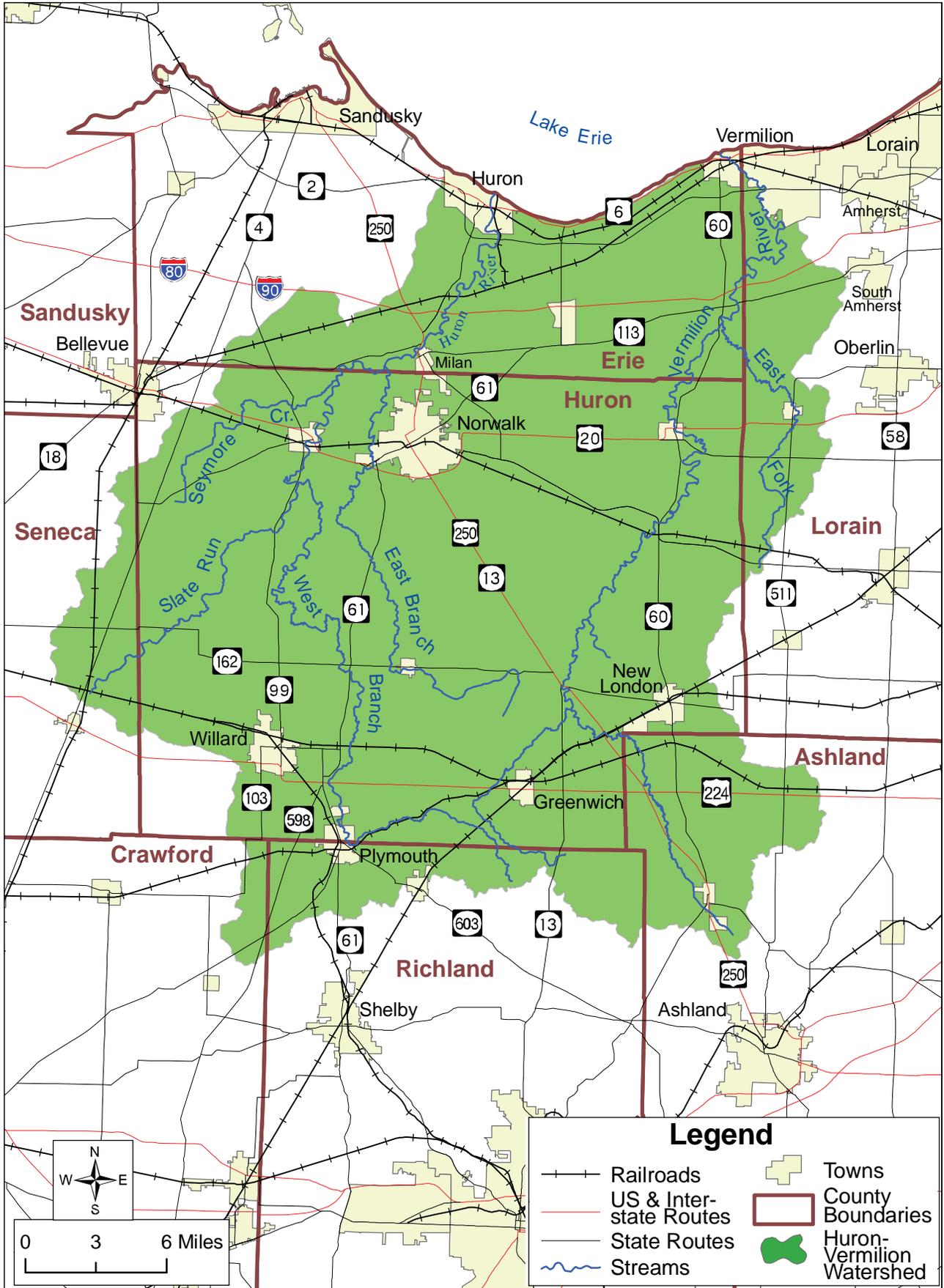
County	Acres	Acres in Watershed	% of Watershed Area	% of County in Watershed
Ashland	273,031	33,640	6.9%	12.3%
Crawford	257,762	4,300	0.9%	1.7%
Erie	162,439	84,265	17.2%	51.9%
Huron	316,619	296,312	60.6%	93.6%
Lorain	316,918	29,644	6.1%	9.4%
Richland	320,076	25,613	5.2%	8.0%
Seneca	353,501	14,836	3.0%	4.2%
Totals		488,610	100.0%	

**TABLE 2 - 2000 CENSUS DATA SUMMARY  
FOR THE HURON-VERMILION WATERSHED**

Summary	Number
Total Population	94,432
Total Households	35,378
Total Families	26,387
Total Housing Units	38,288
Average Household Size	2.65
Average Family Size	3.08
Median Household Income	\$44,266
Average Household Income	\$51,813
Per Capita Income	\$19,586
Population by Race	Number
Total	94,431
Population Reporting One Race	93,552
White	91,465
Black or African American	681
American Indian or Alaska Native	158
Asian	236
Native Hawaiian or Other Pacific Islander	6
Some Other Race	1,006
Population Reporting Two or More Races	879
Total Hispanic Population	2,514

**Source:** U.S. Census Bureau, Census 2000 Summary File 1 and 3 through ESRI Business Analyst Online, <http://bao.esri.com/esribis>

FIGURE 2 - HURON-VERMILION WATERSHED MAP



## PHYSICAL INFORMATION

### PHYSICAL DESCRIPTION

The Huron-Vermilion Rivers Watershed extends across the Major Land Resource Areas (MLRA) 111 and 139; the Indiana-Ohio Till Plain of the Central Feed Grains and Livestock Region and the Lake Erie Glaciated Plateau of the Northeastern Forage and Forest Region.

The MLRA 111 is a landscape characterized by a gently undulating glacial Wisconsinan till plain, and most areas are dominated by ground moraines that are broken in places by lake plains, outwash plains, flood plains, and many recessional moraines. The ground moraines and lake plains in front of the recessional moraines are flat to undulating. MLRA 139 is located in the northern portion of the watershed directly feeding into Lake Erie. Most of this MLRA is a gently rolling to strongly rolling, dissected glaciated plateau. The narrowband along Lake Erie is fairly flat. Local relief is about 7 to 50 feet.

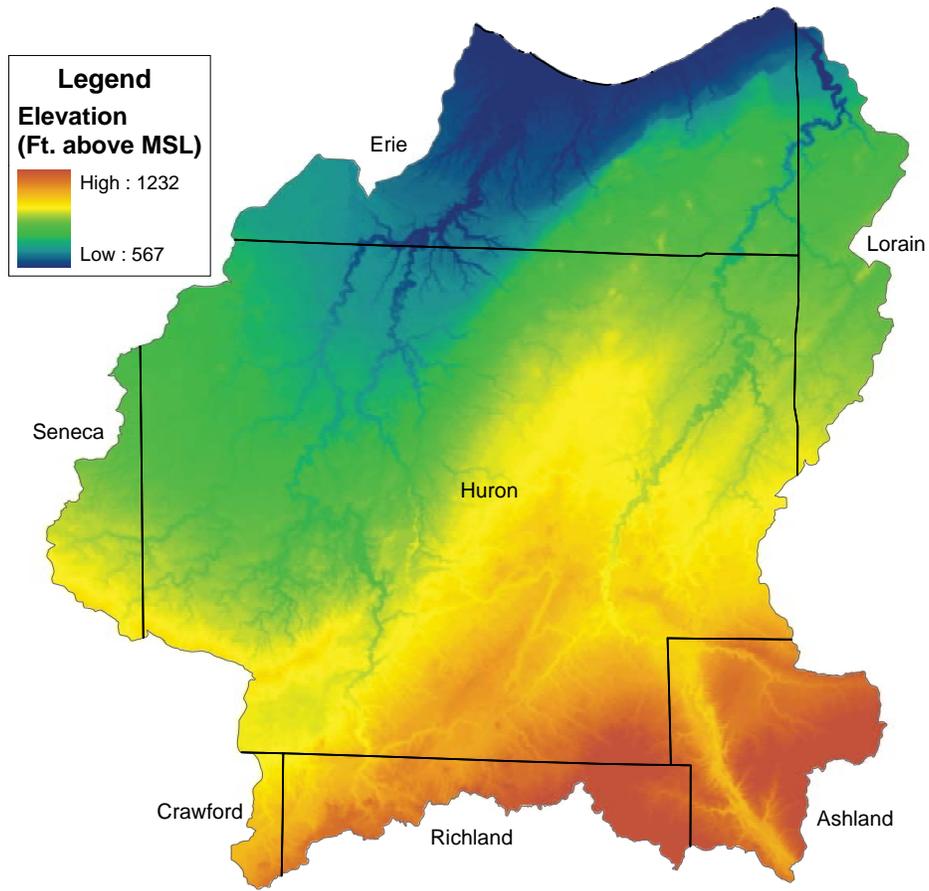
The entire land area of the Huron-Vermilion Watershed was surveyed using the Public Land Survey System (PLSS), and consequently cropland, pastureland and forested areas typically are rectangular in shape. Agriculture typically consists of cash grain farming of corn, soybeans and wheat production, forage (grass-legume hay, tall fescue pasture, and alfalfa hay), and livestock production.

The watershed's bedrock geology predominantly consists of late Devonian shale and sandstone with Shale units dominating closer to the surface along Lake Erie. Surficial materials include glacial deposits of till, glaciolacustrine sediments, and outwash from Wisconsin and older glacial periods. The outwash, lake sediments, and stratified drift deposits that fill valleys are important sources of ground water. Younger stream deposits cover the glacial deposits in some of the river valleys.

The following cities and villages are situated entirely or partially in the Huron-Vermilion Watershed: Huron, Vermilion, Berlin Heights, Milan, Norwalk, Monroeville, Wakeman, Kipton, Willard, North Fairfield, New London, Plymouth, Greenwich, Savannah, and Shiloh.

Wooded wetlands currently constitute about 4.2 percent of the watershed and an additional 0.1 percent of non-forested wetlands are present in the watershed.

**FIGURE 3 - 10-METER DIGITAL ELEVATION MODEL  
FOR THE HURON-VERMILION WATERSHED**



**TABLE 3 - HURON-VERMILION WATERSHED SLOPE**

Class	Area (Sq.Mi.)	Percent of Watershed
0-1%	372.3	48.8
>1-2%	145.3	19.0
>2-4%	120.1	15.7
>4-6%	50.9	6.7
>6-8%	27.3	3.6
>8-10%	16.1	2.1
>10%	31.6	4.1
Total =	763.6	100.0

## LAND USE AND LAND COVER

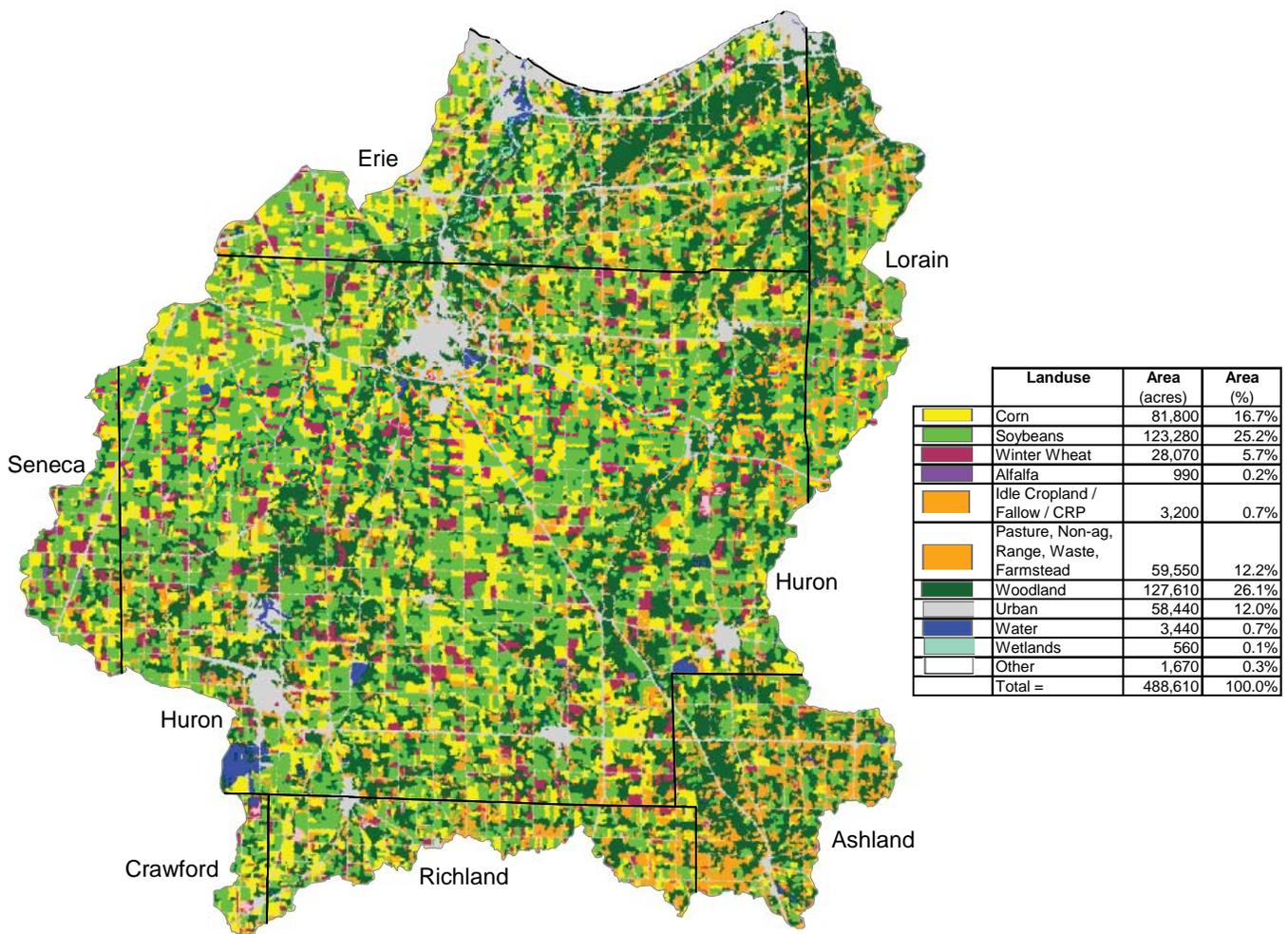
### INFORMATION AND TRENDS

According to the USDA-NRCS National Resources Inventory (NRI), from 1982 to 1997, there was an increase of about 17,900 acres of urban/built-up land, representing about 3.7 percent of the Huron-Vermilion Watershed with a corresponding decline in forestland and cropland acreage.

In 1997, according to the NRI, the watershed was 57.7 percent cropland, 3.1 percent pastureland, 15.6 percent forestland, 2.0 percent minor cover/uses, 1.2 percent rural transportation, 1.1 percent water, 2.4 percent Conservation Reserve Program (CRP), and about 9.9 percent urban/built-up land.

In 2006, there were about: a) 234,140 acres of cropland; b) 3,200 acres of fallow cropland/CRP; c) 59,550 acres of pasture/non-ag/range/waste/farmstead; d) 58,440 acres of urban land; e) 560 acres of wetlands; and f) 127,610 acres of woodland. (Source: USDA NASS Landcover Data, 2006)

**FIGURE 4 - LAND USE MAP**



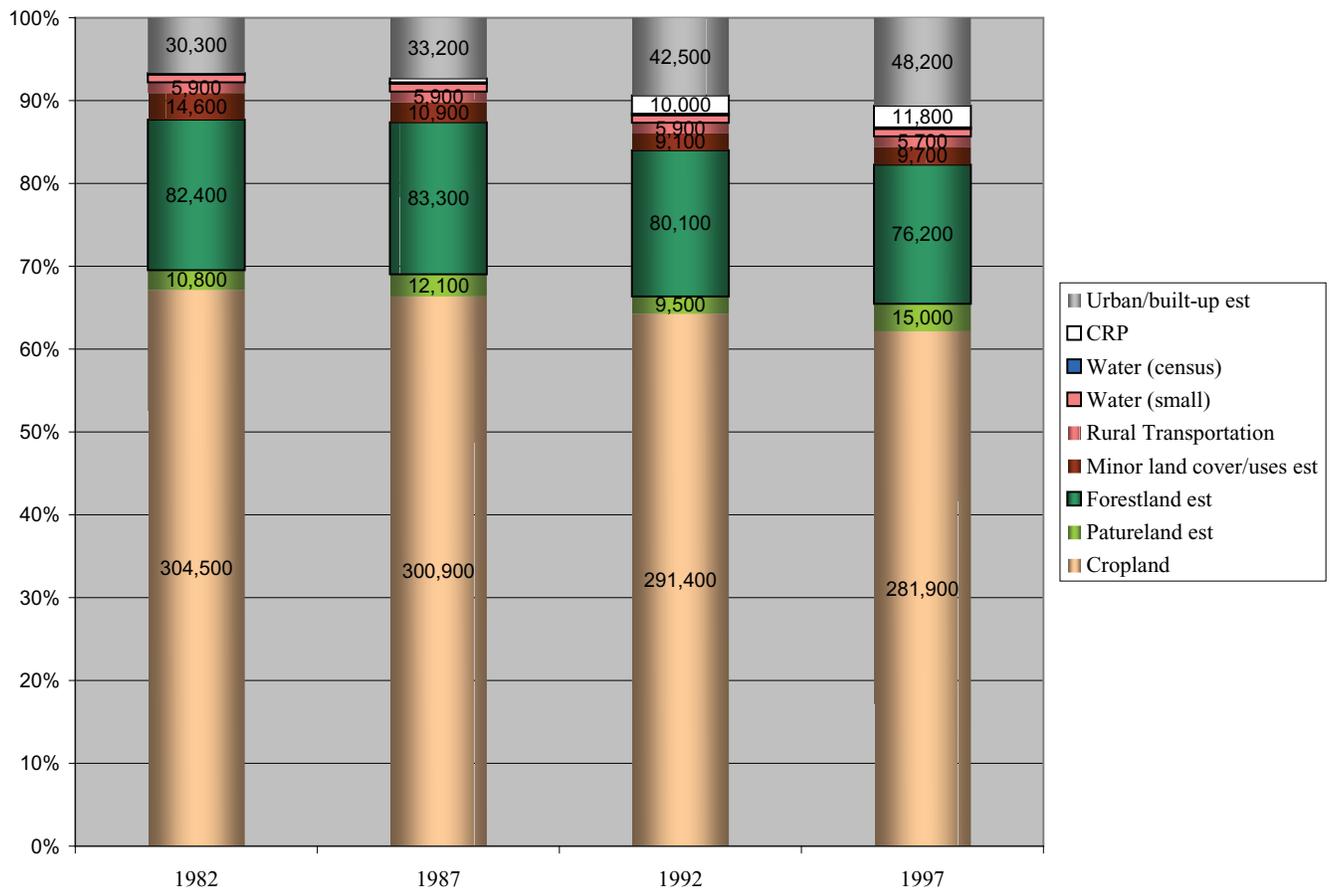
2006 Landcover data from USDA NASS

**TABLE 4 - CROPLAND AND CROP TYPES IN THE WATERSHED**

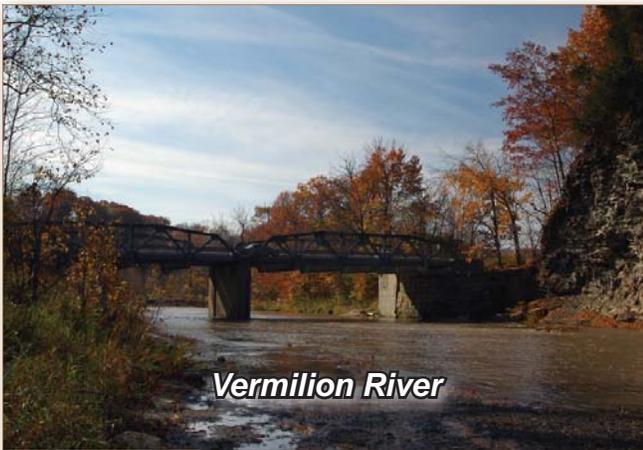
	<b>Cropland</b>	<b>Corn</b>	<b>Bean</b>	<b>Wheat</b>	<b>Hay</b>
Watershed (Acres)	235,530	81,800	123,280	28,070	990
% of Cropland		34.7%	52.3%	11.9%	0.4%

Source: 2006 Landuse / Landcover from USDA NASS

**FIGURE 5 - BROAD LAND USE  
1982 - 1997**

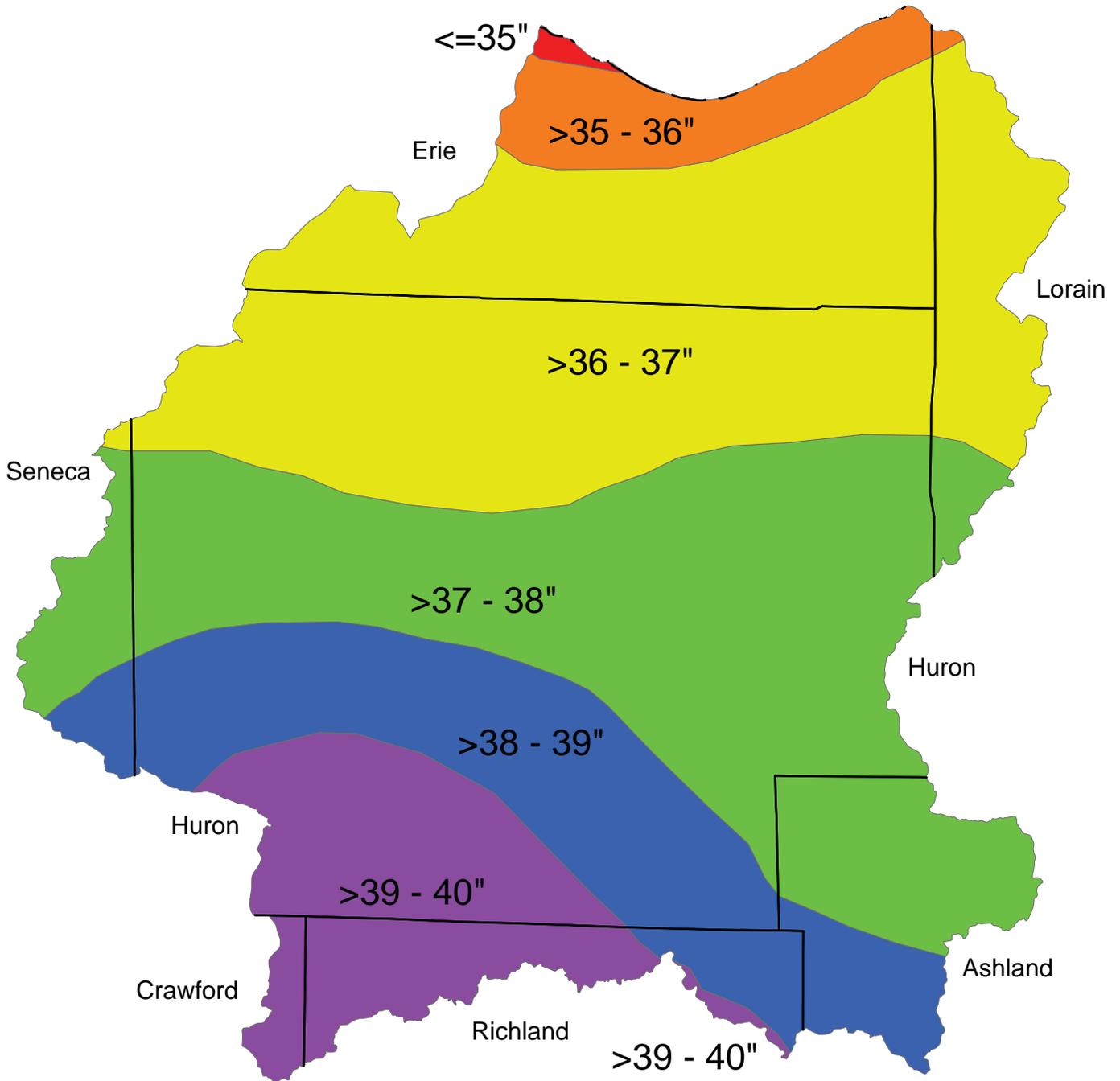


## A VIEW OF THE HURON-VERMILION WATERSHED



WATER RESOURCES INFORMATION

FIGURE 6 - AVERAGE ANNUAL PRECIPITATION

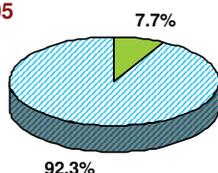


**FIGURE 7 - WATER WITHDRAWAL IN THE HURON-VERMILION WATERSHED**

**Water Withdrawal in the Huron-Vermilion Basin**

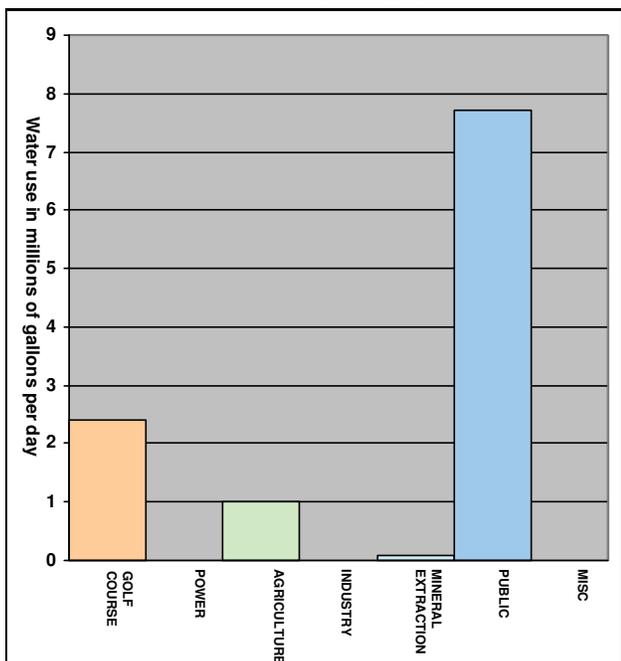
**Total fresh-water withdrawal and source of water in 2005**

Source	Water use, in million gallons per day	Percent of total use
Surface Water	10.31	92.3%
Ground Water	0.86	7.7%
Total	11.17	100.0%

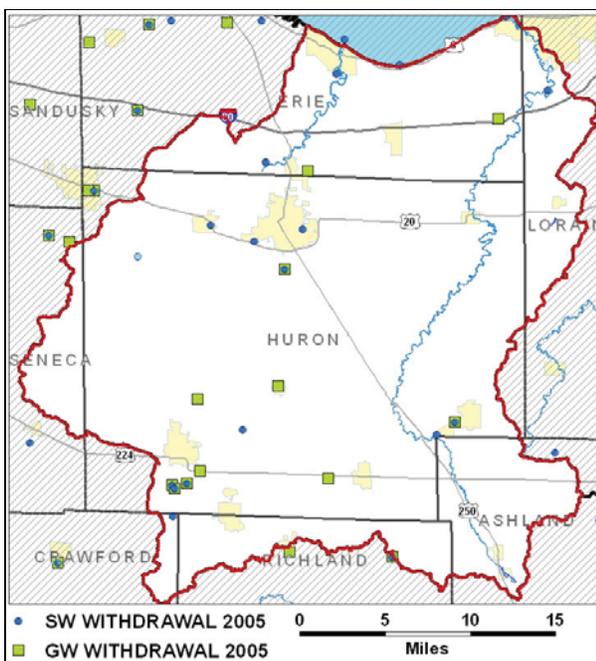


■ Ground Water □ Surface Water

**Total fresh-water withdrawal by category in 2005**



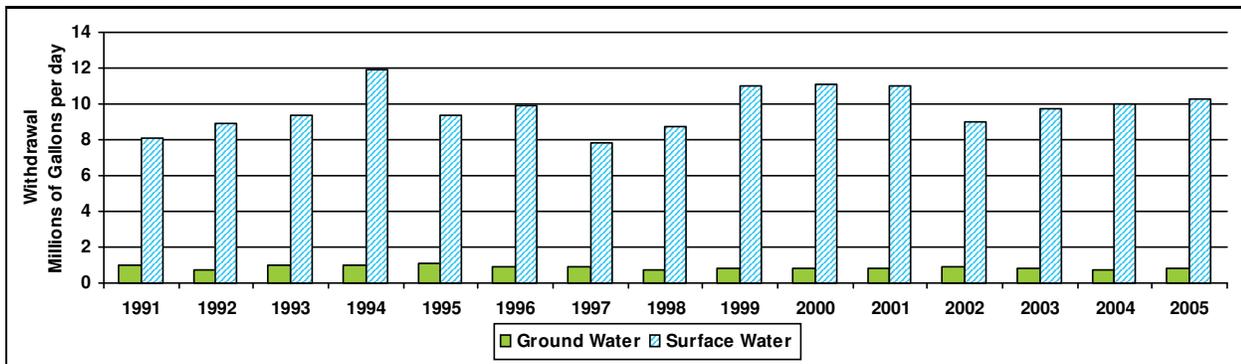
**Location of facilities withdrawing water in 2005**



**Total fresh-water withdrawal by category in 2005 in millions of gallons per day**

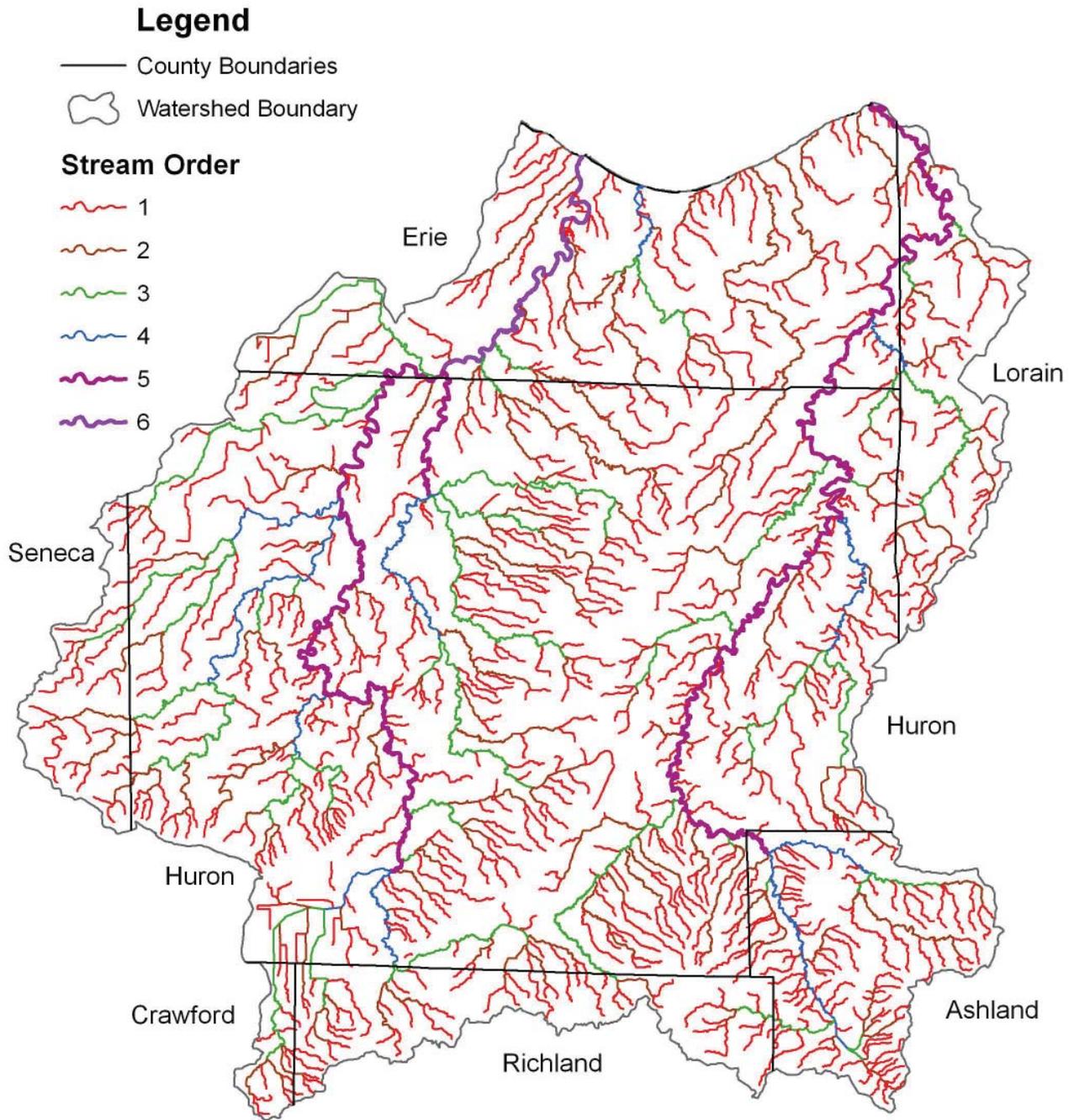
	Golf Course	Power	Agriculture	Industry	Mineral Extraction	Public	Misc	Total
Surface Water	2.34	0.00	0.65	0.00	0.00	7.32	0.00	10.31
Ground Water	0.05	0.00	0.34	0.00	0.08	0.39	0.00	0.86
Total	2.39	0.00	1.00	0.00	0.08	7.70	0.00	11.17
Percent Total	21.4%	0.0%	8.9%	0.0%	0.7%	69.0%	0.0%	100.0%

**Water withdrawal trends**



Provided by Ohio Department of Natural Resources (<http://www.dnr.state.oh.us/tabid/4035/Default.aspx>) in cooperation with U.S. Geological Survey (<http://oh.water.usgs.gov/>) and Natural Resources Conservation Service ([www.oh.nrcs.usda.gov/](http://www.oh.nrcs.usda.gov/)). Indiana data provided by Indiana DNR ([http://www.in.gov/dnr/water/water\\_availability/SWWF/index.html](http://www.in.gov/dnr/water/water_availability/SWWF/index.html)). See ([www.dnr.state.oh.us/tabid/18805/Default.aspx](http://www.dnr.state.oh.us/tabid/18805/Default.aspx)) for explanation of data.

**FIGURE 8 - STREAM ORDERS FOR THE HURON-VERMILION WATERSHED**



**TABLE 5 - STREAM MILES BY ORDER**

	Acres of Standing Water (Lakes/Ponds)	Total Miles of Streams	Total Miles 1st Order Streams	Total Miles 2nd Order Streams	Total Miles 3rd Order Streams	Total Miles 4th Order Streams	Total Miles 5th Order Streams	Total Miles 6th Order Streams
Watersheds	1993.11	1654.5	913.3	337.4	211.5	73.0	104.2	15.1
Ashland Co. Portion	191.2	152.4	99.0	26.0	9.7	16.2	1.5	N/A
Crawford Co. Portion	65.9	19.3	9.8	5.0	4.6	N/A	N/A	N/A
Erie Co. Portion	243.7	244.9	121.0	67.0	21.4	7.5	13.0	15.1
Huron Co. Portion	1295.3	1028.9	552.7	195.7	154.4	48.2	77.9	N/A
Lorain Co. Portion	124.9	90.8	45.7	18.9	13.2	1.0	11.9	N/A
Richland Co. Portion	61.7	75.7	55.1	14.3	6.3	N/A	N/A	N/A
Seneca Co. Portion	10.4	42.4	29.9	10.5	2.0	N/A	N/A	N/A

<sup>1</sup> 0.05 Acres and larger, and does not include Sandusky Bay backwater in the Sandusky River.

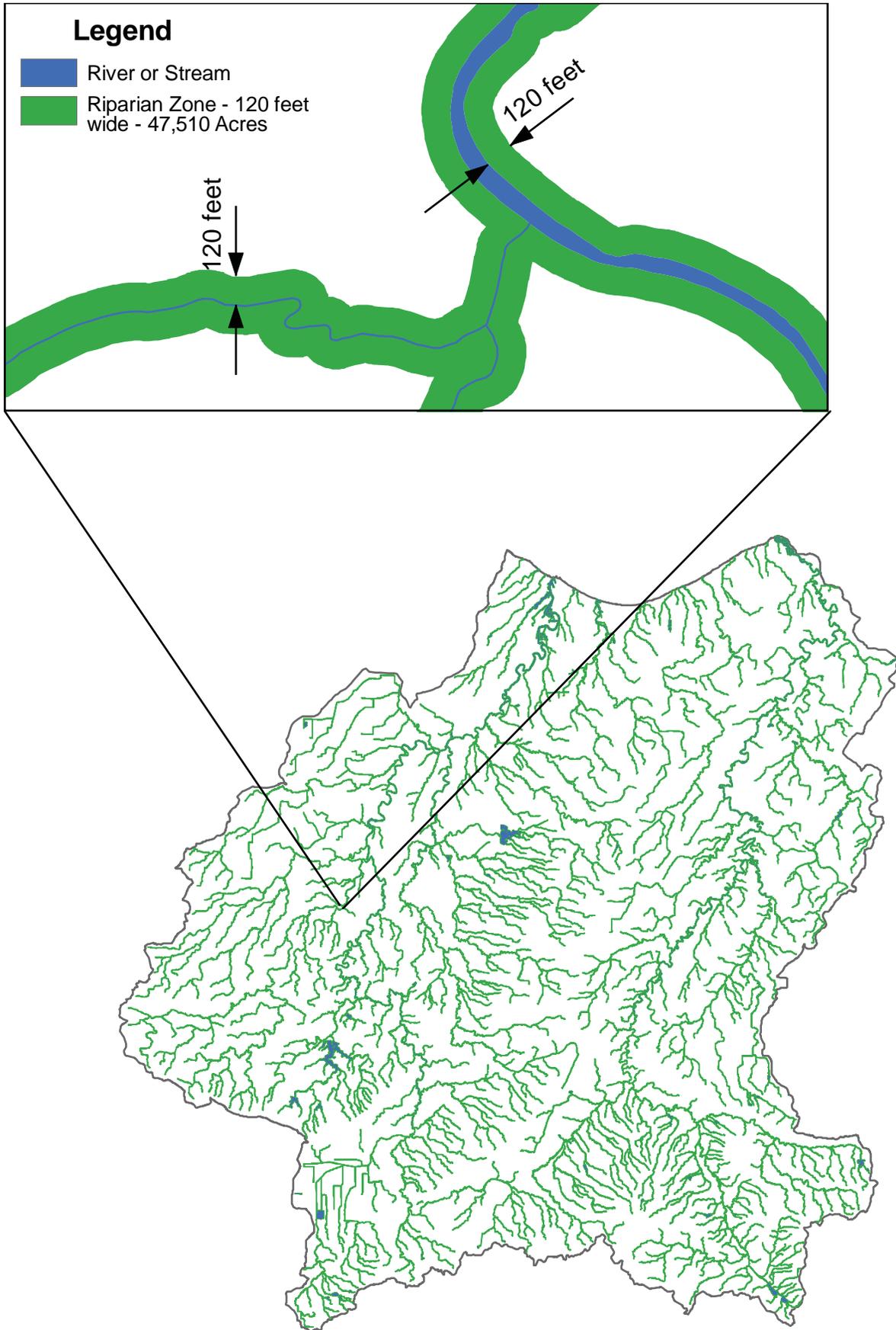
**RIPARIAN ZONE PROTECTED AND UNPROTECTED**

Available Common Land Unit (CLU) data was used to get an estimate of the amount of cropland riparian area that is protected by Conservation Reserve Program (CRP) buffer practices. Additionally, the total amount of protected riparian area was estimated by adding naturally protective landuses (e.g. woods, wetlands, farmsteads, and urban) from the National Agricultural Statistics Service 2006 landuse layer to cropland from the CLU layer that was protected by CRP practices. (Note: This buffer is half as wide as buffer used for soil management concern on the next page.)

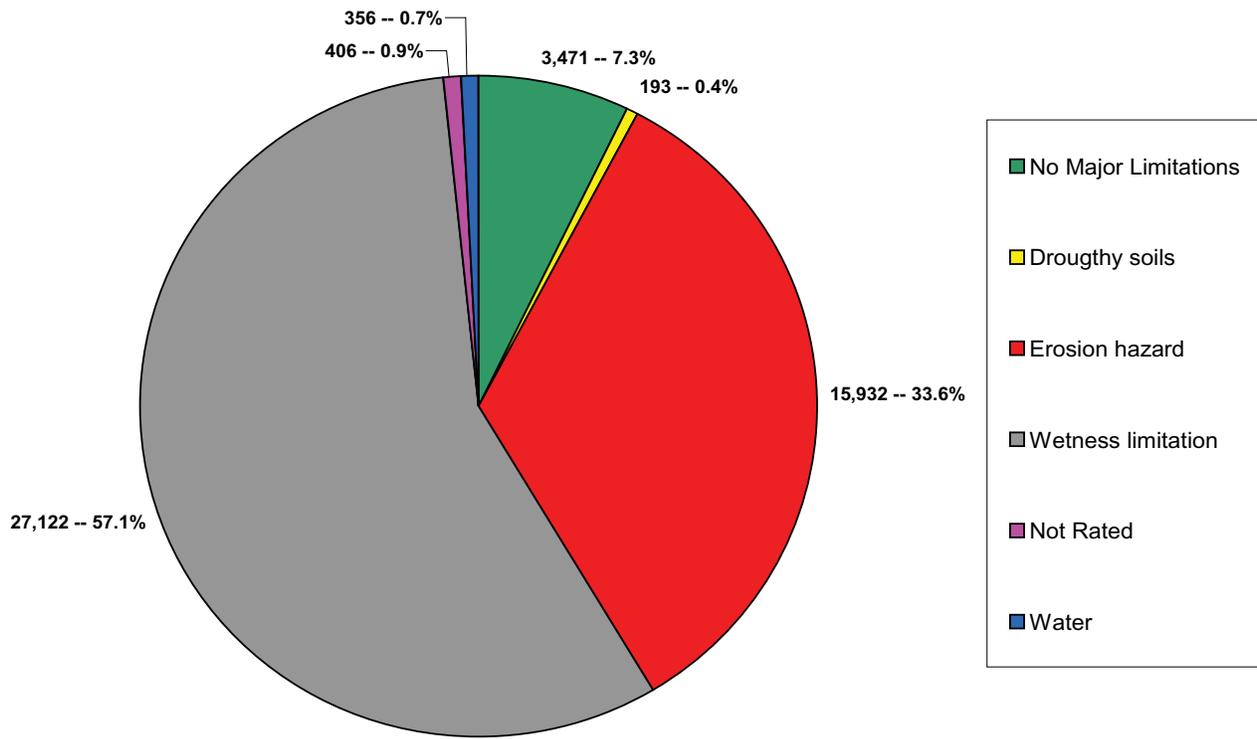
**TABLE 6 - RIPARIAN ZONE PROTECTED AND UNPROTECTED**

Acres Within 60 ft. Stream Buffer Both Sides (120 ft. total)	
Percent of Total Cropland Acres in Riparian Zone Protected By CRP program	10.6%
Percent of Total Cropland Acres In Riparian Zone Unprotected	89.4%
Percent of Total Acres In Riparian Zone That Are Protected	76.1%
Percent of Total Acres in Riparian Zone That Need Protection	23.9%

FIGURE 9 - RIPARIAN ZONE ANALYSIS MAP



**FIGURE 10 - PRIMARY SOIL MANAGEMENT CONCERN WITHIN 120 FEET OF STREAMS  
(ACRES AND PERCENTAGE)**



## WATER QUALITY ASSESSMENT DATA

### Huron River Watershed Water Quality Assessment

The Huron River Total Maximum Daily Load (TMDL) final report was published August 9, 2005. TMDLs identify and evaluate water quality problems in impaired water bodies and propose solutions to bring those waters into attainment of their designated use.

The Huron TMDL report addresses water quality problems that were identified on the 2004 Section 303(d) list. This list, using the 11-digit Hydrologic Unit as a basis for assessment, found all three watershed assessment units, namely 04100012 030, 04100012 010, and 04100012 020 impaired for their aquatic life use. Their designated aquatic life use is Warm Water Habitat (WWH) and is the water that will support plant and animal species accustomed to warm water. Generally, most of the impairment occurs in smaller drainage areas (less than 20 Sq. Mi.) where there is lower sustained stream flow. Conversely, larger areas with higher sustained flows more often meet the water quality standards. Table 7 displays watershed assessment scores, impairments by assessment unit, and corresponding NRCS Field Office Technical Guide conservation practices which will have a beneficial effect on these impairments.

Point source loads in the watershed have met their EPA approved targets. Non-point source loads have yet to meet the targets needed to obtain the water quality standards. The TMDL report gives needed percent reductions in sediment, nitrogen and phosphorus as shown in Table 7. These reductions will allow the streams in the watershed to meet the water quality standards. The TMDLs do not specifically address the sediment and nutrient loads to Lake Erie affecting lake water quality. Increasing loads of dissolved phosphorus generally occurring in other Lake Erie tributaries (Maumee, Sandusky, Cuyahoga and Grand) may also be occurring in the Huron River leading to algal blooms and low dissolved oxygen in Lake Erie.

### Vermilion River Watershed Water Quality Assessment

The Vermilion River Total Maximum Daily Load (TMDL) Draft Report for Public Review was published on July 22, 2005. The Ohio EPA identified the Vermilion River (assessment units 04100012 050 and 04100012 060) as impaired on the 2004 303(d) list (Ohio EPA, 2004) after a field survey of the water quality in 2002. The survey found impairment of the Aquatic Life Use and impairment of the designated or recommended Recreation Use. The major causes of non-attainment for aquatic life uses are organic enrichment, excessive nutrients, sedimentation, habitat degradation, and flow alteration. The major cause of non-attainment for recreation uses are pathogens (elevated fecal coliform counts.) Most of the impairments occur in the headwater portions of the watershed where there are lower sustained flows. The parameters selected for Total Maximum Daily Load development are sediment, habitat, total phosphorus, and bacteria. Similar to the Huron, impairment occurs mostly in the smaller drainage area headwaters where low summer stream flows provide little dilution to point source discharges. Nutrient and sediment loads of the Vermilion into Lake Erie are generally less significant compared to the other tributaries.

Table 8 displays watershed assessment scores, impairments by assessment unit, and corresponding NRCS Field Office Technical Guide conservation practices which will have a beneficial effect on these impairments. Also, Table 8 shows the TMDLs developed for Phosphorus and Total Phosphorus Allocations for the Vermilion River Watershed.

**TABLE 7 - HURON WATERSHED WATER QUALITY ASSESSMENT DATA**  
(DATA FROM OEPA TMDL REPORT - AUGUST 2005)

Unit	Attainment Status		Conservation Practices Benefiting Impairments If Applied to Watershed					
	Watershed Score*	Causes of Impairment	Conservation Tillage	Conservation Buffers +	Nutrient Management	Animal Waste Utilization	Cons Cover/Tree Planting ++	Drainage Water Mgt
<b>HUC 11 Assessment Unit 04100012-XXX</b>								
<b>West Branch Huron River (headwaters to upstream Slate Run) 010</b>	<b>54</b>	Organic Enrichment/ D.O.	***	***	***	***	***	***
		Nutrients	***	***	***	***	***	***
		Siltation	***	***			***	
		Habitat Alteration		***			***	***
		Oil and Grease						
		Flow Alteration	***	***			***	***
<b>West Branch Huron R (just Upstream of Slate Run to mouth) 020</b>	<b>80</b>	Nutrients	***	***	***	***	***	***
		Habitat Alteration		***			***	***
		Natural Limits						
<b>Huron River Mainstem, East Branch Huron River 030</b>	<b>50</b>	Flow Alteration	***	***			***	***
		Pesticides	***	***			***	
		Habitat Alteration		***			***	***
		Nutrients	***	***	***	***	***	***
		Siltation	***	***			***	
		Unknown						
		Ammonia			***	***		
<b>Severe Basin Wide Impairment (Scores 0-39)</b>	<b>Impairment Justifying Basin Wide Effort (Scores 40-79)</b>	<b>Score Indicative of Localized Water Quality Issues (Scores 80-90)</b>						

\*\*\* Denotes a conservation practice which will have a positive effect on the impairment identified.  
 + Note: Conservation Buffers = Filter strips, Riparian Forest Plantings, Wetland Restoration, Field Windbreaks  
 ++ Note: Conservation Cover = Cover Crops, CRP Plantings, Riparian Tree Plantings, Windbreaks  
 \* Watershed assessment unit score is average grade of aquatic life use status. A max assessment unit score of 100 is possible if all monitored sites meet designated aquatic life uses. The method of calculation is presented in Ohio EPA 2002 Integrated Water Quality Monitoring and Assessment Report.

This table prepared from Ohio EPA Sandusky Watershed TMDL Data of August '05 and NRCS Field Office Technical Guide Conservation Effects

**TABLE 8 -VERMILION WATERSHED WATER QUALITY ASSESSMENT DATA**  
**(DATA FROM OEPA TMDL REPORT -JULY 2005)**

Unit	Attainment Status		Conservation Practices Benefiting Impairments If Applied to Watershed					
	Watershed Score*	Causes of Impairment	Conservation Tillage	Conservation Buffers +	Nutrient Management	Animal Waste Utilization	Cons Cover/Tree Planting ++	Drainage Water Mgt
<b>HUC 11 Assessment Unit 04100012-XXX</b>								
<b>Headwaters Vermilion River to above East Branch 050</b>	51	Organic Enrichment	***	***	***	***	***	***
		Nutrient Enrichment	***	***	***	***	***	***
		Siltation	***	***			***	
		Pathogens		***	***	***	***	***
		Habitat Alteration		***			***	***
		Siltation/Flow Alteration	***	***			***	
<b>Vermilion River below and including East Branch 060</b>	39	Organic Enrichment	***	***	***	***	***	***
		Pathogens		***	***	***	***	***
		Habitat Alteration		***			***	***
		Nutrient Enrichment	***	***	***	***	***	***
		Siltation	***	***			***	
<b>Severe Basin Wide Impairment (Scores 0-39)</b>		<b>Impairment Justifying Basin Wide Effort (Scores 40-79)</b>	<b>Score Indicative of Localized Water Quality Issues (Scores 80-90)</b>					

\*\*\* Denotes a conservation practice which will have a positive effect on the impairment identified.  
+ Note: Conservation Buffers = Filter strips, Riparian Forest Plantings, Wetland Restoration, Field Windbreaks  
++ Note: Conservation Cover = Cover Crops, CRP Plantings, Riparian Tree Plantings, Windbreaks  
\* Watershed assessment unit score is average grade of aquatic life use status. A max assessment unit score of 100 is possible if all monitored sites meet designated aquatic life uses. The method of calculation is presented in Ohio EPA 2002 Integrated Water Quality Monitoring and Assessment Report.

This table prepared from Ohio EPA Sandusky Watershed TMDL Data of August '05 and NRCS Field Office Technical Guide Conservation Effects

**TABLE 9 - PERCENTAGE REDUCTIONS NEEDED TO MEET WATER QUALITY TARGETS IN THE HURON RIVER WATERSHED**

(Source of data: Ohio EPA Huron River Watershed TMDL Report)

Assessment Unit	Sediment	Nitrite+Nitrate	Phosphorus
Upper West Branch Huron River (010)	49%	31%	25%
Lower West Branch Huron River (020)	49%	27%	43%
East Branch Huron River & Huron River Mainstem (030)	65%	32%	5%

**TABLE 10 - TMDL'S AND TOTAL PHOSPHOROUS ALLOCATIONS FOR THE VERMILION RIVER WATERSHED.**

(SOURCE OF DATA OHIO EPA VERMILION RIVER WATERSHED DRAFT TMDL REPORT)

Stream Name (HUC 14 Code)	Existing Load Conditions			Percent Reduction		TMDL Loads	Margin of Safety	TMDL Allocations		
	NPS	PS	Total	NPS	PS			Natural	WLA <sup>1</sup>	LA <sup>2</sup>
Assessment Unit: 04100012-050										
Vermilion: Headwaters (010)	5978	68	6047	15	50	5116	256	254	34	4572
Vermilion: above Buck Ck (020)	5538	0	5538	15	none	4707	235	188	0	4284
Buck Creek (030)	5415	0	5415	15	none	4603	230	169	0	4204
Vermilion: above SW Br. (040)	3504	0	3504	15	none	2979	149	113	0	2717
Southwest Branch (050)	9499	465	9963	15	45	8329	416	350	256	7307
Vermilion: above E. Br. (060)	10984	0	10984	15	none	9337	467	436	0	8434
Assessment Unit: 04100012-060										
East Branch (010)	9845	1574	11419	15	75	8761	438	370	393	7560
Vermilion: above E. Fork (020)	7516	73	7589	15	none	6462	323	294	73	5772
East Fork (030)	10035	0	10035	15	50	8529	426	360	0	7743
Vermilion: below E. Fork (040)	5777	728	6504	15	10	5565	278	329	655	4303

<sup>1</sup>WLA = Waste Load Allocations for point sources (PS).

<sup>2</sup>LA = general Load Allocations for nonpoint sources (NPS).

**TABLE 11 - MAJOR WATER BODIES IN THE WATERSHED**

<b>Name/Location</b>	<b>Acres</b>	<b>Elev(ft.)</b>	<b>Type</b>	<b>Uses</b>
Holiday Lake	217.4	835	Dam on Stream	Private Recreation and Fishing
Willard Reservoir	194.4	920	Upground	Municipal Water, Recreation
Nowalk, Memorial Reservoir	95.8	792	Dam on Stream	Municipal Water, Recreation
Nowalk, Upper Reservoir	45.3	793	Dam on Stream	Municipal Water, Recreation
Nowalk, Lower Reservoir	30.6	766	Dam on Stream	Municipal Water
Bellevue Reservoir #5	84.7	804	Upground	Municipal Water, Recreation
Celeryville Reservoir	59.4	945	Upground	--
Mud Lake	33.6	1025	Natural	--
Spring Lake	27.0	1025	Natural	--

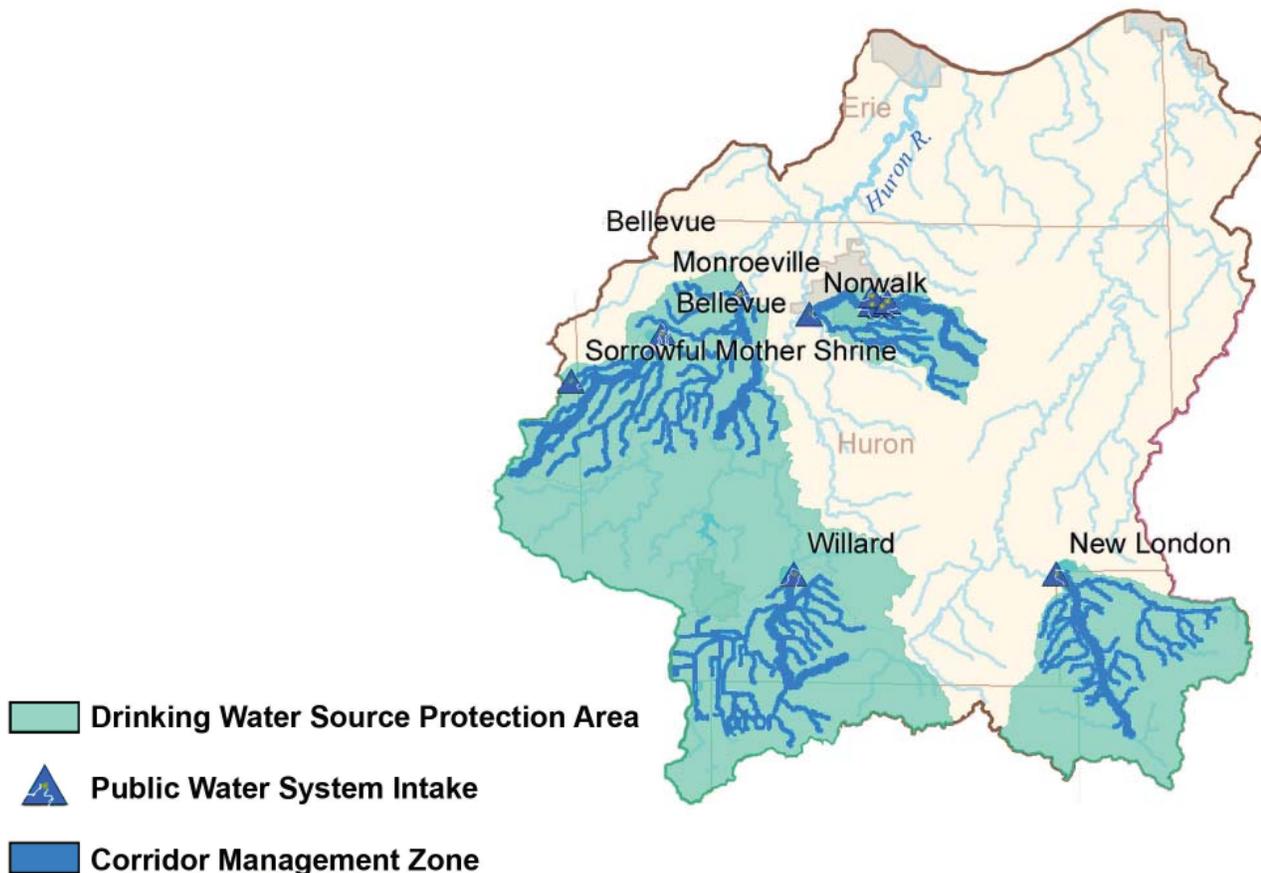
## DRINKING WATER SOURCE PROTECTION AREA

The Source Water Assessment and Protection Program in Ohio helps public water suppliers protect drinking water sources, such as streams and underground aquifers, from contamination, in keeping with the federal Safe Drinking Water Act amendments of 1986 and 1996. These efforts consist of both an assessment (including protection area delineation; identifying the potential contaminant sources in that area; and determining the susceptibility of the aquifer or surface water) and a plan for protection. Possible threats to the surface water source include agricultural runoff (pesticide/fertilizer storage and application, animal feedlots), transportation spills, home construction runoff, oil/gas production activities, unsewered areas, wastewater treatment discharges, landfills, and commercial sources.

The map below shows Drinking Water Source Assessment Areas for Public Water Systems using surface water in the Huron-Vermilion subbasin. The areas shaded in blue are stream corridor management zones which are typically upstream from points of water intake.

Conservation Management Practices such as nutrient management, pest management, conservation buffers and filters, conservation tillage, and animal waste utilization can have a beneficial effect on water quality in the designated source water protection areas.

**FIGURE 11 - DRINKING WATER SOURCE PROTECTION AREA**



Source: Ohio EPA

## **OLD WOMAN CREEK FRESHWATER ESTUARY**

Located in north eastern Erie County less than one mile east of the southern most border of Lake Erie is the Old Woman Creek fresh water estuary. One of the states few remaining examples of a natural estuary, it provides a transition zone between land, streams, and lake. The site habitats include upland forest, swamp forest, barrier beach, marshes, and open water. These areas support large numbers of diverse native plants, fish, amphibians, reptiles, birds, and mammals. Old Woman Creek is protected as a State Nature Preserve and is the only fresh water National Estuarine Research Reserve in the country. A visitor center made of many green materials and handicap assessable hiking trails are available to the public.

## SOIL RESOURCE INFORMATION

### SOIL RESOURCES

The soils of the Huron-Vermilion watershed formed in many different kinds of parent materials including glacial till, lacustrine and beach deposits, glacial outwash, recent alluvium, material weathered from bedrock and organic soil material.

There are 270 different soil types occurring in the watershed, each with its separate soil management concerns, crop productivity and capability for different land uses. The soils are dominantly nearly level and gently sloping mineral soils formed in deposits of glacial till but also include acreages of sandy soils on beach ridges and flats, organic soils in depressional areas and sloping erosive soils on short side slopes along valleys and narrow bands of end moraines.

Nearly level and gently sloping areas of somewhat poorly drained Bennington soils comprise about 31 percent of the watershed. Gently sloping and sloping areas of moderately well drained Cardington soils make up about seventeen percent of the watershed. Very poorly drained Pewamo and poorly drained Condit soils in swales each comprise about four percent of the watershed. These soils need artificial drainage for grain crop production due to wetness limitations. In addition, gently sloping areas of Bennington and Cardington soils have a moderate hazard of water erosion.

Soil management concerns for most of the soils of the Huron-Vermilion Watershed include: a) seasonal wetness and the need for artificial drainage on about 280,000 acres of land; b) a hazard of soil erosion by water on about 179,000 acres of land; c) a hazard of soil erosion by wind on about 15,300 acres; d) a hazard of droughtiness due to a restricted root zone on about 8,400 acres; e) and a hazard of soil subsidence and wind erosion on about 3,200 acres of organic soils.

### LAND CAPABILITY SYSTEM

Land capability classification shows, in a general way, the suitability and management concerns of soils for most kinds of field crops. In general, the soils here are grouped at two levels, capability class and subclass. Capability classes, the broadest groups, are designated by numbers 1 through 8 indicating progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1: soils having few limitations for use; Class 2: soils having moderate limitations;

Class 3: soils having severe limitations; Class 4: soils having very severe limitations;

Class 5: soils having severe limitations for use other than a hazard of erosion; and Class 6 and 7: soils having very severe limitations making them generally unsuitable for cultivation.

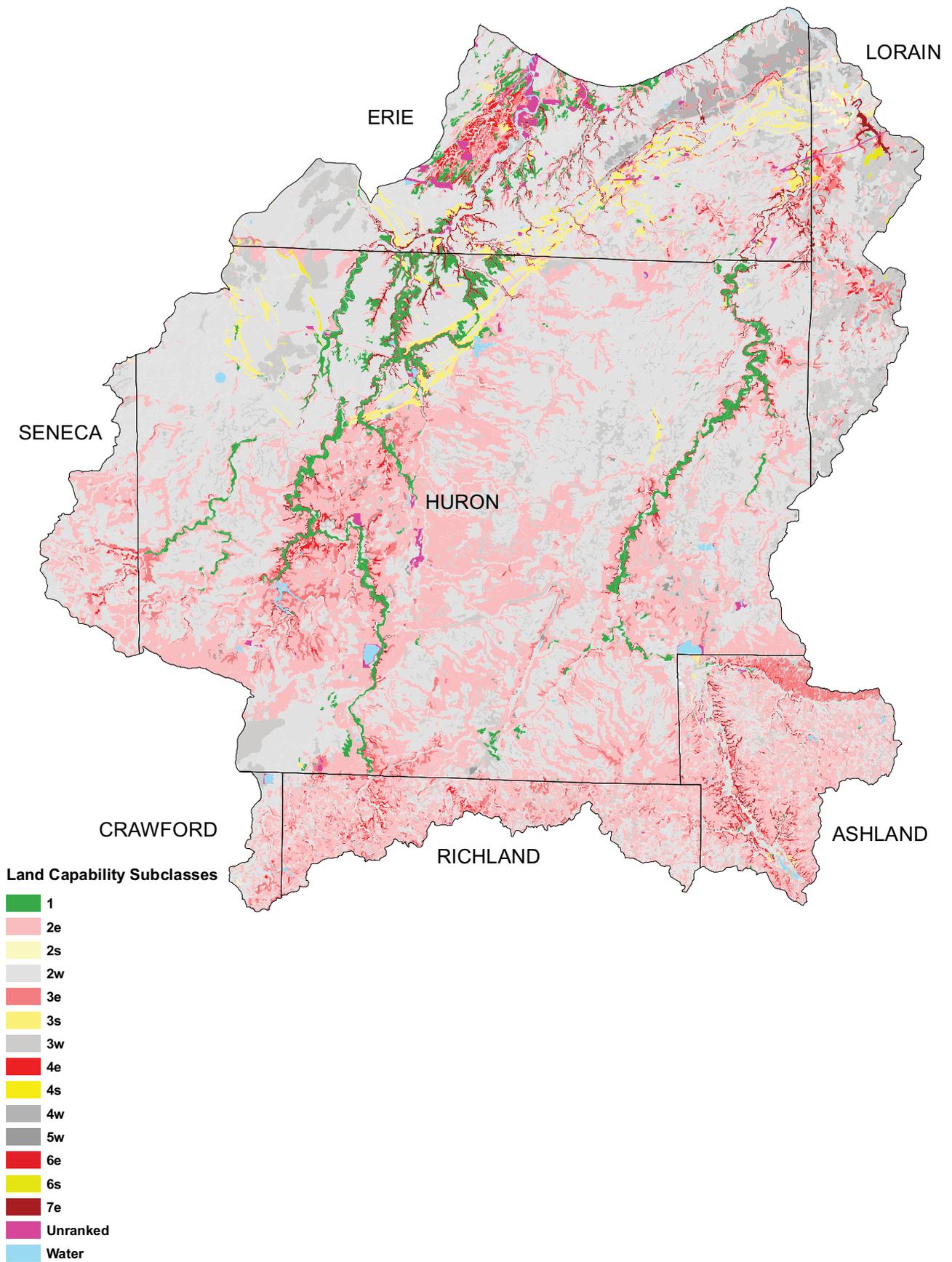
Capability subclasses are soil groups within one class and are designated by adding a lower case letter e, w, or s to the class number denoting a hazard of erosion, wetness, or a restricted root zone respectively.

In general, there are about 14,300 acres of Class 1 soils (having no significant limitations); 374,200 acres of Class 2 soils; 72,200 acres of Class 3 soils; 12,200 acres of Class 4 soils; 800 acres of Class 5 soils; 900 acres of Class 6 soils; and 8,100 acres of Class 7 soils.

**TABLE 12 - LAND CAPABILITY SUBCLASSES**

<b>Land Capability Subclass</b>	<b>Acres</b>	<b>Percent</b>
1	14,286	2.9%
2e	146,308	29.9%
2s	576	0.1%
2w	227,408	46.5%
3e	17,885	3.7%
3s	7,190	1.5%
3w	47,119	9.6%
4e	6,424	1.3%
4s	463	0.1%
4w	5,324	1.1%
5w	759	0.2%
6e	668	0.1%
6s	212	0.0%
7e	8,115	1.7%
Water	2,804	0.6%
Not Rated	3,071	0.6%

FIGURE 12 - LAND CAPABILITY SUBCLASSES



## PRIME FARMLAND CLASSIFICATION

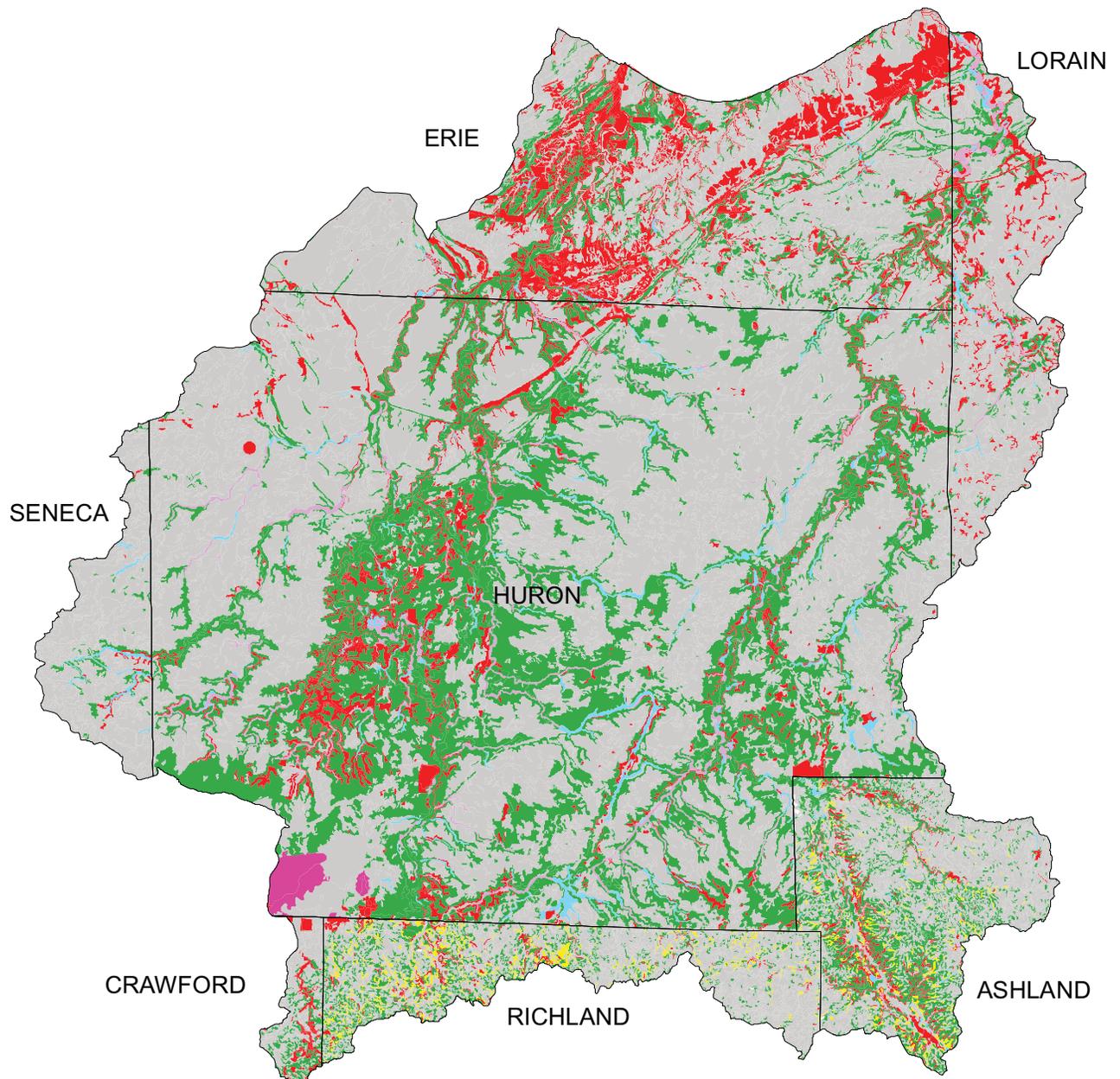
Prime farmland is one several kinds of important farmland defined by the USDA. It is of major importance in meeting the Nation's short and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the USDA encourages and helps facilitate wise use of the Nation's prime farmland.

Prime farmland is defined as land that is best suited to the production of food, feed, forage, fiber, and oil-seed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. Prime farmland has defined soil qualities, growing season and moisture supply needed for a well managed soil to produce a sustained high yield of crops in an economic manner with a minimum adverse environmental impact.

Prime farmland has soil with: 1) an adequate and dependable supply of moisture from precipitation or irrigation; 2) a favorable temperature and growing season; 3) a favorable soil acidity/alkalinity level; 4) few or no rocks; 5) is permeable to water and air; 6) is not excessively erodible; 7) is not saturated with water for long periods; 8) and is not frequently flooded during the growing season.

In the watershed, about 301,900 acres, or about 62 percent of the watershed, is classified as prime farmland if drained; 121,100 acres, or 25 percent, is classified as all areas are prime farmland; 7,500 acres, or 1 percent, is classified as prime farmland if drained and protected from frequent flooding; an additional 7,500 acres, or 1 percent, is classed as prime farmland if protected from frequent flooding; 3,700 acres of sloping Cardington, Belmore, Alexandria, Chili and Canfield soils are classed as farmland of local importance; and 1,800 acres of Carlisle and Linwood soils are classed as farmland of unique importance. About 45,000 acres, or about 9 percent, is classified as not prime farmland. Bennington silt loam, 0 to 2 percent slopes is the most extensive soil type classified as prime farmland if drained and Cardington silt loam is the most extensive soil type classified as all areas are prime farmland. Allis clay loam, 0 to 2 percent slopes is the most extensive soil classed as not prime farmland.

FIGURE 13 - PRIME FARMLAND



**Prime Farmland Code**

- All areas are prime farmland
- Farmland of local importance
- Farmland of unique importance
- Not prime farmland
- Prime farmland if drained
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if protected from flooding or not frequently flooded during the growing season

## THE "SALAD BOWL" OF OHIO

Huron County ranks first in Ohio in the sale of fresh market vegetable crops largely do to the mucky soils in the Willard Marsh. The marsh is known as Ohio's salad bowl because of the large quantity of vegetables grown there and its bowl shape geography. Crops include dry onions, green onion, radish, potato, celery, broccoli, sweet corn, bell peppers, cucumbers, parsley, and many other leaf crops. In 1896, several families from Holland settled the area known as the Willard Marsh and worked the land to construct the Marsh Run drainage ditch over seven miles to the Huron River.

The approximately 1200 acres of deep muck that make up the marsh is in the Celeryville Conservancy District, located in the south western portion of Huron County. In addition to the marsh, the adjacent 1,676 acre Willard Marsh Wildlife Area is mostly comprised of these mucky soils. These rich, black soils are perfect for the Ohio Agricultural Research and Development Center (OARDC) Muck Crops Station, the oldest outlying station in the state.

In 1968 construction was completed on a 75 acre, 360 million gallon reservoir. Eight water control structures were created, four of which are fabridams, and 15.3 miles of channel improvements were made. This PL-566 project involved the Soil Conservation Service, Soil and Water Conservation Districts and the Celeryville Conservancy District. Producers experienced a 400% increase in production after the project was completed. Wind erosion and oxidation can rob these producers of over 1/2 inch of this valuable top soil a year. The fabridams allow flooding of the marsh in the off season to saturate the muck and reduce oxidation. The annual economic value of this area ranges between \$35,000,000 and \$50,000,000. If combined, the vegetable farms in Celeryville would be the third largest employer in Huron County.

## HYDRIC SOIL DISTRIBUTION

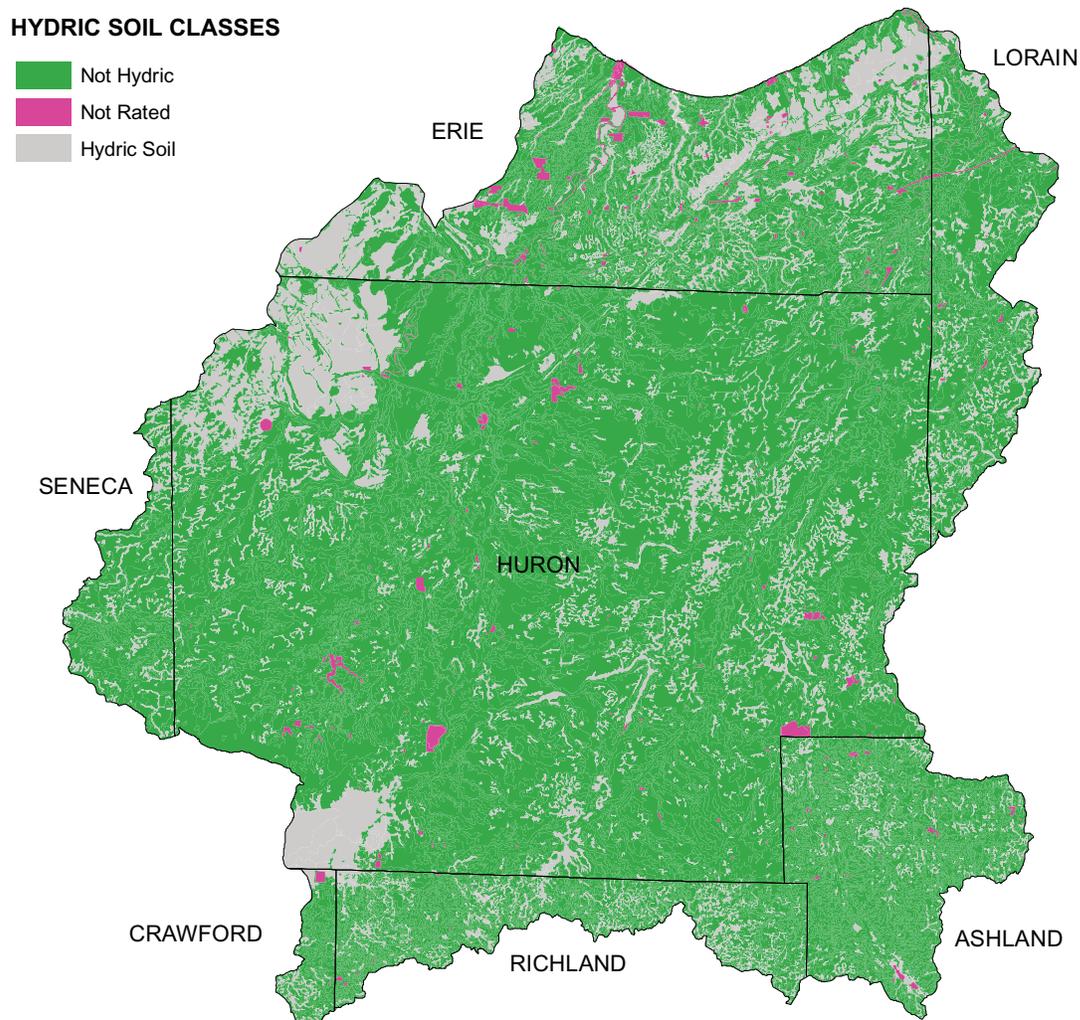
Hydric soils are those soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil and support the growth and regeneration of hydrophytic, or water-loving, vegetation.

In the Huron-Vermilion Watershed, hydric soils occur primarily in narrow swales on glacial till uplands but also occur on several expansive flats and depressional areas and comprise about 16 percent of the watershed.

Of the 270 different soil types occurring in the watershed, 62 soil types are hydric soils occupying about 80,400 acres of the watershed. Pewamo silty clay loam and Condit silty clay loam are the most extensive hydric soils and occupy 17,200 and 16,500 acres respectively on till uplands. Carlisle soils are very poorly drained organic soils that formed in organic soil material that accumulated during the pond filling cycle.

Many of these soils are well suited to artificial drainage for cropland. Areas of Carlisle soils may be artificially drained but are subject to primary and secondary subsidence and wind erosion if drained. Also subsurface drain lines are subject to reduced efficiency due to iron oxides plugging drainage tile. Water table management is effective in reducing the hazard of subsidence.

**FIGURE 14 - HYDRIC SOIL**



## SOIL LOSS

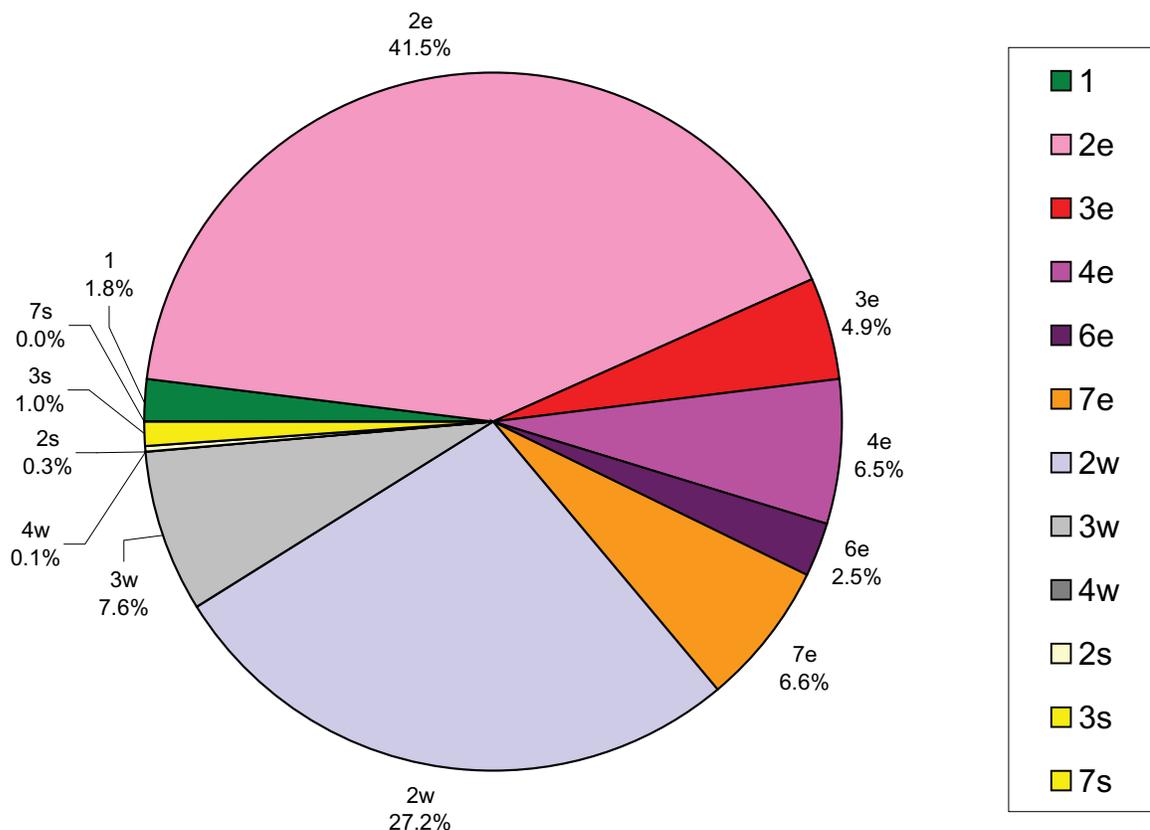
Average soil erosion rates by water on cultivated and non-cultivated cropland in the Huron-Vermilion Rivers Watershed has declined from about 2.9 T/Ac/Year in 1982 to about 1.6 T/Ac/Year in 1997.

Using land capability classes, average annual soil erosion rates on cropland for 1997 and 1982 were estimated from NRI as follows:

**TABLE 13 - AVERAGE ANNUAL SOIL EROSION RATES ON CROPLAND**

Land Capability Subclass	1997	1982
	Soil Erosion Rate (T/Ac/Year)	
1	1.0	1.4
2e	2	3.6
2s	0.7	1.0
2w	1.0	1.5
3e	4.8	5.9
3s	1.3	1.3
3w	1.1	1.6
4e	14.3	16.2
4w	0.4	1.6
6e	9.6	14.4
7e	60.9	117.2

**FIGURE 15 - 1997 CROPLAND SOIL LOSS BY LAND CAPABILITY SUBCLASS (TONS/YEAR AND PERCENTAGE)**



**TABLE 14 - ESTIMATED 1997 GROSS SOIL LOSS FROM CROPLAND BY LAND CAPABILITY SUBCLASS**

<b>Land Capability Subclass</b>	<b>Annual Gross Soil Loss (Tons/Year)</b>	<b>Percent of Total</b>
1	8,500	1.8%
2e	191,500	41.5%
3e	22,600	4.9%
4e	30,100	6.5%
6e	11,500	2.5%
7e	30,500	6.6%
2w	125,600	27.2%
3w	35,300	7.6%
4w	500	0.1%
2s	1,200	0.3%
3s	4,500	1.0%
7s	200	0.04%
<b>Total</b>	<b>462,000</b>	<b>100.0%</b>

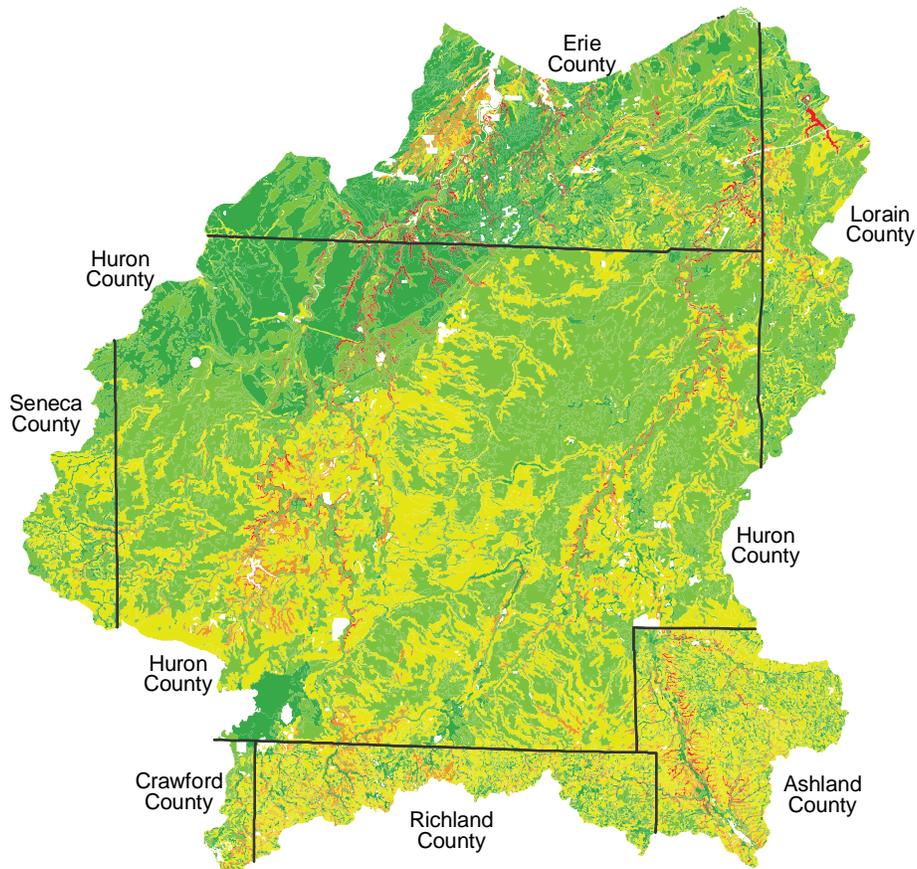
Note: some land capability subclasses not estimated in NRI due to statistical probabilities and low acreages: 5e, 5s, 6w, and 7w.

## ANALYSIS OF SOIL EROSION POTENTIAL WITHIN THE WATERSHED

This watershed is not as flat as the other watersheds to the west that drain into the western Lake Erie Basin. In those watersheds, the flatness often masks differences in soil erosion potential when typical highly erodible land measurements are used. Despite having more relief in the Huron and Vermilion watersheds, soil erosion potential was again calculated for comparison purposes. Soil erosion potential was calculated for each map unit in the watershed by multiplying the Rainfall Factor (R) times the Soil Erodibility Factor (K) times the Length Slope Factor (LS). These resulting values were grouped by ranges. The higher the resulting RKLS value, the greater the potential for the soil to erode.

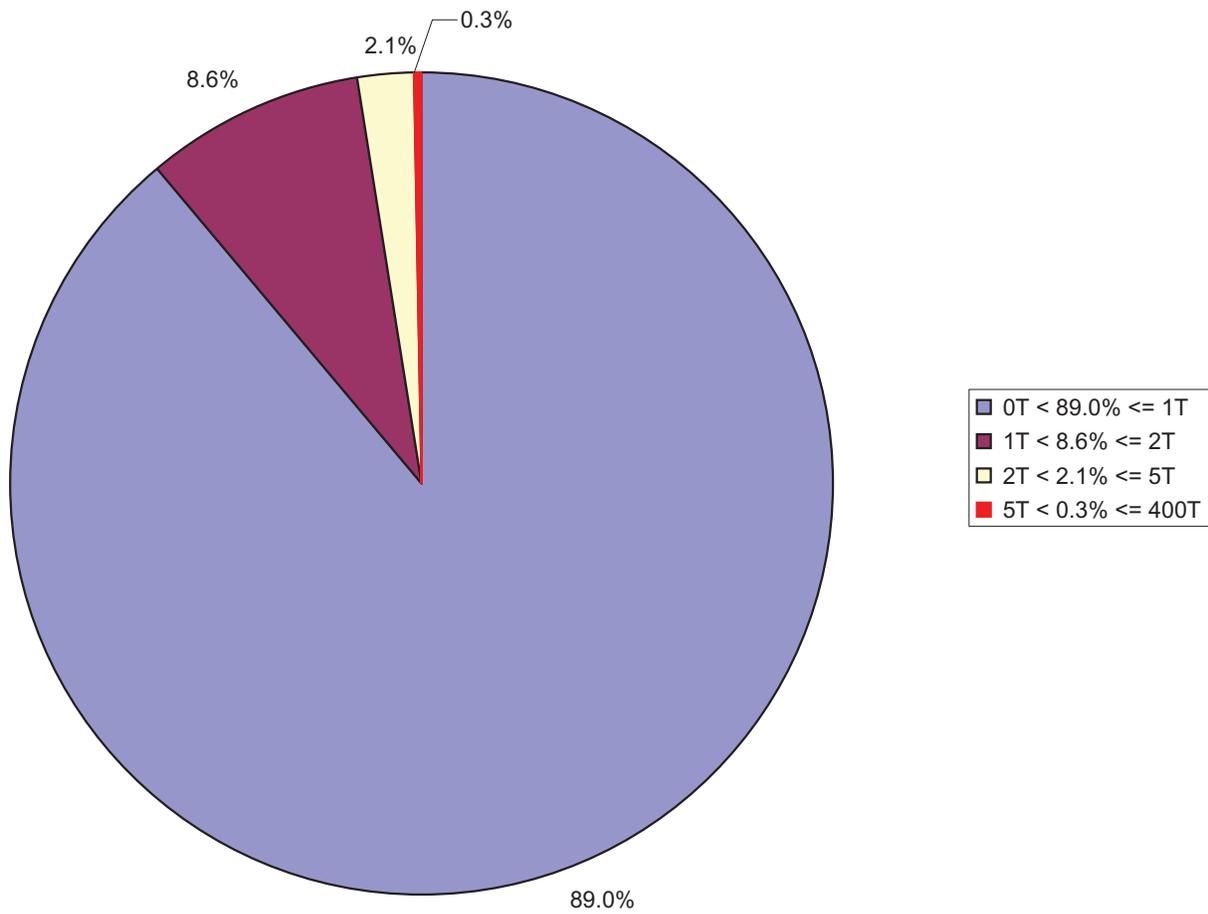
Figure 18 depicts areas within each range. Areas that are yellow, orange or red show highest inherent potential for the soil to erode. This analysis does not account for any management or treatment practice in place that will affect the actual rates of erosion. It only measures potential.

**FIGURE 16 - SOIL EROSION POTENTIAL (R x K x LS)**



<b>LEGEND</b>			
	RKLS	Acres	%
	<= 5.5	85,290	17.5%
	5.6 to 12.2	214,870	44.0%
	12.3 to 37.4	152,440	31.2%
	37.5 to 175	18,770	3.8%
	175.1 to 1000	8,200	1.7%
	Not rated	9,040	1.9%
	Total =	488,610	100.0%

**FIGURE 17 - PERCENT OF CULTIVATED CROPLAND ERODING AS A MULTIPLE OF "T" - 1997 NRI**



*Ephemeral Rill Erosion*

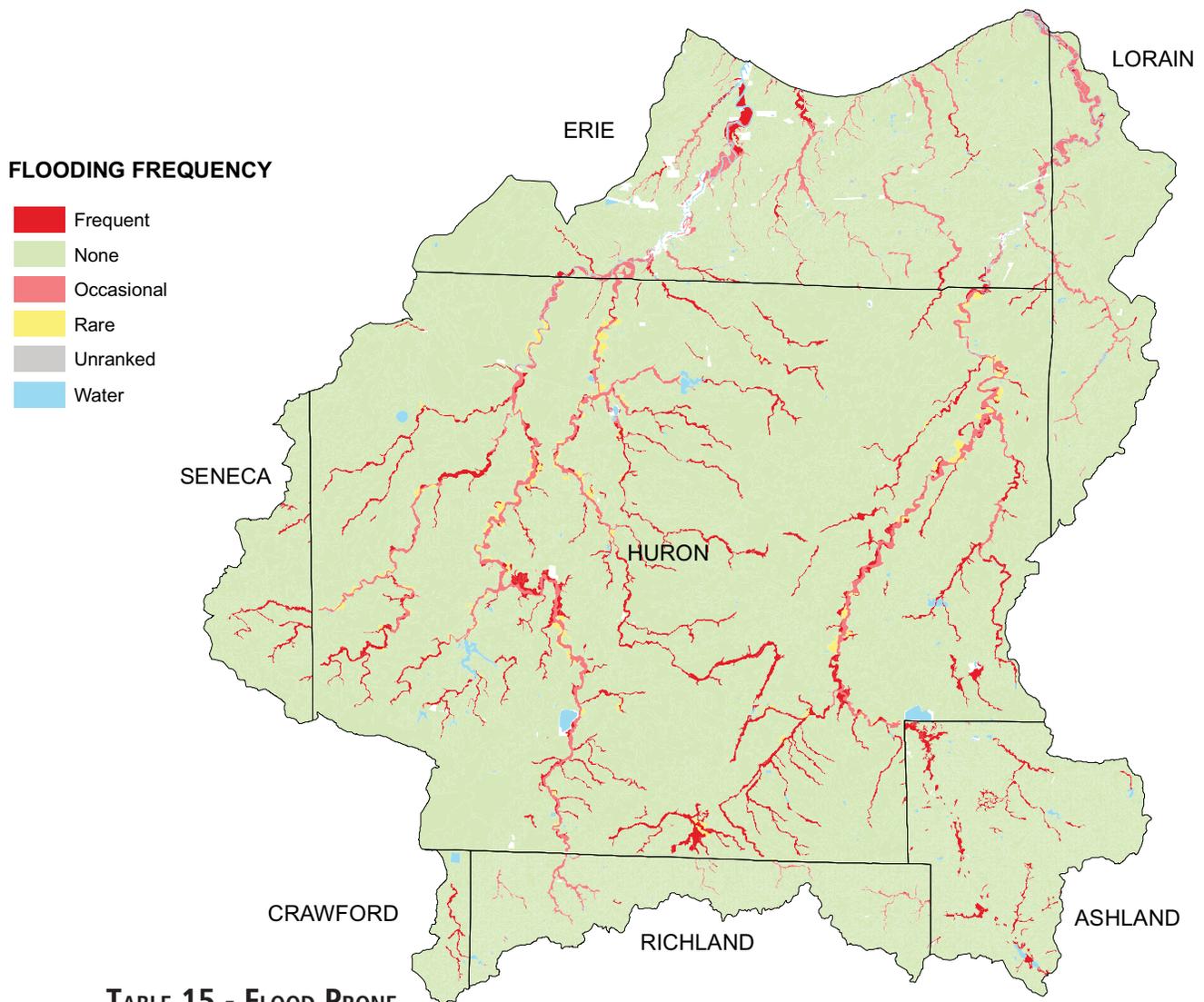


*Sheet Erosion*

## FLOOD PLAIN SOILS

Soils formed in recent alluvium on naturally occurring flood plains comprise about 30,100 acres or about 6.2 percent of the Huron-Vermilion Watershed. These soils are on relatively narrow flood plains along streams that commonly occur at the base of sloping to very steep uplands. These soils formed in recent deposits of alluvium that were deposited by stream bank overflow. These soils may flood frequently (usually about once per year), occasionally (usually about once every other year) and some soils may only flood rarely. Soil maps identify alluvial soils by soil map unit name and they interpret the flooding frequency and are landform based.

**FIGURE 18 - FLOOD PRONE SOILS**



**TABLE 15 - FLOOD PRONE SOILS DATA**

	Acres
Frequently Flooded	15,600
Occasionally Flooded	12,400
Rarely Flooded	2,110

## FLOODING AND WATER DRAINAGE IN THE HURON-VERMILION WATERSHED

### NORWALK FLOOD , 2006

Drainage is a big concern for landowners and farmers in the Huron River Watershed. The dominant wet soils require subsurface and surface drainage systems to maximize crop production. On June 22, 2006, this problem was compounded when six to ten inches of rain fell in Huron and Erie Counties. Hardest hit was Norwalk, Ohio, where an emergency declaration was issued by the state. Flood water reached the tops of playground equipment and twenty homes needed to be evacuated. Over 800 homes and businesses were flooded in Huron County. Approximately 30 roads in the area had to be closed in the area because of flooding.



NORWALK FLOOD , 2006



**TABLE 16 - HURON-VERMILION WATERSHED FLOOD DISCHARGES**

<b>Huron River at Milan Peak Discharges (USGS gage #04199000)</b>		
<b>Year</b>	<b>Discharge (cfs)</b>	<b>Gage (height in ft.)</b>
7/5/1969	49,600	31.10
1/22/1959	25,800	24.08
5/12/1956	18,200	21.10
8/26/1998	16,800	23.26
12/30/1990	14,500	-
6/22/2006	14,300	23.95
4/26/1961	13,600	19.73
3/11/1952	13,200	19.80
8/20/2007	12,700	22.70
2/27/1997	12,300	20.68

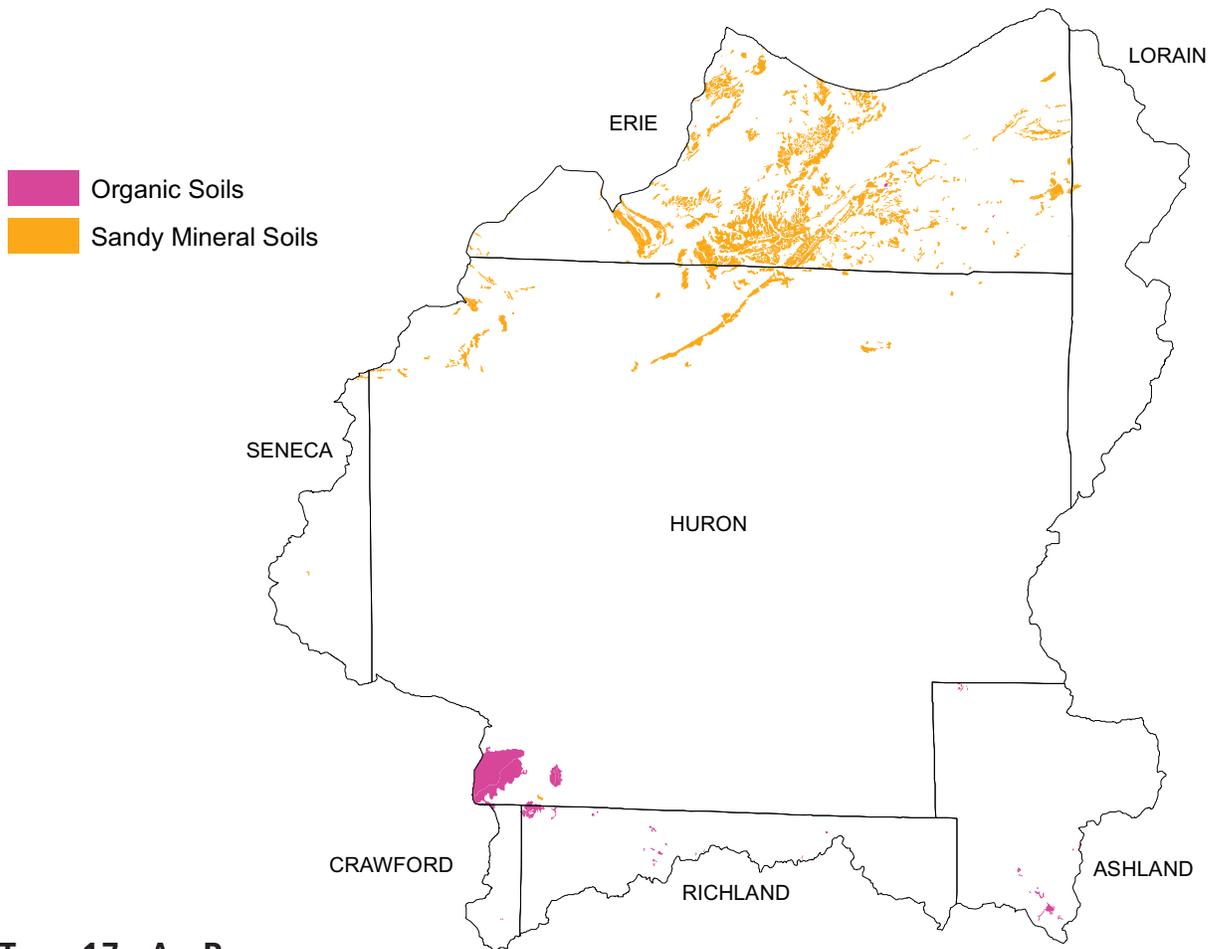
<b>Vermilion River Near Vermilion Peak Discharges (USGS gage #04199500)</b>		
<b>Year</b>	<b>Discharge (cfs)</b>	<b>Gage (height in ft.)</b>
7/6/1969	40,800	17.14
1/21/1959	20,500	13.80
6/23/2006	16,600	11.18
3/4/1979	11,000	16.13
1/26/1952	9,820	11.50
5/12/1956	9,820	11.47

## AIR RESOURCES INFORMATION

### WIND EROSION

There are about 15,300 acres in the Huron-Vermilion watershed comprised of soils subject to a severe wind erosion hazard. Mineral soils subject to wind erosion primarily have sandy surface layers and comprise about 12,100 acres, occurring on glacial beach ridges and deltas and nearshore bars on lake plains in the northern part of the watershed. They are subject to blowing and wind erosion if left bare during the winter and spring months. Organic soils, such as Carlisle muck, are also subject to severe wind erosion and make up about 3,200 acres mainly in the southern part of the watershed.

**FIGURE 19 -SOILS SUBJECT TO SEVERE WIND EROSION**



**TABLE 17 - AIR RESOURCE CONCERNS TABLE**

Soils Subject to Wind Erosion (acres)	
Organic Soils	Mineral Soils
3,200	12,100

## PLANT AND ANIMAL RESOURCES

### LIVESTOCK RESOURCES INFORMATION

Most of the livestock in the watershed is raised in confinement operations. A high percentage of the watershed is cropland, with pasture as a minor land use. Cattle are the predominant type of livestock in the watershed. Horses for pleasure are a livestock component of this watershed along with swine and poultry. The southern portion of the watershed is experiencing a significant influx of poultry operations. Grassed based intensive grazing operations are sprouting as new enterprises in the watershed. At the present time, these operations are small to moderate. The bulk of the livestock waste generated in the watershed is utilized via application to cropland. Waste is handled in predominately the solid form. There is ample land in the watershed to utilize the livestock waste generated. The waste generated is estimated to supply approximately 11 percent of the total phosphorous needs for the crops grown in this watershed.

**TABLE 18 - LIVESTOCK OPERATIONS DATA**

<b>Huron-Vermillion Watershed Livestock Operations Data</b>	<b>Number</b>
Total Number of Confined Livestock State Permitted Operations in the Watershed	0
Estimated Number of Non Permitted Confined Livestock Operations in the Watershed	753
Number of Non Permitted Facilities in the Watershed with Recent Comprehensive Nutrient Management Plans (CNMP's) or following NRCS Waste Utilization Standard 633	225
Estimated Number of New Comprehensive Nutrient Management Plans that may be needed in the Watershed	528

**TABLE 19 - ESTIMATED LIVESTOCK ANIMAL UNITS, MANURE PRODUCTION,  
AND NUTRIENT PRODUCTION**

County and Watershed Totals	AU	AU	AU	AU	Manure Production(Tons/ Yr.)			Nutrient Production (1000 Lbs./Yr.)		
	Dairies	Beef	Swine	Poultry	Dairy/Beef	Swine	Poultry	N	P2O5	K2O
Ashland	17,606	8,947	2,634	104	307,149	32,488	1,233	3,464	1,750	2,602
Crawford	2,674	4,934	6,359	4	75,051	78,442	45	1,705	1,164	1,247
Erie	1,114	1,184	300	2	24,348	3,703	18	287	149	215
Huron	7,800	2,763	1,542	11	126,541	19,021	116	1,488	772	1,116
Lorain	9,360	2,368	1,010	13	144,324	12,456	153	1,584	784	1,193
Richland	13,594	6,842	2,224	250	236,636	27,438	2,972	2,739	1,416	2,050
Seneca	1,114	7,039	4,285	2	70,853	52,855	14	1,349	875	992
Huron-Vermilion Watersheds	11,347	4,998	2,549	10	191,853	31,438	118	2,287	1,197	1,714

Note: Poultry estimates err on the low side because yearly statistics do not report them. Some poultry data is taken from the 2002 Census of Agriculture but there as well the data may be unreported where it would disclose individual farm numbers.

Huron-Vermilion W/S	Nutrients/Cropland Acre (Lbs/Ac/Yr)		
	N	P2O5	K2O
Produced by animals in the watershed	9.8	5.1	7.3
Needed for crop production in the watershed	70.1	47.8	76.8

Note: Estimated data from Agricultural Statistics prorated based on county acres in the watershed and local knowledge

## **WILDLIFE AND ENDANGERED SPECIES**

Approximately 60 percent of the Huron and Vermillion watersheds is in agricultural use (predominantly row crops), most of which provides marginal habitat for common edge or disturbance adapted species. Lack of winter cover or food for resident species is severely limiting in these areas. Most permanent cover is found in woodlands, which occupy just over a quarter of the watershed area. Non-wooded wetlands or grasslands are very limited (approximately 2 percent), fragmented and subject to a variety of disturbances such as mowing which negatively impacts wildlife use. Within the rural areas of the watershed, woodlands occur mostly as small isolated woodlots although there are some more extensive wooded riparian areas scattered through the watershed. Within the urban areas, significant wildlife habitat is limited to a few parks or natural areas.

Habitat quality in streams and rivers in the watershed is negatively impacted by excess sediments, nutrients, stream modification and lack of permanent riparian cover in both rural and urban areas. Smaller tributaries and headwaters are the most severely impacted.

Table 20 primarily reflects the limited fish and wildlife habitat associated with most of the rural and urban areas. These watersheds have very few records of unique plant communities and threatened or endangered species. Table 21, listing some of the rare and endangered species, only includes those species which are Federally-listed as well as those listed as Endangered by the state of Ohio.

**TABLE 20 - HABITAT REFERENCE INFORMATION**

	Availability and Condition of Wildlife Habitat				
	Much Less Than Typical State Watershed	Less Than Typical State Watershed	Comparable to Typical State Watershed	Better Than Typical State Watershed	Much Better Than Typical State Watershed
Stream Habitat	N/A	Condition degraded in many places	N/A	N/A	N/A
Grassland Habitat	Very limited extent Low quality	N/A	N/A	N/A	N/A
Wetland Habitat	Very limited extent Low quality	N/A	N/A	N/A	N/A
Forest Habitat	N/A	N/A	Moderate amount of woodland present	N/A	N/A

These designations were based on information from OEPA Water Quality reports, Ohio Division of Wildlife Comprehensive Wildlife Plan, qualitative review of land cover information using broad wildlife habitat models and expert opinion

**TABLE 21 - RARE OR ENDANGERED SPECIES INFORMATION**

Rare or Endangered Plant Species Reported from Watershed	Rare or Endangered Animal Species Reported from Watershed
Twisted Teeth Moss <i>Barbula indica</i> var. <i>indica</i>	Plains Clubtail <i>Gomphus externus</i>
Ground Juniper <i>Juniperus communis</i>	Eastern Pondmussel <i>Ligumia nasuta</i>
Long-bracted Orchid <i>Coeloglossum viride</i>	Bald Eagle <i>Haliaeetus leucocephalus</i>
Smooth Rose <i>Rosa blanda</i>	Golden-winged Warbler <i>Vermivora shrysoptera</i>
Narrow-leaved Blue-eyed-grass <i>Sisyrinchium mucronatum</i>	
Bushy Aster <i>Aster dumosus</i>	

## CONSERVATION SYSTEMS AND PRACTICE APPLICATION DATA

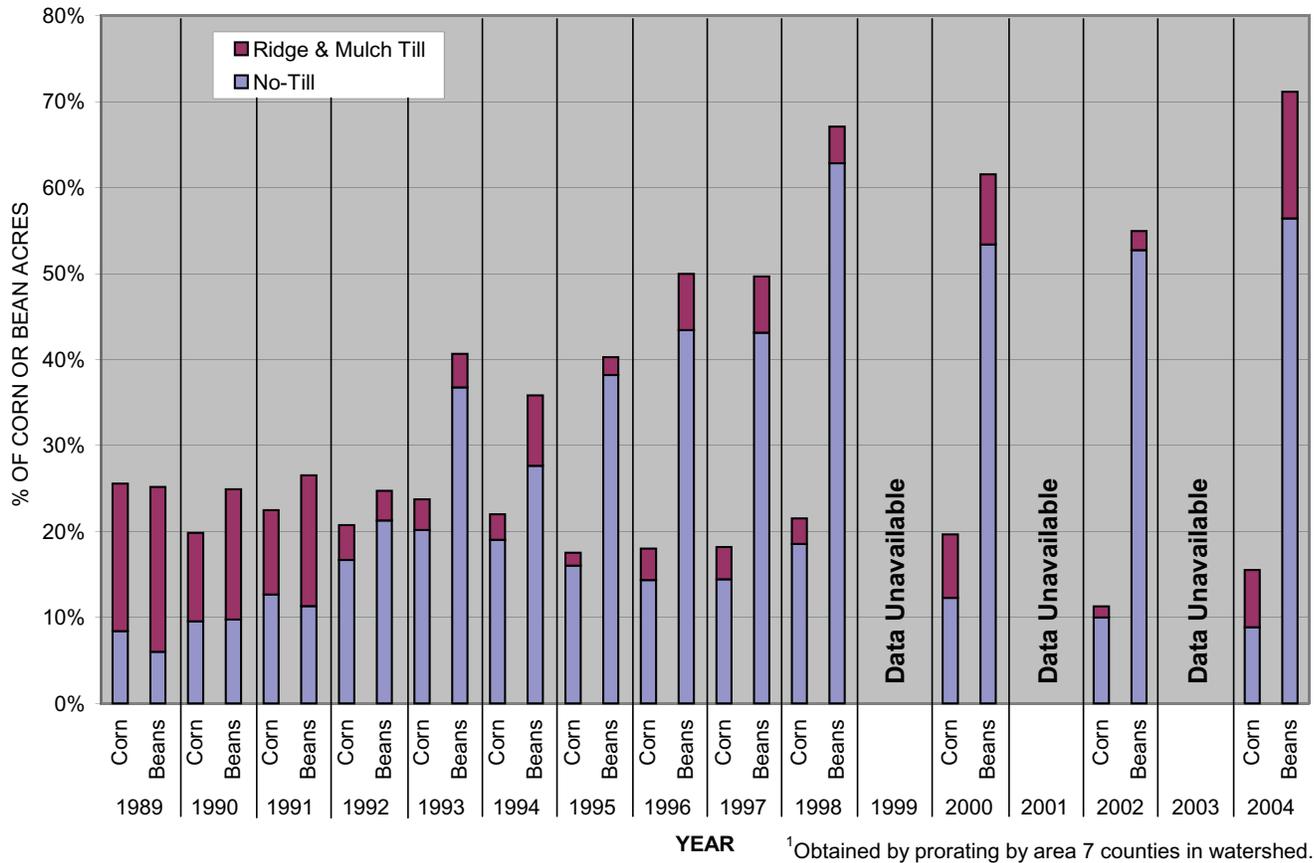
The following table was produced using NRCS' Performance Results System (PRS) and shows the application of key conservation practices and systems plus the number of conservation system acres applied by Farm Bill Program. PRS is used to track, analyze and report NRCS conservation accomplishments. For more information on these and other reports visit: <http://ias.sc.egov.usda.gov/PRSHOME/>.

**TABLE 22 - NRCS CONSERVATION PROGRESS PERFORMANCE MEASURES**

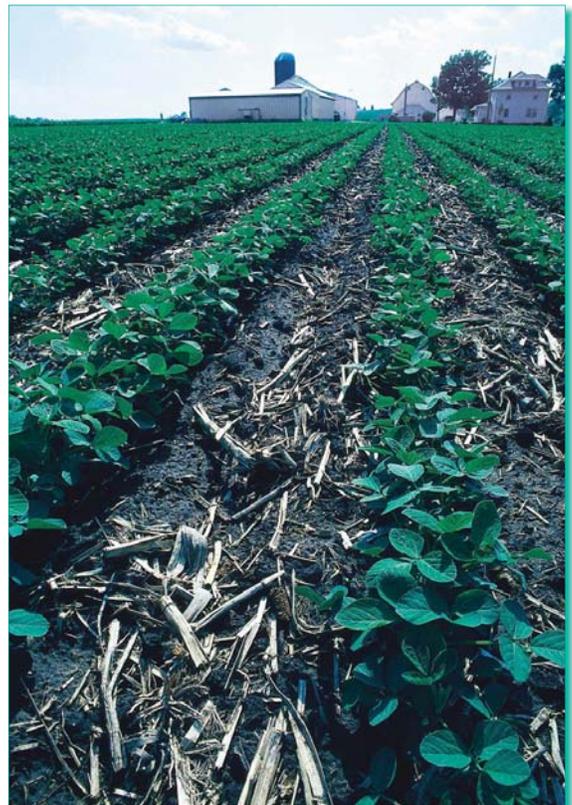
	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>Total</b>
Total Conservation Systems Planned (acres)	14,349	25,401	48,631	N/A	26,827	31,618	146,826
Total Conservation Systems Applied (acres)	14,727	14,797	8,523	N/A	16,623	29,429	84,099
<b>Conservation Practices</b>							
Erosion Control Total Soil Saved (tons/year)	11,109	7,071	3,288	N/A	16,575	22,178	60,221
Filterstrips (393) (acres)	407	215	213	150	24	84	943
Grassed Waterways (412) (acres)	62	45	42	40	10	53	212
Prescribed Grazing (528 and 528A) (acres)	13	57	53	8	0	209	332
Residue Management (329A-C) (acres)	3,589	1,585	4,345	13,827	12,436	18,573	40,528
Riparian Forest Buffers (391) (acres)	24	76	66	37	5	6	177
Tree and Shrub Establishment (612) (acres)	185	131	92	166	12	327	747
Total Nutrient Management (acres)	11,167	7,125	11,136	8,288	12,477	6,082	47,987
Total Waste Management (313) (numbers)	1	7	5	0	3	1	17
Total Wetlands Created, Restored, or Enhanced (ac)	33	16	11	4	0	44	104
Total Wildlife Habitat (644 - 645)	1,017	373	387	1,312	167	18,601	20,545
<b>Acres Enrolled in Farm Bill Programs</b>							
Conservation Reserve Program	10,290	4,655	6,045	N/A	509	4,849	26,348
Environmental Quality Incentives Program	4,369	5,337	1,902	N/A	3,330	12,517	27,455
Farmland Protection Program	0	0	0	N/A	0	0	0
Wetlands Reserve Program	301	0	121	N/A	0	0	422
Wildlife Habitat Incentive Program	0	0	0	N/A	0	0	0

Performance Results System (PRS) data was extracted (at the Hydrologic Unit Code level) for conservation systems and practices for six years (starting in fiscal year 2001). Information at the hydrologic unit code level was not available where N/A is listed. For more information on these and other performance reports visit: <http://ias.sc.egov.usda.gov/PRSHOME/>.

**FIGURE 20 - CONSERVATION TILLAGE TRENDS**



*Corn and soybeans planted in crop residue.*



**TABLE 23 - AGRICULTURAL CENSUS DATA AND ECONOMIC INFORMATION**

	Total County Data							Watershed Data <sup>1</sup>
	Ashland	Crawford	Erie	Huron	Lorain	Richland	Seneca	
<b>USDA Census of Agriculture - 2002</b>								
Farms (number)	1,089	693	392	865	975	1086	1,185	1,386
Land in farms (acres)	161,100	234,204	94,681	228,346	161,918	158,653	280,449	326,184
Average size of farm (acres)	148	338	242	264	166	146	237	240
Harvested cropland (acres)	102,186	207,911	77,277	181,438	115,084	101,580	234,949	254,701
Market value of crop products sold (\$1,000)	\$15,543	\$38,696	\$29,354	\$53,294	\$84,870	\$19,739	\$43,627	\$79,013
Market value of livestock, poultry & products (\$1000)	\$34,689	\$30,159	\$3,252	\$13,102	\$12,918	\$26,615	\$11,972	\$22,566
Vegetables harvested for sale (farms)	33	10	34	33	75	44	15	64
Vegetables harvested for sale (acres)	229	69	521	3,939	1,301	293	1,161	4,180
<b>National Agricultural Statistics Service - 2006</b>								
Wheat Winter - Harvested (acres)	9,000	25,900	8,800	22,400	6,200	8,300	42,900	30,114
Corn For Grain - Harvested (acres)	30,600	74,300	29,400	62,800	22,700	24,800	77,000	86,373
Soybeans - Harvested (acres)	37,500	107,600	36,400	92,600	55,300	42,100	117,400	125,428
Dry Hay - Harvested (acres)	18,700	3,800	3,000	6,900	10,600	16,300	4,800	12,878
<b>NRCS Conservation Program Financial Assistance</b>								
1996 Farm Bill (includes EQIP & WRP)	\$496,967	\$164,539	\$405,708	\$662,747	\$342,810	\$41,949	\$234,362	\$939,936
Environmental Quality Incentives Program ('02-'08)	\$1,715,537	\$880,341	\$789,579	\$3,049,446	\$1,135,945	\$1,053,113	\$1,250,453	\$3,732,521
Conservation Security Program ('04-'06)	\$47,221	\$0	\$2,930,762	\$11,288,817	\$323,405	\$0	\$191,160	\$12,129,204
Wetland Reserve Program ('02-'07)	\$13,000	\$0	\$14,136	\$0	\$87,500	\$0	\$0	\$17,119
Wildlife Habitat Incentives Program ('02-'07)	\$0	\$0	\$0	\$4,527	\$79,280	\$29,165	\$2,192	\$14,078
Farm and Ranch Lands Protection Program	\$96,058	\$0	\$0	\$0	\$0	\$0	\$92,981	\$15,738
Grassland Reserve Program	\$58,582	\$0	\$0	\$0	\$73,251	\$0	\$0	\$14,070
Total 1996-2008 NRCS Administered Program Dollars	\$2,427,365	\$1,044,880	\$4,140,185	\$15,005,537	\$2,042,191	\$1,124,227	\$1,771,148	\$16,862,667

<sup>1</sup>Prorated by county area in watershed

## WATERSHED PROJECTS AND PLANNING INFORMATION

**TABLE 24 - LOCAL WATERSHED RELATED ORGANIZATIONS IDENTIFIED IN THE WATERSHED**

Organization Name	Description/Purpose/Benefits	Contact Information	Type of Group (Govt., NGO, partnerships)
Firelands Land Conservancy Watershed	Our mission is to serve the people of the North Central Ohio Lake Erie Watersheds to conserve in perpetuity the natural resources and rural character of the land through partnerships, voluntary conservation options and education.	Website: <a href="http://www.wrlc.cc/">http://www.wrlc.cc/</a> Email: <a href="mailto:firelandslc@oberlin.net">firelandslc@oberlin.net</a>	Non-profit
Friends of the Vermilion River Watershed	Mission: To improve and protect the Vermilion River by promoting watershed awareness to the community, monitoring water quality, sharing water quality data, and providing educational resources.	Website: <a href="http://www.volohio.org/watershed.htm">http://www.volohio.org/watershed.htm</a> Email: <a href="mailto:robertsasala@aol.com">robertsasala@aol.com</a> (Bob Sasala)	NGO
Friends of Old Woman Creek	The Friends of Old Woman Creek promotes public awareness and appreciation of the uniqueness of the estuary and supports stewardship programs that sustain the ecological integrity of Old Woman Creek	Website: <a href="http://www.firelandstributaries.org/fowc.html">http://www.firelandstributaries.org/fowc.html</a> Email: <a href="mailto:bhohman@erie-county-ohio.net">bhohman@erie-county-ohio.net</a>	Non-Profit, Partnership
ODNR Division of Natural Areas & Preserves	The Division of Natural Areas & Preserves protects natural areas with ecological and/or geological significance under provisions of the State of Ohio Natural Areas Act of 1970.	Website: <a href="http://www.dnr.state.oh.us/Home/default/tabid/867/Default.aspx">http://www.dnr.state.oh.us/Home/default/tabid/867/Default.aspx</a> Old Woman Creek: <a href="http://www.dnr.state.oh.us/dnap/location/oldwoman_creek/tabid/954/Default.aspx">http://www.dnr.state.oh.us/dnap/location/oldwoman_creek/tabid/954/Default.aspx</a>	State Government
Soil and Water Conservation Districts for each county in the Watershed	Conservation Districts are locally organized self-governing bodies chartered by the State. Through voluntary action and cooperation of landowners (and other stake holders), the District works to conserve land, water, forest, wildlife and other related resources for the benefit of all.	Website: <a href="http://www.nacdnet.org/about/districts/websites/">http://www.nacdnet.org/about/districts/websites/</a>	State and Local Government

Source: <http://ohiowatersheds.osu.edu/>

**TABLE 25 - LIST OF RELEVANT PUBLISHED WATERSHED PLANS, STUDIES, REPORTS**

Name	Description
Huron River Watershed TMDL	Total Maximum Daily Load Report by the Ohio Environmental Protection Agency, 2005. Available at <a href="http://www.epa.state.oh.us/dsw/tmdl/HuronRiverTMDL.html">http://www.epa.state.oh.us/dsw/tmdl/HuronRiverTMDL.html</a>
Vermilion River Watershed TMDL - Draft	Total Maximum Daily Load Report by the Ohio Environmental Protection Agency, Draft 2005. Available at <a href="http://www.epa.state.oh.us/dsw/tmdl/VermilionRiverTMDL.html">http://www.epa.state.oh.us/dsw/tmdl/VermilionRiverTMDL.html</a>
FEMA Flood Insurance Rate Maps (FIRM's) and Flood Insurance Studies (FIS).	Available for most Ohio villages and cities and unincorporated areas in Ohio on the flood map link at the website: <a href="http://www.fema.gov/hazard/flood/index.shtm">www.fema.gov/hazard/flood/index.shtm</a> Paper and digital copies of maps are issued by FEMA. The maps show areas subject to flooding.
Groundwater Pollution Potential County Maps and Reports	Prepared using the DRASTIC system using existing data to rank areas with respect to relative vulnerability to contamination. Available for all counties in the Huron-Vermilion hydrologic unit. Available at <a href="http://ohiodnr.com/water/gwppmaps/default/tabid/3541/Default.aspx">http://ohiodnr.com/water/gwppmaps/default/tabid/3541/Default.aspx</a>
Ground Water Resources County Maps	Available at <a href="http://ohiodnr.com/water/Home/gwrmaps/default/tabid/3629/Default.aspx">http://ohiodnr.com/water/Home/gwrmaps/default/tabid/3629/Default.aspx</a>
Drinking Water Source Protection Plans	Public Water Systems within watershed with Drinking water Source Protection Plans. Program administered by Ohio EPA. Website: <a href="http://www.epa.state.oh.us/ddagw/pdu/swap_securelogin.html">http://www.epa.state.oh.us/ddagw/pdu/swap_securelogin.html</a>

## SUMMARY AND OBSERVATIONS OF WATERSHED RESOURCE CONCERNS

- This watershed (hydrologic unit) is more rolling than northwest Ohio with about 68 percent of the area less than or equal to 2 percent slope.
- About 48 percent of the watershed is cropland and 87 percent of the cropland was corn and soybeans in 2006.
- From 1982 to 1997, urban land in the watershed increased by 59 percent.
- There are 1,655 miles of streams in the watershed. Fifty-five percent of these are first order streams (headwaters of watershed.)
- Twenty-five percent of this watershed is prime farmland without improvement and an additional 62 percent is prime if drained. The 7 counties mostly or partially in the watershed have a combined market value of agricultural products of \$418 million. Prorating the value by the percent of area in the watershed gives total watershed market value of \$102 million.
- This watershed has about 16 percent hydric soils. Approximately 4.2 percent of the watershed is wooded wetlands.
- Several watersheds groups exist in the hydrologic unit including “Friends of the Vermilion River.” See the list in Table 24.
- This watershed has a significant acreage of soils subject to wind erosion (3 percent.)
- This watershed has adequate land to utilize the livestock waste produced in the watershed and from a nutrient standpoint, capacity to utilize additional waste. The waste generated from livestock is estimated to supply approximately 11 percent of the total phosphorous needs for the crops grown in the watershed.
- Ohio EPA has an approved TMDL project for the Huron River dated 2005 and a draft version for the Vermilion River, also dated 2005. They are available at <http://www.epa.state.oh.us/dsw/tmdl/HuronRiverTMDL.html> and <http://www.epa.state.oh.us/dsw/tmdl/VermilionRiverTMDL.html>, respectively.
- The Huron River Watershed TMDL indicates all three Huron 11-digit hydrologic units are impaired for their intended aquatic life use. Two of the units, 010 and 030, are impaired to a greater degree while the third unit (020) is impaired to a lesser degree. Most of the impairments occur in drainage areas less than 20 Sq. Mi. Larger areas with higher sustained flows more often meet the water quality standards.
- The Vermilion River Watershed TMDL is in draft status but indicates that the two Vermilion 11-digit hydrologic units are impaired for aquatic life use and recreation. Similar to the Huron, impairment occurs mostly in the smaller drainage area headwaters. Nutrient and sediment loads of the Vermilion into Lake Erie are generally less significant compared to the other tributaries.
- Ground and surface water are both important water sources in this watershed. Among large water users (having capacity to withdrawal over 100,000 gallons/day) surface water accounted for 92% of the source waters and ground water 8 percent in 2005.
- Agriculture withdraws about 9 percent of the water used in the watershed by large water withdrawers.

## NEXT STEPS

Part two of the assessment process will include preparing a matrix to summarize the conservation practices and systems needed for this watershed, the amounts, and the estimated costs of implementation. Based on this assessment the following conservation practices are significant practices that are needed and important in protecting the resources of this watershed. Also included is a listing of the USDA Farm Bill Incentive Programs which provide financial incentives for landowners to install these needed practices.

### NEEDED CONSERVATION PRACTICES

- Comprehensive Nutrient Management Plans
- Conservation Tillage
- Cover Crops
- Drainage Water Management
- Erosion Control Structures
- Field Borders
- Field Windbreaks
- Filter Strips
- Grass waterways
- Nutrient Management
- Pasture and Hayland Plantings
- Riparian Forest Buffers
- Tree Plantings
- Upland Wildlife Habitat Management
- Wetland Wildlife Habitat Management
- Wetland Restoration or Creation

### APPLICABLE USDA FARM BILL PROGRAMS

- Conservation Reserve Program (CRP and CREP)
- Conservation Security Program (CSP)
- Environmental Quality Incentive Program (EQIP)
- Farm and Ranchland Preservation Program (FRPP)
- Grazing Lands Conservation Initiative (GLCI)
- Resource Conservation and Development (RC&D) Program
- Wetland Reserve Program (WRP)
- Wildlife Habitat Incentive Programs (WHIP)

## REFERENCES AND CITATIONS

1. Huron-Vermilion Rivers Watershed 10-Meter Digital Elevation Model  
Source: Ohio EPA and USGS Ohio Water Science Center derived 10-meter DEM from 7 ½ minute hypsography DLGs.
2. Huron-Vermilion Rivers Watershed Average Annual Precipitation  
Source: PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, 800-meter grid precipitation normals for 1971-2000, <http://www.ocs.oregonstate.edu/prism/products/matrix.phtml?vartype=tmax&view=maps>  
Last visited on May 14, 2007.
3. Huron-Vermilion Rivers Watershed Stream Orders  
Source: Stream order from National Hydrography Dataset (NHD) high-resolution streams layer, <http://nhd.usgs.gov> , as calculated by Arcview extension streamorder.avx.
4. Huron-Vermilion Rivers Watershed Soil Erosion Potential  
Source: Data Source for LS values taken from typical values for SSURGO map units contained in Field Office Technical Guide, Section II, Cropland Interpretations.
5. The Livestock Estimate was prepared from county agricultural statistics data and a procedure developed in consultation with Ohio State University Extension and others. Reported livestock county numbers were prorated on a per acre basis to each of the county 8 digit HUC units. The resulting numbers were then evaluated and adjusted if needed by local NRCS field offices and NRCS/SWCD staff based on local knowledge of where the livestock was located within the county. Standard book values were then applied to estimate the manure production for each type of livestock based on common storage and application systems for that type of livestock. The results were totaled to provide an estimate of manure and nutrient production for the watershed.

Users are cautioned that this is an estimate only for comparison purposes. There are limitations in the input data. One difficulty is that agricultural statistics data is not reported when there are few producers in a county because of confidentially restrictions. These data is missing or unavailable in some cases for some operations.

This analysis also makes no allowances for movement of manure into or out of the watershed by operations which border the watershed boundaries, or by operators which farm land in more than one watershed. There is no available data to quantify the extent of that. Nevertheless, this analysis is a general estimate of the capacity of the watershed to properly utilize the nutrients produced within the watershed and the general need for export of waste out of the watershed, or the importation of commercial fertilizer.