

RAPID WATERSHED ASSESSMENT - DATA PROFILE

BLANCHARD RIVER 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 Blanchard River Watershed was completed by NRCS with input from our conservation partners and other local entities.

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INTRODUCTION

The Blanchard River Watershed is located in Allen, Hancock, Hardin, Putnam, Seneca, and Wyandot Counties in northwest Ohio. The watershed is delineated by the United States Geological Survey as 8-digit hydrologic unit number 04100008. The 493,434-acre (771 square mile) watershed of the Blanchard River drains into the Auglaize River near the Village of Dupont in Putnam County. Over 80 percent of the watershed is cropland, and over 81 percent of the watershed has 2 percent slope or less. The largest city in the watershed is Findlay. The total population in the Blanchard River Watershed was estimated to be 91,266 (2000 Census).

FIGURE 1 - WATERSHED MAP

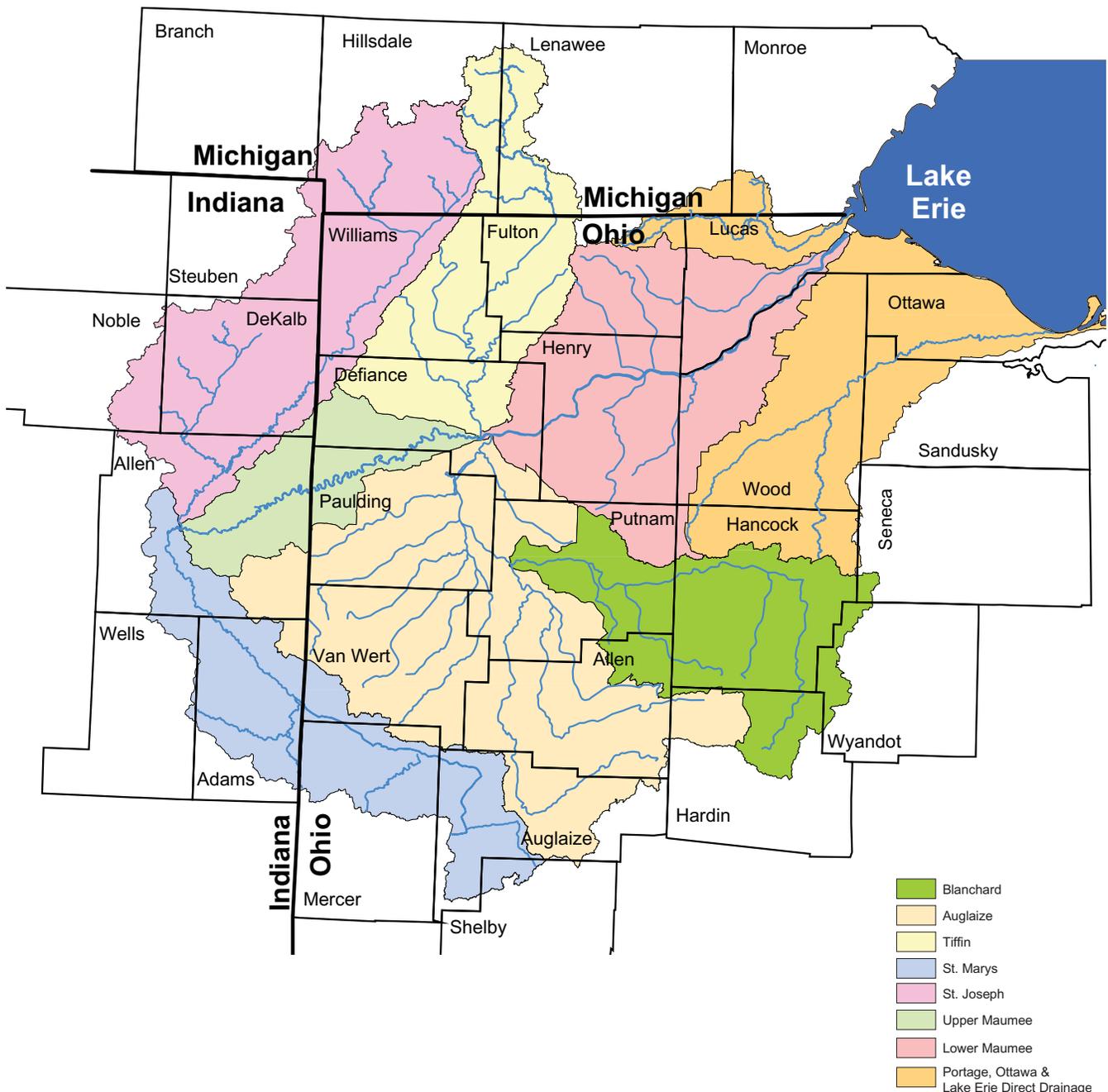


TABLE 1 - COUNTIES LOCATED IN THE BLANCHARD

County	Acres	Acres in Watershed	% of Watershed Area	% of County in Watershed
Allen	260,840	35,430	7.2%	13.6%
Hancock	341,639	242,623	49.2%	71.0%
Hardin	301,761	62,857	12.7%	20.8%
Putnam	310,026	119,390	24.2%	38.5%
Seneca	353,647	5,810	1.2%	1.6%
Wyandot	261,279	27,324	5.5%	10.5%
Totals		493,434	100.0%	

**TABLE 2 - 2000 CENSUS DATA SUMMARY
FOR THE BLANCHARD RIVER WATERSHED**

Summary	Number
Total Population	91,266
Total Households	34,796
Total Families	24,163
Total Housing Units	37,034
Average Household Size	2.54
Average Family Size	3.06
Median Household Income	\$43,910
Average Household Income	\$52,508
Per Capita Income	\$20,359
Population by Race	Number
Total	91,266
Population Reporting One Race	90,364
White	87,374
Black or African American	788
American Indian or Alaska Native	158
Asian	905
Native Hawaiian or Other Pacific Islander	12
Some Other Race	1,127
Population Reporting Two or More Races	902
Total Hispanic Population	2,587

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

PHYSICAL INFORMATION

PHYSICAL DESCRIPTION

The Blanchard River Watershed extends across two Major Land Resource Areas – MLRA 99 (Erie-Huron Lake Plain of the Lake States Fruit, Truck Crop, and Dairy Region) in the western part and MLRA 111 (Indiana-Ohio Till Plain of the Central Feed Grains and Livestock Region) in the eastern part.

The part of this watershed within MLRA 99 typically is a nearly level glacial lake plain with a few scattered ridges of sandy soils that represent past shorelines and moraines. Local relief typically varies by less than 10 feet, except for the beach ridges and low moraines that can rise almost 30 feet above the general level of the landscape. The watershed within 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.

The entire land area of the Blanchard River 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 with some livestock production.

Bedrock geology consists of the Salina Group Dolomite in the western half of the watershed and Tymochtee, Greenfield, and Lockport Dolomites in the eastern half. Limestone quarries are scattered about in all counties within the watershed. Some karst features (e.g., sinkholes) exist in the northeastern part of the watershed in Wyandot County.

The following cities and villages are situated entirely or partly in the Blanchard River Watershed: Arlington, Beavertown, Benton Ridge, Bluffton, Columbus Grove, Continental, Dunkirk, Dupont, Findlay, Forest, Gilboa, Glandorf, Jenera, Kenton, Miller City, Mount Blanchard, Mount Cory, Ottawa, Pandora, Patterson, Rawson, Vanlue, and Wharton.

Prior to historical settlement, wetlands were common and, based on soil survey information, made up about 42 percent of the watershed. Due to the clearing of swamp forest and the subsequent drainage of the land, most of the wetlands have been artificially drained. Wetlands occurring in cropland currently constitute less than 1 percent of the watershed and wooded wetlands constitute about 3.2 percent of the watershed.

**FIGURE 3 - 10-METER DIGITAL ELEVATION MODEL
FOR THE BLANCHARD RIVER WATERSHED**

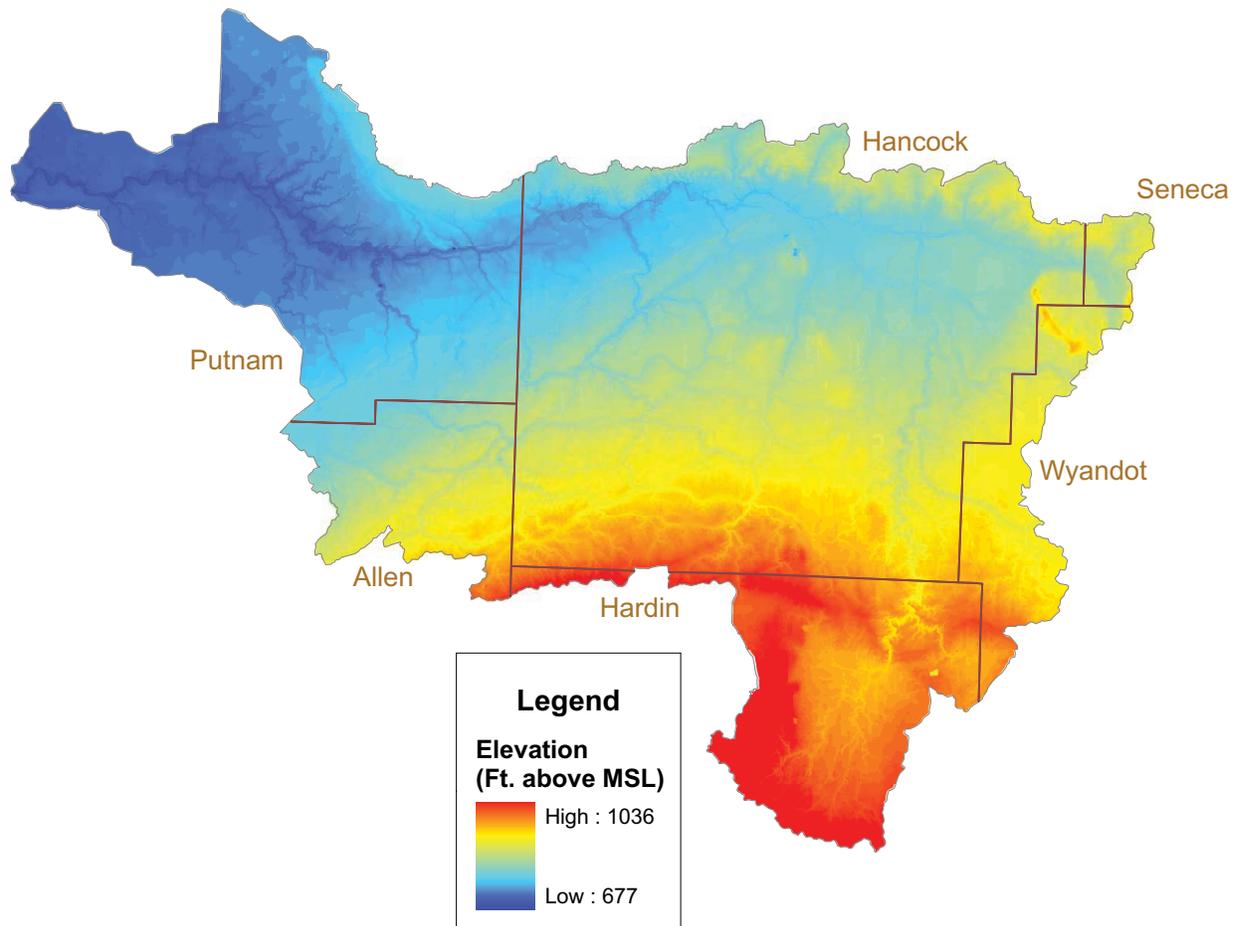


TABLE 3 - WATERSHED SLOPE

Slope Class	Area (Sq.Mi.)	Percent of Watershed
0-1%	510.2	66.2
>1-2%	130.3	16.9
>2-4%	91.1	11.8
>4-6%	26.9	3.5
>6-8%	7.6	1.0
>8-10%	2.8	0.4
>10%	2.1	0.3
Total =	771.0	100.0

LAND USE AND LAND COVER

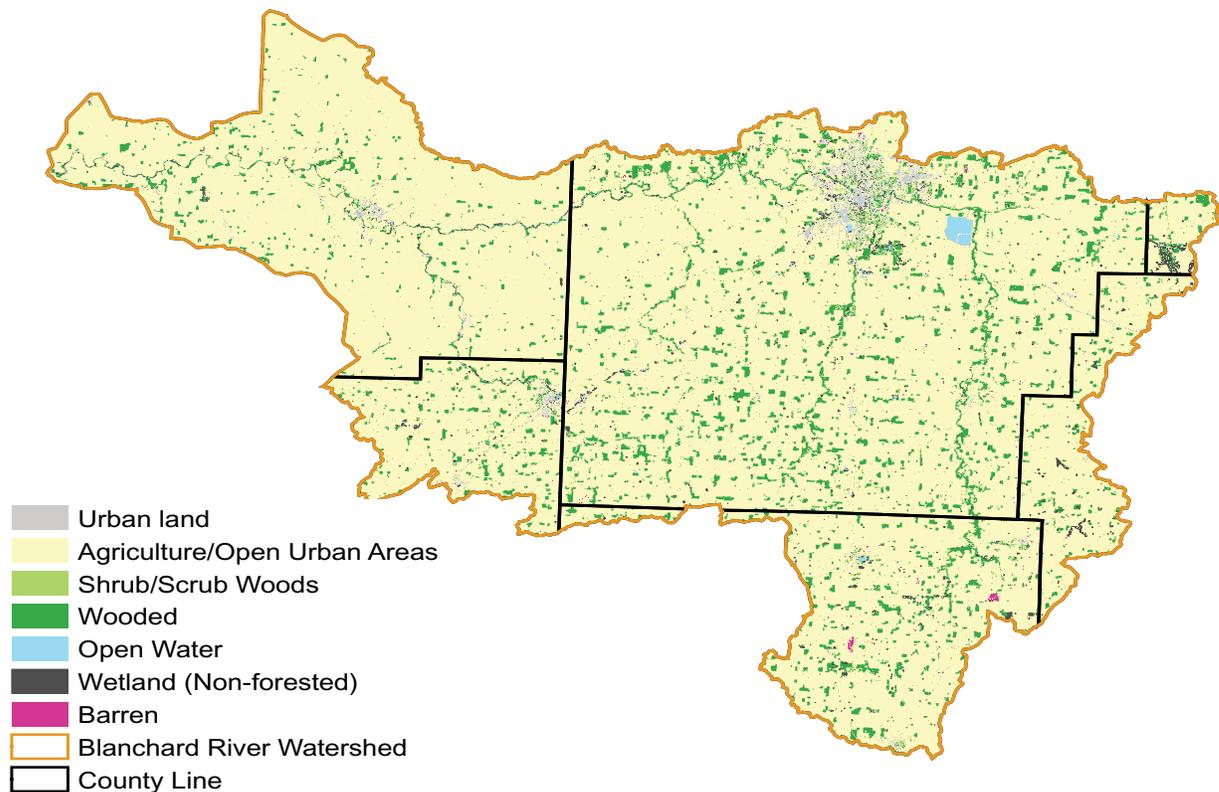
INFORMATION AND TRENDS

In 1994, there were about: 442,000 acres of agricultural land; 40,000 acres of forest; 2,700 acres of shrub/scrub woods; 5,500 acres of urban land; 1,500 acres of wetlands in open fields; and 270 acres of barren land (Source: ODNR-Division of Real Estate and Land Management Land Cover Inventory of Ohio)

According to the USDA-NRCS National Resources Inventory (NRI), from 1982 to 1997, there was an increase of about 13,000 acres of urban/built-up land, representing about 2.6 percent of the Blanchard River Watershed with a slight corresponding decline in pastureland, cropland, and forestland acreage.

In 1997, according to the NRI, the watershed was 80 percent cropland, 1 percent pastureland, 5 percent forestland, 4 percent minor cover/uses, 2 percent rural transportation, 1 percent water, less than 1 percent Conservation Reserve Program (CRP), and about 6 percent urban/built-up land.

FIGURE 4. LAND USE MAP



¹ From 2002 Census of Agricultural - County Data Prorated by Area in Watershed

² From Ohio Agricultural Statistics - Harvested Acres Averaged for '03-'06 Prorated by Area in Watershed

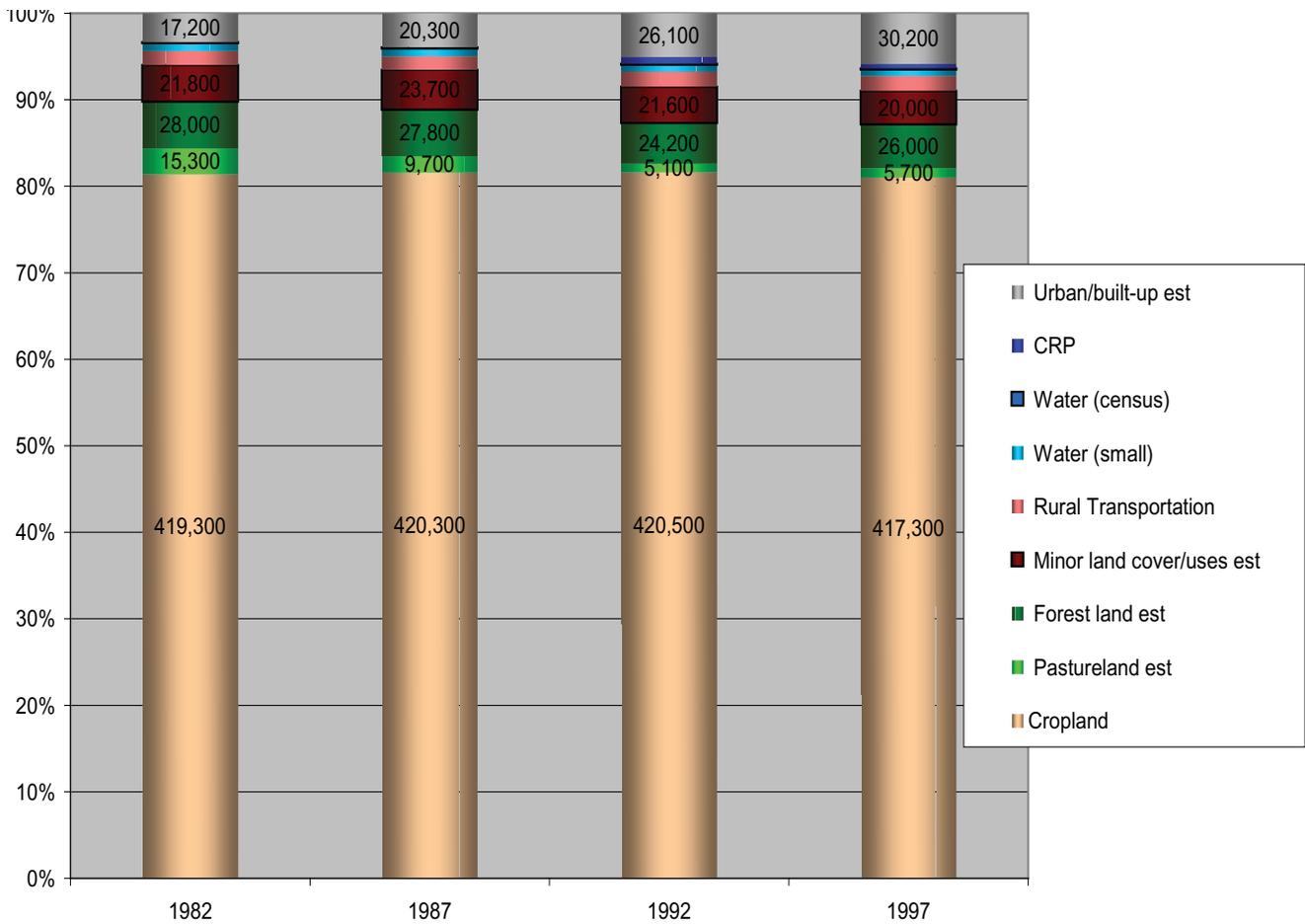
TABLE 4 - CROPLAND AND CROP TYPES IN THE WATERSHED

	Cropland¹	Corn²	Bean²	Wheat²	Hay²
Total	Acres	Percent	Percent	Percent	Percent
Watershed	380,355	31.2%	49.9%	15.9%	3.0%

¹ From 2002 Census of Agricultural - County Data Prorated by Area in Watershed

² From Ohio Agricultural Statistics - Harvested Acres Averaged for '03 - '06 Prorated by Area in Watershed

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



Source: NRI Data

Seneca County, Ohio



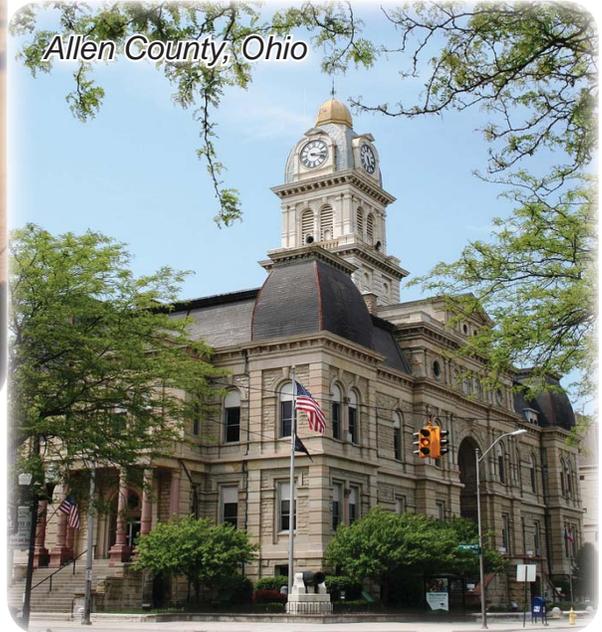
Hardin County, Ohio



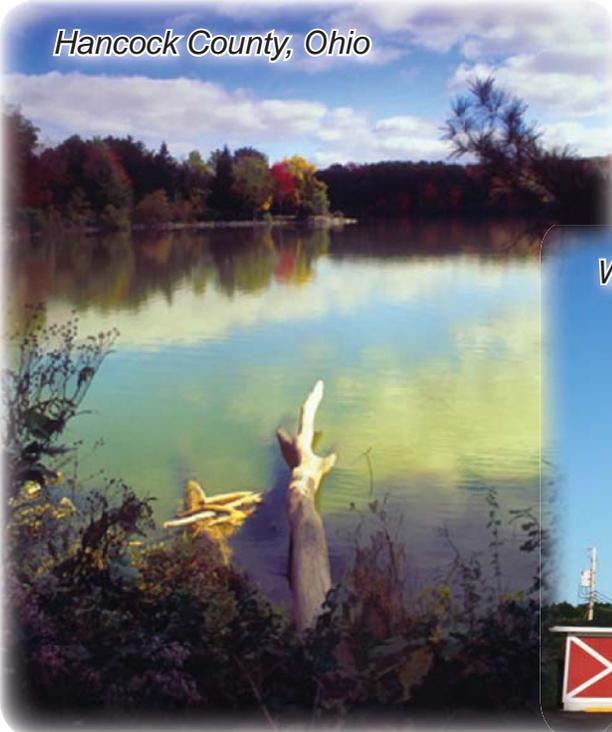
Putnam County, Ohio



Allen County, Ohio



Hancock County, Ohio



Wyandot County, Ohio



WATER RESOURCES INFORMATION

FIGURE 6 - AVERAGE ANNUAL PRECIPITATION

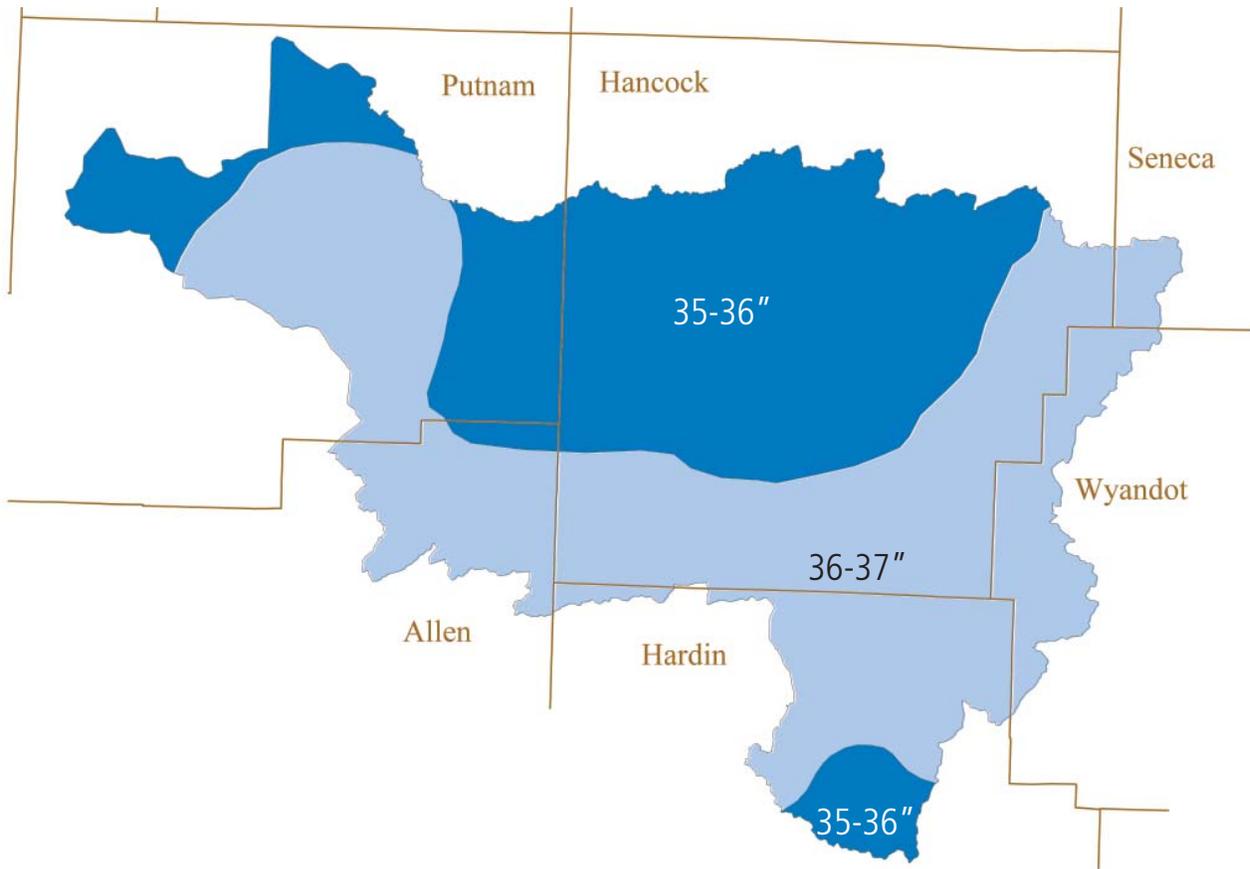
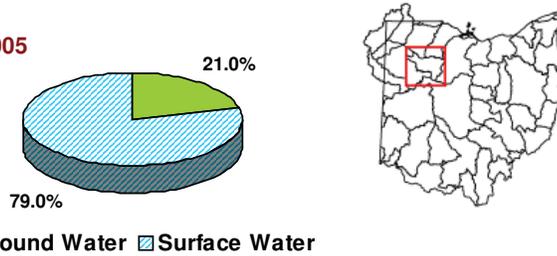


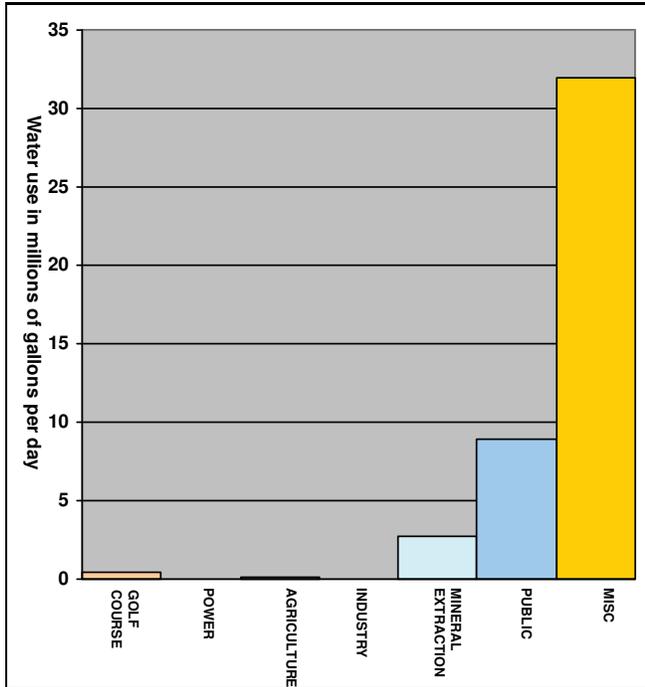
FIGURE 7 - WATER WITHDRAWAL IN THE BLANCHARD RIVER WATERSHED

Total fresh-water withdrawal and source of water in 2005

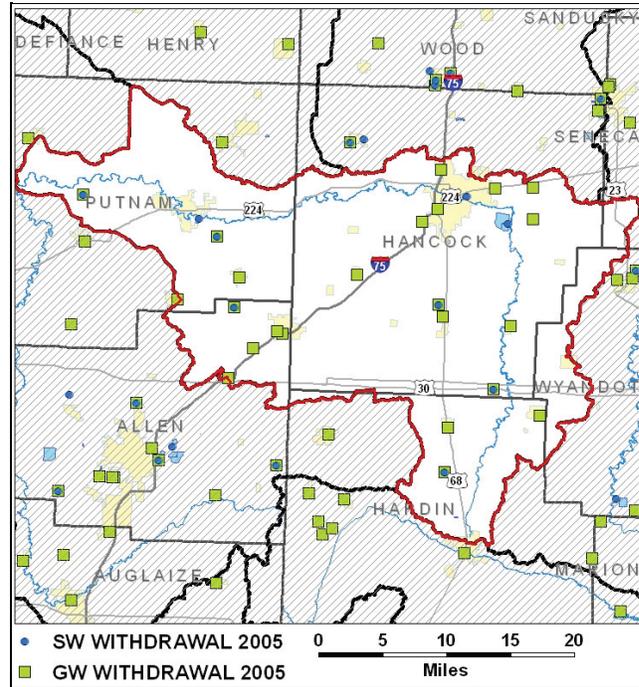
Source	Water use, in million gallons per day	Percent of total use
Surface Water	34.78	79.0%
Ground Water	9.25	21.0%
Total	44.03	100.0%



Total fresh-water withdrawal by category in 2005



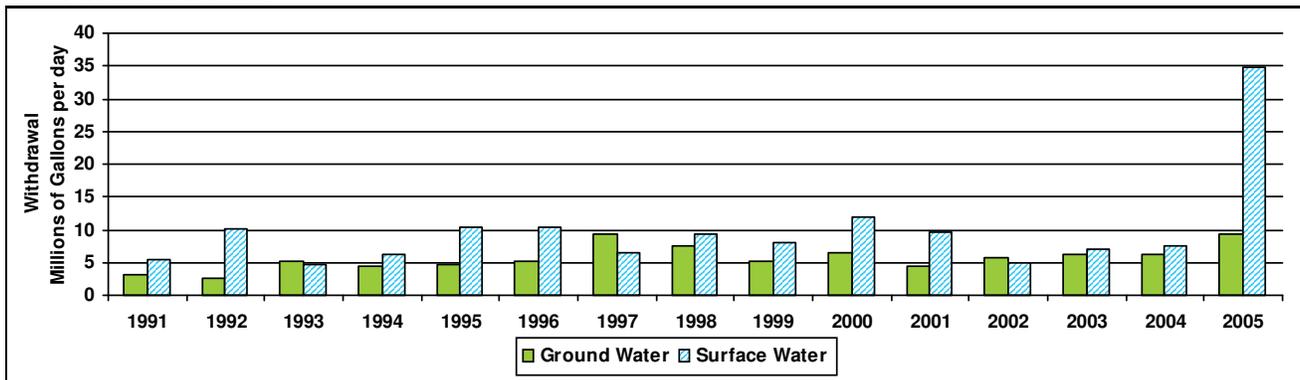
Location of facilities withdrawing water in 2005



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	0.28	0.00	0.06	0.00	0.06	7.76	26.62	34.78
Ground Water	0.12	0.00	0.01	0.00	2.62	1.19	5.30	9.25
Total	0.40	0.00	0.07	0.00	2.68	8.96	31.93	44.03
Percent Total	0.9%	0.0%	0.1%	0.0%	6.1%	20.3%	72.5%	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/). Indiana data provided by Indiana DNR (http://www.in.gov/dnr/water/water_availability/SWWF/index.html). See (www.dnr.state.oh.us/tabid/18805/Default.aspx) for explanation of data.

FIGURE 8 - STREAM ORDERS FOR THE BLANCHARD RIVER WATERSHED

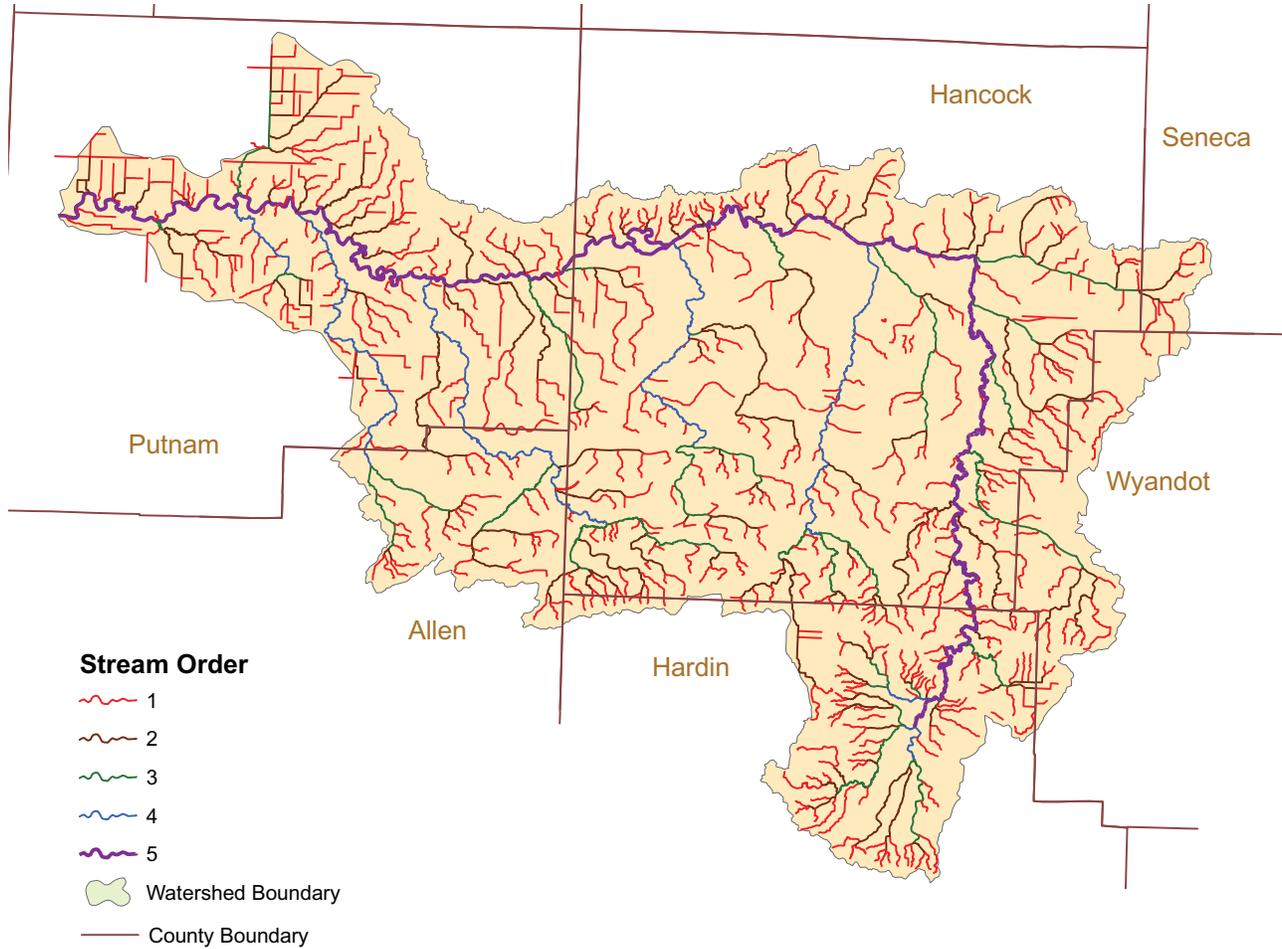


TABLE 5 - STREAM MILES BY ORDER

	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 Blanchard River Watershed	1609 ¹	1234.9	690.1	243	119.9	80.5	101.3
Allen Co. Portion	69.4	78.4	42.7	12.8	13.5	9.5	N/A
Hancock Co. Portion	1248.6	568.7	293.8	116.8	69.5	34.6	53.8
Hardin Co. Portion	80.4	186.9	116.0	35.0	20.8	5.2	9.9
Putnam Co. Portion	97.4	341.4	193.2	66.7	12.7	31.2	37.6
Seneca Co. Portion	110.5	12.4	9.2	3.2	N/A	N/A	N/A
Wyandot Co. Portion	2.3	47.2	35.3	8.5	3.5	N/A	N/A

¹ 0.05 Acres and larger

FIGURE 9 - RIPARIAN ZONE ANALYSIS MAP

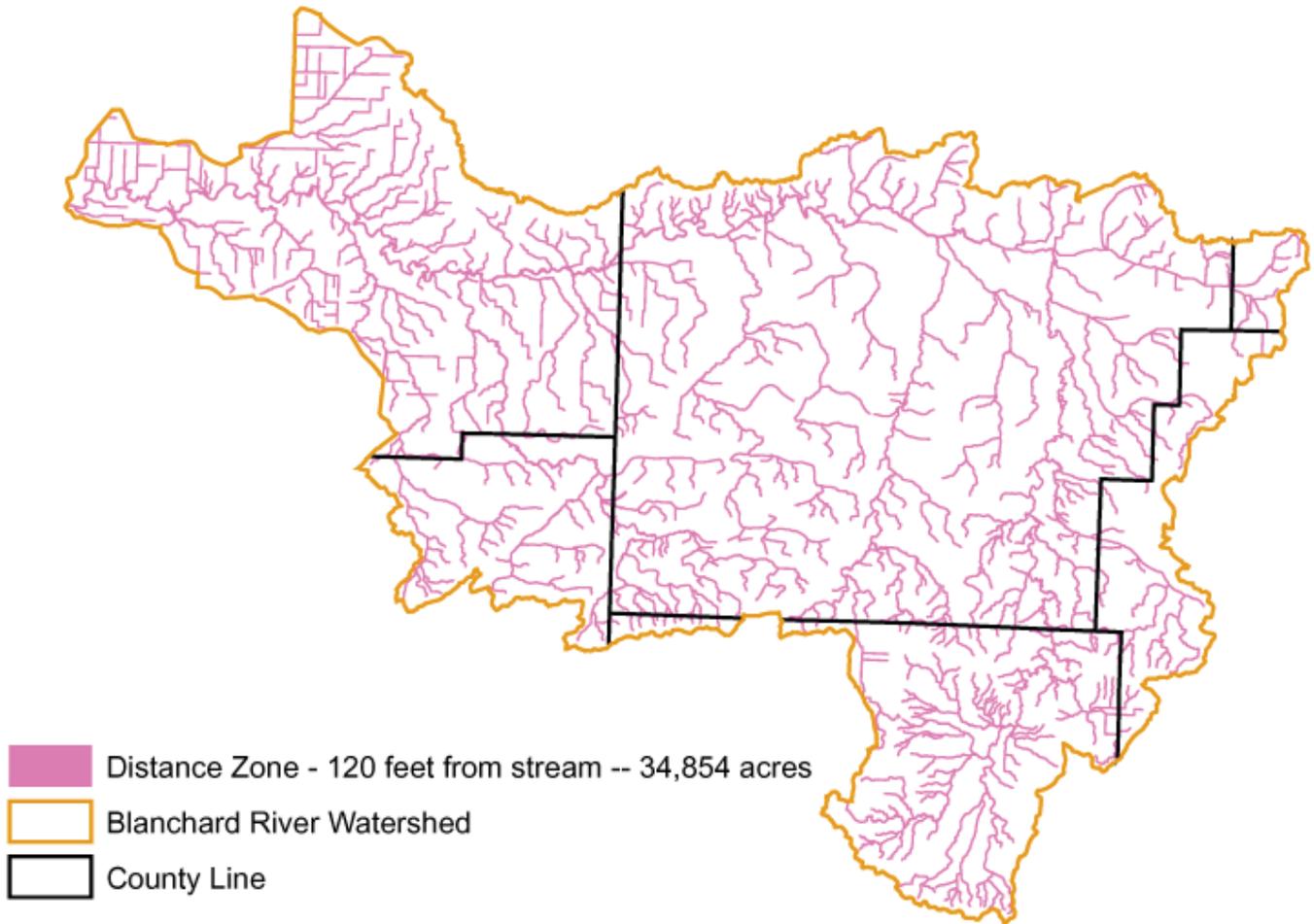


FIGURE 10 - PRIMARY SOIL MANAGEMENT CONCERN WITHIN 120 FEET OF STREAMS

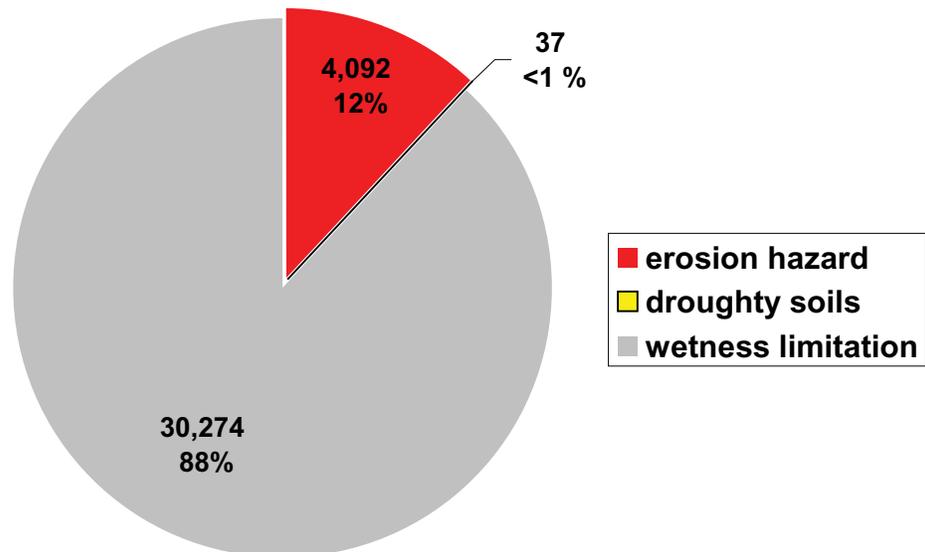


FIGURE 11 - USE ATTAINMENT STATUS

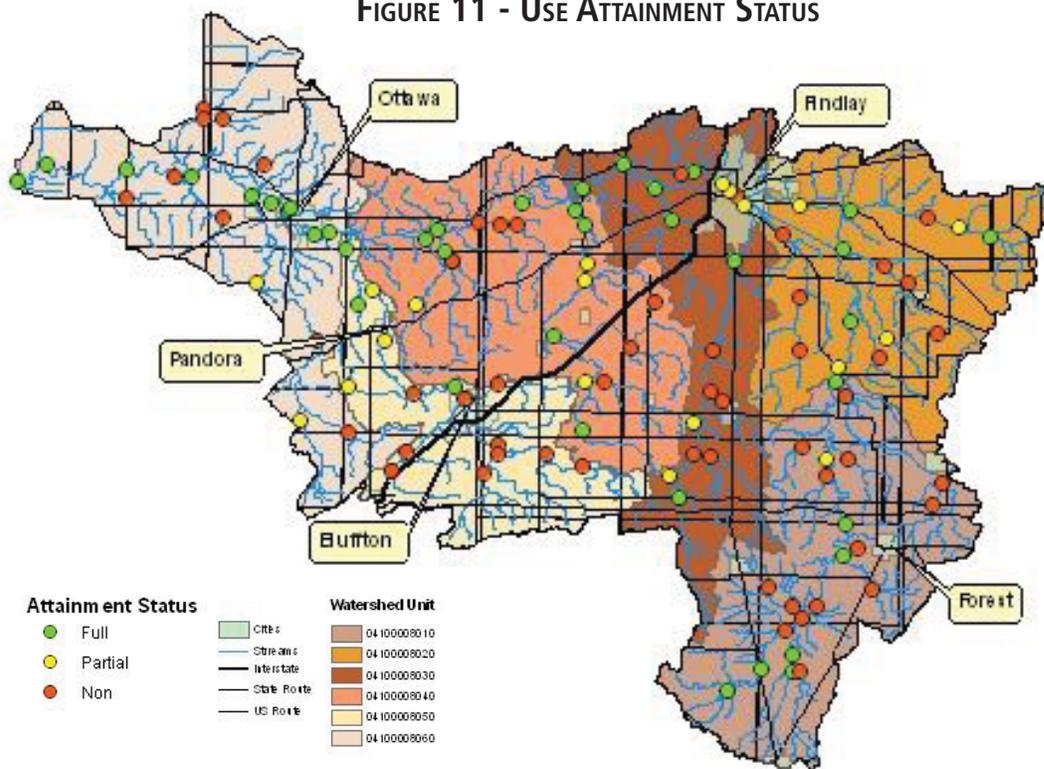


TABLE 6 - WATER QUALITY ASSESSMENT DATA

Unit	Attainment Status			Impairment Causes						Conservation Practices Benefiting Impairments					
	Watershed Assessment Unit Score *	% Sites Full	% Sites Part or Non	Habitat/Flow Alteration	Siltation	Organic Enrichment	Low Oxygen	Nutrient Enrichment	Ammonia	Conservation Tillage	Conservation Buffers ***	Nutrient Management	Animal Waste Utilization	Cons Cover/Tree Planting	Drainage Water Mgt
Headwaters 10	24	25%	75%	x		x	x	x	x	x	x	x	x	x	x
Outlet/Lye Creek 20	53	50%	50%	x	x	x	x	x	x	x	x	x	x	x	x
Eagle Creek 30	39	27%	73%	x	x	x	x	x	x	x	x	x	x	x	x
Ottawa Creek 40	54	50%	50%	x	x		x	x		x	x	x	x	x	x
Riley Creek 50	7	7%	93%	x	x	x	x	x		x	x	x	x	x	x
Cranberry Creek 60	75	56%	44%	x		x	x	x	x	x	x	x	x	x	x
Large River Unit	100	100%		x		x		x		x	x	x	x	x	x

*** Note: Conservation Buffers = Filter strips, Riparian Forest Plantings, Wetland Restoration, Field Windbreaks

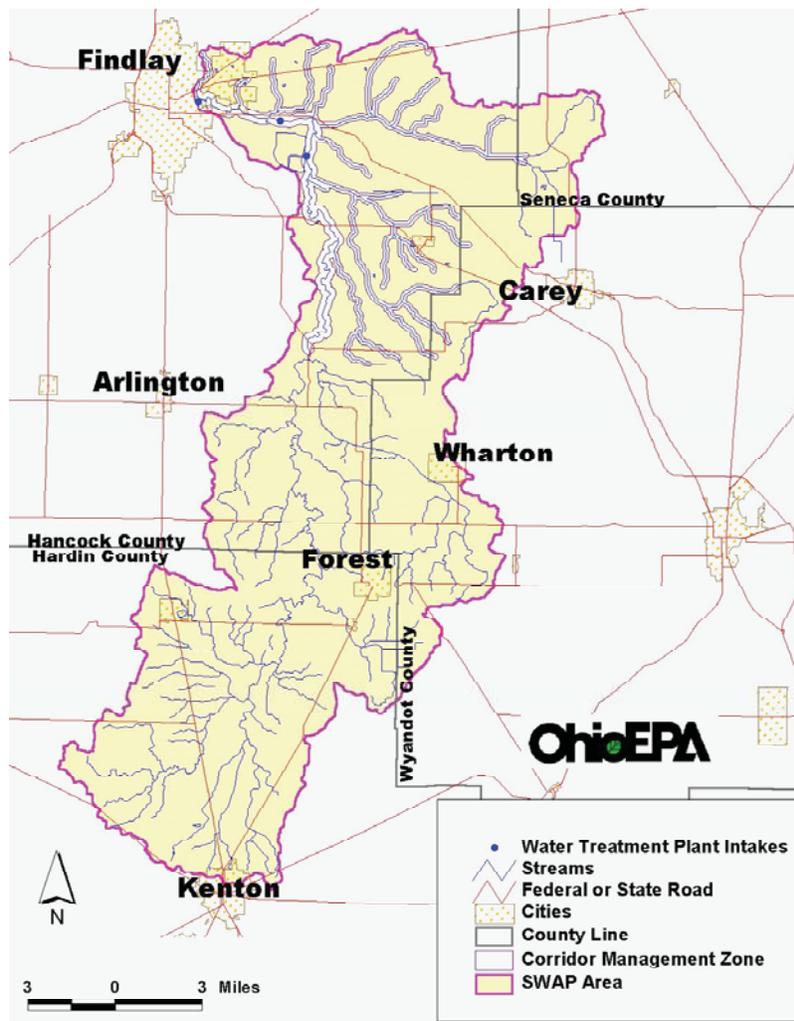
* Watershed assessment unit score is average grade of aquatic life use status. A max assessment unit score of 100 is possible if all monitored sites meet designated aquatic life uses. The method of calculation is presented in Ohio EPA 2002 Integrated Water Quality Monitoring and Assessment Report.

Source: This table prepared from Ohio EPA Blanchard River Watershed Assessment Data – July 12, 2007

TABLE 7 - MAJOR WATER BODIES IN THE WATERSHED

Name/Location	Acres	Elev.(ft.)	Type	Uses
Findlay Upground Reservoir Number Two	629.1	808	Upground	Municipal Water, Recreation
Findlay Upground Reservoir Number One	178.0	808	Upground	Municipal Water, Recreation
Multiple Strip Mines Lakes, south of Findlay	67.9	786		Recreation
Lake at Dunkirk	41.1	917		
Lake at Bluffton	20.3	807	Abandoned Quarry	Recreation
Lake near intersection of Eagle Cr. & Rt.15	19.6	793		
Ottawa Upground Reservoir	19.5		Upground	Municipal Water, Recreation

**FIGURE 12 - BLANCHARD RIVER WATERSHED HEADWATERS - CITY OF FINDLAY
DRINKING WATER SOURCE PROTECTION AREA**



SOIL RESOURCE INFORMATION

SOIL RESOURCES

Soil is a three-dimensional natural body consisting of mineral and organic material. The nature of any soil at a given site is the result of the interactions of five general factors – parent material, climate, plants and animals, relief, and time.

Parent material is the raw material acted on by the soil forming factors. The soils of the Blanchard River Watershed formed in many different kinds including glacial till, lacustrine and beach deposits, glacial till, recent alluvium, material weathered from bedrock, and organic material.

There are 256 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, very poorly drained to gently sloping, somewhat poorly drained mineral soils formed in deposits of lacustrine material or glacial till, but also include small acreages of moderately well and well drained soils on sloping to very steep slopes, sandy soils on beach ridges or organic soils in depressional areas.

Nearly level and gently sloping areas of somewhat poorly drained Blount soils comprise about 30 percent of the watershed. Occupying flats and low knolls on glacial till plains, these soils need artificial drainage for grain crop production. In addition, sloping areas of Blount soils have a moderate hazard of erosion due to water. Associated with Blount soils in swales and depressional areas are very poorly drained Pewamo soils which comprise about 20 percent of the watershed and also need artificial drainage for farming.

The third most extensive soil in the watershed is very poorly drained Paulding clay, comprising about 5 percent. This nearly level soil needs artificial drainage for farming, although the efficiency of artificial subsurface drainage is hindered by the very high clay content of the subsoil.

Soil management concerns for most of the soils of the Blanchard River Watershed include: a) seasonal wetness and the need for artificial drainage on about 366,000 acres of land; b) a hazard of soil erosion by water on about 105,000 acres of land; c) a hazard of soil erosion by wind on about 5,000 acres; d) a hazard of droughtiness due to a restricted root zone on about 2,700 acres; and e) and a hazard of soil subsidence on about 1,600 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 Roman numerals I through VII indicating progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I: soils having few limitations for use; Class II: soils having moderate limitations; Class III: soils having severe limitations; Class IV: soils having very severe limitations; Class V: soils having severe limitations for use other than a hazard of erosion; and Class VI and VII: soils having very severe limitations making them generally unsuitable for cultivation.

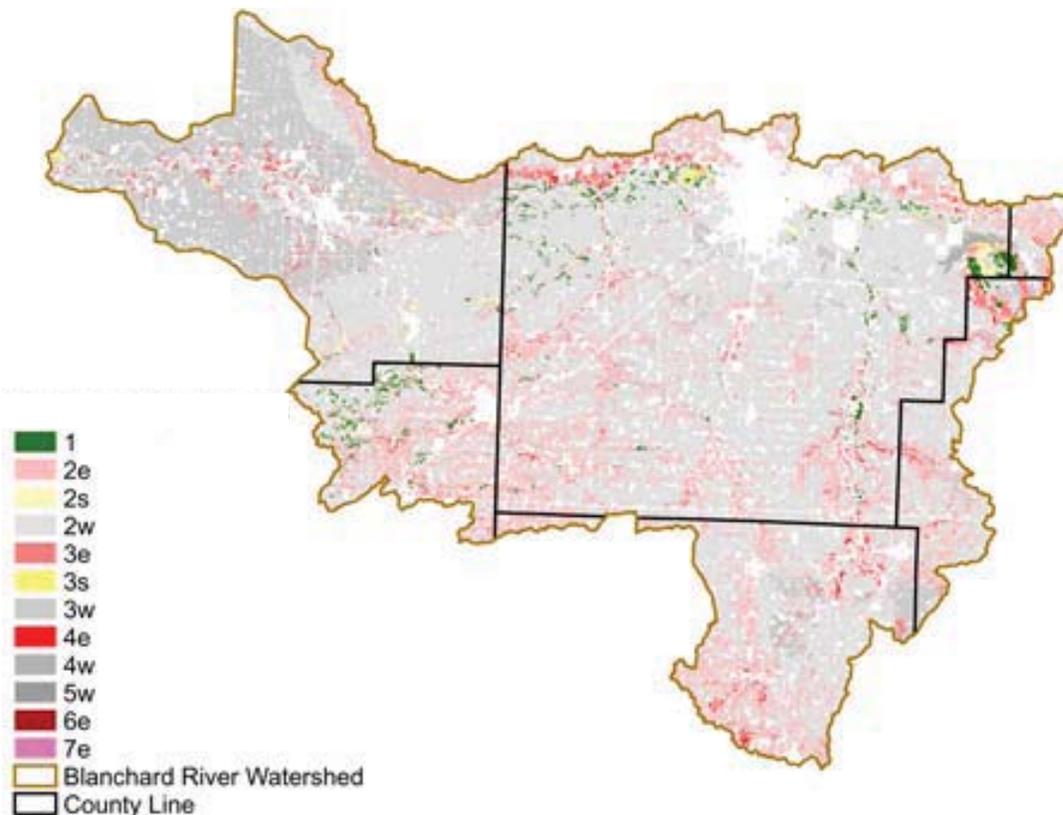
Capability subclasses are soil groups within one class and are designated by adding a lower case letter e, w, or s to the class number denoting a hazard of erosion, wetness, or a restricted root zone respectively.

In general, there are about 6,800 acres of Class I soils (having no significant limitations); 376,000 acres of Class II soils; 93,000 acres of Class III soils; 5,000 acres of Class IV soils; 165 acres of Class V soils; 700 acres of Class VI soils; and 750 acres of Class VII soils.

TABLE 8 - LAND CAPABILITY SUBCLASSES

Land Capability Subclass	Acres
I	6,830
IIe	89,613
IIs	1,078
IIw	285,240
IIIe	10,893
IIIs	1,606
IIIw	80,186
IVe	3,885
IVw	1,181
Vw	165
VIe	672
VIIe	75
Not Rated	11,994

FIGURE 13 - LAND CAPABILITY SUBCLASSES



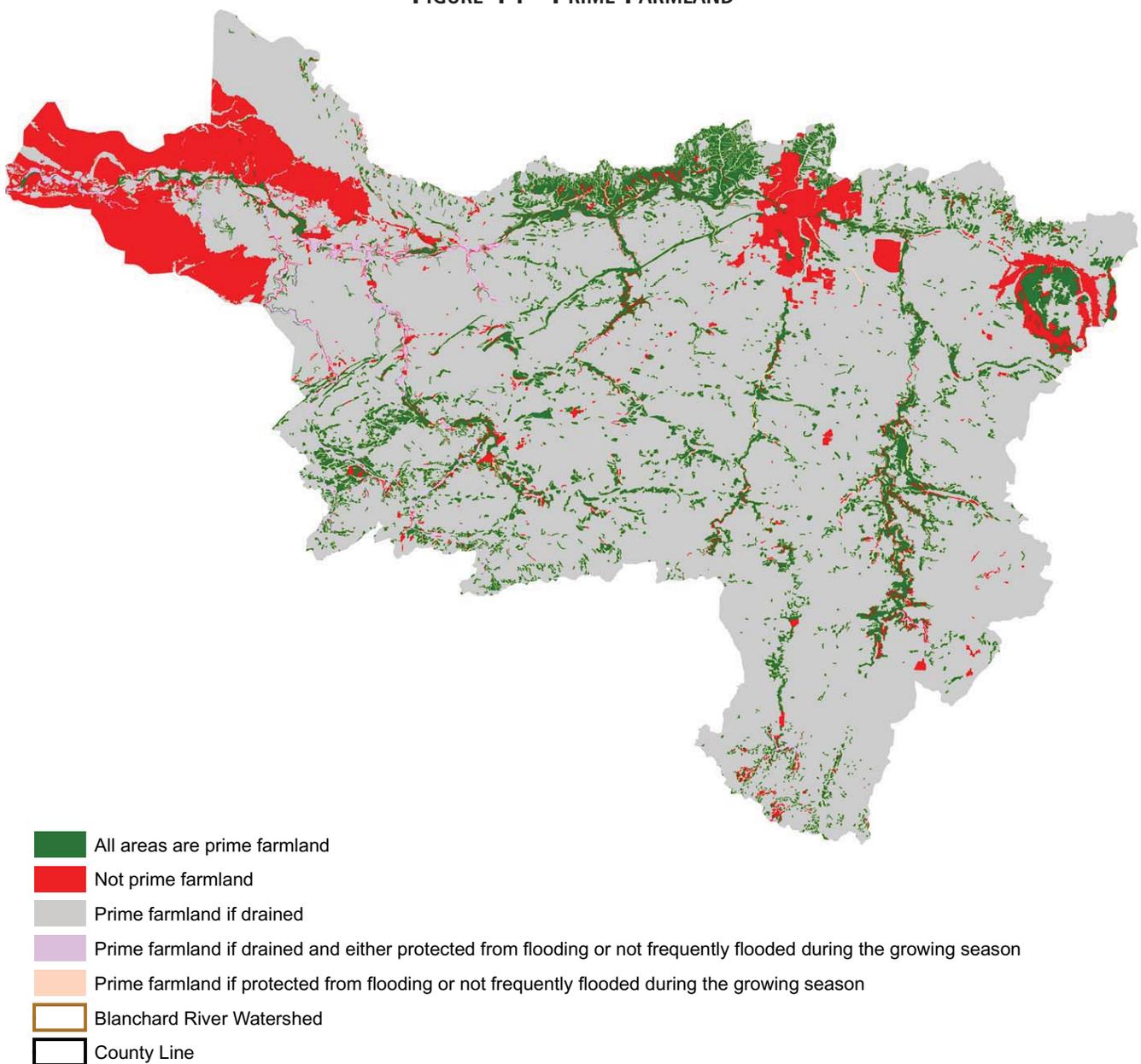
PRIME FARMLAND CLASSIFICATION

Prime farmland is one of several kinds of important farmland defined by the USDA.

In the watershed, about 117 soil types are listed as “prime farmland if drained,” including areas of Blount and Pewamo soils. In addition, 88 different soil types are defined as “all areas are prime farmland.” Glynwood silt loam, 2 to 6 percent slopes is the most extensive and comprises about 14,100 acres. Houcktown loam, 2 to 6 percent slopes is the second most extensive and comprises about 3,100 acres.

In the Blanchard River Watershed, about 71 different soil types are defined as “not prime farmland,” including the most extensive soil, Paulding clay.

FIGURE 14 - PRIME FARMLAND



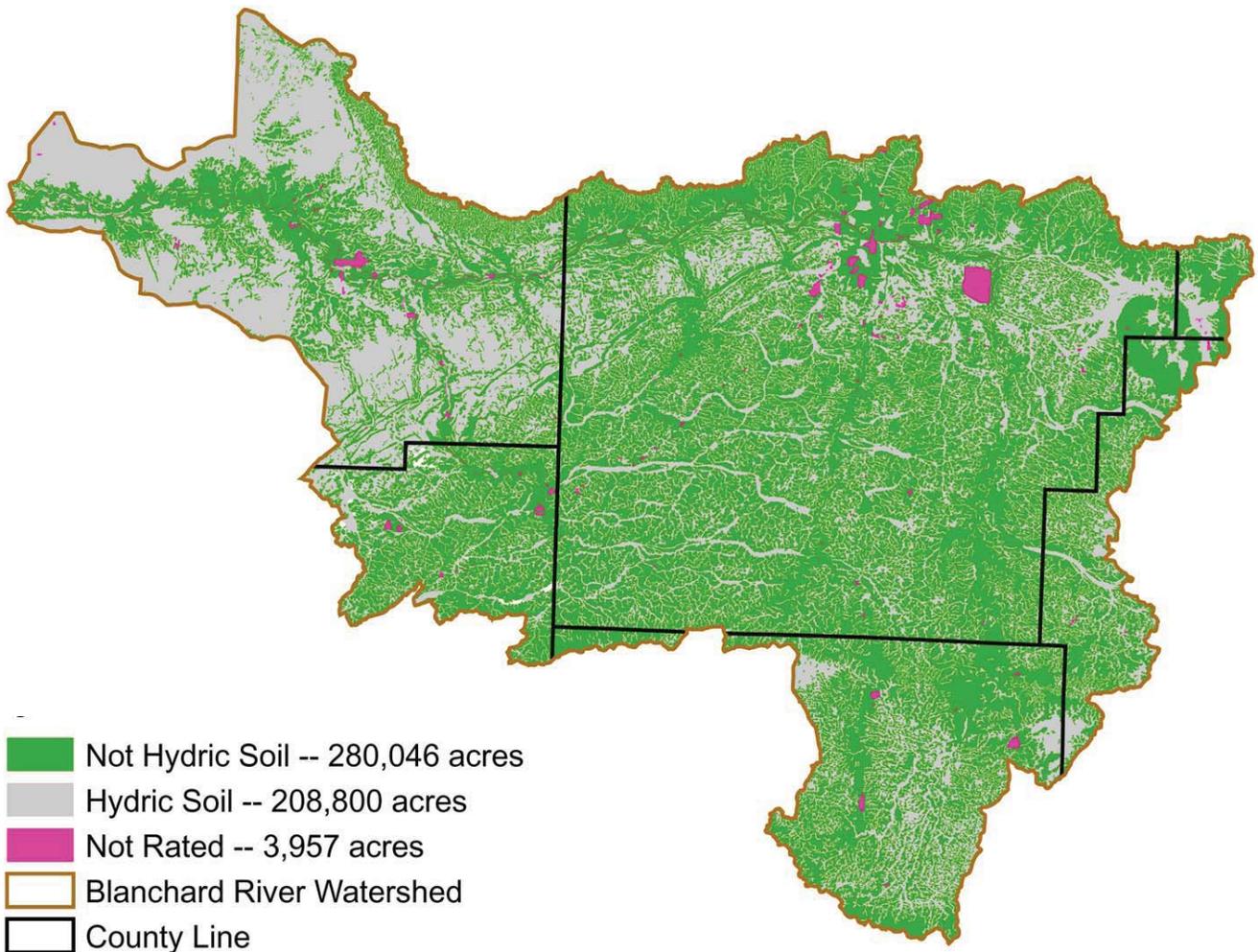
HYDRIC SOIL DISTRIBUTION

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 and support the growth and regeneration of hydrophytic vegetation.

In the Blanchard River Watershed, hydric soils occur in depressional areas. In MLRA 99, hydric soils, such as Paulding clay, typically occur in wide, expansive flats on lake plains. In MLRA 111 hydric soils, such as Pewamo silty clay loam, typically occur in relatively narrow swales on glacial ground moraine.

Of the 256 different soil types occurring in the watershed, 66 soil types are hydric soils occupying about 208,000 acres or about 42 percent of the watershed. Pewamo silty clay loam and Paulding clay are the two most extensive hydric soils and are about 100,600 and 24,100 acres, respectively. Other hydric soils include Hoytville, Latty, Lenawee, Mermill, Millgrove, Millsdale, Pandora, Rensselaer, Sloan, Toledo and Westland soils.

FIGURE 15 - HYDRIC SOIL



SOIL LOSS

Average soil erosion rates by water on all cropland in the Blanchard River Watershed has declined from about 2.8 T/Ac/Year in 1982 to about 2.0 T/Ac/Year in 1997. In 1997, using land capability classes, average soil erosion rates were estimated at about: 1.6 T/Ac/Year on Class I land; 3.4 T/Ac/Year on Class IIe land; 1.5 T/Ac/Year on Class IIw land; 3.5 T/Ac/Year on Class IIIe land; 1.5 T/Ac/Year on Class IIIw land; and 18.6 T/Ac/Year on Class IVe cropland.

In 1997, Class IIw soils accounted for about 47 percent of gross soil losses in the Blanchard River Watershed despite the fact that only about 1.5 T/Ac/Year of soil eroded from that class (NRI). The high clay content of these fine textured surface layers produces runoff containing a high content of suspended clays that can enter and pollute surface water. In 1997, Class IIe soils accounted for about 35 percent of gross soil loss.

FIGURE 16 - 1997 CULTIVATED CROPLAND SOIL LOSS BY LAND CAPABILITY SUBCLASS

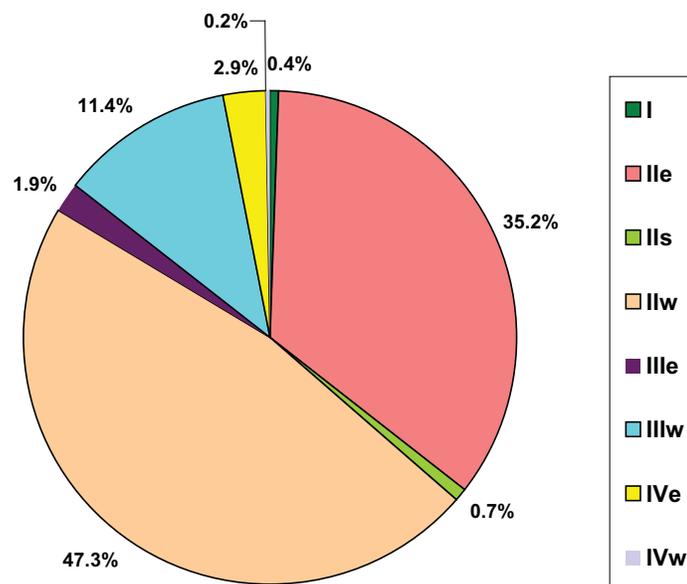


TABLE 9 - ESTIMATED 1997 GROSS SOIL LOSS FROM CULTIVATED CROPLAND BY LAND CAPABILITY SUBCLASS

Land Capability Subclass	Annual Gross Soil Loss*	Percent of Total
I	3,600	0.4%
IIe	294,600	35.2%
IIs	6,200	0.7%
IIw	396,400	47.3%
IIIe	16,000	1.9%
IIIw	95,300	11.4%
IVe	24,300	2.9%
IVw	1,500	0.2%
Total	837,900	100.0%

* In thousands of tons/year

ANALYSIS OF SOIL EROSION POTENTIAL WITHIN THE WATERSHED

The flat nature of this watershed often masks differences in soil erosion potential when typical highly erodible land measurements are used. For this reason, 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 17 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 land treatment in place that will affect the actual rates of erosion. It only measures potential.

FIGURE 17 - SOIL EROSION POTENTIAL (R x K x LS)

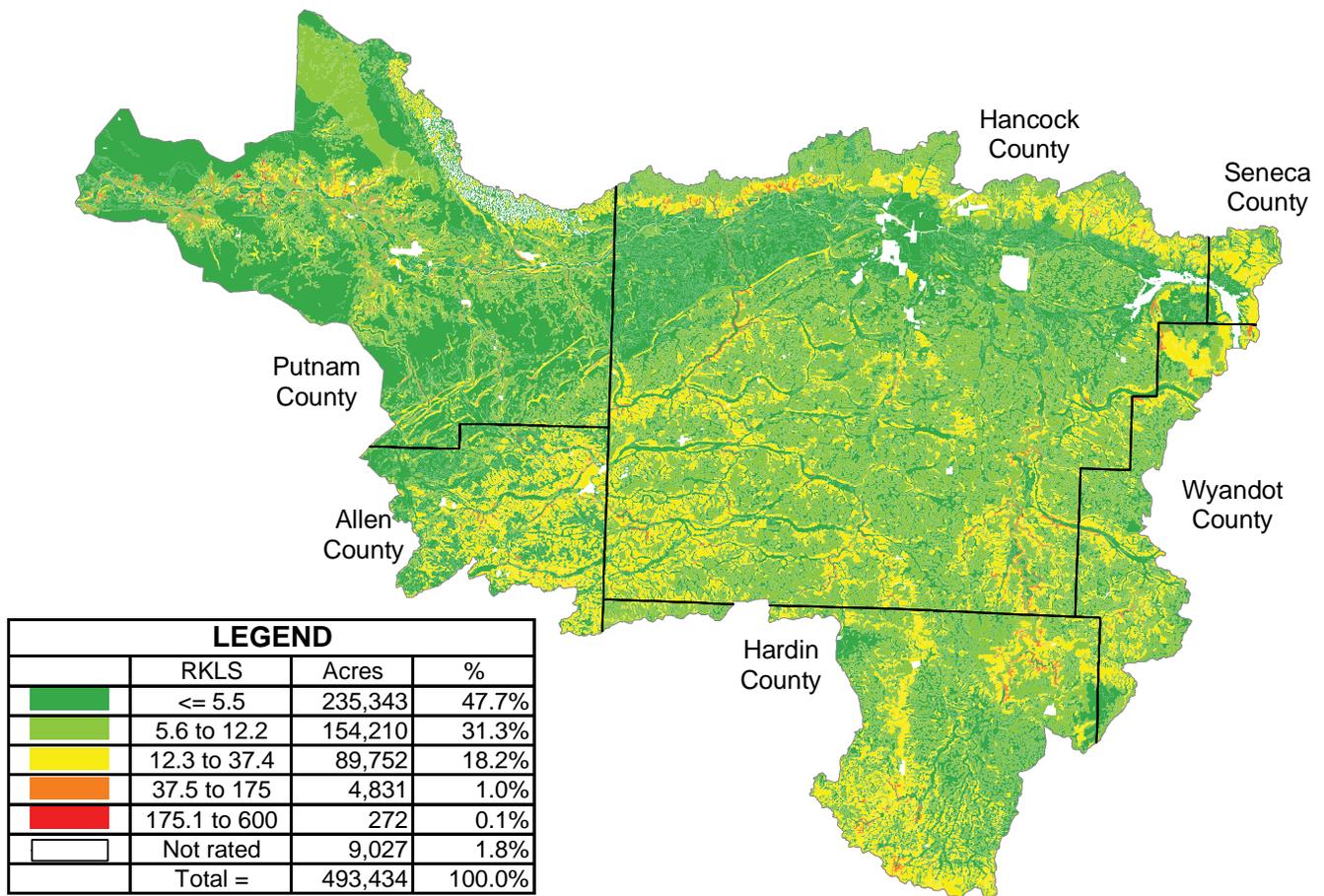
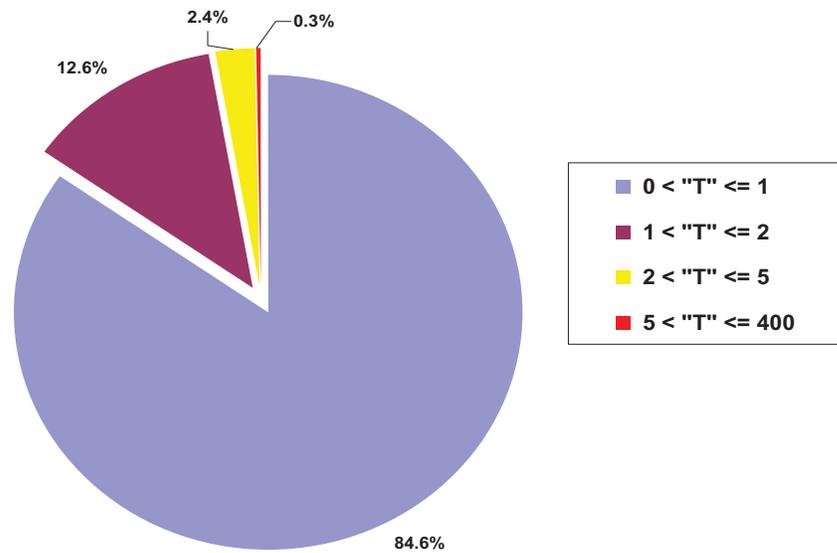


FIGURE 18 - 1997 CULTIVATED CROPLAND SOIL EROSION RATES AS A MULTIPLE OF "T"



Sediment and runoff leaving conventional tilled crop fields in the Blanchard River Watershed during the storm of August 21-25, 2007

FLOOD PLAIN SOILS

Soils formed in recent alluvium on naturally occurring flood plains comprise about 22,600 acres or about 5 percent of the Blanchard River 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) or occasionally (usually about once every other year). Soil maps identify alluvial soils by soil map unit name and are landform based. FEMA maps depict flood prone areas by elevation and may include areas depicted on the soil survey map as not-flood prone. The most inclusive approach to flood plain identification is to combine areas depicted as occasionally and frequently flooded from the soil survey with the FEMA 100-year flood zone, where available.

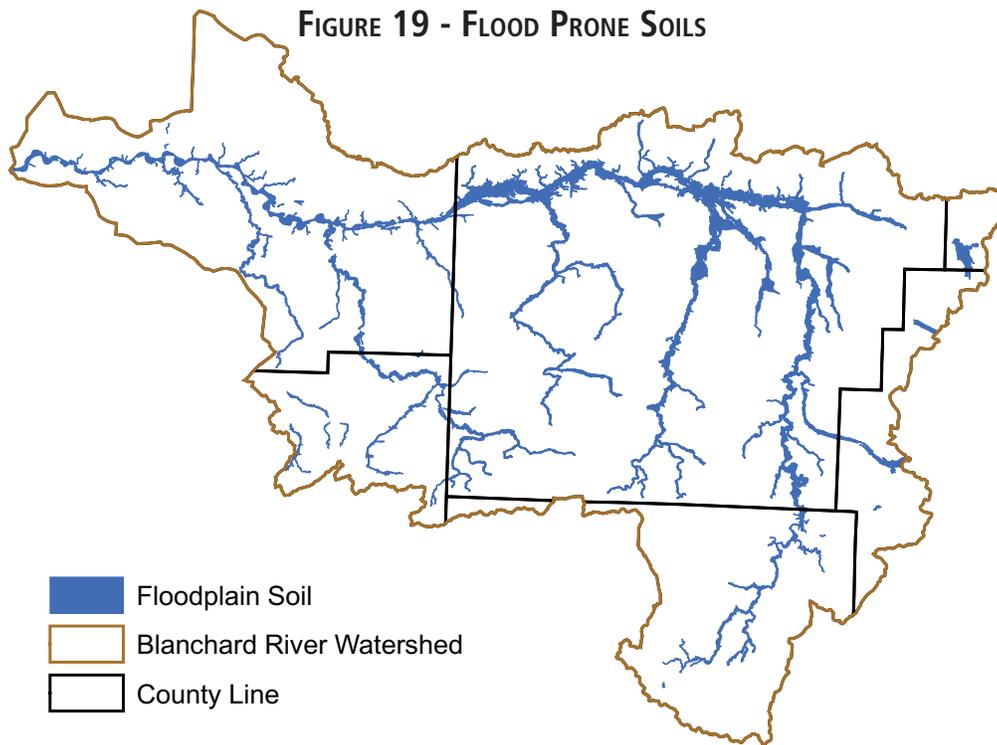


TABLE 10 - FLOOD PRONE SOILS DATA

	Acres
Frequently Flooded	6,124
Occasionally Flooded	16,549

The City of Ottawa's water supply reservoir is surrounded by flood waters from the Blanchard River Watershed during the flood of August 21-25, 2007



FLOODING IN THE BLANCHARD RIVER WATERSHED

Flooding has been a recurring problem in the watershed corresponding largely to extremes in the weather. Using the USGS gage near Findlay (Gage No. 04189000), out of 81 years of record, 53 years had river levels at or above flood stage. Maximum height above flood stage has been 7.5 ft. in 1913 and 2007. The record discharge was in 1913 at 22,000 cfs (estimated) followed by August 2007 at 15,600 cfs. The USGS calculates the 100-year flood flow at 13,800 cfs (Water-Resources Investigations Report 03-4164). A table of the largest flows, in descending order of magnitude, is shown below:

TABLE 11 - BLANCHARD RIVER FLOOD DISCHARGES

Year	Discharge(cfs)
1913	22,000
2007	15,600
1981	13,000
1959	12,100
1928	11,800
1950	10,200
1991	9,670
1997	9,630
1975	8,860

During August 20-25, 2007, record flooding occurred in Findlay, Bluffton, Pandora, and Ottawa. Rain-fall amounts of 5 inches to more than 10 inches were reported at various locations in the watershed, with heaviest amounts in the headwaters. The flooding equaled or nearly equaled the flood of record of 1913. Untold economic damages, loss of property, homes, and one loss of life were suffered. Business districts in Findlay and Ottawa were hard hit. The total economic loss from this storm is still being quantified as of the draft of this report, but is expected to exceed totals for any of the previous storms of record.



View of Findlay looking east towards the Findlay Courthouse during flooding August 21-25, 2007.

**FLOODING IN THE BLANCHARD RIVER WATERSHED
AUGUST 21 - 25, 2007**



Flooding of Interstate 75 at the City of Bluffton caused severe erosion and closing of this major Interstate highway. (Allen County Engineer Photos)



View of a gas station located at I-75 and SR-12 in the City of Findlay. (below)



Flood waters in the City of Ottawa closed numerous businesses. (below) (Putnam SWCD photo)



Flood damage cleanup along Main Street in the City of Findlay. (left) (NRCS photo)

AIR RESOURCES INFORMATION

WIND EROSION

There are over 5,070 acres in the watershed comprised of soils subject to a wind erosion hazard. Most of these areas have sandy soils which occur on glacial beach ridges that traverse the area. These soils have coarse textured sandy surface layers and are subject to blowing and wind erosion if left bare during the winter and spring months.

Other soils subject to wind erosion are areas of muck or organic soils in the eastern part of the watershed. These soils also subject to blowing when dry and bare.

FIGURE 20 -SOILS SUBJECT TO SEVERE WIND EROSION

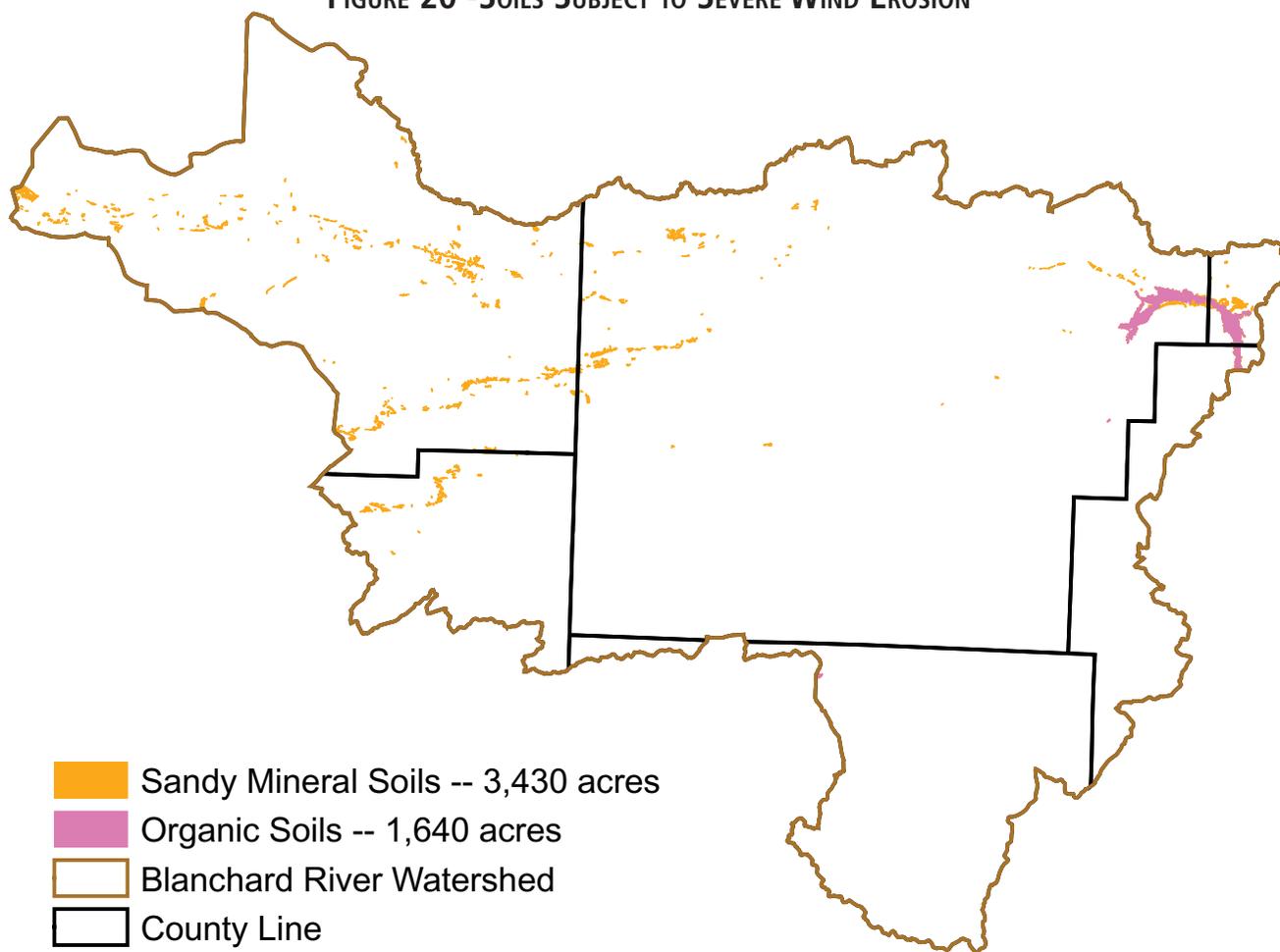


TABLE 12 - AIR RESOURCE CONCERNS TABLE

Soils Subject to Wind Erosion (acres)	
Organic Soils	Mineral Soils
1,640	3,430

PLANT AND ANIMAL RESOURCES

LIVESTOCK RESOURCES INFORMATION

Most of the livestock in the watershed is raised in confinement operations with the high percentage of cropland in the watershed. Pasture is a minor land use. Swine is the predominant type of livestock in the watershed. Horses for pleasure are a livestock component of this watershed. The University of Findlay operates an Equestrienne Center and maintains an equestrienne program within its curriculum. Grassed based intensive grazing operations are sprouting as new enterprises in the watershed. At the present time, these operations are small and moderate, but in recent years interest has been increasing.

The bulk of the livestock waste generated in the watershed is utilized via application to cropland. Waste is handled in predominately the liquid form. There is ample land in the watershed to utilize the livestock waste generated. The waste generated is estimated to supply approximately 17 percent of the total phosphorous needs for the crops grown in this watershed.

TABLE 13 - LIVESTOCK OPERATIONS DATA

Blanchard Watershed Livestock Operations Data	Number
Total Number of Confined Livestock State Permitted Operations in the Watershed	3
Estimated Number of Non Permitted Confined Livestock Operations in the Watershed	148
Number of Non Permitted Facilities in the Watershed with Recent Comprehensive Nutrient Management Plans	30
Estimated Number of New Comprehensive Nutrient Management Plans (CNMP's) that may be needed in the Watershed	118

TABLE 14 - 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
Allen	1,114	5,263	5,213	0	56,745	64,302	0	1,349	932	986
Hancock	2,897	1,645	2,661	0	51,913	32,824	0	916	579	675
Hardin	13,436	3,289	7,369	17,547	219,468	90,898	208,365	7,495	6,279	5,001
Putnam	9,360	2,763	8,311	1,451	147,459	102,513	11,873	2,965	2,028	2,142
Seneca	1,114	7,039	4,285	0	70,853	52,855	0	1,349	875	992
Wyandot	3,789	1,908	6,673	11,257	65,956	82,313	133,673	4,361	3,944	2,856
Blanchard W/S	9,022	3,945	8,100	5,390	155,056	99,913	61,947	4,014	3,053	2,794
								Nutrients/Cropland Acre (Lbs/Ac/Yr)		
Blanchard River Watershed Nutrients Produced from Manure and Needed by Crops								N	P2O5	K2O
Produced								10.6	8.0	7.3
Needed								66.5	48.5	81.3

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

WILDLIFE AND ENDANGERED SPECIES

Wildlife habitat in the watershed is heavily influenced by the predominance of land devoted to row crops. Virtually all original native vegetation has been removed. Most of the agricultural land provides marginal habitat for common edge or disturbance adapted species; lack of winter cover or food for resident species is severely limiting. Permanent cover in the form of woodland, wetlands, or grasslands is limited (approximately 10 percent), fragmented, and subject to a variety of disturbances. Although 40-50 percent of the watershed was wetland pre-settlement, the amount of wetland is now only about 5 percent; much of that is in wet woods. Woodlands occur mostly as small isolated woodlots or narrow riparian borders. Very few grassland areas (CRP, old field, pasture/hayland) exist and most are subject to disturbance such as mowing which negatively impacts wildlife use. Habitat quality in streams and rivers in the watershed is negatively impacted by excess sediments, nutrients, stream modification, and lack of permanent riparian cover; this is particularly true of smaller tributaries. The presence of unique plant communities is minimal.

TABLE 15 - HABITAT REFERENCE INFORMATION

	Availability and Condition of Wildlife Habit				
	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	Limited extent Low quality	N/A	N/A	N/A	N/A
Wetland Habitat	Limited extent Low quality	N/A	N/A	N/A	N/A
Forest Habitat	Limited extent Moderate quality	N/A	N/A	N/A	N/A

These designations were based on information from Ohio EPA 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 16 - RARE OR ENDANGERED SPECIES INFORMATION

Important Rare or Endangered Plant Species Reported Present	Important Rare or Endangered Animal Species Reported Present
None	Clubshell (<i>Pleurobema clava</i>)
None	Rayed Bean (<i>Villosa fabalis</i>)

CONSERVATION SYSTEMS AND PRACTICE APPLICATION DATA

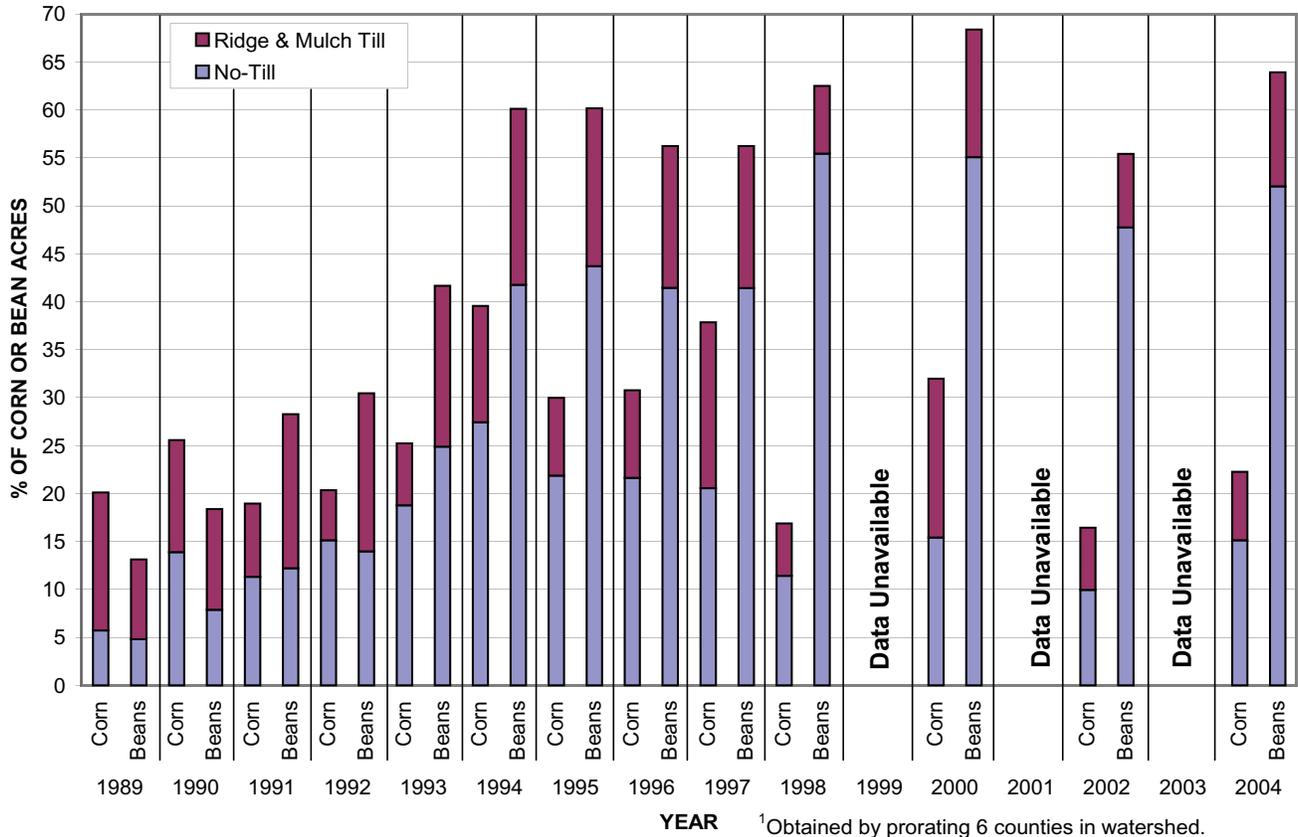
The following table was produced using NRCS's Performance Results System (PRS) and shows the application of key conservation practices and systems plus the number of conservation system acres applied by Farm Bill program. PRS is used to track, analyze, and report NRCS conservation accomplishments. For more information on these and other reports, visit: <http://ias.sc.egov.usda.gov/PRSHOME/>. (Note: This only reflects practices applied in the system and may not include all practices installed in the watershed.)

TABLE 17 - NRCS CONSERVATION PROGRESS PERFORMANCE MEASURES

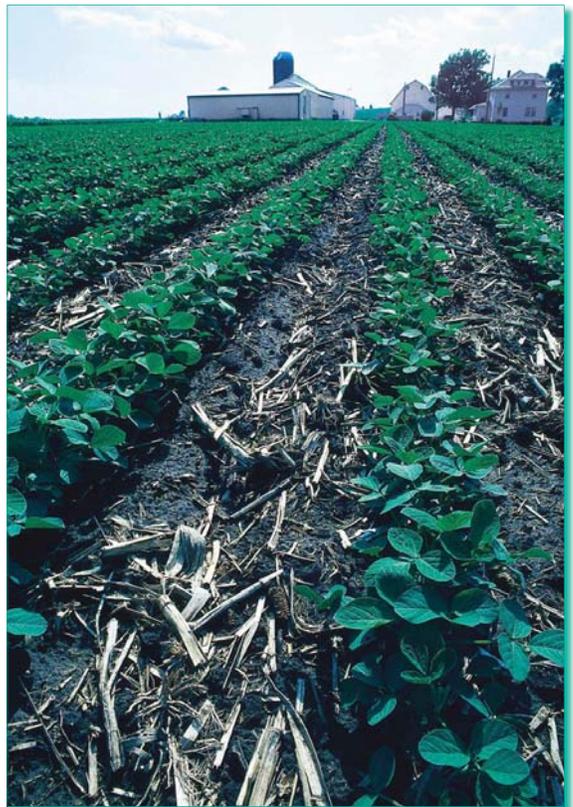
	FY01	FY02	FY03	FY04	FY05	FY06	Total
Total Conservation Systems Planned (acres)	16,447	7,465	8,346	N/A	5,083	14,222	51,563
Total Conservation Systems Applied (acres)	19,477	6,837	6,291	N/A	4,517	7,121	44,243
Conservation Practices							
Erosion Control Total Soil Saved (tons/year)	29,398	18,960	4,712	N/A	5,026	2,928	61,024
Filterstrips (393) (acres)	267	380	356	66	137	143	1,283
Grassed Waterways (412) (acres)	16	26	16	5	13	24	95
Prescribed Grazing (528 and 528A) (acres)	0	0	0	0	0	86	86
Residue Management (329A-C) (acres)	16,009	5,439	1,686	4,310	3,135	5,638	31,907
Riparian Forest Buffers (391) (acres)	15	7	20	0	8	3	53
Tree and Shrub Establishment (612) (acres)	21	29	67	0	17	143	277
Total Nutrient Management (590 - AFO & non-AFO) (ac)	16,697	7,145	6,179	1,052	1,564	3,411	34,996
Total Waste Management (313) (numbers)	0	3	1	0	0	0	4
Total Wetlands Created, Restored, or Enhanced (acres)	8	1	4	0	143	712	868
Total Wildlife Habitat (644 - 645)	1,099	202	528	275	107	1,257	3,193
Acres On Which A Farm Bill Program Conservation Practice Was Reported Applied							
Conservation Reserve Program	6,096	2,036	739	N/A	1,038	1,105	11,014
Environmental Quality Incentives Program	304	0	0	N/A	307	771	1,382
Farm and Ranchland Protection Program	0	0	0	N/A	0	0	0
Wetlands Reserve Program	0	0	0	N/A	281	542	823
Wildlife Habitat Incentives 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 6 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/>.

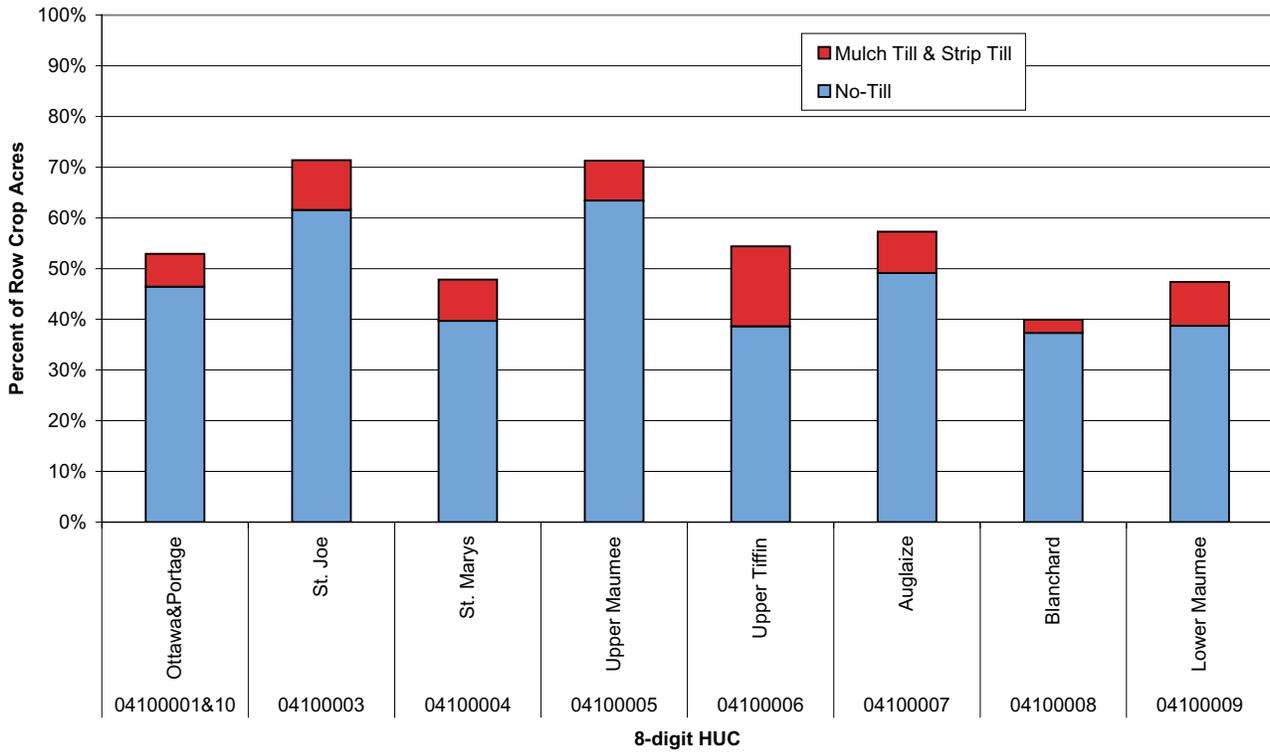
FIGURE 21 - CONSERVATION TILLAGE TRENDS¹



*Corn and soybeans
planted in crop residue.*



**FIGURE 22 - 2006 CONSERVATION TILLAGE IN THE WESTERN LAKE ERIE BASIN
CORN AND SOYBEANS**



**FIGURE 23 - 2006 CONSERVATION TILLAGE IN THE WESTERN LAKE ERIE BASIN
CORN, SOYBEANS, AND WHEAT**

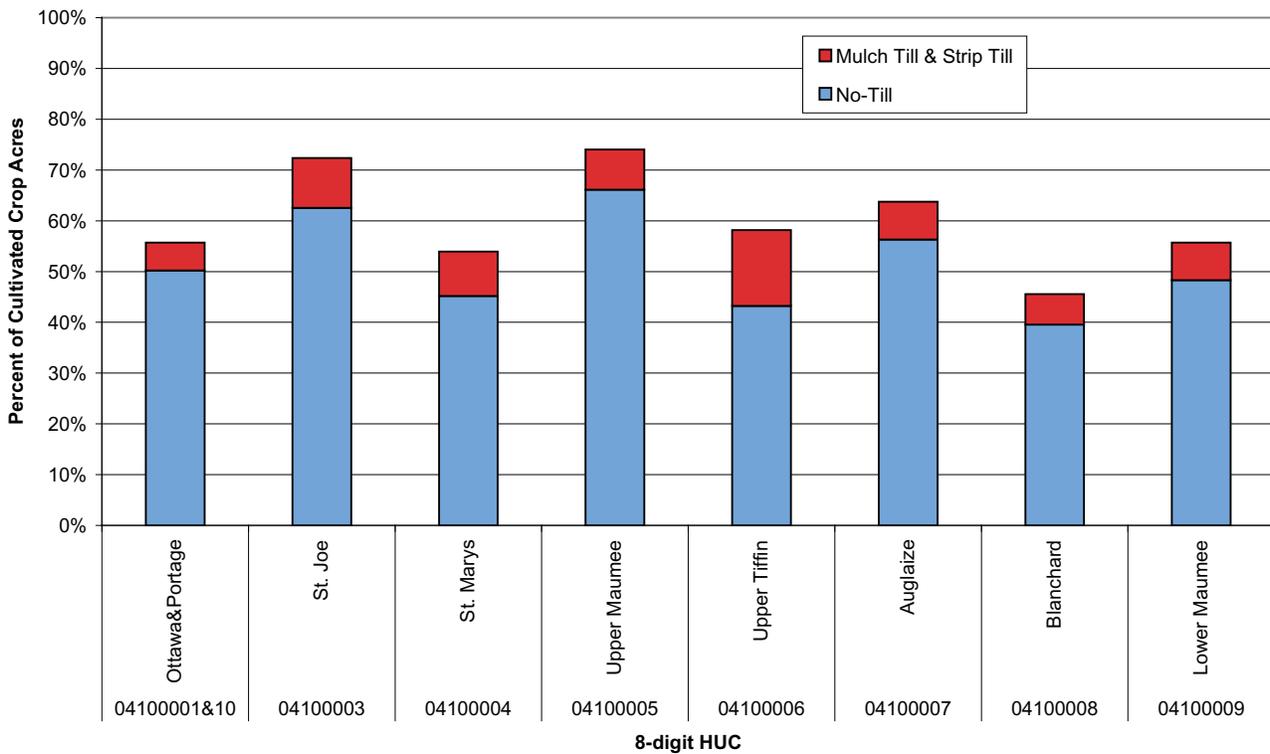


TABLE 18 - AGRICULTURAL CENSUS DATA AND ECONOMIC INFORMATION

Ag Census Data ¹	Total County Data							Prorated
	Allen	Hancock	Hardin	Putnam	Seneca	Wyandot	Watershed ²	
Number of Farms	968	976	842	1,348	1,185	607	1,602	
Land in Farms (Acres)	188,150	262,095	246,393	331,517	280,449	201,146	416,415	
Cropland Acres Harvested	157,647	234,260	207,482	291,447	234,949	171,793	365,137	
Average Size of Farms-Acres	194	269	293	246	237	331	264	
Number of Farms with Harvested Cropland	739	835	645	1,200	964	458	1,354	
Number of Farms with Poultry/Livestock	169	181	225	294	347	128	331	
Number of Farms with Harvested Vegetables	242	456	no data	2,754	1,161	no data	1,436	
Market Value-ag products sold-Crops(\$1,000)	30,245	35,796	34,277	54,258	43,627	25,738	60,983	
Market Value Livestock, poultry & products (\$1,000)	11,019	10,386	61,272	34,068	11,972	46,407	39,832	
'96-'06 NRCS Conservation Financial Assistance (\$1,000) ³	893	535	4,178	2,104	1,502	639	2,274	
Corn for Grain-Acres ⁴	53,400	73,000	76,000	67,300	77,000	61,900	108,612	
Winter Wheat All-Acres Harvested ⁴	20,600	43,100	21,400	53,300	42,900	27,900	62,026	
Soybean-Acres Harvested ⁴	82,300	125,000	115,500	131,100	117,400	97,900	186,709	
All Hay (Dry)-Acres Harvested ⁴	3,600	4,900	6,000	12,200	4,800	3,600	10,374	
Tomatoes for Processing-Acres Harvested ⁴	--	--	--	1,950	--	--	751	

¹Data from 2002 Census of Agriculture unless otherwise noted.

²Prorated by area in watershed.

³From NRCS staff (includes EQIP, FRPP, CSP, WRP, WHIP, GRP, SWCA)

⁴National Agricultural Statistics Service for 2006

WATERSHED PROJECTS AND PLANNING INFORMATION

TABLE 19 - LOCAL WATERSHED RELATED ORGANIZATIONS IDENTIFIED IN THE WATERSHED

Organization Name	Description/Purpose/Benefits	Contact Information	Type of Group (Govt., NGO, partnerships)
Blanchard River Watershed Partnership	Preserve the natural and environmental aspects of the watershed, improve or maintain the water quality in the river, and facilitate regional policy development.	Website: www.blanchardriver.org Email: rkozlowski1@woh.rr.com	Partnership, governments, public interest groups
Tri-Moraine Audubon Society	Promote the conservation and restoration of ecosystems, including agricultural systems, while focusing on the enjoyment of birds and the natural environment through fellowship, education, and stewardship for the benefit of our future generations.	Ohio Chapter for Allen, Auglaize, Hancock, Hardin, Logan, Mercer, Shelby, and Van Wert Counties Website: www.tri-moraineaudubon.org/	NGO
Ohio Pheasants Forever	To raise funds for local habitat projects, conservation education, and other worthy conservation causes.	Website: http://www.ohiopf.com/index.html Email Address: jinglis@pheasantsforever.org	NGO
Maumee Watershed Conservancy District	Help provide flood control and improve drainage for the Auglaize River basin.	1464 Pinehurst Drive Defiance, OH 43512 (419) 782-8746	Political subdivision of State of Ohio
The Joyce Foundation	Protecting the Great Lakes by promoting clean energy, combating global warming, restoring river ecosystems, and advocating investment in Great Lakes restoration.	www.joycefdn.org/	Environmental action group
Hancock County Regional Planning Commission	Provides professional planning services for the City of Findlay and Hancock County and is responsible for enforcement of the Hancock County Subdivision Regulations.	www.hancockrpc.org/	Government
Lima-Allen County Regional Planning Commission	Comprehensive planning and program implementation within Allen County and its various communities.	http://lacrpc.com/	Government, NGOs

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

TABLE 20 - LIST OF RELEVANT PUBLISHED WATERSHED PLANS, STUDIES, REPORTS

Name	Description
Watershed Plan and Environmental Assessment, Upper Blanchard River (1992)	A plan of structural and nonstructural measures to reduce urban flood damages for Findlay, Ohio. Prepared under authority of Public Law 83-566.
Blanchard River Flood Hazard Study	A flood study of the river giving flood elevations for the 10, 50, 100, and 500 year flood events.
Upper Auglaize Watershed Agricultural Non-Point Source Modeling Project – Final Report	An interagency effort to use a Geographic Information System (GIS)-based modeling approach for assessing and reducing pollution from agricultural runoff and other nonpoint sources.
City of Findlay	City zoning and flood maps can be found at www.ci.findlay.oh.us .
FEMA Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FIS) are available for most Ohio villages and cities and unincorporated areas in Ohio on the flood map link at the website: www.fema.gov/hazard/flood/index.shtm	Paper and digital copies of maps that are issued by FEMA. The maps show areas subject to flooding.
Groundwater Pollution Potential of Putnam County, 2006	Prepared using the DRASTIC system using existing data to rank areas with respect to relative vulnerability to contamination.
Groundwater Pollution Potential of Hancock County, 1994	Prepared using the DRASTIC system using existing data to rank areas with respect to relative vulnerability to contamination.
Groundwater Pollution Potential of Hancock County, 2005	Prepared using the DRASTIC system using existing data to rank areas with respect to relative vulnerability to contamination.
<p>Drinking Water Source Protection Plans:</p> <ul style="list-style-type: none"> • Village of Ada (Hardin Co.) • Village of Dunkirk (Hardin Co.) • Village of Arlington (Hancock Co.) • Village of Columbus Grove (Putnam Co.) 	List of Public Water Systems within watershed with Drinking Water Source Protection Plans endorsed by Ohio EPA (1/23/07).

SUMMARY AND OBSERVATIONS OF WATERSHED RESOURCE CONCERNS

- This watershed is predominantly flat with more than 83 percent of the land less than 2 percent slope.
- Seventy-seven percent of the watershed is cropland and 81 percent of the cropland is corn and soybeans.
- In an average year, 81 percent of the watershed is covered by corn and soybeans.
- From 1982 to 1997, urban land in the watershed increased by 175 percent.
- There are 1,235 miles of streams in the watershed. Half of these are first order streams (headwaters of watershed).
- Seven percent (34,854 acres) of the land within this watershed is within 120 feet of a stream.
- Approximately 60 percent of the watershed does not meet criteria for healthy aquatic life use according to an Ohio EPA water quality study of the Blanchard River Watershed in 2007. All subwatersheds in the watershed are classified as impaired by Ohio EPA. Impairments are:
 - Habitat Alteration
 - Siltation
 - Organic Enrichment
 - Low Oxygen
 - Nutrient Enrichment
 - Ammonia

These impairments are addressed/remedied by the following conservation practices:

- Conservation Tillage
 - Conservation Buffers
 - Nutrient Management
 - Waste Utilization
 - Conservation Cover
 - Tree Planting
 - Drainage Water Management
- 10.9 percent of this watershed is prime farmland without improvement and an additional 77 percent is prime when drained. The 6 counties partially in the watershed have combined gross agricultural receipts of \$399 million. Prorating the county receipts by the percent of area in the watershed gives total watershed receipts of \$101 million.
 - This watershed is 42.3 percent hydric soils.
 - 47.3 percent of the gross erosion in this watershed occurs on land on which the predominant hazard is classified as “wetness.”

- Conservation tillage (87 percent no-till and 13 percent mulch/ridge till) is practiced on 46 percent of the cultivated cropland in this watershed.
- This watershed ranks last in the percentage of conservation tillage practiced as compared to the seven other watersheds in the Western Lake Erie Basin Project Area.
- This watershed has an active and organized watershed group (Blanchard River Watershed Partnership). This watershed does not have an endorsed watershed action plan.
- This watershed has a significant acreage of soils subject to wind erosion (1 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.
- Ohio EPA has an active TMDL project in this watershed. The TMDL report is in preparation. The technical support document is available at <http://www.epa.state.oh.us/dsw/tmdl/BlanchardRiverTMDL.html>.
- Ground water and surface water are both important water sources in this watershed. Among large water withdrawalers, surface water predominated in 2005.
- Agriculture is a minor user of water in the watershed compared to other water uses.
- Flooding is a significant concern in the City of Findlay. In 1992, NRCS prepared a PL566 Watershed Plan and Environmental Assessment for the area within the City of Findlay. The study recommended a flood alert warning system. The study also recommended work on the channel within the City of Findlay. Plans were obtained and the necessary permits secured, but federal funding was never forthcoming and the City partially implemented the project on their own in 2007.
- An Ohio EPA water quality study of the Blanchard River Watershed in northwest Ohio found the following:
 - Approximately 40 percent of the watershed is meeting criteria for aquatic life use standards for warm water habitat streams. Sampling for the study was done in 2005 to document current conditions in the watershed and note areas with water quality problems. More than 100 miles of the Blanchard River and tributaries including Eagle Creek, Ottawa Creek, Cranberry Creek and Riley Creek were surveyed in Allen, Hancock, Hardin, Putnam, Seneca, and Wyandot Counties.
 - There has been major improvement downstream of the Findlay wastewater treatment plant. A new plant, completed in 2001, has significantly reduced ammonia concentrations from those sampled in 1989, and resulted in improved fish and macroinvertebrate populations.
 - Recent wastewater plant improvements in Bluffton have led to improved effluent quality, but the biological communities have not yet responded favorably.

- Much of the watershed is affected by physical alteration to habitat and hydrology that benefits row crop production, but impacts aquatic communities. Nutrients and bacteria related to agricultural practices, unsewered areas, and small wastewater treatment plants are causing impairments, particularly for recreational uses such as fishing and canoeing.
- Smaller wastewater treatment systems in communities such as Pandora, Forest, and Arlington and unsewered areas including, but not limited to, Mt. Blanchard, Patterson, and Miller City negatively impact streams. Combined sewer overflows from Findlay, Dunkirk, Pandora, and Bluffton impact streams after heavy storms. Lowhead dams in Riley Creek and the Blanchard River in Findlay create temperature and dissolved oxygen violations. Source: <http://www.epa.state.oh.us/pic/nr/2007/july/BlanchardRiver.html>.

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. Blanchard River 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. Blanchard River 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 5/14/07.
3. Blanchard River 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. Blanchard River Water Use Information
Source: Water Use by Subbasin, USGS 1995, 1995 being the last 5-year report containing water use by 8-digit subbasin http://oh.water.usgs.gov/water_use/95huc.html. Last visited on 5/14/07.
5. Blanchard River 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.
6. 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.